



MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A++' Accredited by NAAC

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CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from 2024-2025 Batch onwards)

Curriculum for B.Sc. Operation Theatre & Anesthesia Technology

Approved as per AC-51/2025, Dated 29/04/2025

Amended History

1. Approved as per AC-48/2023, [Resolution No. 6.2] Dated 12/12/2023.
2. Amended as per AC-48/2023, [Resolution No. 6.6] Dated 12/12/2023.
3. Approved as per AC-50/2024, [Resolution no. 3.1], [Resolution No. 3.10]; Dated 27/11/2024.
4. Amended as per AC-51/2025, [Resolution No. 3.3 (Annexure-5C)], [Resolution No. 3.24]; Dated 29/04/2025.

Resolution No. 3.3 of Academic Council (AC-51/2025):

Resolved to approve the Learning Objectives for all 08 undergraduate programs—B.Sc. Medical Laboratory Technology, B. Sc. Medical Radiology & Imaging Technology, **B.Sc. Operation Theatre & Anesthesia Technology**, B.Sc. Cardiac Care Technology , B.Sc. Perfusion Technology , B. Optometry , B.Sc. Medical Dialysis Technology , and B.Sc. Physician Assistant in Emergency & Trauma Care offered under MGMSBS . These Learning Objectives will be applicable to all existing and forthcoming batches from the Academic Year 2025-26 onwards [ANNEXURE-5A, 5B, **5C**, 5D, 5E, 5F, 5G & 5 H].



MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI
(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)

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Sector 1, Kamothe Navi Mumbai-410209, Tel.No.022-27437631, 27437632

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B.Sc. Operation Theater & Anesthesia Technology Learning Objectives

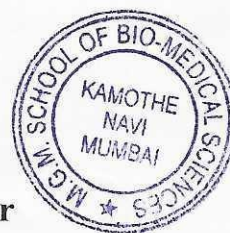
At the end of completion of Internship in 4th year student shall achieve following skills:


1. Support and work as a link between OT Sisters and Doctor in OT
2. Prepare the OT prior to surgery, including Anesthesia preparation and Surgical Preparation.
3. Trained in sterilization of OT and instruments
4. Assist the Anesthetist in delivering General Anesthesia and Regional Anesthesia
5. Assist in common Surgeries as second SOS first assistant in emergency.
6. Trained in performing basic nursing procedures like IV Catheterization, RT insertion, Nebulisation, Oxygen therapy, Injections.
7. Monitor the patient in pre-op and post-op room.
8. Do Cardio-pulmonary resuscitation.
9. Use a defibrillator correctly during Cardio-pulmonary resuscitation.
10. Use basic monitors, equipments and C-arm in OT.
11. Aware regarding maintenance of basic monitors, equipments and C-arm in OT including sterilization of endoscopes.
12. Maintain all OT records in a proper way.
13. Assist in Blood transfusion therapy.
14. Monitor the patient during Blood transfusion.
15. Check parameters as per check list before & after surgery.
16. Provide psychological support to the patient.
17. Counsel patients' relatives.
18. Manage common accidents and untoward incidences in OT
19. Manage the Arthroscopy unit and other endoscopes.

20. Perform different injection techniques commonly used in OT
21. Check availability of emergency drugs in emergency tray in the OT
22. Taking BP and Pulse of patients.
23. Verify IPD papers for Preoperative preparation NBM status and consent for surgical procedure.
24. Prepare dressing pads, swabs and packs
25. Packing drums for sterilization.
26. Observe patient during surgery and postoperative period.
27. Segregate of Biomedical waste.
28. Prepare of electric gadgets such as Laparoscope, cautery etc
29. Monitor Central suction, electric suction machines and foot suction machines.
30. Check whether OT lists are signed by authorities.
31. Monitor availability of anesthesia disposables such as ETT, Tracheostomy tray, airways, laryngoscopes with all blades, connectors, stylets, spinal and epidural tray, defibrillators, ventilators etc.
32. Check availability of IV anesthetics such as Thiopentone, propofol, ketamine. Muscle Relaxants such as suxamethonium, pancuronium, atracurium, vecuronium. Local anesthetics such as lignocaine, Bupivacaine etc.
33. Demonstrate color coding of various types of cylinders.
34. Monitor central oxygen system, manifolds, liquid oxygen, measurement of pressures in Oxygen cylinders.
35. Use fire extinguishers.
36. Demonstrate various positions of operation table and their indications.
37. Prepare inventories of various OT equipments, instruments, consumables and disposables including indents, opening and closing balances.
38. Their training shall be more focused on technical part than paper work.


HOD


Head Clinical Coordinator

Co-ordinator




Director
Director
MGM School of Biomedical Sciences
MGM Institute of Health Sciences
Kamathe, Navi Mumbai- 410 209, India

Annexure-46A of AC-48/2023



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CHOICE BASED CREDIT SYSTEM (CBCS)

(Academic Year 2024 - 25)

Curriculum for

B.Sc. Allied Health Sciences

B.Sc. Operation Theater & Anesthesia Technology

Resolution No. 6.2 of Academic Council (AC-48/2023):

Resolved to approve the syllabus realigning the curriculum notational hours, credit as per NEP-2020 and NCeF, for Semester I & II of B.Sc. AT & OT, B.Sc. CCT, B.Sc. MDT, B.Sc. PT, B.Sc. MLT, B.Sc. MRIT, B. Optometry & B.Sc. PA [Annexure-46A, 46B, 46C, 46D, 46E, 46F, 46G & 46H].

OUTLINE OF COURSE CURRICULUM														
B.Sc. Operation Theatre and Anaesthesia Technology														
Semester I														
Code No.	Core Course	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total (hrs.)	Internal Asseme nt (IA)	Semester End Exam (SEE)	Total
Theory														
BATOT 101 L	Human Anatomy Part I	2	-	-	-	2	30	-	-	-	30	10	40	50
BATOT 102 L	Human Physiology Part I	2	-	-	-	2	30	-	-	-	30	10	40	50
BATOT 103 L	General Biochemistry & Nutrition	3	-	-	-	3	45	-	-	-	45	10	40	50
BATOT 104 L	Introduction to National Health Care System	2	-	-	-	2	30	-	-	-	30	10	40	50
Practical														
BATOT 101 P	Human Anatomy Part I	-	-	1	-	-	-	-	15	-	15	-	-	-
BATOT 102 P	Human Physiology Part I	-	-	1	-	-	-	-	15	-	15	-	-	-
BATOT 103 P	General Biochemistry Nutrition	-	-	1	-	-	-	-	15	-	15	-	-	-
BATOT 105 P	Community Engagement & Clinical Visit (Including related practicals to the Parent course)	-	-	-	24	8	-	-	-	360	360	-	50	50
Ability Enhancement Course														
AEC 001 L	English & Communication skills	4	-	-	-	4	60	-	-	-	60	10	40	50
AEC 002 L	Envioronmental Sciences	4	-	-	-	4	60	-	-	-	60	10	40	50
Total		17	0	3	24	25	255	0	45	360	660	60	290	350

OUTLINE OF COURSE CURRICULUM														
B.Sc. Operation Theatre and Anaesthesia Technology														
Semester II														
Code No.	Core Course	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total
Theory														
BATOT 106 L	Human Anatomy Part II	2	-	-	-	2	30	-	-	-	30	10	40	50
BATOT 107 L	Human Physiology Part II	2	-	-	-	2	30	-	-	-	30	10	40	50
BATOT 108 L	General Microbiology	3	-	-	-	3	45	-	-	-	45	10	40	50
BATOT 109 L	Basic Pathology & Hematology	4	-	-	-	4	60	-	-	-	60	10	40	50
BATOT 110 L	Introduction to Quality and Patient safety (Multidisciplinary/Interdisciplinary)	3	-	-	-	3	45	-	-	-	45	10	40	50
Practical														
BATOT 106 P	Human Anatomy Part II	-	-	1	-	-	-	-	15	-	15	-	-	-
BATOT 107 P	Human Physiology Part II	-	-	1	-	-	-	-	15	-	15	-	-	-
BATOT 108 P	General Microbiology	-	-	1	-	-	-	-	15	-	15	-	-	-
BATOT 109 P	Basic Pathology & Hematology	-	-	1	-	-	-	-	15	-	15	-	-	-
BATOT 111 P	Community Engagement & Clinical Visit (Including related practicals to the Parent course)	-	-	-	24	8	-	-	-	360	360	-	50	50
Skill Enhancement Elective Course														
SEC 001 L	Medical Bioethics & IPR	3	-	-	-	3	45	-	-	-	45	10	40	50
SEC 002 L	Human Rights & Professional Values													
Total		17	0	4	24	25	255	0	60	360	675	60	290	350

FIRST YEAR

B.Sc. Operation Theater & Anesthesia Technology SEMESTER-I

Code No.	Core Subjects
Theory	
BATOT101L	Human Anatomy Part I
BATOT 102 L	Human Physiology Part I
BATOT103 L	General Biochemistry & Nutrition
BATOT 104 L	Introduction to National HealthCare System (Multidisciplinary/ Interdisciplinary)
Practical	
BATOT 101 P	Human Anatomy Part I
BATOT 102 P	Human Physiology Part I
BATOT103 P	General Biochemistry
BATOT 105 P	Community Engagement & Clinical Visit (Including related practicals to the Parent course)
Ability Enhancement Course	
AEC 001 L	English & Communication Skills
AEC 002 L	Environmental Sciences

Name of the Programme	B.Sc. Operation Theater & Anesthesia Technology
Name of the Course	Human Anatomy- Part I
Course Code	BATOT101 L

Teaching Objective	<ul style="list-style-type: none"> To introduce the students to the concepts related to General anatomy, Muscular, Respiratory, Circulatory, Digestive and Excretory system
Learning Outcomes	<ul style="list-style-type: none"> Comprehend and describe the normal disposition, inter -relationships, gross, functional and applied anatomy of various structures in the human body. Describe the basic anatomy of Respiratory and Circulatory system Describe the basic anatomy of Digestive and Excretory system

Sr. No.	Topic	Learning objectives	Subtopic	No. of Hours
1	Introduction to anatomy	<ul style="list-style-type: none"> To specify the various terms of anatomy To define cell To describe Cell Division To define tissue and enumerate its types To enumerate layers of skin and function 	Definition and various terms of anatomy Define cell with diagram, Cell Division – Definition and steps of mitosis and meiosis Tissue and enumerate the types of tissues with location and function Skin - Layers and function of skin	3
2	Skeletal System	<ul style="list-style-type: none"> To define bone and classify To list the names and number of bones in skeleton To define joint To classify joints To describe synovial joint To describe Shoulder, Hip & Knee joint 	Bone – Definition, functions, classification by - shape, region, development and structure List the names and number of bones in appendicular and axial skeleton Appendicular skeleton I - Bones of upper Limb, Appendicular skeleton II - Bones of lower limb Axial skeleton I -skull	6

			<p>mandible, Axial skeleton II- vertebrae sacrum and pelvis</p> <p>Joint-Definition of joint with structural classification and examples</p> <p>Definition and features of Synovial Jointclassification of Synovial Joint with examples</p> <p>Shoulder, Hip, Knee joint – for each joint type, bones forming joint, list of ligaments, Movements and muscle groups producing movements at these joints, applied anatomy</p>	
3	Muscular System	<ul style="list-style-type: none"> • To define muscle • To classify muscles • To enumerate the muscles of upper limb • To describe deltoid and biceps brachii • To enumerate the muscles of lower limb, mastication & abdomen • To describe Gluteus maximus, hamstrings, sternocleidomastoid & trapezius 	<p>Define Muscle and describe the types with features</p> <p>Enumerate the muscles of upper limb – group wise Describe deltoid and biceps brachii in detail</p> <p>Enumerate the muscles of lower limb – group wise Describe Gluteus maximus and hamstrings in detail Describe sternocleidomastoid in detail Enumerate the muscles of mastication Back - Describe trapezius in detail Enumerate the Muscles of abdomen</p>	5
4	Respiratory System	<ul style="list-style-type: none"> • To specify parts of respiratory System • To describe Larynx • To enumerate list of bones and cartilages of Thoracic cage, • To enumerate the movements. 	<p>Respiratory System - Introduction to Respiratory system and Parts Larynx-List of cartilages with type, Describe interior, nerve supply (names), function & applied anatomy</p> <p>Thoracic cage - list of bones and cartilages forming cage, enumerate</p>	4

		<ul style="list-style-type: none"> To describe diaphragm To describe Lung To list layers of pleura To describe Trachea & bronchopulmonary segments To define Mediastinum To list boundaries&divisions 	<p>the movements.</p> <p>Diaphragm- Describe origin, insertion, major openings, movements and applied anatomy</p> <p>Lung- external features, mediastinal surface, applied anatomy</p> <p>Pleura- name the layers</p> <p>Trachea- external features and function</p> <p>Bronchopulmonary segments- definition, list the segments, features of segments, applied anatomy</p> <p>Mediastinum- definition, boundaries, divisions</p>	
5	Circulatory System	<ul style="list-style-type: none"> To classify blood vessels To describe Heart To list layers of Pericardium To describe Coronary Circulation To enumerate Blood vessels of Thorax 	<p>Types of blood vessels- classification with example</p> <p>Heart- external& internal features</p> <p>Pericardium- layers</p> <p>Coronary Circulation- name vessels, for each vessel origin and distribution, list veins of the heart, applied anatomy</p> <p>Blood vessels of Thorax- list of vessels, branches of arch of aorta</p>	4
6	Digestive System	<ul style="list-style-type: none"> To describe Pharynx, Oesophagus, Stomach To enumerate Parts, functions and differences of Small and Large Intestine To describe liver, Spleen, Pancreas To enumerate salivary glands and their functions 	<p>Pharynx - Extent, parts, list internal features, list of muscles and nerve supply of pharynx</p> <p>Oesophagus- extent, function, applied anatomy</p> <p>Stomach -Gross anatomy, shape, capacity, location, parts, blood supply (Names of vessels), lymphatic drainage (Names of groups of nodes), relation, functions, applied anatomy</p> <p>Small and Large Intestine – Parts, function and differences</p> <p>Liver -External features,</p>	6

			location, functions, applied anatomy	
			Spleen -External features, location, functions, applied anatomy	
			Pancreas - External features, location, ducts, functions, applied anatomy	
			Salivary glands -Enumerate salivary gland and functions	
7	Excretory System	<ul style="list-style-type: none">To describe Kidney and Urinary Bladder	Kidney - External features, blood supply (Names of vessels) and function, applied anatomy	2
			Urinary Bladder - External features, capacity, list of ligaments and location, blood supply (Names of vessels), applied anatomy	
			Urethra - male and female urethra difference	
Total				30 hrs

BATOT101 P - Human Anatomy Part I- (Demonstration)

Sr No.	Topic	Learning objectives	Subtopic	No. of Hours
1	Introduction to anatomy	<ul style="list-style-type: none">To understand Terminology of anatomy	Terminology	1
2	Skeletal System	<ul style="list-style-type: none">To identify types of Bones, Joints,To understand Shoulder, Hip, Knee joint – movements	Bone- Classification of bones Joint- classification and examples Shoulder, Hip, Knee joint – movements at these joints	1
3	Muscular System	<ul style="list-style-type: none">To identify Muscles of upper limb, lower limb, Sternocleidomastoid, muscles of Mastication, Trapezius	Muscles of upper limb Muscles of lower limb Neck – Sternocleidomastoid muscles of Mastication Muscles of back - Trapezius	3
4	Respiratory System	<ul style="list-style-type: none">To identify features of LarynxTo identify bones and cartilages of Thoracic cageTo identify Lung external features	Larynx- cartilages, interior	1
			Thoracic cage- bones and cartilages	
			Lung- external features, mediastinal surface,	1
			Trachea- external features	
			Mediastinum- definition, boundaries, divisions	
5	Circulatory System	<ul style="list-style-type: none">To identify external & internal features of Heart	Heart- external& internal features	1
			Right and left Coronary artery	
			Blood vessels of Thorax- list of vessels, branches of arch of aorta	
6	Digestive System	<ul style="list-style-type: none">To identify features of Pharynx,Stomach, Small and Large Intestine, Liver, Spleen & pancreas	Pharynx - parts, internal features	5
			Oesophagus- extent,	
			Stomach- Gross anatomy, shape, parts, interior	
			Small and Large Intestine – Parts, features	
			Liver- External features	
			Spleen- External features	
			Pancreas- External features	
7	Excretory System	<ul style="list-style-type: none">To identify featuresof kidney & urinary bladder	Kidney – External and internal features	2
			Urinary Bladder- External and internal features	
Total				15 hrs

Text Books :

1. Manipal Manual of Anatomy for Allied Health Sciences courses: Madhyastha S.
2. G.J. Tortora&N.P.Anagnostakos: Principles of Anatomy and Physiology
3. B.D. Chaurasia: Handbook of General Anatomy

Reference books:

1. B.D. Chaurasia :
 - Volume I-Upper limb & Thorax,
 - Volume II- Lower limb, Abdomen & Pelvis
 - Volume III- Head, Neck, Face
 - Volume IV- Brain-Neuroanatomy
2. Vishram Singh:
 - Textbook of Anatomy Upper limb & Thorax
 - Textbook of Anatomy Abdomen & Lower limb
 - Textbook of Head neck and Brain
3. Students Gray's Anatomy - Descriptive and Applied, 36th Ed; Churchill Livingstone.

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	Human Physiology Part I
Course Code	BATOT102 L

Teaching objective	To teach basic physiological concepts related to: General physiology, Hematology, Cardiovascular, Digestive, Respiratory physiology, Nerve-Muscle physiology
Learning outcomes	At the end of the semester, the student shall be able to <ul style="list-style-type: none"> To demonstrate knowledge of Homeostasis, transport mechanism, composition & functions of blood and blood components, blood groups coagulation process, Immunity To demonstrate knowledge of basics of functioning of heart, Cardiac cycle, normal count & Variation in heart rate, cardiac output, Blood pressure. Normal ECG To demonstrate knowledge of Composition and functions of all Digestive juices, Movements of gut, Digestion & Absorption of food To demonstrate knowledge of Mechanism of respiration, Transport of Respiratory Gases-O₂ & CO₂, respiratory centers and their function To demonstrate knowledge of Structure & types of neuron, muscles, , Neuromuscular junction& Transmission

Sr. No.	Topics	Learning Objectives	No. of Hours
1	General Physiology- a. Introduction to physiology, b. Homeostasis-Definition , Positive & negative feedback mechanism c. Transport Across cell membrane- Types, diffusion, osmosis, active transport	At the end of the session, the student shall be able to <ul style="list-style-type: none"> Define physiology and its significance Define Homeostasis, Define& describe Positive & negative feedback mechanism with examples, classify transport mechanism, Explain diffusion, osmosis, active transport 	2
2	Blood – a. Composition and functions of Blood, b.RBC-structure, Normal count, and Physiological variation of the RBC, stages of erythropoiesis, factors required for erythropoiesis c.Hb Concentrations- normal value & variation , function d. Anemia: Causes, effects on body	At the end of the session, the student shall be able to <ul style="list-style-type: none"> Describe composition & functions of blood Describe structure &function RBC, Normal count, and Physiological variation of the RBC, Enumerate stages of 	8

	<p>e. WBC- Types and functions, Normal count, and Physiological variation,</p> <p>f. Blood Groups - ABO and RH grouping,</p> <p>g. Platelet - Normal count, and Physiological variation and functions</p> <p>h. Coagulations - & Anticoagulants,</p> <p>i. Immunity – definition & types,</p> <p>j. Body Fluid: Compartments, Composition,</p>	<p>Erythropoiesis, & factors required for Erythropoiesis</p> <ul style="list-style-type: none"> • Mention normal value & variation & function of hemoglobin • Define Anemia, enumerate its causes, mention its effects on body • Classify WBC, mention Normal count, and Physiological variation, • Describe structure & function each WBC, • Enumerate functions of platelets & variation in platelets count • Explain ABO & Rh blood groups and their importance • Describe coagulation process and enumerate invivo and invitro Anticoagulants • Define & classify immunity • Classify body fluid compartments & mention their composition 	
3	<p>Cardio vascular system -</p> <p>a. general organization, functions & importance of CVS ,</p> <p>b. Structure of heart, properties of cardiac muscle,</p> <p>c. Origin & spread of Cardiac Impulse, cardiac pacemaker,</p> <p>d. Cardiac cycle – arterial & ventricular Events ,heart sounds- normal heart sounds, causes</p> <p>e. E C G-Normal waves & significance, Uses of ECG</p> <p>f. Heart Rate- normal count & Variation. factors affecting</p> <p>g. Cardiac output _ normal values ,factors affecting</p> <p>h. Blood Pressure definition & normal values, Physiological needs & variation,</p> <p>g. concept of CVS regulatory mechanisms</p>	<p>At the end of the session, the student shall be able to</p> <ul style="list-style-type: none"> • Describe general organization, functions importance of CVS , • Describe Structure of heart & Enumerate properties of cardiac muscle, • Describe Origin & spread of Cardiac Impulse& mention cardiac pacemaker, • Describe arterial & ventricular events in Cardiac cycle • Enumerate normal heart sounds & its causes • Draw & Identify Normal E C G waves & Mention their significance, • Enumerate uses of ECG , • Mention normal Heart Rate & define Tachycardia ,Bradycardia • Enumerate factors affecting HR 	8

		<ul style="list-style-type: none"> Define Cardiac output ,mention normal value Enumerate factors affecting CO Define Blood Pressure ,mention normal BP values & variation, Classify regulatory mechanisms, Enumerate function of VMC Enumerate effects of sympathetic and parasympathetic stimulation on heart, HR,CO,BP 	
4	Digestive system – a. organization of Digestive system, b. Composition and functions of all Digestive juices- Saliva, gastric juice , Pancreatic juice, Bile, Intestinal juice, c. Deglutition-Stages, Peristalsis d. Digestion & Absorption of Carbohydrate, Proteins & Fats in short	At the end of the session, the student shall be able to <ul style="list-style-type: none"> Describe organization of Digestive system, Enumerate Composition and functions of Saliva, gastric juice , Pancreatic juice, Bile, Intestinal juice, Enumerate Stages of Deglutition describe Peristalsis Describe Digestion & Absorption of Carbohydrate, Proteins & Fats in short 	4
5	Respiratory System – a. Physiologic anatomy, functions of respiratory system, b. Mechanism of respiration-Inspiration& Expiration, Muscles of Respiration c. Lung Volumes & capacities-Definition & normal values d. Transport of Respiratory Gases-O ₂ & CO ₂ - pressure gradient, forms of transport e. Regulation of Respiration- respiratory centers and their function	At the end of the session, the student shall be able to <ul style="list-style-type: none"> Mention parts of and functions of respiratory system, Describe Mechanism of Inspiration& Expiration, Enumerate Muscles of Respiration Define Lung Volumes & capacities & mention their normal values Describe Transport of O₂ by blood, Draw a labeled oxygen –Hb dissociation curve. Enumerate factors shifting the curve to left and right Describe various forms in which CO₂ transported 	5

		<ul style="list-style-type: none"> Enumerate respiratory centers and their function 	
6	Muscle nerve physiology – a. Structure of neuron & types, b. Types of muscles, c. Structure of skeletal Muscle, Sarcomere, Neuromuscular junction & Transmission.	At the end of the session, the student shall be able to <ul style="list-style-type: none"> Draw a labeled Structure of neuron Classify neurons Classify muscles, Draw a labeled Structure of Sarcomere, Draw a labeled Structure Neuromuscular junction Describe the steps in Neuromuscular Transmission. 	3
Total			30hrs

BATOT102 P - Human Physiology Part I (Demonstration)

Sr.No.	Topics	No.of Hrs.
1	Study of Microscope and its use, Collection of Blood and study of Haemocytometer	15
2	Haemoglobinometry	
3	White Blood Cell count	
4	Red Blood Cell count	
5	Determination of Blood Groups	
6	Leishman's staining and Differential WBC Count	
7	Determination of Bleeding Time, Determination of Clotting Time	
8	Pulse & Blood Pressure Recording, Auscultation for Heart Sounds	
9	Artificial Respiration – Demonstration, Spirometry – Demonstration	
Total		15hrs

Textbooks:

1. Basics of medical Physiology – D Venkatesh and H. H. Sudhakar, 3rd edition.
2. Principles of Physiology – Devasis Pramanik, 5th edition.
3. Human Physiology for BDS – Dr A. K. Jain, 5th edition.

Reference books:

1. Textbook of Medical Physiology, Guyton, 2nd South Asia Edition.
2. Textbook of Physiology Volume I & II (for MBBS) – Dr. A. K. Jain

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	General Biochemistry & Nutrition
Course Code	BATOT 103 L

Teaching Objective	<p>At the end of the course, the student demonstrates his knowledge and understanding on:</p> <ul style="list-style-type: none"> • Structure, function and interrelationship of biomolecules and consequences of deviation from normal. • Action mechanism and importance of enzymes and isoenzymes in biological system. • Generation of Energy at cellular level. • Understand aspects of Nutrition and it's deficiencies. • Clinical significance of vitamins and minerals in health and diseases. • Universal Safety precautions in health care.
Learning Outcomes	<ul style="list-style-type: none"> • Define "biochemistry". • Classify carbohydrates and give their biological significance. • Classify proteins and give their biological significance. • Classify lipids and give their biological significance. • Describe structure, types and functions of DNA and RNA. • Explain the types and mechanism of enzyme (biochemical catalysts) action. Understand the diagnostic importance of enzymes and isoenzymes. • Explain the ultimate generation of large quantities of ATP from the fate of various biomolecules. • Explain the functions and clinical importance of vitamins and minerals. • Describe the structure, types and functions of DNA and RNA. • Explain the functions and clinical importance of vitamins and minerals. • Basic Knowledge of clinical laboratory samples, First-Aid and universal safety precautions. • Describe the importance of balanced diet, nutrition and its related deficiencies.

Sr. No.	Topics	No. of Hrs.
1	Introduction and scope of biochemistry	1
2	1) Chemistry of Carbohydrates: <ul style="list-style-type: none"> Definition and classification of carbohydrates with examples (Definition and Functions of Monosaccharides, Disaccharides and Polysaccharides) 	3
	2) Chemistry of Proteins: <ul style="list-style-type: none"> Amino acids (total number of amino acids, essential and non essential amino acids) Definition and Classification of Proteins Structural organization of proteins Denaturation of Proteins. 	3
	3) Chemistry of Lipids: <ul style="list-style-type: none"> Definition, functions, Classification of Lipids (Simple, Compound and Derived Lipids) Essential Fatty Acids. 	2
	4) Chemistry of Nucleic acid: <ul style="list-style-type: none"> Nucleosides and Nucleotides Watson and Crick model of DNA RNA- it's type along with functions 	2
3	Elementary knowledge of enzymes – <ul style="list-style-type: none"> Classification of enzymes Mechanism of enzyme action Factors affecting enzyme activity Diagnostic importance of enzymes and isoenzymes. 	7
4	Biological oxidation <ul style="list-style-type: none"> Outline of Electron transport chain. Definition of Oxidative phosphorylation. 	3
5	Vitamins and Minerals <ul style="list-style-type: none"> RDA, Sources, functions and deficiency manifestations of Fat soluble vitamins. RDA, Sources, functions and deficiency manifestations of Water soluble vitamins. RDA, Sources, functions and deficiency manifestations of Calcium, Phosphorous, Iron, Iodine. 	12
6	Pre examination Skills – <ul style="list-style-type: none"> Collection, preservation and transport of blood and urine samples Anticoagulants used in Biochemistry Disposal of biological Waste materials used in Biochemical laboratory Universal precautions and Safety measures First-Aid 	6
7	Nutrition: <ul style="list-style-type: none"> Specific Dynamic Action BMR and its significance Balanced Diet Protein Energy Malnutrition (Kwashiorkor and Marasmus) Nitrogen Balance Glycemic Index 	6
Total		45 hrs

BATOT 103 P – General Biochemistry (Demonstration)

Sr. No.	Topics	No. of Hrs
1	Introduction to Personnel protective equipments used in laboratory and their importance (LCD)	15
2	Principle and applications of colorimeter (LCD)	
3	Demonstration of tests for carbohydrates (Monosaccharides, disaccharides and polysaccharides)	
4	Test on bile salts and bile pigments (only demonstration)	
5	Tests on Normal constituents of Urine (only demo) <ul style="list-style-type: none"> • Urea • Creatinine • Uric acid • Ammonia 	
6	Tests on Abnormal constituents of Urine (only demo) <ul style="list-style-type: none"> • Sugar • Protein • Blood • Ketone bodies 	
Total		15 hrs

Textbooks:

1. Essentials of Biochemistry, 2nd Edition, Dr. Pankaj Naik
2. Textbook of Medical Laboratory Technology, Volume 1, 3rd Edition by Praful Ghodkar
3. Textbook of Medical Laboratory Technology, Volume 2, 3rd Edition by Praful Ghodkar
4. Essentials of Biochemistry, Third Edition, Dr. (Prof) Satyanarayana.

Reference books:

1. Textbook of Biochemistry for Medical Student, 6th Edition, DM Vasudevan
2. Principles and Techniques of Biochemistry and Molecular Biology, 5th Edition, Wilson & Walker

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	Introduction to National Health Care System (Multidisciplinary/Interdisciplinary)
Course Code	BATOT 104 L

Teaching Objective	<ul style="list-style-type: none"> To teach the measures of the health services and high-quality health care To understand whether the health care delivery system is providing high-quality health care and whether quality is changing over time. To provide to National Health Programme- Background objectives, action plan, targets, operations, in various National Health Programme. To introduce the AYUSH System of medicines.
Learning Outcomes	<ul style="list-style-type: none"> The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world.

Sr. No	Topic Name	Learning objectives	Topics	Hrs
1	Introduction to healthcare delivery system	The student should be aware about healthcare delivery system in India and should be able to describe the healthcare delivery system functioning at various levels	<ul style="list-style-type: none"> Healthcare delivery system in India Three tier healthcare delivery system in India Village level health workers (ASHA, AWW) Working and functions of Sub centre, PHC, CHC Role of Medical Officer, Health worker male/female Role of Health assistant-male/female National Health mission-key points and salient features Health system in developed nations-UK, Canada, USA, developing countries general idea Issues in healthcare delivery system in India 	6
2	Introduction to AYUSH system of medicine	The students should have a general idea about AYUSH system of medicine and should be able to describe the rationale behind need for integration of various system of medicine	<ul style="list-style-type: none"> Describe following: Ayurveda, Homeopathy, Unani, Siddha Naturopathy and Yoga under following head- a) Principle b) Characteristic features c) Merits 	2

			d) Demerits <ul style="list-style-type: none"> Need for integration of various systems of medicine 	
3	Health scenario of India	Students should be able to link and give an overview of the evolution of Health scenario of India-past, present and future	The evolution of health scenario in India from various Health planning committees (only overview with emphasis on Bhorecommittee) to recent national Health Policy to Sustainable development goals.	2
4	Demography and vital statistics	Student should be <ul style="list-style-type: none"> able to describe concept of demography, able to enumerate demographic indicators aware of various sources of epidemiological data Understand the relationship between demography and its effect on public health 	<ul style="list-style-type: none"> Definition of Demography Demography cycle Demographic indicators Population pyramids Dependency Ratio Indicators of Fertility(enumeration) Sex Ratio Population explosion Factors Responsible for High Fertility in India Population Census Vital statistics and its Registration Registration of Birth and Deaths Act National Family Health Survey(overview) 	5
5	Epidemiology- General principles	<ul style="list-style-type: none"> Define epidemiology, describe its concept, principles and uses Enumerate, define and discuss epidemiological study methods Define, calculate and interpret epidemiological data 	<ul style="list-style-type: none"> Define epidemiology Concept of epidemiology Uses of epidemiology Basic measurements in epidemiology Types of epidemiological studies Concept of Screening Monitoring and surveillance(overview) 	5
6	Epidemiology of Communicable diseases with Infectious Disease epidemiology	Student should know epidemiology of disease, lab diagnosis, prevention and control measures	<ul style="list-style-type: none"> Natural history of disease Iceberg phenomenon Carriers Modes of transmission IP and GT Secondary Attack Rate Basic concepts in Immunization including UIP Cold Chain Disinfection Notification of Disease <p>Epidemiology of</p> <ol style="list-style-type: none"> Measles HIV TB Covid19 Polio Acute diarrhoeal diseases Acute Respiratory diseases Vector borne diseases (Malaria, dengue) 	5

			9. Typhoid 10. Hepatitis	
	Epidemiology of non-communicable diseases	Student should know epidemiology of disease, lab diagnosis, prevention and control measures	<ul style="list-style-type: none"> • Cancer • Blindness • Cardiovascular disease • DM • HTN • Accidents and Injuries 	2
8.	National Health Programmes	Student should be aware about various National programmes running in the country and should be able to give a basic idea about them	Heads to be focussed under National Health Programme: <ol style="list-style-type: none"> 1. Introduction 2. Goals/targets/objectives 3. Initiatives taken/Services provided under the programme, broadly. <ul style="list-style-type: none"> • ICDS • RMNCH+A • NVBDCP • NBCP • NACP • NTEP • NPCDCS • Ayushman Bharat 	3
Total				30 hrs

Books:

1. National Health Programs Of India National Policies and Legislations Related to Health: 1 J. Kishore (Author)
2. A Dictionary of Public Health Paperback by J Kishor
3. Health System in India: Crisis & Alternatives , National Coordination Committee, Jan Swasthya Abhiyan
4. In search In Search of the Perfect Health System
5. Central Bureau of Health Intelligence (1998). Health Information of India, Ministry of Health and Family Welfare, New Delhi.
6. Goyal R. C. (1993). Handbook of Hospital Personal Management, Prentice Hall of India, New Delhi, 17–41. Ministry of Health and Family Welfare (1984). National Health Policy, Annual Report (1983–4), Government of India, New Delhi
7. Historical Development of Health Care in India, Dr. Syed Amin Tabish,
8. cultural Competence in Health Care by Wen-Shing Tseng (Author), Jon Streltzer (Author)
9. Do We Care: India's Health System by K. Sujatha Rao (Author)

BATOT105 P - Community Engagement & Clinical Visit (Including related practicals to the Parent course) (Total -360 hrs)

ABILITY ENHANCEMENT COURSE

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	English and Communication Skills
Course Code	AEC 001 L

Teaching Objective	<ul style="list-style-type: none"> This course deals with essential functional English aspects of the of communication skills essential for the health care professionals. To train the students in oral presentations, expository writing, logical organization and Structural support.
Learning Outcomes	<ul style="list-style-type: none"> Able to express better. Grow personally and professionally and Develop confidence in every field

Sr. No.	Topics	No. of Hrs.
1	Basics of Grammar - Vocabulary, Synonyms, Antonyms, Prefix and Suffix, Homonyms, Analogies and Portmanteau words	10
2	Basics of Grammar – Part II - Active, Passive, Direct and Indirect speech, Prepositions, Conjunctions and Euphemisms	10
3	Writing Skills - Letter Writing, Email, Essay, Articles, Memos, one word substitutes, note making and Comprehension	5
4	Writing and Reading, Summary writing, Creative writing, news paper reading	5
5	Practical Exercise, Formal speech, Phonetics, semantics and pronunciation	5
6	Introduction to communication skills - Communication process, Elements of communication, Barriers of communication and how to overcome them, Nuances for communicating with patients and their attenders in hospitals	6
7	Speaking - Importance of speaking efficiently, Voice culture, Preparation of speech. Secrets of good delivery, Audience psychology, handling , Presentation skills, Individual feedback for each student, Conference/Interview technique	5
8	Listening - Importance of listening , Self assessment, Action plan execution, Barriers in listening, Good and persuasive listening	5
9	Reading - What is efficient and fast reading , Awareness of existing reading habits, Tested techniques for improving speed, Improving concentration and comprehension through systematic study	5
10	Non Verbal Communication - Basics of non-verbal communication, Rapport building skills using neuro- linguistic programming (NLP), Communication in Optometry practice	4
Total		60 hrs

Text books:

1. Graham Lock, Functional English Grammar: Introduction to second Language Teachers. Cambridge University Press, New York, 1996.
2. Gwen Van Servellen. Communication for Health care professionals: Concepts, practice and evidence, Jones & Bartlett Publications, USA, 2009

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	Environmental Sciences
Course Code	AEC 002 L

Teaching Objective	<ul style="list-style-type: none"> To understand and define terminology commonly used in environmental science To teach students to list common and adverse human impacts on biotic communities, soil, water, and air Quality. To understand the processes that govern the interactions of organisms with the biotic and abiotic. Understand the relationship between people and the environment; Differentiate between key ecological terms and concepts
Learning Outcomes	<ul style="list-style-type: none"> Current environmental issues and highlight the importance of adopting an interdisciplinary approach. Sample an ecosystem to determine population density and distribution. Create food webs and analyse possible disruption of feeding relationships.

Sr. No.	Topics	No. of Hrs.
1	Concept Of Environment, Land : A Natural Resource, Natural Resource : Forest, The Story Of Water, Treasure Of Earth	2
2	Global Food Position : Challenges And Solutions, Renewable Energy Resources : Energy And Environment, Energy & Environment, Part-1, Dams : Boon Or Curse, Fresh Water Ecology, Reservoir Ecosystem, Part-1	8
3	Reservoir Ecosystem, Part-2, The Concept Of Ecosystem, Energy Flow In Ecosystem, Eco-Friendly Agriculture, Desert Ecosystem, Forest Ecosystem, Ecological Succession, Food Webs & Ecological Pyramids, Grass Land Ecosystem	6
4	Bio-Geographical Classification Of India, Natural Dye, Biodiversity : An Introduction ,Biodiversity And Its Conservation, Biodiversity At Global National And Local-Level,Threats To Biodiversity, Value Of Biodiversity, Endangered Common Plant And Animal Species	8
5	India As - A Megadiversity Nation, Types Of Noise Pollution, Air Pollution, Soil Pollution, Effects Of Noise Pollution, Role Of An Individual In Prevention Of Pollution, Land Slides	8
6	Cyclone, Flood, Earth Quakes And Disaster Management, The Changing Nature Of Earth	4
7	Basics Of Municipal Solid Waste, Management Of Municipal Solid Waste, Agony Of Seas, The Price Of Panacea - Biomedical Waste, Effects And Controls Of Water Pollution	4
8	Nuclear Hazards, Industries & Waste, Dealing With Industrial Waste, Environmental Rights, Environmental Threats, Public Environmental Awareness, Ethics Of Environmental Education, Environmental Values	4

9	Indian Legislative Steps To Protect Our, Nvironment, Water Management Practices, Sustainable Development, Urban Problems Related To Energy, Resettlement And Rehabilitation	4
10	Environment And Climate Change, Sex Ratio, Population Explosion, Impact Of Human Population On Environment, Infectious Diseases And Waterborne Diseases	2
11	Hiv/Aids, Cancer & The Environment, Environment And Human Health, Chemicals In Food, Typha : A Bio-Remedial Plant, Castor Bean, Pinus	5
12	Malaria, Machla : A Serene Village, The Secret Of Taste – Chilli, Common Avenue – Trees, Common Village Trees, Flower - The Beautiful Gift Of Nature, Silk Cotton Tree : Kapok, Cotton Yarn	5
Total		60 hrs

Books:

1-Bharucha, Erach (2005):"Text Book of Enviromental Studies for Undergraduate Courses", Universities Press (India) pvt ltd, Hyderabad, India.

2-IGNOU – 1991 – AHE-1/5 – Human Environment Management of Environment - Indira Gandhi open university, New Delhi

3-IGNOU 1995 – FST-1/4 Foundation course in Science and Technology “Environment and Resource” - Indira Gandhi open university, New Delhi

4-Kothari Dr. Milind – 2005 – Environmental Education – Universal Publication, Agra.

FIRST YEAR

B.Sc. Operation Theatre and Anaesthesia Technology

SEMESTER- II

Code No.	Core Subjects
Theory	
BATOT106 L	Human Anatomy Part II
BATOT107 L	Human Physiology Part II
BATOT108 L	General Microbiology
BATOT109 L	Basic Pathology & Hematology
BATOT110 L	Introduction to Quality and Patient safety
	(Multidisciplinary/Interdisciplinary)
Practical	
BATOT106 P	Human Anatomy Part II
BATOT107 P	Human Physiology Part II
BATOT108 P	General Microbiology
BATOT109 P	Basic Pathology & Hematology
BATOT111 P	Community Engagement & Clinical Visit (Including related practicals to the Parent course)
Skill Enhancement Elective Course	
SEC 001 L	Medical Bioethics & IPR
SEC 002 L	Human Rights & Professional Values

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	Human Anatomy- Part II
Course Code	BATOT106 L

Teaching Objective	To teach students the basic anatomy of Reproductive, Lymphatic, Endocrine, Nervous systems and special senses
Learning Outcomes	<ul style="list-style-type: none"> Describe the basic anatomy of Reproductive system. Describe the basic anatomy of Lymphatic system. Describe the basic anatomy of Endocrine system Describe the basic anatomy of Nervous system Describe the basic anatomy of Special senses

Sr. No.	Topics	Learning Objectives	Subtopics	No. of Hrs.
1	Reproductive system	<ul style="list-style-type: none"> To describe testis To list parts of epididymis To list of coverings and contents of spermatic cord To describe ovaries, Fallopian Tube & Uterus To classify supports of uterus with examples 	Testis - coverings, features (external & internal), blood supply (Names of vessels), lymphatic drainage (Names of groups of nodes) & any 2 applied aspects	6
			Epididymis – parts	
			Spermatic cord – List of coverings and contents	
			Ovaries – Position, features (external), ligaments, blood supply (Names of vessels), lymphatic drainage (Names of groups of nodes) & applied anatomy	
			Fallopian Tube - Position, features (external), blood supply (Names of vessels), lymphatic drainage (Names of groups of nodes) & applied anatomy	
			Uterus - Position, features (external & internal), supports (Classification with examples), blood supply (Names of vessels), lymphatic drainage (Names of groups of nodes), applied anatomy	
2	Lymphatic system	<ul style="list-style-type: none"> To list parts and 	Lymphoid system – Lymph, Functions, Parts, Primary	5

		<p>functions of lymphoid system</p> <ul style="list-style-type: none"> To classify lymphoid tissue with examples To describe microscopic features of lymph node, thymus, spleen, & tonsil To describe of cervical, axillary & inguinal lymph nodes 	<p>&secondary lymphoid tissue, Microscopic features, Functions Lymph node</p> <p>Thymus - Microscopic features, Functions</p> <p>Spleen- Microscopic features, Functions</p> <p>MALT – definition and examples Tonsil - Microscopic features, Functions</p> <p>Cervical,Axillary,Inguinal - Lymphnodegroups – Location, Number, Drainage area, applied aspect 1 each</p>	
3	Endocrine system	<ul style="list-style-type: none"> To describe pituitary, thyroid, parathyroid and adrenal glands 	<p>Pituitary gland - Coverings, Position, features (external), Secretions, blood supply (Names of vessels) & applied anatomy</p> <p>Thyroid gland - Coverings, Position, features (external), Secretions, blood supply (Names of vessels), lymphatic drainage (Names of groups of nodes) & applied anatomy</p> <p>Adrenal gland - Coverings, Position, features (external), Secretions, blood supply (Names of vessels), & applied anatomy</p> <p>Parathyroid gland - Position, features (external), Secretions, blood supply (Names of vessels), & applied anatomy</p>	4
4	Nervous system	<ul style="list-style-type: none"> To describe structure of neuron To classify neurons & neuroglia with examples To list divisions of nervous system To list meninges, dural folds To define & classify dural 	<p>Introduction to nervous system – Neuron - Structure, Axon & dendrite differences, Classification with examples Neuroglia – Classification, Functions Divisions of Nervous system</p> <p>Meninges – Names, Names of dural folds, Dural venous sinuses – Definition, Classification&List</p> <p>Cavernous sinus - Position, features (external & internal),</p>	13

		<ul style="list-style-type: none"> venous sinuses To describe cavernous sinus To describe features & functional areas of cerebrum To describe blood supply of brain To describe cerebellum To list parts of brain stem To describe medulla, pons & midbrain including their internal structure at inferior olivary nucleus, facial colliculus and superior colliculus To describe spinal cord including its internal structure To list cranial nerves To describe origin & distribution of III, VII & XII nerves To describe circulation of C.S.F To name ventricles of brain with their connections 	<p>Connections, Tributaries & applied anatomy</p> <p>Cerebrum – Features, Sulci, gyri, Functional areas – Names & Numbers (Broadman), Location & Function.</p> <p>Blood supply of brain – Names of arteries and their area of distribution with applied anatomy. Circle of Willi's – Location, Formation, Branches and Applied</p> <p>Cerebellum – Location, Features, Divisions, Deep nuclei (names), Connections – Names of 3 peduncles with main tracts passing through, Blood supply – Names of arteries, Cerebellar syndrome</p> <p>Brainstem - Parts</p> <p>Medulla - Location, features (external), List of cranial nerves emerging from it, Internal features – T.S at inferior olivary nucleus, Applied aspect</p> <p>Pons - Location, features (external), List of cranial nerves emerging from it, Internal features – T.S at facial colliculus, Applied aspect</p> <p>Midbrain - Location, features (external), List of cranial nerves emerging from it, Internal features – T.S at superior colliculus, Applied aspect</p> <p>Spinal cord - Extent, size, features (external), number of spinal nerves, Internal features – T.S showing tracts, List of ascending and descending tracts with their function, Applied aspects any 2</p> <p>List of cranial nerves with function</p> <p>Oculomotor, Facial,</p>	
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			Hypoglossal nerve – Origin and distribution	
			CSF – Path of circulation and applied aspect	
			Ventricles – Names and connections	
5	Sensory system	<ul style="list-style-type: none"> To specify parts of eye and ear with their functions To list contents of middle ear 	Eye – Parts of eye and their functions Ear – Parts of ear and their functions, List of middle ear contents	2
Total				30 hrs

BATOT 106 P - Human Anatomy Part II (Demonstration)

Sr.No.	Topics	LearningObjectives	Subtopics	No.of Hrs.
1	Reproductive system	To identify features of organs of male and female reproductive system	Testis - coverings, features (external &internal) Epididymis – parts	1
			Spermatic cord – coverings and contents	
			Ovaries – features (external), Ligaments	1
			Fallopian Tube - Parts, features (external)	
			Uterus - Position, Parts, features, broad ligament, Structures at cornu	
2	Lymphatic system	To identify location of Cervical,Axillary,Inguinal Lymphnodegroups	Cervical, Axillary, Inguinal - Lymphnodegroups – Location	1
3	Endocrine system	To identify features of thyroid, parathyroid & adrenal glands	Thyroid gland - Position, features (external)	1
			Adrenal gland - Position, features (external)	
			Parathyroid gland - Position	
4	Nervous system	<ul style="list-style-type: none">To identify features of cerebrum, cerebellum, brain stem, spinal cordTo identify formation of circle of Willis’To identify features of ventricles of brain	Cerebrum – Features, Sulci, gyri, Functional areas – Names & Numbers (Broadman), Location	4
			Circle of Willi’s – Location, Formation	
			Cerebellum – Location, features, Divisions, 3 peduncles	6
			Brainstem - Parts	
			Medulla - features (external), cranial nerves attachment	
			Pons - features (external), cranial nerves attachment	
			Midbrain - features (external), cranial nerves attachment	
			Spinal cord - Extent, size, features (external)	
			Ventricles – Identification	
5	Sensory system	To understand parts of eye and ear	Eye – Parts of eye	1
			Ear – Parts of ear	
Total				15 hrs

Textbooks:

1. Manipal Manual of Anatomy for Allied Health Sciences courses: Madhyastha S.
2. G.J. Tortora & N.P. Anagnostakos: Principles of Anatomy and Physiology
3. Textbook of Histology, A practical guide: - J.P. Gunasegaran

Reference Books:

1. B.D. Chaurasia:
 - Volume I - Upper limb & Thorax,
 - Volume II - Lower limb, Abdomen & Pelvis
 - Volume III - Head, Neck, Face
 - Volume IV - Brain - Neuroanatomy
2. Vishram Singh:
 - Textbook of Anatomy Upper limb & Thorax
 - Textbook of Anatomy Abdomen & Lower limb
 - Textbook of Head, Neck and Brain ,
3. Students Gray's Anatomy - Descriptive and Applied, 36th Ed; Churchill Livingstone.

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	Human Physiology Part II
Course Code	BATOT107 L

Teaching Objective	To teach students the basic physiological concepts related to: <ul style="list-style-type: none"> Renal system, Endocrinology & Reproductive system, CNS, Special senses
Learning Outcomes	<p>At the end of the semester, the student shall be able to</p> <ul style="list-style-type: none"> To demonstrate knowledge of Parts and Functions of Nervous system, Synapse, Receptors, Reflex, spinal cord, Ascending tracts, Descending tracts, Cerebral cortex, Cerebellum, Basal ganglia Hypothalamus To demonstrate knowledge of Structure of Eye, functions of different parts of eye, Refractive errors of Eye, functions of ear, Tests for Hearing To demonstrate knowledge of Structure and function of skin, body temperature, cause of fever To demonstrate knowledge of endocrine glands of the body and hormone secreted by each gland & their main functions To demonstrate knowledge of Parts of Male Reproductive System, stages of spermatogenesis, functions of Testosterone, parts of Female reproductive system, Menstrual cycle, functions of Oestrogen & Progesterone, urine pregnancy test Contraceptives methods To demonstrate knowledge of functions of kidney, steps of Glomerular filtration, functions of PCT, DCT, Loop of Henle, CT of Nephron, Micturition reflex

Sr. No.	Topics	Learning Objectives	No. of Hours
1	Nervous system – a. Parts and Functions of Nervous system b. Synapse-transmission, Receptors-Types & examples, c. Reflexes –definition & Classification d. Spinal cord- structure and function e. Ascending tracts-Names & functions, f. Descending tracts- Names & functions,, g. Functions of various parts of the Brain- Cerebral cortex, Cerebellum, Basal ganglia Hypothalamus. h. Cerebro-Spinal Fluid (CSF): Composition, functions & Circulation, Lumbar Puncture, i. Autonomic Nervous System (ANS): Functions.	At the end of the session, the student shall be able to <ul style="list-style-type: none"> • Enumerate Parts and Functions of Nervous system , • Draw labeled diagram of Synapse • Describe steps of synaptic transmission, • Classify Receptors with examples, • Define Reflex , Classify reflexes with example • Explain structure (parts) of spinal cord and function • Enumerate Ascending tracts & their functions, • Enumerate Descending tracts & their functions, • Enumerate Functions of various parts of the Brain- Cerebral cortex, Cerebellum, Basal ganglia Hypothalamus. • Describe Composition, functions & Circulation Cerebro-Spinal Fluid (CSF), Explain significance of Lumbar Puncture • Explain Functions of Autonomic Nervous System (ANS) 	10
2	Special senses- a. Vision: Structure of Eye, functions of different parts, Refractive errors of Eye and correction, b. Hearing: Structure and function of ear, Tests for Hearing (Deafness)	At the end of the session, the student shall be able to <ul style="list-style-type: none"> • Draw Structure of Eye • Enumerate functions of different parts of eye, • Classify and Define different Refractive errors of Eye and 	6

		correction, <ul style="list-style-type: none"> Enumerate function of ear, Describe Tests for Hearing (Deafness) 	
3	Skin – Structure and function, Body temperature- Normal value & variation, heat gain and heat lost mechanisms, fever.	At the end of the session, the student shall be able to <ul style="list-style-type: none"> Describe Structure and function of skin Mention Normal value & variation of body temperature Enumerate heat gain and heat lost mechanisms, Define fever & Enumerate cause of fever 	4
4	Endocrine System - Names of endocrine glands, Names of hormone secreted by each gland and their main function	At the end of the session, the student shall be able to <ul style="list-style-type: none"> Enumerate endocrine glands of the body and hormone secreted by each gland Enumerate the main functions of Growth hormone, thyroid hormone, parathyroid, Insulin, Aldosterone, cortisone 	2
5	Reproductive systems – a. Male Reproductive System: spermatogenesis, functions of Testosterone, b. Female reproductive system: Ovulation, Menstrual cycle, functions of Oestrogen & Progesterone, Pregnancy test, Contraceptives, Lactation: Composition of Milk, advantages of breast Feeding.	At the end of the session, the student shall be able to <ul style="list-style-type: none"> Enumerate Parts of Male Reproductive System Enumerate stages of spermatogenesis, Enumerate functions of Testosterone, Enumerate parts of Female reproductive system Define Ovulation, Enumerate uterine changes in Menstrual cycle, Enumerate functions of Oestrogen & Progesterone , Explain Physiological basis of urine pregnancy test, Enumerate different Contraceptives methods, Composition of Milk, Enumerate advantages of breast 	4

		Feeding.	
6	Excretory System- structure & functions of kidney, Glomerular filtration & tubular functions of Nephron, Juxta Glomerular Apparatus, Micturition, Artificial Kidney.	At the end of the session, the student shall be able to <ul style="list-style-type: none"> • Enumerate functions of kidney, • Draw labeled structure of Nephron • Enumerate steps and pressure gradient of Glomerular filtration • Enumerate functions of PCT, DCT, Loop of Henle, CT of Nephron. • Draw labeled structure of Juxta Glomerular Apparatus and enumerate functions • Describe nerve supply of urinary bladder Explain Micturition reflex • Artificial Kidney 	4
Total			30 hrs

BATOT 107 P - Human Physiology Part II –(Demonstration)

Sr.No.	Topics	No. ofHrs.
1	Recording of body temperature	15
2	Examination of sensory system- somatic sensations	
3	Examination of motor system-, movements, reflexes	
4	Examination of Eye- Distance and Near vision, Color vision, Visual reflexes	
5	Examination of ear- tests for hearing	
Total		15hrs

Textbooks:

1. Basics of medical Physiology – D Venkatesh and H.H. Sudhakar, 3rd edition.
2. Principles of Physiology – Devasis Pramanik, 5th edition.
3. Human Physiology for BDS – Dr A.K. Jain, 5th edition.

Reference books:

1. Textbook of Medical Physiology, Guyton, 2nd South Asia Edition.
2. Textbook of Physiology Volume I & II (for MBBS) – Dr. A.K. Jain.

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	General Microbiology
Course Code	BATOT108 L

Teaching Objective	<ul style="list-style-type: none"> To teach the students general principles of immunology, bacteriology, mycology, and virology. Understand the importance of clinical information in supporting a timely, accurate Microbiological diagnosis. To provide students with essential medical knowledge and a broad understanding of human infection. To demonstrate clinical skills essential in providing basic diagnostic services such as proper collection, transportation, receiving, acceptance or rejection and storage of blood sample, urine, stool, body fluids. To inculcate knowledge regarding rationale and principles of technical procedures of the microbiological diagnostic lab tests and interpretation of test results.
Learning Outcomes	<p>The student should be able to</p> <ul style="list-style-type: none"> Describe the working pattern of different Sections. (Bacteriology, Immunology/serology, mycology, parasitology, and virology) Apply methods of sterilization and disinfection to control hospital and community acquired infections Demonstrate knowledge of microorganisms and the disease process as well as aseptic and sterile techniques for their isolation and identification Perform Microbiological laboratory procedures according to appropriate safety standards Perform beside tests for detection of infectious diseases and to correlate the clinical manifestations with the etiological agents

Sr. No.	Topics	Objectives	No.of Hrs.
1	Concepts and Principles of Microbiology- Introduction to Bacteriology, Historical Perspective, Koch's Postulates, Importance of Microbiology, Microscopy	<ul style="list-style-type: none"> To understand the principles of Microbiology To understand the history of Microbiology To understand the principle and types of Microscopy 	4

2	General Characters of Microbes- Morphology, staining methods, Bacterial growth & Nutrition 1) Morphology of Bacteria, 2) Staining Method : Gram stain & AFB stain 3) Routine: Basic culture media, Blood Agar, MacConkey Agar, Nutrient Agar 4) Antibiotic Sensitivity Test	<ul style="list-style-type: none"> To be able to perform the various staining procedures-Gram staining, ZN staining To understand the morphology and physiology of microorganisms To be able to understand bacteriological media and biochemicals To be able to understand antibiotic susceptibility test methods 	6
3	Sterilization and Disinfection- Concept of sterilization, Disinfection, asepsis, Physical methods of Sterilization, Chemical methods (Disinfection), OT Sterilization, Biomedical Waste Management.	<ul style="list-style-type: none"> To apply methods of sterilization and disinfection to control hospital and community acquired infections 	5
4	Infection and Infection Control- Infection, Sources, portal of entry and exit, Standard (Universal) safety Precautions & hand hygiene, Hospital acquired infections & Hospital Infection Control	<ul style="list-style-type: none"> To know about Infection control practices. To be able to demonstrate Universal safety precautions (Standard Precautions) 	3
5	Immunity- Types Classification, Antigen, Antibody- Definition and types, Ag-Ab Reactions (Serological)- Types and examples,	<ul style="list-style-type: none"> To understand types of immunity To know about antigen and types of antibodies To be able to understand the principle & procedure of common serological tests 	6
6	Systemic Bacteriology (Morphology, diseases caused)- Introduction, 1. Gram positive cocci (GPC)- Staphylococcus aureus, Streptococcus Str. pyogenes, S. pneumoniae) 2. Gram positive bacilli (GPB) – Corynebacterium diphtheriae (CD) 3. Gram negative Cocci (GNC) – Neisseria meningitidis, Neisseria gonorrhoeae. 5. Gram negative bacilli a) Enterobacteriaceae- E. coli, Klebsiella, Proteus, Salmonella, Shigella b) Pseudomonas, Vibrio Cholera 6. Mycobacteria – M. tuberculosis, M. leprae 7. Anaerobic bacteria – Clostridium tetani,	<ul style="list-style-type: none"> List of gram-positive bacteria and diseases caused by them List of gram-negative bacteria and diseases caused by them List of anaerobic bacteria and diseases caused by them Mycobacterium tuberculosis- diagnosis and diseases caused by them 	7

	welchi		
7	Mycology -Introduction,Classification, Enumerate common fungi & disease caused Candida Aspergillus Cryptococcus Mucor	To be able to classify fungi on morphological baenumerate list of common fungi and diseases caused by them <ul style="list-style-type: none"> • Candida • Aspergillus • Cryptococcus • Mucor 	3
8	Virology – <ul style="list-style-type: none"> • Introduction,GeneralProperties of viruses • Difference between Virus & Bacteria • Enumerate DNA & RNA Virus 1) HIV(Route of transmission, Disease caused & Lab diagnosis). 2) Hep B virus (Route of transmission, Disease caused & Lab diagnosis).	To be able to describe <ul style="list-style-type: none"> • GeneralProperties of Virus • Difference between Virus & Bacteria • Enumerate DNA & RNA Virus To describe Route of transmission, Disease caused & Lab diagnosis of 1) Human immunodeficiency Virus- HIV 2) Hepatitis B virus - HBV	4
9	Parasitology – Introduction to Parasitology – Classification & general characteristics List of common parasite ((Enumerate & disease caused) E. histolytica, Plasmodium spp, Taeniaspp, Roundworm, Hookworm, W. bancrofti – Filaria. Life cycle & Lab diagnosis of Malaria & Roundworm.	<ul style="list-style-type: none"> • To be able classify and mention general characteristics of parasites • To enumerate list of common parasites and mention diseases caused by parasites- E. histolytica, Plasmodium spp, Taeniaspp, Roundworm, Hookworm, W. bancrofti – Filaria. • To be able to perform stool examination for ova, cysts and trophozoites of parasites 	7
Total			45hrs

BATOT 108 P - General Microbiology(Demonstration)

Sr No	Topics	No of hrs
1	Microscopy	15
2	Collection & transport of specimen	
3	Gram stain	
4	ZN stain	
5	Morphology of bacteria – Gram positive & negative cocci, Gram positive & negative bacilli	
6	Sterilization	
7	Disinfection	
8	Infection control – Biomedical waste (BMW) hand hygiene	
9	Uninoculated culture media and culture methods	
10	Antibiotic sensitivity testing	
11	Serological reactions	
12	Virology	
13	Parasitology- stool examination	
14	Mycology	
15	Vaccines & immunization schedule	
	TOTAL	15 hrs

Text Book:

1. Text Book of Microbiology for Nursing Students, Anant Narayan Panikar

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	Basic Pathology & Hematology
Course Code	BATOT109 L

Teaching Objective	<ul style="list-style-type: none"> • To teach the students general principles of hematology, histopathology, cytopathology, clinical pathology and blood bank techniques • Understand the importance of clinical information in supporting a timely, accurate pathological diagnosis. • Describe normal and disordered hematopoiesis. • To provide students with essential medical knowledge and a broad understanding of human disease. • To demonstrate clinical skills essential in providing basic diagnostic services such as proper collection, transportation, receiving, acceptance or rejection and storage of blood sample, urine, body fluids and tissue samples.
Learning Outcomes	<ul style="list-style-type: none"> • The student should be able to describe the working pattern of different laboratories (Hematology, Histopathology & Cytology) and blood bank. • The student should be able to provide technical help for selected sophisticated hematological techniques with adequate knowledge of various principles. • To aid hematology in the reference ranges for hemoglobin, hematocrit, erythrocytes, and leukocytes in infants, children and adult • The student should be able to describe the practice of collection, handling and transportation of medical laboratory specimens. • The student should be able to explain quality assurance in medical laboratories.

Sr. No.	Topic	Objectives	No. of hours
1.	Introduction to Pathology	Role of pathologist in diagnosis of disease, Definition and its various branches.	1
2.	Working and maintenance of laboratory instruments.	Principle, operational steps and uses of the following instruments: 1. Automated hematology analyzer 2. Cyto-centrifuge 3. Histokinette	2
3.	General principles of Hematology techniques: <ul style="list-style-type: none"> Laboratory requisition form Introduction/overview to hematology : hematopoiesis Normal constituents of Blood, their structure and functions Various anticoagulants used in Hematology Bloodcollection: Basic steps for blood collection by venipuncture, order of draw and complications of venipuncture. Processing of blood sample Preparation, fixation,routinestaining of peripheral blood smear. Peripheral smear (CBC report) Hemoglobin estimation, different methods and normal values 	<ul style="list-style-type: none"> Laboratory requisition form Enlist the functions of blood. Stages of hematopoiesis with morphology of cells. Draw and label the different cells of blood. Anticoagulant: Definition Preference of anticoagulant for different hematological studies. Mechanism of action of each anticoagulant. Differences between plasma and serum. Enlist the steps in preparation of peripheral blood smear. Enlist the different stains used for Peripheral smear staining. Enumerate the characteristic features of an ideal peripheral blood smear. Thick and thin smear and their uses. Enlist names of parasites identified on peripheral smear. Interpretation of normal CBC report. Structure of hemoglobin and enumerate the various methods of hemoglobin estimation.(Cyanmethemoglobin method, Acid hematin method and cell counter) Normal values of hemoglobin in Male and Female. Enlist the causes of increased and decreased hemoglobin. Advantages of Cyanmethemoglobin method 	10

	<ul style="list-style-type: none"> • Total leucocyte count (TLC) • Differential Leucocyte Count (DLC) • Plateletcount 	<p>over Acid hematin method.</p> <ul style="list-style-type: none"> • Normal values of total WBC count, platelet count. • Define leukocytosis and enumerate the causes. • Uses of WBC pipette and contents of WBC diluting fluid. • Define leucopenia and enumerate the causes. • Define thrombocytosis and enumerate the causes. • Define thrombocytopenia and enumerate the causes. 	
4.	<p>General principles of histopathology techniques</p> <ul style="list-style-type: none"> • Collection • Fixation of tissue • Tissue processing • Routinestaining (H&E staining) 	<p>Collection:</p> <ul style="list-style-type: none"> • What is a histopathology specimen? • Importance of specimen collection to the laboratory. • Steps in specimen collection. • Enumerate the types of histopathological specimens. • Enlist criteria of specimen rejection. <p>Fixation:</p> <ul style="list-style-type: none"> • Define fixation. • Aim of fixation. Mention advantages and disadvantages of fixation. • Enumerate the common fixatives used for tissue fixation. • Define decalcification and name common decalcifying agents. <p>Tissue processing:</p> <ul style="list-style-type: none"> • Steps in tissue processing. • Define dehydration. • Commonly used dehydrating agents. • Microtome and its application. • Enumerate types of microtome. <p>Staining:</p> <ul style="list-style-type: none"> • Principle and uses of H&E stain. • Enumerate the steps of H&E staining. • Interpretation of H&E staining. 	6

		<ul style="list-style-type: none"> Enlist the various mounting agents. 	
5.	<p>General principles of cytology techniques</p> <ul style="list-style-type: none"> Collection, preservation, transportation and processing of cytological specimens. Routine cytology staining (PAP) 	<p>Collection:</p> <ul style="list-style-type: none"> What is a cytology specimen? Enumerate the types of cytology specimens. Steps in transportation of cytology sample. Enlist criteria of specimen rejection. Steps in cervical cytology specimen collection (PAP smear). <p>Fixation:</p> <ul style="list-style-type: none"> Enumerate the common fixatives used for cytology samples. <p>Processing:</p> <ul style="list-style-type: none"> Enumerate steps in processing of cytology sample. <p>Staining:</p> <ul style="list-style-type: none"> Principle and uses of PAP stain. Enumerate the steps of PAP staining. 	5
6.	<p>General principles of clinical pathology techniques</p> <ul style="list-style-type: none"> Collection, transport, preservation and processing of various clinical specimens. Urine examination - collection and preservation, Physical, chemical and microscopic examination for abnormal constituents by urinalysis method Introduction to body fluids (Distinguish between Transudate and exudate) 	<p>Collection & transport:</p> <ul style="list-style-type: none"> Steps in clinical pathology sample collection. Common clinical pathology tests. Importance of clinical pathology. Steps in transportation of clinical pathology sample? Enlist criteria of specimen rejection. <p>Preservation:</p> <ul style="list-style-type: none"> Preservation of clinical pathology samples. <p>Processing:</p> <ul style="list-style-type: none"> Enumerate steps in processing of clinical pathology sample. <p>Staining:</p> <ul style="list-style-type: none"> Enumerate the stains used for clinical pathology sample. <p>Urine examination:</p> <ul style="list-style-type: none"> Methods of urine collection Enlist the gross and microscopic features of abnormal urine/ example of abnormal urine 	5

7.	<p>General principles of BloodBank techniques</p> <ul style="list-style-type: none"> • Introduction/Review of blood banking • Blood group system • Collection and processing of blood for transfusion • Compatibility testing • Blood transfusion reactions 	<ul style="list-style-type: none"> • ABO and Rh system of blood grouping. • Enlist the different methods of blood group estimation. • Enlist donor selection criteria. • Enumerate transfusion reactions and enlist the investigations carried out in transfusion reactions. • Enlist the different blood components for transfusion. • In brief: storage of whole blood and its components. 	5
8	<p>General and systemic pathology:</p> <p>I) Cell Injury</p> <ul style="list-style-type: none"> • Reversible cell injury • Irreversible cell injury • Cellular adaptations – Hypertrophy, hyperplasia, atrophy and metaplasia. 	<ul style="list-style-type: none"> • Enlist the causes of reversible and irreversible cell injury. • Enlist differences between reversible and irreversible cell injury. • Definition of different types of cellular adaptations. 	20
	<p>II) Inflammation:</p> <ul style="list-style-type: none"> • Acute inflammation: cellular and vascular changes and inflammatory cells • Chronic inflammation: general features, granulomatous inflammation with examples 	<ul style="list-style-type: none"> • Definition of acute and chronic inflammation. • Enlist the causes of Acute and chronic inflammation. • Types of Tuberculosis enlist the organs affected and lab investigations • Types of Hepatitis and enlist the investigations 	
	<p>III) Circulatory disturbances:</p> <ul style="list-style-type: none"> • Edema • Thrombosis • Embolism 	<ul style="list-style-type: none"> • Definition and enlist the types of circulatory disturbances. • Define edema and enlist the causes. 	

	<ul style="list-style-type: none"> Shock Infarction 	<ul style="list-style-type: none"> Define thrombosis and mention the types and causes. Define Embolism and enlist types and causes. Define shock. Enumerate the types Define infraction and enlist the causes and organs affected 	
	IV) Hypersensitivity reaction	<ul style="list-style-type: none"> Mention the types of hypersensitivity reactions Anaphylaxis: Definition, morphological features and distinguishing features 	
	V) Neoplasia	<ul style="list-style-type: none"> Definition of anaplasia, dysplasia and metaplasia Difference between benign and malignant lesions 	
	VI) AIDS, Malaria, Dengue	<ul style="list-style-type: none"> AIDS- Enlist the modes of spread and investigations Malaria- Clinical features, Mode of spread and enlist the Lab investigations. Dengue- Clinical features, Mode of spread and enlist the Lab investigations 	
9.	Hematology: <ul style="list-style-type: none"> Anemia Leukemia 	<ul style="list-style-type: none"> Define anemia and enumerate the types of anemia Enlist the investigations for anemia Define leukemia Enlist the types of leukemia Enumerate clinical features and lab investigations in leukemia. 	5
10	Introduction to concepts of NABL and NABH	<ul style="list-style-type: none"> Define NABL and NABH Enlist the importance of NABL and NABH 	1
Total			60 hrs

BATOT109 P – Basic Pathology & Hematology (Demonstration)

Sr. No.	Topics	No. of Hrs.
1.	<ul style="list-style-type: none"> Methods of blood collection: Basic steps for blood collection by venepuncture, order of draw and complications of venepuncture. Anticoagulants used in Hematology and Vacutainer. 	2
2.	<ul style="list-style-type: none"> Processing of blood sample : Automated hematology analyzer 	1
3.	<ul style="list-style-type: none"> Preparation, fixation, routine staining of peripheral blood smear. Peripheral smear (CBC report) Peripheral smear for malaria, anemia and leukemia. 	2
4.	<ul style="list-style-type: none"> Hemoglobin estimation, different methods and normal values. Total leucocyte count (TLC) Differential leucocyte count (DLC) 	1
5.	Histopathology: <ul style="list-style-type: none"> Collection Fixation of tissue Tissue processing including histokinette and microtome Routine staining (H&E staining) 	3
6.	Cytopathology: <ul style="list-style-type: none"> Collection, preservation, transportation and processing of cytological specimens. Routine staining (PAP staining) 	2
7.	Clinical pathology: <ul style="list-style-type: none"> Collection, transport, preservation and processing of various clinical specimens including cyto-centrifuge. Urine examination - collection and preservation, microscopic examination for abnormal constituents. 	2
8.	Blood Bank techniques: <ul style="list-style-type: none"> Visit to blood Bank Collection and processing of blood for transfusion Blood group estimation, Rh typing and cross- matching. 	2
Total		15 hrs

Reference Books:

1. A Handbook of Medical Laboratory (Lab) Technology: Second Edition. V.H. Talib(Author)
2. Comprehensive Textbook of Pathology for Nursing (Pathology, Clinical Pathology, Genetics) (English, Paperback, Dr. A.K. Mandal, Dr. Shramana Choudhury)
3. Textbook of Medical Laboratory Technology- Praful B. Godkar, Darshan P. Godkar.
4. Medical Laboratory Technology. Methods and Interpretations – RamnikSood, 6th Edition (Volume 1&2)
5. Medical Laboratory technology a procedure manual for routine diagnostic test including phlebotomy/ venipuncture procedure – 4th Edition, Volume- I, II, III. Kanai L. Mukharjee(Author)
6. Practical Pathology P. Chakraborty, Gargi Chakraborty New Central Book Agency, Kolkata.
7. Theory & Practice of Histological Techniques John D. Bancroft et.al. Churchill Livingstone Printed in China.
8. Hand Book of Histopathological & Histochemical Techniques C.F.A. Culling ButterworthsCompany Ltd. London.
9. Essentials of Hematology by Shirish M Kawthalkar, 3rd Edition.
10. Textbook of Pathology for *Allied Health Sciences* by RamadasNayak, Edition: 1st Publisher:Jaypee Brothers Medical Publishers.
11. The ABC of CBC: interpretation of complete blood count & histograms. D P Lokwani and SunitLokwani(Author). Jaypee Brothers Medical Publishers.

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	Introduction to Quality and Patient safety
Course Code	BATOT 110 L

Teaching Objective	<ul style="list-style-type: none"> • The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system. • To understand the basics of emergency care and life support skills. • To Manage an emergency including moving a patient • To help prevent harm to workers, property, the environment and the general public. • To provide a broad understanding of the core subject areas of infection prevention and control. • To provide knowledge on the principles of on-site disaster management.
Learning Outcomes	<ul style="list-style-type: none"> • Upon completion, Students should be able to apply healthcare quality improvement and patient safety principles, concepts, and methods at the micro-, meso-, and macro-system levels.

Sr. No.	Topics	No. of Hrs.
1	Quality assurance and management – Concepts of Quality of Care, Quality Improvement Approaches, Standards and Norms, Introduction to NABH guidelines	7
2	Basics of emergency care and life support skills - Basic life support (BLS), Vital signs and primary assessment, Basic emergency care – first aid and triage, Ventilations including use of bag-valve-masks (BVMs), Choking, rescue breathing methods, One- and Two-rescuer CPR	7
3	Bio medical waste management and environment safety -Definition of Biomedical Waste, Waste minimization, BMW – Segregation, collection, transportation, treatment and disposal (including color coding), Liquid BMW, Radioactive waste, Metals/ Chemicals / Drug waste, BMW Management & methods of disinfection, Modern technology for handling BMW, Use of Personal protective equipment (PPE), Monitoring & controlling of cross infection (Protective devices)	8
4	Infection prevention and control - Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)], Prevention & control of common healthcare associated infections, Components of an effective infection control program, Guidelines (NABH and JCI) for Hospital Infection Control	8
5	Antibiotic Resistance - History of Antibiotics, How Resistance Happens and Spreads, Types of resistance- Intrinsic, Acquired, Passive, Trends in Drug Resistance, Actions to Fight Resistance, Bacterial persistence, Antibiotic sensitivity, Consequences of antibiotic resistance	8
6	Disaster preparedness and management - Fundamentals of emergency management, Psychological impact management, Resource management, Preparedness and risk reduction, information management, incident command and institutional mechanisms.	7
Total		45 hrs

Reference Books:

1. Washington Manual of Patient Safety and Quality Improvement Paperback – 2016 by Fondahn (Author)
2. Understanding Patient Safety, Second Edition by Robert Wachter (Author)
3. Handbook of Healthcare Quality & Patient Safety Author : Girdhar J Gyani, Alexander Thomas
4. Researching Patient Safety and Quality in Healthcare: A Nordic Perspective Karina Aase, Lene Schibevaag
5. Old) Handbook Of Healthcare Quality & Patient Safety by Gyani Girdhar J (Author)
6. Handbook of Healthcare Quality & Patient Safety by .Gyani G J/Thomas A
7. Quality Management in Hospitals by S. K. Jos

BATOT 111 P - Community Engagement & Clinical Visit (Including related practicals to the Parent course) (Total -360 hrs)

	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	Medical Bioethics & IPR
Course Code	SEC 001L

Teaching Objective	<ul style="list-style-type: none"> • To introduce the wide range of ethical issues in health care. • To provide basic skills in: A) Approaching ethical issues. B) Analysis and statement of issues. C) Understanding the relevant ethical principles invoked. • Imparting knowledge and skills that will enable students to develop ethical answers to these issues • To acquire specialized knowledge of law and IPR. • The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.
Learning Outcomes	<ul style="list-style-type: none"> • Upon successful completion of the course, students will be able to: Recognize what constitutes an ethical concern in health care • Understanding ethical issues in Health care. • Understand better the complexity and multi-dimensionality of medical ethical concerns and uniqueness of each problem. • Capacity to rationally justify your decision • Develop the ability to reason through difficult medical/clinical ethical issues both orally, in the context of a group of their peers, and through written • The students get awareness of acquiring the patent and copyright for their innovative works. • They also get the knowledge of plagiarism in their innovations which can be questioned legally.

Sr. No.	Topics	No. of Hrs.
1	Introduction to Bioethics- Bioethical issues related to Healthcare & medicine .	5
2	Anatomy - Cadaver ethics, Human dignity, PNDT, Disposal of cadaver, Genetic Counselling	7
3	Physiology - Animal ethics, Health policy privacy	7
4	Biochemistry & Pathology - Prudence of investigation confidentiality, Patients bill of rights, Disposal of investigative material, Integrity, Blood transfusion	5
5	Pharmacology - Rational drug prescribing, Clinical trials, Risk minimization, Animal ethics	5
6	Microbiology - Hand wash, Drug resistance minimization, Prudence of investigation confidentiality, Sterilization procedure, Biosafety and bio hazard	5
7	Medicolegal aspects of medical records	3
8	Introduction to Intellectual Property: Concept of Intellectual Property Kinds of Intellectual Property Patents, Copyrights Designs, Trademarks, Geographical Indication, Infringement of IPR, Its protection and Remedies Licensing and its types	8
Total		45 hrs

Reference Books:

1. Contemporary issues in bioethics – Beauchamp & Walters (B&W) 4th edition.
2. Classic philosophical questions by Glouck (8th Edition)
3. Case book series and booklets by UNESCO Bioethics Core curriculum 2008
4. Encyclopedia of Bioethics 5 vol set, (2003) ISBN-10: 0028657748
5. Intellectual property rights- Ganguli-Tat McGrawhill. (2001) ISBN-10: 0074638602,
6. Intellectual Property Right- Wattal- Oxford Publication House.(1997) ISBN:0195905024.

Name of the Programme	B.Sc. Operation Theatre and Anaesthesia Technology
Name of the Course	Human Rights & Professional Values
Course Code	SEC 002L

Teaching Objective	<ul style="list-style-type: none"> • To understand interaction between society and educational institutions. • To sensitize the citizens so that the norms and values of human rights and duties of education programme are realized. • To encourage research activities. <p>To encourage research studies concerning the relationship between Human Rights and Duties Education.</p>
Learning Outcomes	<ul style="list-style-type: none"> • This course will aim at making the learners acquire conceptual clarity and develop respect for norms and values of freedom, equality, fraternity and justice. • It will include awareness of civil society organizations and movements promoting human rights. • This will make the students realize the difference between the values of human rights and their duties

Sr. No.	Topics	No. of Hrs.
1	Background - Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights	6
2	Human rights at various level - Human Rights at Global Level UNO, Instruments: U.N. Commission for Human Rights, European Convention on Human Rights.	6
3	Human rights in India - Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993- National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman	7
4	Human Rights Violations - Human Rights Violations against Women, Children, Violations against Minorities SC/ST and Trans-genders, Preventive Measures.	6
5	Professional values - Integrity, Objectivity, Professional competence and due care, Confidentiality	6
6	Personal values - ethical or moral values, Attitude and behavior- professional behavior, treating people equally	6
7	Code of conduct - professional accountability and responsibility, misconduct, Cultural issues in the healthcare environment	8
Total		45 hrs

Reference Books:

1. Jagannath Mohanty Teaching of Human Rights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. New Delhi 2009
2. Ram Ahuja: Violence Against Women Rawat Publications Jewahar Nager Jaipur. 1998.
3. Sivagami Parmasivam Human Rights Salem 2008
4. Hingorani R.C.: Human Rights in India: Oxford and IBA New Delhi.

B.Sc. Allied Courses Scheme of Examination Pattern

B.Sc. First Year (Semester I & II)
w.e.f.(Academic Year 2023-24 onwards)

Internal Examination Pattern (Theory)

Question type	No. of questions	Questions to be answered	Question X marks	Total marks
Short answers	5	4	4 x 3 marks each	12 marks
CIA	1. Seminar / poster (4 marks) 2. Assignments/open book test (4 marks)			8 marks
Total				20 marks

Note –20 marks to be converted to 10 marks weightage for submission to the university.

University Examination Pattern (Theory)

Question Type	No. of Questions	Questions to be Answered	Question X marks	Total marks
Section A				
Structured LAQ	3	2	2X8	16 Marks
Short notes	8	6	6X4	24Marks
Total				40 Marks

Note: The exam pattern for Course “Community Engagement & Clinical Visit (Including Related Practicals To The Parent Course)” is as per Annexure No-1.

EVALUATION FORM FOR

COMMUNITY ENGAGEMENT & CLINICAL VISIT (INCLUDING RELATED PRACTICALS TO THE PARENT COURSE)

Name of the Student:**Program/Course:****Semester:****Name of the Internal Faculty/Observer:****Name of the External Faculty/Observer:**

Sr. No.	Core Competencies	Marks Allotted	Marks Obtained
1.	Community Engagement/Educational Tour/Field work/Hospital visits/NSS (Report)	15	
2.	Demonstrated understanding of responsibilities	10	
3.	Managed time effectively to meet deadlines		
4.	Communicated well with others (Staff members, Teacher, Patients, Community Members, etc)		
5.	Demonstrated knowledge required to meet objectives		
6.	Completed required tasks as assigned by Teacher/Co-ordinator		
7.	Model making / Quiz/ Poster/Conference/ Seminar/ Presentation/Innovative Ideas Competition	15	
8.	Attendance	10	
Total Marks		50	

Internal Faculty/Observer Signature:**Date:****External Faculty/Observer Signature:**

Revised Post facto approval for amending the ATKT rules.

1 message

SBS Navi Mumbai <sbsnm@mgsuhs.com>

Wed, Jul 19, 2023 at 10:20 AM

To: Vice Chancellor <vc@mgsuhs.com>

Cc: Registrar MGMIHS <registrar@mgsuhs.com>, Controller of Exam MGMIHS <coe@mgsuhs.com>

Respected Sir,

Please find attached herewith the request letter for Post facto approval for amending the ATKT rules.

Kindly do the needful.

Thanking you,

Director

MGM School of Biomedical Sciences

(Deemed University u/s 3 of UGC Act, 1956) Grade 'A++' Accredited by NAAC

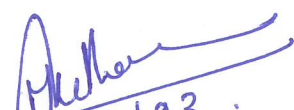
MGMIHS, Kamothe

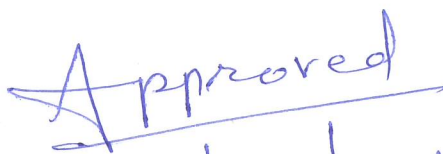
Navi Mumbai

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 Letter to VC Post facto approval for amending the atkt rules 19.07.2023.pdf
4143K

① As based on the NEP Policy. BSc. IIIrd + 1st yr of Inter ship become 4 year of Progr ^{so now} we have made it upto 1 to VIII Sem. So request to approved post facto approval for ATKT Rule for sem VII & VIII. So that candidate will be allowed for II, VII sem exam and ^{not} allowed to appear in the final Sem examination (sem VIII) unless the candidate has cleared all the previous sem examination (I to VII).


19/7/23.


19/7/23.



MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI

(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)

(Deemed University u/s 3 of UGC Act 1956)

Grade "A" Accredited by NAAC

Sector 1, Kamothe, Navi Mumbai-410209, Tel.No.022-27437631, 27432890

Email: sbsnm@mgmuhs.com Website: www.mgmsbsnm.edu.in

Ref: MGMSBS/23/07/1709

Date: 18-07-2023

To,
Hon'ble Vice Chancellor
MGMIHS,
Kamothe, Navi Mumbai

Through – proper channel

Sub: Post facto approval for amending the ATKT rules.

Respected Sir,

As per National Education Policy (NEP) 2020, we have accordingly changed our credit & semester pattern where students will have to appear for VII & VIII Semester exams as approved vide resolution no. 6.7 of AC - 46/2023 for batch AY 2020-21 onwards.

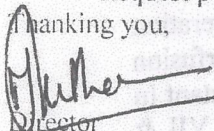
We request post-facto approval to amend our ATKT rules (Resolution No. 3.2.1.d of BOM 57/2019 dated 26.04.2019) for batch AY 2020-21 onwards as per below:

Carryover Pattern (ATKT Rules):

- A student will be allowed to keep term for Semester II irrespective of number of heads of failure in the Semester I.
- A student will be allowed to keep term for Semester III if he/she passes each Semester I & II **OR** fails in not more than two courses each in Semester I & II.
- Student will be allowed to keep term for Semester IV irrespective of number of heads of failure in Semester III. However, the student shall pass each course of Semester I and Semester II in order to appear for Semester IV.
- Student shall be allowed to keep term for Semester V if he/she passes Semester I, Semester II, Semester, III and Semester IV. **OR** shall pass Semester I and Semester II and fails in not more than two courses each in Semester III and Semester IV.
- Student shall be allowed to keep term for Semester VI irrespective of number of heads of failure in Semester V. However, he/she has passes Semester I, Semester II, Semester, III and Semester IV.
- A student will be allowed to keep term for Semester VII if he/she passes each Semester V & VI **OR** fails in not more than two courses each in Semester V & VI.
- A Candidate shall not be allowed to appear in the final semester examination (Semester VIII) unless the candidate has cleared all the previous semester examinations (I to VII).

Request postfacto approval as regular Semester VI exams are due on 3rd Week of August 2023.

Thanking you,


Director

MGM School of Biomedical Sciences

Kamothe, Navi Mumbai

Director

MGM School of Biomedical Science

Kamothe, Navi Mumbai

cc to: Controller of Examination, MGMIHS

Registrar, MGMIHS



Resolution No. 3.1 of Academic Council (AC-50/2024):

Resolved to approve CBCS syllabus & Indexes [ANNEXURE-3A, 3B, **3C**, 3D, 3E, 3F, 3G, 3H] along with the revised COs & POs (Semester I to VIII) [ANNEXURE -3I, 3J, 3K, 3L, 3M, 3N, 3O, 3P] for B.Sc. Medical Laboratory Technology, B.Sc. Medical Radiology & Imaging Technology, **B.Sc. Operation Theatre & Anesthesia Technology**, B.Sc. Cardiac Care Technology, B.Sc. Perfusion Technology, B. Optometry, B.Sc. Medical Dialysis Technology, B.Sc. Physician Assistant in Emergency & Trauma Care programs (Semester III to VIII) to be effective from batch admitted in Academic Year 2024-25 onwards.

Annexure-3C of AC-50/2024



MGM SCHOOL OF BIOMEDICAL SCIENCES

(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)

(Deemed to be University u/s 3 of UGC Act 1956)

Grade "A⁺⁺" Accredited by NAAC

Sector 1, Kamothe Navi Mumbai-410209, Tel.No.: 022-27437631, 27437632, 27432890

Email. sbsnm@mgmuhs.com/Website: www.mgmsbsnm.edu.in

CHOICE BASED CREDIT SYSTEM (CBCS)

(Academic Year 2024 - 25)

Curriculum for

B.Sc. Allied Health Sciences

B.Sc. Operation Theater & Anesthesia Technology

Semester III to VIII

B.Sc. Operation Theater & Anesthesia Technology**Program Outcomes (PO)**

Program Code	Program Objective
PO1	Clinical Proficiency Demonstrate advanced knowledge and technical skills in operation theatre procedures, anesthesia techniques, and perioperative care.
PO2	Patient Safety and Care Apply principles of patient safety and ethical standards in the management of anesthesia and operation theatre environments, ensuring optimal care and minimizing risks.
PO3	Communication and Collaboration Exhibit effective communication skills to collaborate with surgical teams, anesthesiologists, and other healthcare professionals, ensuring cohesive patient care.
PO4	Critical Thinking and Problem-Solving Utilize critical thinking and problem-solving abilities to assess and manage complex clinical situations in anesthesia and surgery, adapting to dynamic environments.
PO5	Professionalism and Ethics Uphold professional ethics, demonstrate responsibility, and commit to continuous learning in the field of operation theatre and anesthesia technology.
PO6	Leadership and Management Develop leadership and management skills to coordinate and oversee operation theatre activities, manage resources, and ensure smooth workflow.
PO7	Technology Integration Operate and maintain anesthesia equipment, surgical instruments, and other advanced medical technologies, ensuring their proper use in clinical settings.
PO8	Holistic Development Integrate a holistic approach to patient care, considering the physical, psychological, and social aspects of health to ensure comprehensive and compassionate treatment.

OUTLINE OF COURSE CURRICULUM**B.Sc. Operation Theatre and Anaesthesia Technology****Semester III**

Code No.	Core Course	Credits/Week					Hrs/Semester					Marks			
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total	
Theory															
BOTAT 112 L	Introduction To Operation Theatre Technology (OT)	2	-	-	-	2	30	-	-	-	30	20	80	100	
BOTAT 113 L	Introduction To Anesthesia Technology (AT)	2	-	-	-	2	30	-	-	-	30	20	80	100	
BOTAT 114 L	Principles of Anesthesia	2	-	-	-	2	30	-	-	-	30	20	80	100	
BOTAT 115 CP	OTAT Directed Clinical Education-I	-	-	-	27	9	-	-	-	405	405	-	50	50	
Practical															
BOTAT 112 P	Introduction To Operation Theatre Technology (OT)	-	-	2	-	1	-	-	30	-	30	10	40	50	
BOTAT 113 P	Introduction To Anesthesia Technology (AT)	-	-	2	-	1	-	-	30	-	30	10	40	50	
Generic Elective Course															
GEC 001 L	Pursuit of Inner Self Excellence (POIS)	3	-	-	-	3	45	-	-	-	45	10	40	50	
GEC 002 L	Organisational Behaviour														
Total		9	0	4	27	20	135	0	60	405	600	90	410	500	

OUTLINE OF COURSE CURRICULUM**B.Sc. Operation Theatre and Anaesthesia Technology****Semester IV**

Code No.	Core Course	Credits/Week					Hrs/Semester					Marks			
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total	
Theory															
BOTAT 116 L	Basic Techniques of Anesthesia	2	-	-	-	2	30	-	-	-	30	20	80	100	
BOTAT 117 L	Medical Emergencies & Its Management	3	-	-	-	3	45	-	-	-	45	20	80	100	
BOTAT 118 L	Medicine Relevant to OT Technology	3	-	-	-	3	45	-	-	-	45	20	80	100	
BOTAT 119 CP	OTAT Directed Clinical Education-II	-	-	-	27	9	-	-	-	405	405	-	50	50	
Practical															
BOTAT 116 P	Basic Techniques of Anesthesia	-	-	2	-	1	-	-	30	-	30	10	40	50	
Ability Enhancement Elective Course															
AEC 003 L	Computer and Applications	3	-	-	-	3	45	-	-	-	45	10	40	50	
AEC 004 L	Good Clinical Laboratory Practice and Research Skills														
Total		11	0	2	27	21	165	0	30	405	600	80	370	450	

OUTLINE OF COURSE CURRICULUM														
B.Sc. Operation Theatre and Anaesthesia Technology														
Semester V														
Code No.	Core Course	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total
Theory														
BOTAT 120 L	Basics of Surgical Procedures	2	-	-	-	2	30	-	-	-	30	20	80	100
BOTAT 121 L	CSSD Procedures	2	-	-	-	2	30	-	-	-	30	20	80	100
BOTAT 122 L	Advance Anesthetic Techniques	2	-	-	-	2	30	-	-	-	30	20	80	100
BOTAT 123 CP	OTAT Directed Clinical Education-III	-	-	-	27	9	-	-	-	405	405	-	50	50
Practical														
BOTAT 120 P	Basics of Surgical Procedures	-	-	2	-	1	-	-	30	-	30	10	40	50
BOTAT 122 P	Advance Anesthetic Techniques	-	-	2	-	1	-	-	30	-	30	10	40	50
Discipline Specific Elective														
DSE 001 L	Basics of Clinical Skill Learning	3	-	-	-	3	45	-	-	-	45	10	40	50
DSE 002 L	Hospital Operation Management													
Total		9	0	4	27	20	135	0	60	405	600	90	410	500

OUTLINE OF COURSE CURRICULUM														
B.Sc. Operation Theatre and Anaesthesia Technology														
Semester VI														
Code No.	Core Course	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation (CP)	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total
Theory														
BOTAT 124 L	Basic Intensive Care	4	-	-	-	4	60	-	-	-	60	20	80	100
BOTAT 125 L	Specialized Surgery and Anesthesia	4	-	-	-	4	60	-	-	-	60	20	80	100
BOTAT 126 L	Electronics & Record Keeping for Surgery and Anesthesia	3	-	-	-	3	45	-	-	-	45	20	80	100
BOTAT 127 CP	OTAT Directed Clinical Education-IV	-	-	-	27	9	-	-	-	405	405	-	50	50
Practical														
BOTAT 124 P	Basic Intensive Care	-	-	2	-	1	-	-	30	-	30	10	40	50
Total		11	0	2	27	21	165	0	30	405	600	70	330	400

OUTLINE OF COURSE CURRICULUM**B.Sc. Operation Theatre and Anaesthesia Technology****Semester VII & VIII**

Code No.	Core Course	Credits		Marks							
		Clinical Posing/ Rotation (CP)	Total Credits (C)	Internal Assessment (IA)	Semester End Exam (SEE)	Total					
BOTAT 128	B.Sc. OT & AT Internship (Semester VII)	20	20	20	80	100					
BOTAT 129	B.Sc. OT & AT Internship (Semester VIII)	20	20	20	80	100					

Internship is for 12 months (July-December; January-June) after deducting for national holidays/Sick Holidays/ sundays + Examination), (6 days/ week ;8 Hours/day). Minimum of 21 weeks/semester. Students are encouraged to involve in community outreach activities as part of their clinical postings without absents himself/herself for the other regular classes. During Internship a candidate must have 100% attendance before the award of the degree. NOC from the Dean/Director, MGMSBS to be made mandatory while applying for Convocation Degree.

Internal Assessment Exam Pattern (IA) for Semester VII & VIII (Internship Program)		Scheme of University Semester End Examination (SEE) for Semester VII & VIII (Internship Program)				Attendance (10 marks) of the student. It was decided that weightage be given to attendance as per following scheme	
Internal exam pattern: Total 20 marks with following breakup		Practical exam pattern: Total 80 marks with following breakup				Attendance Percentage	Marks
Description	Marks	Exercise	Description	Marks		< 75	Zero
Internal exam (at department)	10 marks	Q No 1	Case Study	2 x15=30 M		75	5
Viva	5 marks	Q No 2	Station exercise	3 x 5=15 M		76-80	6
Log Book	5 marks	Q No 3	VIVA	15 M		81-85	7
Total = 20 Marks		QNo 4	Log Book	10 M		86-90	8
		QNo 5	Attendance	10 M		91-95	9
		Total = 80 Marks				96-100	10

SECOND YEAR

B.Sc. Operation Theater & Anesthesia Technology

SEMESTER-III

Code No.	Core Subjects
Theory	
BOTAT 112 L	Introduction to Operation Theatre Technology (OT)
BOTAT 113 L	Introduction to Anesthesia Technology (AT)
BOTAT 114 L	Principles of Anesthesia
BOTAT 115 CP	OTAT Directed Clinical Education-I
Practical	
BOTAT 112 P	Introduction to Operation Theatre Technology (OT)
BOTAT 113 P	Introduction to Anesthesia Technology (AT)
Generic Elective Course	
GEC 001 L	Pursuit of Inner Self Excellence (POIS)
GEC 002 L	Organizational Behavior

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - III
Name of the Course	Introduction to Operation Theatre Technology (OT)
Course Code	BOTAT 112 L

Course Outcomes	<ul style="list-style-type: none"> • Demonstrate a comprehensive understanding of the physical layout of a surgical suite, the importance of transition zones, pre-procedure protocols, and the medico-legal aspects related to consent and patient safety in the operation theatre. • Acquire detailed knowledge of sterilization and disinfection methods, including the use of various sterilizers, cleaning procedures, and infection control measures, ensuring a sterile and safe operation theatre environment. • Develop the skills to manage the perioperative environment, including patient transportation, hazard mitigation, and the maintenance and cleaning of OT equipment, ensuring optimal functioning and patient safety.
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Sr. No.	Topics	No. of Hrs.
1	Introduction to O.T- Physical layout of surgical suite & its importance - Transition zones , Location, Peripheral support areas ,Layout of operation theatre, Special procedure rooms, - pre- procedure protocols(checklist), - consent & medico legal aspects Role of OT & Anesthesia Technologists in OT- Preoperative, intraoperative, postoperative	5
2	Methods of Sterilization & Disinfection of instruments – Definition of sterilization & disinfection, classification of disinfectants, Spaulding classification of instruments, cleaning of instruments, various disinfectants used in OT, sterilization methods (Dry Heat, Moist Heat, Radiation), sterilizers (components, principle of working, procedure, care and maintenance, precautions, & their sterilization control), Universal safety precautions. Sterilization of OT- Daily terminal cleaning , Decontamination and disinfection & sterilization , principle of asepsis, infection control in OT, OT environment, laminar air flow, filters of OT, common antiseptics used in OT, fumigation & its record keeping.	10
3	Care of perioperative environment - Establishing surgical environment - Transportation of patient to the O.T - Environmental, physical, chemical and biological hazards - Appropriate operating room attire - Various methods of chemical treatment – alcohols, phenols, formalin, glutaraldehyde, ETO, BPL, gas plasma sterilization, newer chemical agents - Biomedical Waste Management	7
4	OT Equipment and their maintenance - Introduction of various instruments/equipment's used in OT, Use, care, maintenance & cleaning of OT table, suction machine, anesthesia workstation, OT lights, endoscopes, ECG apparatus, defibrillator, multi para monitor, Laparoscopes, Arthroscope, Gastro scope, bronchoscope, USG machine Cleaning, disinfection and sterilization of all anesthetic equipment's & rubber materials	8
Total		30 hrs

BOTAT 112 P: Introduction to Operation Theatre Technology (OT)

Sr. No.	Topics	No. of Hrs.
1	Identification and demonstration of various equipment's in OT, handling of sterilized articles	5
2	Reception and preparation of patient for surgery, observation of patients during operation & post-operative periods, Helping surgeons and others to washup and drape for operation,	5
3	Preparation of dressing, swabs & packs, packing of drums for sterilization, Lay out of instruments trolley	5
4	Packing, collection and dispatch of samples for sterility, preparation of antiseptic solutions in common use in operation theatre	5
5	Procedure for sending specimen for biopsy and aspirated fluid for culture, Disposal of Biomedical Waste	5
6	Preparation of Electronic gadgets for Run (laparoscope, cautery, work station, cable connections	5
Total		30 hrs

Reference:

1. A A. Ahanatha Pillai Manual of AT/OT Technicians.
2. Berry & Kohnis-Berry and Kohnis Operating RAM Technique.

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - III
Name of the Course	Introduction to Anesthesia Technology (AT)
Course Code	BOTAT 113 L

Course Outcomes	<ul style="list-style-type: none"> Gain a thorough understanding of the history of anesthesia and develop expertise in various anesthesia techniques, including general, regional, and monitored anesthesia care, with a focus on preparation, patient positioning, drug administration, and managing side effects. Demonstrate competence in pre-procedure protocols, including patient identification, equipment checks, and record-keeping, ensuring that all necessary anesthesia and resuscitation equipment is available, functional, and properly maintained. Perform comprehensive pre-anesthetic evaluations, including patient history, physical examination, and necessary investigations, while effectively managing intraoperative monitoring, anesthesia maintenance, and postoperative recovery, including handling potential complications.
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Sr. No.	Topics	No. of Hrs.
1	History of Anesthesia: First successful clinical demonstration: Pre - historic (ether) era, Regional anesthetic era, Intravenous anesthetic era, Modern anesthetic era, balanced anesthesia, Minimum standard of anesthesia, Types of Anesthesia Techniques: General Anesthesia, Regional Anesthesia - Including Local, Epidural, Spinal and Nerve Block Anesthesia., Combined General and Epidural Anesthesia, Monitored Anesthesia Care with Conscious Sedation (definition, procedure, preparation, position of patient, required drugs, doses, side effects)	6
2	Pre- procedure protocols – Confirm the identification of the patient, Checking of OT list, record keeping of OT list, checking of oxygen source, N2O source, suction machine, Laryngoscopes, ET tubes, airway trolley, Cannula's and Catheters for IV accessibility, IV Fluids, anesthesia machine, Cardiac Monitor, Pulseoximeter, EtCO2, Vaporizers, Face Mask. Identification and use of anesthesia resuscitation equipment available on trolley- AMBU bag, endotracheal tubes sizes, tracheostomy tray, nasal and oropharyngeal airways and their sizes, laryngoscopes with different types of blades, stylets, connectors, bougies and supraglottic airway devices, proper cleaning and storage of all anesthesia equipment's	6
3	Pre- anesthetic evaluation: Chief complaints, Past history - Disease / Surgery / personal history - Smoking / alcohol; allergies, vital signs co-morbidities, obstetric history (females) Examination- General assessment & systemic examination –CVS, RS, CNS, Abdomen Investigations- Routine & Specific investigations (CT, MRI, Angiography etc), Case acceptance, ASA Grading- I, II, III, IV, V, VI Pre-Op Preparation: NBM, equipment checklist, drugs checklist, informed consent, WHO (surgical safety checklist), surgical site preparation, IV cannulation, antibiotics, premedications and its advantages, drugs to be continued and discontinued before surgery, Special instructions - if any	6
4	Drugs used in Anesthesia (identification, indication, contraindication, side effects) General Anesthesia- Premedications (oxygen, glycopyrrolate, atropine, ondansetron, ranitidine, midazolam, pentazocine, fentanyl, tramadol) inducing agents (barbiturates and non-barbiturates), inhalational agents, muscle relaxants (depolarizing and non - depolarizing agents), reversal agents Local anesthesia – Lignocaine (1%, 2%, 4%, 5%, 10% etc), topical, spray ,EMLA Regional anesthesia- Bupivacaine 0.5%, Ropivacaine, Lignocaine with adrenaline,	7

	Additives- clonidine, fentanyl, buprenorphine Emergency drugs	
5	Intraoperative Monitoring & management- vital signs, blood loss, urine output, depth of anesthesia, surgical requirements, maintenance of patient under anesthesia, IV fluids, skin color, anesthesia workstation. Monitoring – minimum, Non-invasive & Invasive monitoring, disconnection of Endotracheal tube/ circuit, Blood / fluid & electrolyte balance, Reversal from anesthesia - drugs used, Transferring the patient from OT to recovery room, Recovery room – set up, equipment's, monitoring done Post-operative complications & management- Recovery and delayed recovery, post-operative hypoxia and oxygen therapy, PONV	5
Total		30 hrs

BOTAT 113 P: Introduction to Anesthesia Technology (AT)

Sr. No.	Topics	No. of Hrs.
1	Pre-Procedure Protocol- Check the correctness of patients' names, age, address, type of surgery and consent for surgery.	2
2	Anesthesia Equipment's- Description and working of machines and appliances used for anesthesia like Boyle's machine, airway, endotracheal tubes, laryngoscopes etc. <ul style="list-style-type: none"> • Setting a difficult airway cart, crash cart, spinal and epidural tray. • Daily checking of anesthesia workstations, monitors, defibrillators, ventilators and suction machines. • Complete knowledge of Alarms and an essential practice to respond immediately to low saturation, low pressure, high pressure alarms and disconnection alarms is a must. 	6
3	Setting Difficult Airway Cart- difficult intubation trolley & Emergency drugs	6
4	Drug Dilution- <ul style="list-style-type: none"> • Various dilutions and percentages. • Importance of reading labels and preparing drugs and correct labelling methods as adopted by the treating Anesthesiologist. • Knowledge of operating syringe pumps. 	6
5	Preparation for anesthesia General anesthesia - Confirm NBM, consent, nature of surgery, patient name and surgery on OT list, IPD number and whether patient is accompanied with relatives or not. <ul style="list-style-type: none"> • Check for OPD/IPD numbers and papers. See if surgery is advised on paper. • Check NBM status. Check availability of all concerned forms to case paper like registration number, MRD number, • Check MLC number, Consent from Medical Superintendent of Mental Hospital in case mental patient is operated. Also consent from jail authority if a prisoner is getting operated. • Patient positioning as per Surgeon's advice. Arrange for arm- boards, leg-boards, back rests, stirrups, eye-pads and ear plugs. • Set up monitors; ask for need for IV line. • Arrange for required drugs as desired by the anesthetists. • Checking of anesthesia workstations, monitors, defibrillators, ventilators and 	10

	<p>suction machines.</p> <p>Complete knowledge of Alarms and an essential practice to respond immediately to low saturation, low pressure, high pressure alarms and disconnection alarms.</p> <p>Spinal anesthesia- Confirm NBM, consent, nature of surgery, patient name and surgery on OT list, IPD number and whether patient is accompanied with relatives or not.</p> <ul style="list-style-type: none"> • Position for spinal anesthesia. Make available agents used for part preparation. Provide sterile spinal tray. Disposal of used items. <p>Epidural anesthesia- Same as above for Epidural anesthesia.</p> <p>Contents of epidural set, sterilization and need to maintain epidural catheter for post-operative analgesia in recovery room.</p> <p>Local and sedation- Check for OPD/IPD numbers and papers. See if surgery is advised on paper.</p> <ul style="list-style-type: none"> • Check NBM status, accompanying persons present or not. • Patient positioning as per Surgeon's advice. Arrange for arm- boards, leg-boards, back rests, stirrups, eye-pads and ear plugs. • Set up monitors; ask for need for IV line. • Arranging Drugs as desired by the anesthetists. <p>Monitor for vomiting, retching, flushing, rashes, itching etc</p>	
Total		30 hrs

Reference books:

1. Anesthesia Manual-A.A. Ahanatha Pillai
2. Lee synopsis (Handbook of Anaesthesia)

Name of the Programme	B.Sc. Operation Theatre & Anesthesia Technology
Semester	Semester - III
Name of the Course	Principles of Anesthesia
Course Code	BOTAT 114 L

Course Outcomes	<ul style="list-style-type: none"> • Demonstrate a thorough understanding of medical gas supply systems, including the types, care, and identification of gas cylinders, color coding, central gas pipelines, and the operation and maintenance of safety devices and alarms. • Develop competence in the operation and maintenance of anesthesia machines and breathing systems, including understanding their components, classification, and safe use during anesthesia administration • Acquire practical skills in IV catheterization, patient monitoring, administration of medications, and nursing care during medical illnesses, with a focus on safe practices and effective patient care.
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Sr. No.	Topics	No. of Hrs.
1	Medical Gas supply: Various types of gas cylinders- types, care and Identification(Oxygen, N ₂ O, CO ₂), Color coding of various cylinders, Cylinder valves; pin index, Gas piping system, Recommendations for piping system, Alarms & other safety devices, Scavenging of waste anesthetic gases. Central gas pipeline, Manifold system, Liquid O ₂ , Regular checking of supply to OT. Checking of integrity of alarms and pressures.	3
2	Breathing System: General considerations- humidity & heat, Components –connectors, adaptors, reservoir bags, ETCO ₂ & Capnography, pulse oximetry, Classification of breathing system (open, semi-open, semi- closed, closed) Mapleson system - a b c d e f, Jackson Rees system, Bain circuit, Non breathing valves, parts of AMBU bag, Filters, the circle system	3
3	Anesthesia Machine- hanger and yoke system, cylinder pressure gauge, pressure regulator, flow meter assembly, vaporizers- types, hazards maintenance, filling and draining etc.	3
4	Administration of Oxygen- oxygen delivery devices (high flow devices & low flow devices)	2
5	IV Catheterization – preparation, safety precautions, types of cannula (size & colour)	2
6	Passage of Gastric Tube- giving fluids by mouth, Ryles tube, Enema	2
7	Nursing care during medical illness- convulsions, poisoning, asphyxia, anaphylactic shock	3
8	Nursing care during common diseases - myocardial infarction, congestive cardiac failure, infective hepatitis, peptic ulcer, pneumonia etc. immunization	3
9	Injection by various routes - prepare injection trays, check labels to confirm names of drugs contained and recheck the market names, proper disposal of used sharps, syringes, IV sets, transfusion sets and blood stained gauze pieces, monitoring for response of the patient after medication	3
10	Intake output chart- chart about intake through IV and RT, estimate output of patient from urine, stools, respiration, and sweating, pleural and peritoneal drains daily, recording blood loss from pleural, peritoneal, p/v discharge, joint drains and serous discharge from burns .	3

11	Blood sugar measurement- indications, method of blood collection., use of glucometer	3
Total		30 hrs

Reference:

1. Anaesthesia Manual-A.A.Ahanatha Pillai
2. Operation Theatre Technique, Anesthesia , And Emergency care- Vaishali Mohod

Course Code- BOTAT 115 CP: OTAT Directed Clinical Education – I

Students will observe the basic operations of the operation theatre while interacting with the multidisciplinary team members involved in providing optimal care to the patients. The student will be introduced to terminologies, equipment, and techniques used for preparation and management of the OT.
(Total -405 hrs.)

GENERIC ELECTIVE COURSE

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - III
Name of the Course	Pursuit of Inner Self Excellence (POIS)
Course Code	GEC 001 L

Course Outcomes	<ul style="list-style-type: none"> • Students will become self-dependent, more debility for their study and career related matter decisive and develop intuitive • Student's ability to present their ideas will be developed. • Enhanced communication skills, public speaking & improved Presentation ability. • Students will be able to explore their inner potential and inner ability to become a successful researcher or technician & hence become more focused. • Students will observe significant reduction in stress level. • With the development of personal attributes like Empathy, Compassion, Service, Love & brotherhood, students will serve the society and industry in better way with teamwork and thus grow professionally.
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Sr. No.	Topics	No. of Hrs.
1	Spiritual Values for human excellence: The value of human integration; Compassion, universal love and brotherhood (Universal Prayer); Heart based living; Silence and its values, Peace and non-violence in thought, word and deed; Ancient treasure of values - Shatsampatti, Patanjali's Ashtanga Yoga, Vedic education - The role of the Acharya, values drawn from various cultures and religious practices - Ubuntu, Buddhism, etc.; Why spirituality? Concept – significance; Thought culture	10
2	Ways and Means: Correlation between the values and the subject; Different teaching techniques to impart value education; Introduction to Brighter Minds initiative; Principles of Communication; Inspiration from the lives of Masters for spiritual values - Role of the living Master	15
3	Integrating spiritual values and life: Relevance of VBSE (Value Based Spiritual Education) in contemporary life; Significant spiritual values; Spiritual destiny; Principles of Self-management; Designing destiny	10
4	Experiencing through the heart for self-transformation (Heartfulness Meditation): Who am I? ; Introduction to Relaxation; Why, what and how HFN Meditation?; Journal writing for Self-Observation ; Why, what and how HFN Rejuvenation (Cleaning)? ; Why, what and how HFN connect to Self (Prayer)?; Pursuit of inner self excellence ; Collective Consciousness-concept of <i>egregore effect</i> ;	10
Total		45 hrs

Books:

- The Art of Learning: **A Journey in the Pursuit of Excellence**, Josh Waitzkin, Simon and Schuster, 2007
- Reality at Dawn. By Shri Ram Chandra, Published by ISRC

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - III
Name of the Course	Organizational Behavior
Course Code	GEC 002 L

Course Outcomes	<ul style="list-style-type: none"> • Describe and apply motivation theories to team and organizational scenarios in order achieve a team's or an organization's goals and objectives. • Explain the effect of personality, attitudes, perceptions and attributions on their own and other's behaviors in team and organizational settings. • Explain types of teams and apply team development, team effectiveness, and group decision making models and techniques.
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Sr. No.	Topics	No. of Hrs.
1	Organizational Behavior - Definition - Importance - Historical Background - Fundamental concepts of OB - 21st Century corporate - Different models of OB i.e. autocratic, custodial, supportive	6
2	Organization Structure and Design - Authority and Responsibility Relationships - Delegation of Authority and Decentralization - Interdepartmental Coordination - Emerging Trends in Corporate Structure, Strategy and Culture - Impact of Technology on Organizational design - Mechanistic vs Adoptive Structures – Formal and Informal Organization	8
3	Perception Process - Nature & Importance - Perceptual Selectivity - Perceptual Organization - Social Perception - Impression Management	6
4	Learning - Process of Learning - Principles of Learning - Organizational Reward Systems – Behavioral Management	6
5	Motivation - Motives - Characteristics - Classification of motives - Primary Motives - Secondary motives - Morale - Definition and relationship with productivity – Morale Indicators	6
6	Leadership - Definition - Importance - Leadership Styles - Models and Theories of Leadership Styles	7
7	Conflict Management - Traditional vis-a-vis Modern view of conflict - Constructive and Destructive conflict - Conflict Process - Strategies for encouraging constructive conflict - Strategies for resolving destructive conflict	6
Total		45 hrs

Books:

1. Organizational Behavior, 9th Ed. - Stephen Robbins
2. Human Behaviour at work - Davis and Newstorm
3. Organizational Behaviour - Uma Sekaran
4. Organizational Behaviour - Fred Luthans
5. Organizational Behaviour - K. Aswathappa
6. Human Behaviour at Work - Keith Davis
7. Organizational Behaviour - Jit S. Chandran
8. Human Relations & Organizational Behaviour - R.S. Dwivedi
9. Organizational Behaviour - McShane

SECOND YEAR

B.Sc. Operation Theater & Anesthesia Technology

SEMESTER-IV

Code No.	Core Subjects
Theory	
BOTAT 116 L	Basic Techniques of Anesthesia
BOTAT 117 L	Medical Emergencies & Its Management
BOTAT 118 L	Medicine Relevant to OT Technology
BOTAT 119 CP	OTAT Directed Clinical Education-II
Practical	
BOTAT 116 P	Basic Techniques of Anesthesia
Ability Enhancement Course	
AEC 003 L	Computer and Applications
AEC 004 L	Good Clinical Laboratory Practice Research & Skills

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - IV
Name of the Course	Basic Techniques of Anesthesia
Course Code	BOTAT 116 L

Course Outcomes	<ul style="list-style-type: none"> • Develop a thorough understanding and practical skills in basic life support (BLS) techniques, including circulation, airway, and breathing management, along with the effective use of resuscitation equipment such as AEDs, defibrillators, and administration of CPR drugs. • Conduct comprehensive pre-anesthetic evaluations with a focus on patients with complex medical conditions such as ischemic heart disease, respiratory disorders, CNS diseases, and more, while preparing and managing anesthesia drugs and techniques specific to these conditions. • Acquire the knowledge and skills necessary to manage blood transfusions safely, including understanding blood groups, cross-matching, monitoring for transfusion reactions, and ensuring proper documentation, as well as providing comprehensive post-operative care and pain management.
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Sr. No.	Topics	No. of Hrs.
1	Resuscitation techniques: . Basic life support (Circulation, Airway, Breathing) and the equipment used for it, Drugs used in CPR, AED and Defibrillators, components of high-quality CPR Anesthesia ventilator and working principle- Monitoring- ECG, SPO2, IBP, CVP, PA pressure, LA pressure	15
2	Pre-Anesthetic Evaluation & drug preparation with view of diseases: Ischemic Heart diseases- Acute MI Valvular Heart diseases- Mitral & Aortic (stenosis & Regurgitation) Respiratory diseases - COPD, Bronchiectasis, Asthma, Pneumonia, ARF, Tuberculosis CNS diseases- Cerebral edema, ocular trauma, Meningitis, Encephalitis, Liver diseases- Hepatitis, Jaundice, Cirrhosis Renal Diseases - Renal failure Endocrine diseases - DM, DI, Thyroid dysfunction Obesity, Anemia Anesthesia drugs and techniques: phases of anesthesia, endotracheal intubation technique, General anesthesia, regional anesthesia, local anesthesia, Various intravenous fluids (crystalloids & colloids). Blood transfusion: Various blood groups, Method of Blood transfusion, blood components , Indication & hazards of blood transfusion <ul style="list-style-type: none"> • ABO blood grouping system and Rh typing of blood. • Standard universal color coding of blood groups. • Cross-matching and rechecking and documentation on paper. • System of numbering of blood bags, registration number of patients and entry of dates of collection and supply of blood and blood product bags. • Importance of checking the date of expiry. • Importance of monitoring blood transfusion and identification of reaction to incompatible blood. • Importance of reporting a transfusion reaction to concerned blood bank Patient identification, marking, shifting to OT before surgery and out of OT, to recovery room after surgery, complete takeover and handover of the patient with vital signs recording, review of checklist of drugs and procedure, Care of patient in the recovery room, Post-operative pain: evaluation and management	15
Total		30 hrs

BOTAT 116 P: Basic techniques of Anesthesia

Sr. No.	Topics	No. of Hrs.
1	Steps of CPR , chain of survival	2
2	Endotracheal tubes: Checking of ET tube, leaks, size and selection of type of ET tube according to patient	2
3	Facemask: types, its sizes, cleaning and maintenance	2
4	Checking of Anesthesia ventilators and its working	2
5	Identification of IV fluids- crystalloids & colloids and its preparation	3
6	Assisting to anesthesiologist in giving anesthesia., Psychological aspects of patient, staff and relatives of the patient,	2
7	Checking of blood bags and its expiry	2
8	Calculation of IV fluids & drugs for patient with diseases	2
9	Different types of pulse oximeter probes and its working	2
10	Checking, care and maintenance of AED & Defibrillator	2
11	Maintenance of anesthesia equipment's, records and charts.	2
12	Explosion Risk: Firefighting, Assisting for CPR	3
13	Common Infusion fluids and steps of starting of IV therapy	2
14	Boyles apparatus- different parts, checking machine for leakage, safety features present	2
Total		30 hrs

Reference:

1. Anesthesia manual –A.A. Ahanatha Pillai
2. Lee synopsis (Handbook of Anesthesia)

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - IV
Name of the Course	Medical Emergencies & Its Management
Course Code	BOTAT 117 L

Course Outcomes	<ul style="list-style-type: none"> Develop advanced skills in managing difficult airway situations, including difficult mask ventilation, intubation challenges, CVCI (Can't Ventilate, Can't Intubate) scenarios, and emergency airway management techniques such as cricothyrotomy and fiberoptic intubation. Demonstrate competence in first aid for fractures, dislocations, and sprains, management of intraoperative emergencies such as cardiac arrest, and preparedness for trauma and emergency surgeries, including the management of OT fires and electrical mishaps. Acquire skills in managing acute post-operative pain using various analgesic delivery systems, including patient-controlled analgesia and neuraxial analgesia, and in preventing and managing post-operative complications such as malignant hyperthermia, shivering, and electrolyte imbalances.
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Sr. No.	Topics	No. of Hrs.
1	- Difficult mask ventilation, Difficult intubation, CVCI, Hypoxia, Tight bag, Bronchospasm, Laryngospasm - Hypertension, Hypotension, Bradycardia, Tachycardia, Hypothermia, Arrhythmia	4
2	- First aid of fractures, dislocations and sprains. Preparation of such patients for OT - First aid in case of shock. Artificial respiration. - Classification and application of splints.	4
3	-Hyperthermia-Malignant hyperthermia -Shivering -Raised ICP -Hypercarbia -Thyroid dysfunction -Electrolyte imbalances	4
4	-High spinal -Total spinal -Anaphylaxis -Pulmonary edema -DIC - Head Injury- classification & mechanism	4
5	-Mismatched blood transfusion -TURP syndrome -LA toxicity -Emergency LSCS -PPH	4
6	-Intraoperative cardiac arrest -Post-operative restlessness -OT fire & electrical mishap Concept of emergency surgeries & trauma and emergency preparedness in OT	4
7	-Poisoning- Clinical features and first aid (Organophosphorus, snake and scorpion bites and sedative poisoning). -Burns and scalds, rule of 9, first aid. -Common causes and first aid of unconsciousness -First aid in case of drowning	4

	-Transport of accident casualties	
8	Management: Airway assessment : -Management of obstructed airway -Triple maneuver -Gadgets to manage airway obstruction -Laryngoscopy and intubation -Surgical airway -Airway management technique -Ventilation with a face mask -Endotracheal intubation -Fiberoptic Endotracheal intubation o Airway blocks o Preparation o Technique of fibre optic intubation	4
9	Difficult airway management -Use of LMA/different gadgets -Proper use of stylet/bougie -Retrograde tracheal intubation -Trans tracheal techniques o Cricothyrotomy o PCDT -Complications of tracheal intubation	4
10	Airway management in infants and children o Airway difference between infants and adults o Managing the normal airway in infants and children o Managing the difficult airways in infants and children o Tracheal extubation in infants and children	3
11	Acute post-operative pain management -Analgesic delivery system -Oral administration -Intra muscular administration -Intravenous administration -Patient controlled analgesia -Neuraxial analgesia	3
12	Alternative approach to management of Acute post-operative pain -Peripheral nerve blocks -TENS	3
Total		45 hrs

Reference:

1. George Mathews:- Handbook Medicine
2. Lee Synosis: Anaesthesia Handbook

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - IV
Name of the Course	Medicine Relevant to OT Technology
Course Code	BOTAT 118 L

Course Outcomes	<ul style="list-style-type: none"> • Demonstrate thorough understanding and proficiency in various sterilization techniques, including chemical, thermal, and mechanical methods, to ensure the safety and effectiveness of operation theatre procedures. • Apply appropriate disinfection and sterilization protocols for surgical instruments, anesthetic equipment, and specialized devices like endoscopes, ensuring compliance with healthcare standards. • Critically evaluate and troubleshoot the sterilization processes, identifying potential pitfalls and ensuring the reliability of methods such as autoclaving, UV treatment, and laminar airflow systems.
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Sr. No.	Topics	No. of Hrs.
1	Premedicates and adjuncts Antisialogoues Atropine – formulation & dosage, actions, uses, adverse effects Glycopyrrolate - formulation & dosage, actions, uses, adverse effects Antemetics Metoclopramide - formulation & dosage, actions, uses, adverse effects Ondansetron - formulation & dosage, actions, uses, adverse effects Anxiolytics: Diazepam, Midazolam, Phenergan, Lorazepam, Narcotics: Morphine, Pethidine, Fentanyl, Pentazocine, tramadol Antacids- H2 blockers	9
2	IV Agents Thiopentone (Physical form, Dilution dosage, actions, side effects) Propofol (Physical form, contents, dosage, actions, adverse effects, uses) Ketamine (Physical form, dosage, actions, adverse effects, uses) Etomidate (Physical form, dosage, actions, adverse effects & uses) Inhalational Agents – Classification Gases- O2, N2O, Air Halothane – MAC, Color coding, actions, uses, side effect Isoflurane - MAC, Color coding, actions, uses, side effect Sevoflurane - MAC, Color coding, actions, uses, side effect Desflurane - MAC, Color coding, actions, uses, side effect	9
3	Benzodiazepines Diazepam – MOA, formulation & dosage, uses, side effects Lorazepam - MOA, formulation & dosage, uses, side effects Midazolam - MOA, formulation & dosage, uses, side effects Opioids – classification 1. Morphine – MOA, formulation & dosage, uses, adverse effects & antagonists 2. Pethidine – MOA, formulation & dosage, uses, adverse effects & antagonists 3. Fentanyl - MOA, formulation & dosage, uses, adverse effects & antagonists Alfa2 agonists : Dexmedetomidine- MOA, formulation & dosage, dilution, actions, uses, adverse effects. Muscle relaxants – classification Depolarising- succinyl choline – formulation & dosage, action, uses, adverse effects Non – depolarising- Vecuronium – formulation & dosage, metabolism, action, uses, reversal, adverse effects. - Atracurium - formulation & dosage, metabolism, action, uses, reversal, adverse effects Rocuronium - formulation & dosage, metabolism, action, uses, reversal, adverse effects Reversal agents-	9

	Neostigmine - formulation & dosage, metabolism, action, uses, reversal, adverse effects Naloxone, Flumazenil	
4	Local anaesthetics – classification Lidocaine – formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose. Bupivacaine - formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose. Ropivacaine - formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose. Levo bupivacaine - formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose. Fluids crystalloids – types available. Contents (DNS, NS, RL) – uses Colloids - types, specific indication, adverse effects	9
5	Emergency Drugs : Mode or administration, dilution, dosage and effects Adrenaline, Atropine, Ephedrine, Mephentramine, Bicarbonate, calcium, potassium, Inotropes: dopamine, dobutamine, amiodarone, Aminophylline, hydrocortisone, antihistaminic, Antihypertensive –Beta-blockers, Ca-channel blockers, Antiarrhythmic- xylocard, Vasodilators- nitroglycerin & sodium nitroprusside, Respiratory system- Bronchodilators. Renal system- Diuretics, frusemide, mannitol	9
Total		45 hrs

Reference:

1. Lee Synosis
2. Morgan (Anaesthesia Books)
3. Tripathi (Book of Pharmacology)

Course Code- BOTAT 119 CP: OTAT Directed Clinical Education –II

Students will gain additional skills in clinical preparation, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a senior technical officer

(Total – 405 hrs.)

ABILITY ENHANCEMENT ELECTIVE COURSE

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - IV
Name of the Course	Computers and Applications
Course Code	AEC 003 L

Course Outcomes	<ul style="list-style-type: none"> • Introduction to Hardware and processing of computers and storage devices. • Adept knowledge of computer software and applications such as Microsoft office (Word, Excel and Power Point) • Application of operating systems, computer networks & internet in Health Care Settings.
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Sr. No.	Topics	No. of Hrs.
1	Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.	1
2	Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).	3
3	Processor and memory: The Central Processing Unit (CPU), main memory.	4
4	Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.	3
5	Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).	5
6	Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.	5
7	Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.	5
8	Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.	5
9	Introduction of Operating System: introduction, operating system concepts, types of operating system.	4
10	Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.	5
11	Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.	4
12	Application of Computers in clinical settings.	1
Total		45 hrs

Text books:

- (1) Mausner & Bahn : Epidemiology-An Introductory text, 2nd Ed., W.B. Saunders Co.
- (2) Richard f. Morton & j. Richard Hebd : A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
- (3) Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - IV
Name of the Course	Good Clinical Laboratory Practice Research & Skills
Course Code	AEC 004 L

Course Outcomes	<ul style="list-style-type: none"> • Proficiency an adept knowledge of Good Clinical Laboratory Practice (GCLP), ethical principles and guidelines to ensure patient rights and welfare in clinical research. • Understand the importance of Ethical Guidelines and Good Documentation Practices (GDP) in conducting Clinical Research. • Effectively understand the Basics of Biostatistics, Research Study Designing, Methodology, Implementation and Grant Application.
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Sr. No.	Topics	No. of Hrs.
1	Introduction to Good Clinical Laboratory Practice; Definition and principles of GCLP, Historical background and evolution, Regulatory guidelines and standards (e.g., FDA, ICH, WHO), Ethical considerations in clinical research.	10
2	Laboratory Safety and Quality Assurance; Laboratory safety protocols and precautions, Risk assessment and mitigation strategies, Quality control and quality assurance measures, Documentation and record-keeping practices.	5
3	Basic of Biostatistics; Sampling Techniques, Experimental Designs, Basic Data analysis methods, Preparation of Frequency Table, Mean, Mode and Median Analysis.	10
4	Research Ethics and Good Documentation Practices; Ethical principles in clinical research, Informed consent process, Good Documentation Practice (GDP) guidelines, Adverse event reporting and ethical considerations.	5
5	Research Protocol Design and Implementation; Components of a research protocol, Study design and methodology, Protocol review and approval process, Practical considerations in protocol implementation.	10
6	Proposal writing and grant application process; Components of the research proposal, General Considerations in the Proposal formulations, Stages of Proposal Evaluations, Introduction of various funding agencies.	5
Total		45 hrs

THIRD YEAR

B.Sc. Operation Theater & Anesthesia Technology

SEMESTER-V

Code No.	Core Subjects
Theory	
BOTAT 120 L	Basics of Surgical Procedures
BOTAT 121 L	CSSD Procedures
BOTAT 122 L	Advance Anesthetic Techniques
BOTAT 123 CP	OTAT Directed Clinical Education-III
Practical	
BOTAT 120 P	Basics of Surgical Procedures
BOTAT 122 P	Advance Anesthetic Techniques
Discipline Specific Elective	
DSE 001 L	Basics of Clinical Skills Learning
DSE 002 L	Hospital Operation Management

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - V
Name of the Course	Basics of Surgical Procedures
Course Code	BOTAT 120 L

Course Outcomes	<ul style="list-style-type: none"> • Demonstrate a thorough understanding of surgical history, the role of the surgeon, and the importance of teamwork and anticipating the needs of the surgical team. Students will also be proficient in identifying and managing hemorrhage, understanding different types of wounds and their healing processes, and applying aseptic techniques for skin preparation and wound care. • Develop skills in preparing instrument trolleys for various types of surgeries, including general, orthopedic, cardiac, plastic, neuro, urological, gynecological, and ophthalmological procedures. Students will also gain knowledge about different types of sutures and suture needles used in these surgeries. • Acquire the ability to handle various aspects of surgical procedures, including emergency procedures, by understanding surgical terminology, types of incisions, tourniquet use, and the management of surgical wounds and infections.
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Sr. No.	Topics	No. of Hrs.
1	Basics of surgery <ul style="list-style-type: none"> - History of Surgery, role of the surgeon, importance of team work and anticipating the needs of surgeons; stresses that may arise during operative procedure - surgical terminology, types of incision and indications for the use of particular incision; - Hemorrhage-signs and symptoms of internal and external; classification and management; - identification of types of tourniquets reasons for use and duration of application, dangers of use; - Wounds, types, process of healing, treatment and complications; inflammation; wound infections- causes and treatment; incision and drainage of abscesses; importance of personal cleanliness and aseptic techniques; - Pre-operative and post-operative care of the surgical patient; Emergency procedures; - Knowledge of surgical asepsis, skin preparation for invasive procedures 	15
2	Trolley Preparation for different surgeries (Instrument trolley): <ul style="list-style-type: none"> - General Surgery - Orthopedic surgery - Cardiac Surgery - Plastic surgery - Neuro surgery - Urological & pelvic surgery - Gynecological surgery - Ophthalmology Types of suture- absorbable and non- absorbable Types of suture needles	15
Total		30 hrs

BOTAT 120 P: Basics of surgical procedures

Sr. No.	Topics	No. of Hrs.
1	Identification and demonstration of types of sutures	3
2	Use of Comfort Devices –Bed Cradle, sand bags, bed Blocks, Cardiac Table	5
3	Identification and demonstration of types of needles	6
4	Calculation of fluid, starting/administration of iv Fluids	5
5	Tray preparation for different surgeries	6
6	Assist in dressing, Suture care, Care of Drain	5
Total		30 hrs

Reference:

1. Anaesthesia Manual A.A
2. Less Synopsis- Book of Anaesthesia
3. Medical Surgical- Brunner & Siddharath

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - V
Name of the Course	CSSD Procedures
Course Code	BOTAT 121 L

Course Outcomes	<ul style="list-style-type: none"> Understand and apply the principles and functions of CSSD, including waste disposal, protective clothing, and disinfection safeguards in the reception area. Efficiently sort, pack, and sterilize equipment, including using appropriate materials and methods to indicate sterilization. Master various sterilization techniques (moist heat, dry heat, ETO, H₂O₂) and apply general principles to ensure effective sterilization.
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Sr. No.	Topics	No. of Hrs.
1	CSSD <ul style="list-style-type: none"> Objectives, functioning & activities of CSSD Waste disposal, collection of used items from user area, reception area, and reception protective clothing and disinfection safe guards. Use of disinfectants, sorting and classification of equipment for cleaning purposes, sharps, blunt lighted etc, contaminated high risk care- delicate instruments or hot care instruments Materials used for wrapping and packing, assembling pack contents. Types of packs prepared, inclusion of trays and gallipots in packs, method of wrapping and making use of indicators to show that a pack of container has been through a sterilization process date General observation, principles of sterilization, moist heat sterilization, dry heat, ETO, H₂O₂ gas plasma vapour sterilization 	30
Total		30 hrs

Reference:

1. Anaesthesia Manual- A. A. Ahanatha Pillai

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - V
Name of the Course	Advance Anesthesia Techniques
Course Code	BOTAT 122 L

Course Outcomes	<ul style="list-style-type: none"> • Understand the heart's function as a pump, the cardiac cycle, cardiac contractility, stroke volume, and cardiac output. Be able to measure cardiac output and interpret various ECG leads and normal ECG readings, including identification of common arrhythmias. • Understand circulatory shock, cardiac failure, and arterial pressure regulation. Gain knowledge of hypertension treatments and the operation of the heart-lung machine, including its parts, functions, and associated risks. • Master the principles and various modes of intermittent positive pressure ventilation (IPPV), including operating room ventilators, patient care, disinfection, and complications management. Understand the role of artificial ventilation and related equipment in maintaining acid-base balance and overall respiratory function.
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Sr. No.	Topics	No. of Hrs.
1	<p>Function of Heart as a pump, Cardiac cycle, Cardiac contractility and stroke volume, Cardiac output, and its measurement, Various ECG Leads, their placement and Normal ECG, Cardiac Arrhythmias (atrial fibrillation, ventricular tachycardia, extra systoles), Circulatory shock and its physiology, Cardiac failure, Regulation of arterial pressure and its measurement and hypertension (Drugs used for treatment of hypertension).</p> <p>Heart Lung machine- Uses, parts, functions & working, risks & cardioplegia</p> <p>Artificial ventilation and related equipment, Physiology of IPPV (Intermittent positive pressure ventilation), Principles of mechanical ventilation, Various modes of IPPV, Operating Room Ventilators, Complications in patients on Ventilators, General care of a patient on ventilator, Disinfection and sterilization of ventilators, Humidification, Acid base balance,</p>	30
Total		30 hrs

BOTAT 122 P: Advance Anesthesia Techniques

Sr. No.	Topics	No. of Hrs.
1	Heart lung machine – Connection of catheters, Rollers, Pumps	7
2	Various leads, Recording ECG. Labeling: Connecting ECG apparatus to a patient, positions of various chest leads and limb leads, how to label ECG.	8
3	Settings of Ventilator and monitoring	8
4	Charging of defibrillator, positions of paddles, precautions to be taken while defibrillation.(shock)	7
Total		30 hrs

Reference:

1. Lee Synopsis:- Anesthesia Book
2. Mechanical Ventilation Book – By Chang

Course Code- BOTAT 123 CP: OTAT Directed Clinical Education –III

Students will improve their skills in clinical procedures. Progressive interaction with patients and professional personnel are monitored as students practice in a supervised setting. Additional areas include problem solving, identifying machine components and basic side effect management. Students will demonstrate competence in beginning, intermediate, and advanced procedures.

(Total- 405 hrs.)

DISCIPLINE SPECIFIC ELECTIVE

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - V
Name of the Course	Basics of Clinical Skill Learning
Course Code	DSE 001 L

Course Outcomes	<ul style="list-style-type: none"> • Ability to Measure Vital Signs, do basic physical Examination of the patients, NG tube basics, Administration of Medicines • Understand about Asepsis, and the Cleanliness related to asepsis and on mobility of the patients
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Sr. No.	Topics	No. of Hrs.
1	MEASURING VITAL SIGNS: Temperature: Axillaries Temperature, Pulse: Sites of pulse, Measurement, Respiratory, Blood Pressure, Pain: Pain Scale	5
2	PHYSICAL EXAMINATION: Observation, Auscultation (Chest), Palpation, Percussion, History Taking	10
3	FEEDING: ENTRAL FEEDING, NG TUBE: Measurement, Procedure, Care, Removal of Nasal-Gastric Tube, Nasal-Gastric Tube Feeding, and Parenteral Nutrition.	10
4	ADMINISTRATIONS: Oral, Intravenous, Intramuscular, Subcutaneous, Recapping of Syringe, Loading of Drugs, Calculation of Drugs, Venipuncture, IV Infusion, Cannula, Attachment of IV infusion Set, Fluid Collection, Heparin Lock, Maintenance of IV set, Performing Nebulizer Therapy, Inhaler, Oxygen Therapy (Nasal, prongs, nasal Catheter, Venturi Mask, face mask)	10
5	ASEPSIS: Hand wash Techniques, (Medical, Surgical) Universal Precaution, Protecting Equipments: Using Sterile Gloves, Opening a Sterile package and Establishing a Sterile Field, Sterile Dressing Changes, Surgical Attire, Wound Dressing, Suture Removal, Cleaning and Application of Sterile Dressing, Wearing and Removal of personal protective Equipment	5
6	MOBILITY AND SUPPORT: Moving and Positioning, range of Motion exercises (Active & Passive) Assisting for Transfer, Application of Restraints	5
Total		45 hrs

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - V
Name of the Course	Hospital Operation Management
Course Code	DSE 002 L

Course Outcomes	<ul style="list-style-type: none"> • Understand and apply the knowledge of Medico-Legal regulations and Medical Ethics in Healthcare System. • Ability to utilize Hospital Information system in Hospital services. • Understand the operation management of Equipment's and medical records in Health Care services.
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Sr. No.	Topics	No. of Hrs.
1	MEDICO-LEGAL CASES: Introduction, Laws associated with Medico-Legal Cases, Three Core Contents in Medico-legal cases w.r.t Doctors, Patient & Profession,	5
2	CONSIDERATIONS OF ETHICS: Consent, Confidentiality, Mental Health, End of life and Organ Transportation, Research & Clinical Trials	10
3	HOSPITAL INFORMATION SYSTEM(HIS): Hospital Information System Management, software applications in registration, billing, investigations, reporting, medical records management, Security and ethical challenges	10
4	EQUIPMENT OPERATIONS MANAGEMENT: Hospital equipment repair and maintenance, types of maintenance, job orders, equipment maintenance log books, AMCS	10
5	ROLE OF MEDICAL RECORDS IN HEALTH CARE MANAGEMENT: Computers for Medical records, Developments of computerized medical record information processing system(EMR's), Computer stored (Vs) Manual hand written record, Advantages of EMR (Vs) Manual	10
Total		45 hrs

THIRD YEAR**B.Sc. Operation Theater & Anesthesia Technology****SEMESTER-VI**

Code No.	Core Subjects
Theory	
BOTAT 124 L	Basic Intensive Care
BOTAT 125 L	Specialized Surgery and Anesthesia
BOTAT 126 L	Electronics & Record Keeping for Surgery and Anesthesia
BOTAT 127 CP	OTAT Directed Clinical Education-IV
Practical	
BOTAT 124 P	Basic Intensive Care

Name of the Programme	B.Sc. Operation Theatre & Anaesthesia Technology
Semester	Semester - VI
Name of the Course	Basic Intensive Care
Course Code	BOTAT 124 L

Course Outcomes	<ul style="list-style-type: none"> • Understand and operate electronic systems used in surgery and anesthesia, including monitoring equipment, data recording devices, and alarms. • Accurately maintain and manage records related to surgical and anesthetic procedures, including patient data, procedural documentation, and equipment logs. • Integrate electronic data from various sources to ensure comprehensive patient care and effective communication within the surgical and anesthetic teams.
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Sr. No.	Topics	No. of Hrs.
1	General care of patient in ICU: - Eye - Bladder Skin - Tracheostomy, humidification - Vascular lines - arterial, venous line - Physiotherapy - chest physiotherapy	60
2	Management of Sepsis,	
3	Air conditioning and control of pollution in ICU	
4	Trauma Resuscitation- triage, volume replacement	
5	Care of unconscious adult and pediatric patients.	
6	Suctioning and posturing of semiconscious and unconscious patients.	
7	Fluid balance and parenteral nutrition	
8	Ventilators -Principles of working of different ventilators -Alarms of the ventilator, ventilator checking & calibration	
9	Care & maintenance of equipment's of ICU- monitoring devices, suction machine, ventilators, defibrillator	
10	Monitoring and diagnostic procedures in ICU- - Central Venous access. - ECG monitoring. Invasive hemodynamic monitoring	
Total		60 hrs

Reference:

1. Mechanical Ventilation Book 1 –By Chang

BOTAT 124 P: Basic Intensive Care

Sr. No.	Topics	No. of Hrs.
1	Ventilator Care and Maintenance, Emergency Ventilation Techniques	5
2	Suction Machine Operation and Maintenance, Suctioning and Posturing Techniques	5
3	Oxygen Delivery Devices, Use of Oxygen Concentrators and Tanks, Airway Assessment and Maneuvers	4
4	Use of Bag-Valve-Mask (BVM) Resuscitator, Endotracheal Intubation, Supraglottic Airway Devices	5
5	Breathing Exercises, Mobility and Range of Motion Exercises, Bed Mobility and Positioning, Ryle's Tube Insertion, Hyperalimentation Administration	6
6	Blood Gas Analysis, Principles of ABG Machines	5
Total		30 hrs

Reference:

1. Mechanical Ventilation Book1– By Chang

Name of the Programme	B.Sc. Operation Theatre & Anesthesia Technology
Semester	Semester - VI
Name of the Course	Specialized Surgery and Anesthesia
Course Code	BOTAT 125 L

Course Outcomes	<ul style="list-style-type: none"> • Master positioning, monitoring techniques, and equipment used in cardiothoracic surgeries. Understand principles of temperature monitoring and utilize cardiac, blood pressure, ECG, respiratory monitors, and echocardiography. Proficiently perform arterial and venous cannulations. • Understand positioning, monitoring techniques, and equipment requirements for neurological, abdominal, and plastic surgeries. Adapt anesthesia and surgical requirements to specific procedures, ensuring effective patient care. • Manage positioning, monitoring, and equipment for renal, pediatric, and emergency surgeries. Implement precautions for hepatitis B & C positive patients and adapt techniques for specialized conditions. • Execute precise positioning, monitoring, and equipment use for orthopedic, ophthalmic, and gynecological surgeries, tailored to specific needs.
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Sr. No.	Topics	No. of Hrs.
1	Cardiothoracic surgeries- Positioning, monitoring techniques, & equipment's, Principles and techniques of temperature monitoring, Cardiac monitors, blood pressure and ECG monitoring, Respiratory monitors, respiratory rate, Spirometers, SpO ₂ , and EtCO ₂ , TEE and echocardiography machine, Non- invasive cardiac output machine Positioning and techniques for: Radial artery cannulation, Central venous cannulation/pulmonary artery catheter, Femoral artery/venous cannulation,	15
2	Neurological surgeries- positions including sitting, prone & lateral for (trans-sphenoidal hypo-physectomy, technique for fixation of head, knee chest position for spine surgery), monitoring techniques & equipment's, anesthesia and surgical requirement Abdominal surgeries- (laparoscopic surgery, genitourinary surgery) positions, monitoring techniques & equipment, anesthesia and surgical requirement Plastic surgeries- Positioning, monitoring techniques, & equipment's, anesthesia and surgical requirement	15
3	Renal Surgery- position, monitoring techniques, equipment, anesthesia and surgical requirement (renal transplant donor and recipient surgery) Hepatitis B & C positive patient- Care and precautions during operative procedures Pediatric and Neonatal procedures- positions, monitoring techniques & equipment, anesthesia and surgical requirement Emergency procedures- (tracheo-esophageal fistula. Sub diaphragmatic hernia, foreign body removal from bronchus and esophagus) positions, monitoring techniques & equipment, anesthesia and surgical requirement	15
4	Orthopedic surgeries – Positioning, monitoring techniques, & equipment's, anesthesia and surgical requirement Ophthalmic surgeries - Positioning, monitoring techniques, & equipment's, anesthesia and surgical requirement Gynecological procedures- Positioning, monitoring techniques, & equipment's, anesthesia and surgical requirement	15
Total		60 hrs

Reference:

1. Lee Synopsis Lee synopsis
2. M. Rogan
3. Medical surgical – Brunner & Siddharth
4. Ortho-Lippincott
5. OBG/GYN – D.C. Dutta

Name of the Programme	B.Sc. Operation Theatre & Anesthesia Technology
Semester	Semester - VI
Name of the Course	Electronics & Record Keeping for Surgery and Anesthesia
Course Code	BOTAT 126 L

Course Outcomes	<ul style="list-style-type: none"> Operate and maintain essential OT equipment including operation tables, diathermy machines, operation lights, endoscopy equipment, and operating microscopes. Implement electrical safety precautions and perform basic electronics maintenance. Efficiently manage and maintain records for drugs, disposables, and equipment in OT and ICU. Ensure accurate inventory management, adhere to disposal regulations, and maintain authentic records for patient care and operational efficiency.
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Sr. No.	Topics	No. of Hrs.
1	<p>Electronics and electro mechanical techniques-</p> <ul style="list-style-type: none"> Operation tables <ul style="list-style-type: none"> Features, material used in fabrication and advantages of the material. Care, maintenance and uses. Controls-Hydraulic system, Electrical System. Diathermy/Cautery Machines : <ul style="list-style-type: none"> Different types of diathermy and cautery machines, monopolar, Bipolar and underwater working. Structural features of diathermy and cautery machines. Types of active and passive electrodes. Care, maintenance and uses. Prevention of hazards. Operation Lights:- <ul style="list-style-type: none"> Types of Operation Lights and other Light sources. Structural features, care cleaning carbolisation, maintenance and uses. Endoscopy Equipment <ul style="list-style-type: none"> Types of endoscopes, Rigid & fiber - optic scopes i.e. Bronchoscope, Oesophago – gastro - l scope, laproscopes, Cystoscopes and ephroscope etc. Their structural features, uses care maintenance. Operating Microscope: <ul style="list-style-type: none"> Types and features. Principle structural features operating microscope Microscopic photography and cameras used Care, maintenance and uses Glasses used and property <p>Electrical safety precaution in OT, Basic electronics, basic principle, care and maintenance and uses of defibrillator, Boyle's apparatus, anesthesia machine, monitors, pace-makers and stimulators etc.</p>	30
2	<p>OT Consumables and record keeping</p> <ul style="list-style-type: none"> Maintaining record and arranging & labeling drugs - registers for entering drugs used in OT and ICU, Drug dosage chart, Obtaining and recording of monthly count of all drugs , Importance of stringent record keeping to aid in accounting, prevent malpractices Record of disposables & inventory management: the importance of record keeping to anticipate the requirements in case hospital has to face mass casualty. 	15

	<ul style="list-style-type: none">- Disposal of expired drugs: Importance of keeping a record of disposables Authentic record, that the rules of disposal are followed is to be maintained.- Information about registers related to drugs, record of equipments , working or not, AMC/CMC, daily maintenance: stock books, accessories labelled, list of equipment in working condition- Maintaining records of consumables related to equipments- Receiving & Identification of patient in OT. With Records & Investigations	
Total		45 hrs

Course Code - BOTAT 127 CP: OTAT Directed Clinical Education – IV

The course provides students the opportunity to continue to develop confidence and increased skill in simulation and treatment delivery. Students will demonstrate competence in beginning, intermediate, and advanced procedures in both areas. Students will participate in advanced and specialized treatment procedures. **(Total- 405 hrs.)**

INTERNSHIP

Guidelines:

1. The internship consists of Semester VII & VIII.
2. Duration of the internship shall be 365 days.
3. Internship is compulsory for partial fulfilment of the degree.
4. A Student is allowed to commence internship after appearing for Semester VI examination.
5. Student will be allowed to keep term for Semester VII, if He/She passes each semester V & VI OR fails in not more than 2 courses each in semester V & VI.
6. Candidate shall not be allowed to appear in final semester examination (Semester VIII) unless the candidate has cleared all the previous semester examinations (I to VII).

Evaluation

Formative Evaluation

- Day to day assessment of the interns during their internship postings should be done by the Head of the Department/Faculty assigned / Coordinator.
- The objective is that all the interns must acquire necessary minimum skills required for carrying out day to day professional work competently. This can be achieved by maintaining Records/Log Book by all interns.
- This will not only provide a demonstrable evidence of the processes of training but more importantly of the interns own acquisition of competence as related to performance.

Summative Evaluation:

- It shall be based on the observation of the Sr. Technical staff / Faculty of the department concerned and Record / Log book maintained by the interns. Based on these evaluations and attendance, the Head of the Department shall issue certificate of satisfactory completion of training.
- In order to complete internship, the students has to pass both semester VII & VIII exam (Internal & University) with sufficient attendance.
- The student will be awarded the degree by university only when the student has passed in all the semester (I to VIII) including 365 days of internship.

Internship Programme:

- 05 days for orientation Programme
- 300 days in OT Dept. (By rotation in all OT's)
- 15 days for record keeping
- 15 days for Casualty
- 15 days for Equipment & Maintenance
- 15 days for Microbiology & Sterilisation aspects

**RULES AND REGULATION FOR EXAMINATION
OF UNDER GRADUATE AND POST GRADUATE DEGREE COURSES
UNDER MGM SCHOOL OF BIOMEDICAL SCIENCES AS PER CBCS PATTERN**

**{BOM 52/2018 dated 13.01.2018, BOM 55/ 2018 dated 27.11.2018, AC 40/2021 dated 15.06.2021,
AC 41/2021 dated 17.02.2021, AC 42/2022 dated 26.04.2022, AC 44/2022 dated 09.12.2022,
AC 46/2023 dated 28.04.2023, AC 48/2023 dated 12.12.2023, AC-50/2024 dated
27.11.2024, AC-51-2025 dated 29.04.2025}**

RULES AND REGULATION FOR EXAMINATION OF UNDER GRADUATE AND POST GRADUATE DEGREE COURSES UNDER SCHOOL OF BIOMEDICAL SCIENCES OFFERING CBCS PATTERN

1. Title of the courses offered :

Under Graduate Courses (Allied Health Sciences) :

- 1.1 B.Sc. Medical Laboratory Technology
- 1.2 B.Sc. Medical Radiology & Imaging Technology
- 1.3 B.Sc. Cardiac Care Technology
- 1.4 B.Sc. Perfusion Technology
- 1.5 B.Sc. Medical Dialysis Technology
- 1.6 B.Sc. Operation Theatre & Anaesthesia Technology
- 1.7 B. Optometry
- 1.8 B.Sc. Physician Assistant in Emergency & Trauma Care

Post Graduate Courses:

- 1.9 M.Sc. Medical Biotechnology
- 1.10 M.Sc. Medical Genetics
- 1.11 M.Sc. Clinical Embryology
- 1.12 M.Sc. Molecular Biology
- 1.13 Master in Hospital Administration
- 1.14 M.Sc. Cardiac Care Technology
- 1.15 M.Sc. Medical Radiology & Imaging Technology
- 1.16 M. Optometry
- 1.17 M.Sc. Medical Dialysis Technology
- 1.18 Master of Public Health
- 1.19 M.Sc. Clinical Nutrition
- 1.20 M.Sc. Operation Theatre & Anaesthesia Technology
- 1.21 M.Sc. Emergency & Trauma Care Technology

2. Duration of the course:

- 2.1. Duration shall be for a period of four years, Embedded Internship.
- 2.2 Duration shall be for a period of two years for PG programme.

3. Medium of instruction: The medium of instruction and examination shall be in English

4. Letter Grades And Grade Points:

MGMSBS has adopted the UGC recommended system of awarding grades and CGPA under Choice Based Credit Semester System for all the UG/PG programmes.

4.1 MGMSBS follows absolute grading system, where the marks are compounded to grades based on pre-determined class intervals.

4.2 The UGC recommended 10-point grading system is being followed, with letter grades:

Table 1: Grades and Grade Points:

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B (Good)	7
C (Above Average)	6
F (Fail)/ RA (Reappear)	0
Ab (Absent)	0
Not Completed (NC)	0
RC (<50% in attendance or in Internal Assessment)	

4.3 A student obtaining Grade RA shall be considered failed and will be required to reappear in the examination.

4.4 Candidates with NC grading are those detained in a course (s); while RC indicate student not fulfilling the minimum criteria for academic progress or less than 75% in attendance or less than 50% in internal assessments (IA). Registrations of such students for the respective courses shall be treated as cancelled. If the course is a core course, the candidate has to re-register and repeat the course when it is offered next time.

5. CBCS Grading System - Marks Equivalence Table

5.1 Table 2: Grades and Grade Points

Letter Grade	Grade Point	% of Marks
O (Outstanding)	10	86-100
A+ (Excellent)	9	70-85
A (Very Good)	8	60 -69
B (Good)	7	55 -59
C (Above Average) – Pass both for UG and PGs	6	50- 54
F (Fail))/ RA (Reappear)	0	Less than 50
Ab (Absent)	0	-
NC- not completed	0	-
RC- Repeat the Course	0	0

5.2 Table 3: Cumulative Grades and Grade Points

Letter Grade	Grade Point	CGPA
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O (Outstanding)	10	9.01 - 10.00
A+ (Excellent)	9	8.01 – 9.00
A (Very Good)	8	7.01 – 8.00
B (Good)	7	6.00 - 7.00
C (Above Average)	6	5.01 - 6.00

5.3 The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student,

$$SGPA (S_i) = \sum(C_i \times G_i) / \sum C_i$$

where C_i is the number of credits of the i th course and G_i is the grade point scored by the student in the i th course.

The CGPA is also calculated taking into account all the courses undergone by a student over all the semesters of a programme,

$$i.e. CGPA = \sum(C_i \times S_i) / \sum C_i$$

where S_i is the SGPA of the i th semester and C_i is the total number of credits in that semester. Cumulative grade and grade point table as attached.

5.4 Final Percentage of marks (%) = C.G.P.A based on all Six Semesters/Four Semester/Nine Semester X 10

6. Assessment of a Course:

Evaluation for a course shall be done on a continuous basis. Uniform procedure will be adopted under the CBCS to conduct continuous internal assessments (IA), followed by one end-semester university examination (ES) for each course.

6.1 For all category of courses offered (Theory, Practical, Discipline Specific Elective [DE]/ Lab [DL]; Generic Elective [GE] and Ability Enhancement Courses [AE]; Skills Enhancement Courses [SE] Theory or P (Practical) & RP(Research Project), assessment will comprise of Internal Assessment (IA) and the end-semester (ES) examination.

6.2 Courses in programs wherein Theory and Lab are assessed jointly (UG or PG), the minimum passing head has to be 50% Grade in total including internal assessment. RA grade in any one of the components will amount to reappearing in both components. i.e. theory and practical.

6.3 Evaluation for a course with clinical rotation or clinical training or internship will be done on a continuous basis.

7. Eligibility to appear for the end-semester examinations for a course includes:

7.1 "Resolved to accept" 50% eligibility in internal assessment" pattern for all the CBCS programs (UG & PG) running under the constituent units of MGMIHS. (MGM School of Biomedical Sciences, MGM School of Physiotherapy, MGM Medical College (M.Sc. Medical 3 year courses).

"This will be applicable to all existing batches (for remaining regular examinations) and forthcoming batches from June 2022 onwards" .

7.2 The students desirous of appearing for university examination shall submit the application form duly filled along with the prescribed examination fee.

7.3 Incomplete application forms or application forms submitted without prescribed fee or application form submitted after due date will be rejected and student shall not be allowed to appear for examination.

8. Passing Heads

8.1 Courses where theory and practical are involved, the minimum passing head shall be 50% in total including the internal assessment.

8.2 Elective subjects – the minimum prescribed marks for a pass in elective subject will be 50%. The list of student who have opted to for elective should be submitted to the university.

9 **Detention:** A student not meeting any of the above criteria may be detained (NC) in that particular course for the semester. In the subsequent semester, such a candidate improve in all, including attendance and/or IA minimum to become eligible for the next end-semester examination.

10 The maximum duration for completing the course will be 6 years (minimum duration of course x 2) i.e. (4x2) =6 years for UG courses & (2x2) =4 years for PG Courses, failing which his/her registration will be cancelled. Full fees of entire course of three or two years as the case may be liable to be paid by the students.

11 A maximum 3 attempts (including the first appearance) for appearing the examination will be given to students securing “F” grade in a given course (Core course, elective course, project work/report/dissertation/field work/training work/ etc.), along with the subsequent end semester examination.

12 Carryover Pattern (ATKT rules):

- A student will be allowed to keep term for Semester II irrespective of number of heads of failure in the Semester I.
- A student will be allowed to keep term for Semester III if he/she passes each Semester I & II **OR** fails in not more than two courses each in Semester I & II.
- Student will be allowed to keep term for Semester IV irrespective of number of heads of failure in Semester III. However, the student shall pass each course of Semester I and Semester II in order to appear for Semester IV.
- Student shall be allowed to keep term for Semester V if he/she passes Semester I, Semester II, Semester, III and Semester IV. **OR** shall pass Semester I and Semester II and fails in not more than two courses each in Semester III and Semester IV.
- Student shall be allowed to keep term for Semester VI irrespective of number of heads of failure in Semester V. However, he/she has passes Semester I, Semester II, Semester, III and Semester IV.
- A student will be allowed to keep term for Semester VII if he/she passes each Semester V & VI **OR** fails in not more than two courses each in Semester V & VI.
- A Candidate shall not be allowed to appear in the final semester examination (Semester VIII) unless the candidate has cleared all the previous semester examinations (I to VII).

13 Grace Marks for UG Courses:

Resolution No. 3.10 of Academic Council (AC-50/2024): Resolved to approve the amended Grace marks rule for CBCS Allied programme (Biomedical) for UG Allied Health Sciences programmes under MGM SBS:

1. A Candidate shall be eligible for grace marks only in UG courses.
2. Maximum Grace Marks up to 5 marks may be allowed in case of failure in one or more heads of passing a subject/s or examination in to (Theory/Practical)

Resolution No. 3.24 of Academic Council (AC-51/2025):

Resolved to follow uniform grace mark guidelines as prescribed by MGMIHS (maximum upto 5 marks), applicable to Under Graduate students of **Biomedical Sciences**, Physiotherapy, Prosthetic & Orthotics and Pharmacy . The guidelines as prescribed by the Indian Nursing Council to be followed for B.Sc. and M.Sc. Nursing examinations

14 University End-Semester Examination (UG/PG Programs)

- There will be one final university examination at the end of every semester.
- A candidate must have minimum 75% attendance (Irrespective of the type of absence) in theory and practical in each subject to be eligible for appearing the University examination.
- The principal /dean/ director shall send to the university a certificate of completion of required attendance and other requirements of the applicant as prescribed by the university, two weeks before the date of commencement of the written examination.
- A candidate shall be eligible to sit for the examination only, if she / he has secured minimum 50% in internal assessment of that subject. The internal examinations will be conducted at college/ department level.
- Notwithstanding – anything in any examination, a deficiency of attendance at lectures or practical maximum to the extent of 10% - may be condoned by the principal / dean /director.
- If a candidate fails either in theory or in practical, he/ she have to re-appear for both.
- There shall be no provision of re- evaluation of answer sheets for PG programe. Candidates may apply to the university following due procedure for recounting of theory marks in the presence of the subject experts.
- Internal assessments shall be submitted by the Head of the Department to the institute which will be then be forwarded to the university through the Director of MGMSBS at least two weeks before commencement of University theory examination.
- The university examination for first year (UG) shall consist of only theory examination and there shall be no university practical examination.

15. Supplementary examination: There shall be no supplementary examination

16. Re-Verification / Retotaling (UG & PG programs)

- There shall be provision of retotaling of the answer sheets, candidate shall be permitted to apply for recounting/retotaling of theory papers within 8 days from the date of declaration of results.
- Provision of revolution only for UG programs.

Revised Re-Evaluation Rules:

This is with reference to the Circular No. 02-June/2025 - (Reference No. MGMIHS/57.2/X-1/01-2025 dated 13. 01. 2025 and Resolution no 5 of Academic Council-50, 27-11-2024). This is to inform you that for all UG & PG students there is no provision for re-evaluation of theory papers University Examination as the system of double evaluation has been implemented for all programs. However, the provision for retotaling and photocopy of answer scripts will continue to remain in practice with effect from 01.06.2025.

17. B.Sc. Allied Courses Scheme of Examination Pattern**17.1 B.Sc. First Year (Semester I & II) w.e.f. (Academic Year 2023-24 onwards)****Internal Examination Pattern (Theory)**

Question type	No. of questions	Questions to be answered	Question X marks	Total marks
Short answers	5	4	4 x 3 marks each	12 marks
CIA	1. Seminar / poster (4 marks) 2. Assignments/open book test (4 marks)			8 marks
Total				20 marks

Note –20 marks to be converted to 10 marks weightage for submission to the university.

17.2 University Examination Pattern (Theory)

Question Type	No. of Questions	Questions to be Answered	Question X marks	Total marks
Section A				
Structured LAQ	3	2	2X8	16 Marks
Short notes	8	6	6X4	24Marks
Total				40 Marks

Note: The exam pattern for Course “Community Engagement & Clinical Visit (Including Related Practicals to the Parent Course)” is as per Annexure No-1.

17.3 Evaluation Form for Community Engagement & Clinical Visit (Including Related Practicals to the Parent Course)

Name of the Student:

Program/Course:

Semester:

Name of the Internal Faculty/Observer:

Name of the External Faculty/Observer:

Sr. No.	Core Competencies	Marks Allotted	Marks Obtained
1.	Community Engagement/Educational Tour/Field work/Hospital visits/NSS (Report)	15	
2.	Demonstrated understanding of responsibilities	10	
3.	Managed time effectively to meet deadlines		
4.	Communicated well with others (Staff members, Teacher, Patients, Community Members, etc)		
5.	Demonstrated knowledge required to meet objectives		
6.	Completed required tasks as assigned by Teacher/Co-ordinator		
7.	Model making / Quiz/ Poster/Conference/ Seminar/ Presentation/Innovative Ideas Competition	15	
8.	Attendance	10	
Total Marks		50	

Internal Faculty/Observer Signature:

Date:

External Faculty/Observer Signature:

18. Internal Examination Pattern UG Second & Third Year (Semester III to VI)**18.1 Internal examination pattern UG (Second & Third Year)****Theory: 20 marks**

Marks should be submitted by respective departments at least 15 days prior to onset of university examination to the university.

Question type	No. of questions	Questions to be answered	Question X marks	Total marks
Long essays	2	1	1x10	10 marks
Short answers	3	2	2x5	10 marks
Total				Total= 20 marks

18.2 Internal examination pattern UG (Second & Third Year)**Practical: 10 marks**

Internal exam (At department level)	10 marks
Viva	5 marks
Log book	5 marks
Theory and practical	Total = 20 M

Note –20 marks to be converted to 10 marks weightage for submission to the university.

18.3 University Examination Pattern UG Second & Third Year (Semester III to VI)**18.4 Theory Question Paper Pattern for Core Subjects in University Examinations (Second & Third year) Under CBCS - 80 Marks**

Question type	No. of questions	Questions to be answered	Question X marks	Total marks
Section 1				
MCQ	10	10	10x1	10 marks
Section 2				
Structured LAQ	3	2	2x15	30 marks
Short notes	6	5	5 x 8	40 marks
Total				80 Marks

General Instructions (Theory):

- A. Time duration of each Theory Paper will be of Three (3) Hrs. or 1 1/2 Hrs. as the case may be.
- B. Total Marks of each Theory Paper will be 80 Marks / 40 Marks.
- C. There will be TWO Sections in Question Paper. Section ONE will be MCQ while Section TWO will be long & short essay questions. There will be internal option.
- D. Both the Sections are compulsory.
- E. Both the sections are to be written in the separate answer sheet

18.5 Practical Question Paper Pattern For University Examinations Under CBCS – 40 Marks

Exercise	Description	Marks
Q No 1	Practical exercise - 1	1 x10=10 M
Q No 2	Station exercise	3x5M=15 M
Q No 3	VIVA	10 M
Q No 4	Journal	5 M
		Total = 40 M

General Instructions (Practical):

- A. All the students have to remain present at the examination center 15 minutes before the scheduled time for examination.
 - B. Students have to carry with them certified journal, I-card or examination receipt, and other necessary requirements for examination.
 - C. Candidate should not leave the practical hall without the permission of examiner.
 - D. Use of calculator is allowed (case to case basis) and the use of mobile phones, smart watches, any electronic devices is strictly prohibited in the university examination hall.
 - E. The candidate has to leave the laboratory only after the submission of all the answer sheets of the exercises performed.
-

18.5 Elective Subject Internal Examination Pattern UG (Second & Third Year)
Theory: 20 marks

Question type	No. of questions	Questions to be answered	Question X marks	Total marks
Long essays	2	1	1x10	10 marks
Short answers	3	2	2x5	10 marks
Total				Total= 20 marks

Note –20 marks to be converted to 10 marks weightage for submission to the university.

18.6 Theory Question Paper Pattern For Elective Subject in University exam
for UG Second and Third year (semester III to V) (AY 2020-21 onwards)

Question type	No. of questions	Questions to be answered	Question X marks	Total marks
Structured LAQ	3	2	2x10	20 marks
Short notes	5	4	4 x5	20 marks
Total				40 Marks

18.7- Model Checklist for Evaluation of the Clinical Directed Posting (UG)

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the Internal faculty/Observer: _____

Name of the External Faculty/Observer: _____

Core Competencies		
	Marks allotted	Marks obtained
Students will begin to develop critical thinking abilities utilizing the allied health personnel roles of communicator and caregiver. Students will learn principles of professional allied health personnel practice and provide direct care to individuals within a medical surgical setting while recognizing the diverse uniqueness of individuals with health alterations.		
Clinical Teaching		
a. Demonstrate beginning competency in technical skills.	10	
Independent Work by Student guided by faculty		
a. Develop effective communication skills (verbally and through charting) with patients, team members, and family	2.5	
b. Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.	2.5	
Hands on practical work by students		
a. Protect confidentiality of electronic/manual health records data, information, and knowledge of technology in an ethical manner	05	
Independent work by student		
a. Demonstrate expected behaviors and complete tasks in a timely manner. Arrive to clinical experiences at assigned times. Maintain professional behavior and appearance.	05	
Log book	10	
Viva	10	
Attendance	05	
Total	50 Marks	

Sign of Internal Examiner: _____

Sign of External Examiner: _____

18.8 Model Checklist for Evaluation of the Seminar Presentations B.Sc. MDT (Semester IV)

Name of the student: _____ Date: _____

Topic: _____

Name of the Faculty/ Observer: _____

Items for observation during presentation	Marks allotted	Marks Obtained
Extent of understanding of scope & objectives of the topic by the candidate	10 Marks	
Whether cross- references have been consulted	5 Marks	
Quality of slides	10 Marks	
Clarity of presentation	5 Marks	
Public speaking abilities	10 Marks	
Ability to answer questions asked on the topic	10 Marks	
Total	50 Marks	

Note: Assessment of seminar: the seminar shall be assessed on the basis of the content of the topic chosen and its presentation.

19. Internship Exam Pattern (Semester VII & VIII)

19.1 Internal Assessment Exam Pattern (IA) for Semester VII & VIII (Internship Program)

Internal Assessment Exam Pattern (IA) for Semester VII & VIII (Internship Program)	
Internal exam pattern: Total 20 marks with following breakup	
Description	Marks
Internal exam (at department)	10 marks
Viva	5 marks
Log Book	5 marks
Total = 20 Marks	

19.2 Scheme of University Semester End Examination (SEE) for Semester VII & VIII (Internship Program) & Eligibility Criteria for Attendance.

Scheme of University Semester End Examination (SEE) for Semester VII & VIII (Internship Program)		
Practical exam pattern: Total 80 marks with following breakup		
Exercise	Description	Marks
Q No 1	Case Study	2 x 15=30 M
Q No 2	Station exercise	3 x 5=15 M
Q No 3	VIVA	15 M
Q No 4	Log Book	10 M
Q No 5	Attendance	10 M
Total = 80 Marks		

Attendance (10 marks) of the student. It was decided that weightage be given to attendance as per following scheme	
Attendance Percentage	Marks
< 75	Zero
75	5
76-80	6
81-85	7
86-90	8
91-95	9
96-100	10

Note: Internship is for 12 months (July-December; January-June) after deducting for national holidays/Sick Holidays/ Sundays + Examination), (6 days/week; 8 Hours/day). Minimum of 21 weeks/semester. Students are encouraged to involve in community outreach activities as part of their clinical postings without absentsing himself/herself for the other regular classes.

20. Scheme of University Examination Theory for PG Program:

General structure / patterns for setting up question papers for Theory / Practical courses, their evaluation weightages for PG programs of MGMSBS are given in the following tables

20.1 Marks scheme for the University exam:

Final theory marks will be 100 marks (80 marks University Theory exam + 20 Marks Internal assessment).

Question		Marks distribution	Marks allotted per section	Marks
Sec: A	MCQ	10 x 1 M = 10	10	10
Sec: B	SAQ	3/4x 5 M = 15	15	35
Sec: B	LAQ	2/3 x 10 M = 10	20	
Sec: C	SAQ	3/4x 5 M = 15	15	35
Sec: C	LAQ	2/3x 10 M = 10	20	
Total				80 Marks

20.2 Practical exam pattern: Total 40 marks with following breakup:

Exercise	Description	Marks
Q No 1	Practical exercise - 1	1 x20=20 M
Q No 2	Station exercise	2x5M=10 M
Q No 3	VIVA	10 M
Q No 4	Journal	NIL
Total		40 Marks

20.3 Practical to be conducted at respective departments and marks submitted jointly by the parent department to the university.

20.4 Breakup of theory IA calculation for 20 marks

Description	Marks
Internal exam (at department)	15 marks
Seminar	5 marks
Total	20 Marks

20.5 Breakup of practical IA calculation:

Description	Marks
Internal exam (at department)	10 marks
Viva	5 marks
Journal	5 marks
Total	20 Marks

Note –20 marks to be converted to 10 marks weightage for submission to the university.

20.6: Model Checklist for Evaluation of the Seminar Presentations (PG)

Name of the student: _____ Date: _____

Name of the Faculty/ Observer: _____

Items for observation during presentation	Marks allotted	Marks Obtained
Extent of understanding of scope & objectives of the paper by the candidate	10 marks	
Whether cross- references have been consulted		
Ability to defend the paper		
Clarity of presentation		
Any other observation		

Note: Assessment of seminar: the seminar shall be assessed on the basis of the content of the paper chosen and its presentation.

20.7: Model Checklist for Evaluation of the Educational Tour/Field Work/Hospital Visit/Industrial Visit (PG)

Name of the student: _____ Date: _____

Name of the Faculty/ Observer: _____

Items for observation during presentation	Marks allotted	Marks Obtained
Educational Tour/Field Work/Hospital Visit/ Industrial Visit report / Conference/oral presentation	15	
Online MOOC/Swayam / NPTEL courses	05	
Total	20 Marks	

*marks to be given based on the proof submitted by the student. Formal examination not required

20.8: Model Checklist for Evaluation of the Clinical Directed Posting (PG)

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the Internal faculty/Observer: _____

Name of the External Faculty/Observer: _____

Core Competencies		
	Marks allotted	Marks obtained
Students will begin to develop critical thinking abilities utilizing the allied health personnel roles of communicator and caregiver. Students will learn principles of professional allied health personnel practice and provide direct care to individuals within a medical surgical setting while recognizing the diverse uniqueness of individuals with health alterations.		
Clinical Teaching		
b. Demonstrate beginning competency in technical skills.	10	
Independent Work by Student guided by faculty		
b. Develop effective communication skills (verbally and through charting) with patients, team members, and family	2.5	
c. Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.	2.5	
Hands on practical work by students		
b. Protect confidentiality of electronic/manual health records data, information, and knowledge of technology in an ethical manner	05	
Independent work by student		
b. Demonstrate expected behaviors and complete tasks in a timely manner. Arrive to clinical experiences at assigned times. Maintain professional behavior and appearance.	05	
Log book	10	
Viva	10	
Attendance	05	
Total	50 Marks	

Sign of Internal Examiner: _____

Sign of External Examiner: _____

20.9: Semester III – Dissertation (PG) (Internal Assessment)

Dissertation/Project Proposal : overall performance of the student	Marks allotted	Marks Obtained
Open mindedness/ Receptivity to feedback Integrates feedback	5 Marks	
Meets deadlines / Regularity in meeting / Consistency in communication	10 Marks	
Continuous Internal evaluation (CIE)		
Interest shown in selecting topic	5 marks	
Appropriate review	10 marks	
Discussion with guide and other faculty	10 marks	
Quality of protocol	5marks	
Preparation of proforma / log book / daily reports	5marks	
TOTAL	Out of 50	

20.10: Scheme of Evaluation for MGMSBS for Subjects like Dissertation/ Project Work/ Report (Semester IV)

Evaluation parameter (Semester IV)	Continuous Internal Evaluation (CIE)	Semester End Evaluation (SEE)	
	Guide	Internal examiner	External examiner
Thesis preparation, Novelty, Overall Lab Work Culture	25	-	-
Dissertation/Project work book	25	25	25
Evaluation of thesis including Viva Voce	-	50	50
Total	50	75	75
Overall Total = 200 Marks			

21. Scheme of University Examination Theory for MHA & MPH Program:

Revised Scheme of University Examination for PG Program (w.e.f. AY 2022-23)

MASTER of PUBLIC HEALTH (MPH) & MASTER of HOSPITAL ADMINISTRATION (MHA)

SEMESTER I & IV

General structure / patterns for setting up question papers for Theory / Practical courses, their evaluation weightage for PG Programs (MPH & MHA) are given in following tables

Marks Scheme for the University Examination

Final Theory Mark will be 100 Marks (80 Marks University Theory Exam + 20 Marks Internal Assessment)

21.1 Theory Paper Pattern: Marks: 80 Time: 3 Hrs.

Question Paper	Question No.	Question Type	Marks Distribution	Marks Per Section
Section A	1	LAQ (1 out of 2)	1 X 10 Marks = 10	40
	2	SAQ (5 out of 6)	5 X 06 Marks = 30	
Section B	3	LAQ (1 out of 2)	1 X 10 Marks = 10	40
	4	SAQ (5 out of 6)	5 X 06 Marks = 30	
TOTAL				80 Marks

Note: If the paper is combination of two sub-subjects, the each section is to be dedicated for separate sub-subject for 50% weightage each.

21.2 Practical Examination, if applicable, will be as per last approved pattern

21.3 Internal Assessment Pattern - Theory Marks – 20

Internal Theory Examination	30 Marks / 2 = 15 Marks
Seminar / Assignment	10 Marks / 2 = 05 Marks
Total	20 Marks

21.4: Checklist for Evaluation of Practice of Hospital Administration- Basic (MHA 105 CP)**University Exam**

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the Internal Faculty/Observer: _____

Core Competencies	Marks allotted	Marks obtained
Students will be prepared for leadership roles in the hospital sector through imparting training in planning, operation by various departmental postings including orientation in the managerial aspects of clinical and support services.		
Students will develop critical thinking and skills of professional hospital administrator by taking initiative to analyze the program/activity		
Hospital Teaching		
a. Demonstrate competency in technical skills.	10	
Independent Work by Student guided by faculty		
a. Develop effective communication skills (verbally and through charting) with patients, team members, and family	2.5	
b. Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.	2.5	
Hands on practical work in hospital by students		
a. Protect confidentiality of electronic/manual hospital records data, information, and knowledge of technology in an ethical manner	2.5	
b. Managerial aspects through various departmental postings	05	
Independent work by student		
a. Demonstrate expected behaviors and complete tasks in a timely manner. Arrive at hospital at assigned times. Maintain Professional behavior and appearance	2.5	
b. Logbook	05	
Project Report		
a. Presentation	10	
b. Viva	05	
Attendance	05	
Total	50 marks	
Sign of Internal Examiner: _____		
Sign of External Examiner: _____		

21.5: Checklist for Evaluation of Practice of Hospital Administration – Advanced (MHA 204 CP) University Exam

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the Internal faculty/Observer: _____

Core Competencies	Marks allotted	Marks obtained
Students will be prepared for leadership roles in the hospital sector through imparting multidimensional knowledge of the hospital. Students will develop critical thinking and skills of professional hospital administrator, its operation, facilities so that they can work in the areas of formulating policies, planning operational action plans, managing / supervising various departmental activities and audit process.		
Hospital Teaching		
a. Demonstrate competency in technical skills.	5	
Independent Work by Student guided by faculty		
a. Develop effective communication skills (verbally and through charting) with patients, team members, and family	2.5	
b. Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.	2.5	
Hands on practical work in hospital by students		
a. Protect confidentiality of electronic/manual hospital records data, information, and knowledge of technology in an ethical manner	2.5	
b. Self-directed learning through various departmental postings	05	
c. Various audit process undertaken in departmental postings	05	
Independent work by student		
a. Demonstrate expected behaviors and complete tasks in a timely manner. Arrive at hospital at assigned times. Maintain Professional behavior and appearance	2.5	
b. Projects / seminars / conferences / courses completed	05	
c. Logbook	05	
Project Report		
a. Presentation	05	
b. Viva	05	
Attendance	05	
Total	50 marks	
Sign of Internal Examiner: _____		
Sign of External Examiner: _____		

21.6: Checklist for Evaluation of Practice of Hospital Administration –Project (MHA 305 P)**UNIVERSITY EXAM**

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the Internal faculty/Observer: _____

Core Competencies	Marks allotted	Marks obtained
Students will be prepared for leadership roles in the hospital sector through imparting multidimensional knowledge of the hospital. Students will develop critical thinking and skills of professional hospital administrator, its operation, facilities so that they can work in the areas of formulating policies, planning operational action plans, managing / supervising various departmental activities and audit process.		
Hospital Teaching		
a. Demonstrate competency in technical skills.	5	
Independent Work by Student guided by faculty		
a. Develop effective communication skills (verbally and through charting) with patients, team members, and family	2.5	
b. Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.	2.5	
Hands on practical work in hospital by students		
a. Protect confidentiality of electronic/manual hospital records data, information, and knowledge of technology in an ethical manner	05	
b. Self-directed learning and managerial aspects through various departmental postings	05	
a. Various audit process undertaken in departmental postings	05	
Independent work by student		
Demonstrate expected behaviors and complete tasks in a timely manner. Arrive at hospital at assigned times. Maintain professional behavior and appearance	05	
a. Projects / seminars / conferences / courses completed	10	
b. Logbook	10	
Hospital Project		
a. Presentation	30	
b. Viva	10	
Attendance	10	
Total	100 marks	
Sign of Internal Examiner: _____		
Sign of External Examiner: _____		

21.7: Checklist for Evaluation of Practice of Public Health (Basic) MPH 105 CP University Exam

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the Internal faculty/Observer: _____

Core Competencies	Marks allotted	Marks obtained
Students will develop critical thinking and research skills , data analysis , documentation.		
Topic		
The topic and the importance of topic are precise / Independent scientific thinking/originality	2.5	
Introduction & Literature Review		
1. Does the student present enough and relevant background on what is known on the topic, existing information gap, and importance of bridging that gap?	2.5	
2. Does the student cite enough, relevant literature properly to support the information presented?	2.5	
Methods		
1. Is there enough detail of what, when, where, and how the research was performed so that other researcher can repeat the method for similar studies?	2.5	
Results		
1. Are the results presented clearly, concisely, and in logical order for each objective, hypothesis, or research question (in case of multiple objectives, hypotheses, and/or research questions)?	5	
2. Are the Pictures, Figures, Tables, and any other artwork presented of high quality (legible, labelled properly, standing alone) and described and referred in the text properly?	5	
Discussion		
1. Is the discussion presented in a logical order for each objective, hypothesis, or research question (in case of multiple objectives, hypotheses, and/or research questions)?	2.5	
2. Does the student answer the research question(s), or accept or fail to accept null hypothesis(es) proposed for the study?	2.5	
3. Does the student relate the findings to relevant literature with proper citation?	2.5	
4. Does the student present satisfactory reasons for findings that are in disagreement with previously reported results in other literature?	2.5	
Conclusions and other parts		
Does the student draw reasonable conclusion(s) based on the research findings, and present implications of the findings? Are the conclusions of any utility to the scientific community, or any other stakeholders? Are the acknowledgements and cited references properly presented?	5	
Overall Quality of Writing		
Given the entire application, what is the overall assessment of the individual thesis?	5	
Communication		
In a cogent manner	5	
Using appropriate style	2.5	
By adequately defending the results orally	2.5	
Total	50 marks	

Sign of Internal Examiner: _____

Sign of External Examiner: _____

21.8: Checklist for Evaluation of Practice of Public Health (Advance) MPH 204 CP University Exam

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the internal faculty/Observer: _____

Core Competencies	Marks allotted	Marks obtained
Students will develop critical thinking and research skills, data analysis, documentation.		
Topic		
The topic and the importance of topic are precise / Independent scientific thinking/originality	2.5	
Introduction & Literature Review		
1. Does the student present enough and relevant background on what is known on the topic, existing information gap, and importance of bridging that gap?	2.5	
2. Does the student cite enough, relevant literature properly to support the information presented?	2.5	
Methods		
1. Is there enough detail of what, when, where, and how the research was performed so that other researcher can repeat the method for similar studies?	2.5	
Results		
1. Are the results presented clearly, concisely, and in logical order for each objective, hypothesis, or research question (in case of multiple objectives, hypotheses, and/or research questions)?	5	
2. Are the Pictures, Figures, Tables, and any other artwork presented of high quality (legible, labelled properly, standing alone) and described and referred in the text properly?	5	
Discussion		
1. Is the discussion presented in a logical order for each objective, hypothesis, or research question (in case of multiple objectives, hypotheses, and/or research questions)?	2.5	
2. Does the student answer the research question(s), or accept or fail to accept null hypothesis(es) proposed for the study?	2.5	
3. Does the student relate the findings to relevant literature with proper citation?	2.5	
4. Does the student present satisfactory reasons for findings that are in disagreement with previously reported results in other literature?	2.5	
Conclusions and other parts		
Does the student draw reasonable conclusion(s) based on the research findings, and present implications of the findings? Are the conclusions of any utility to the scientific community, or any other stakeholders? Are the acknowledgements and cited references properly presented?	5	
Overall Quality of Writing		
Given the entire application, what is the overall assessment of the individual thesis?	5	
Communication		
In a cogent manner	5	
Using appropriate style	2.5	
By adequately defending the results orally	2.5	
Total	50 marks	

Sign of Internal Examiner: _____

Sign of External Examiner: _____

21.9: Checklist for Evaluation of Practice of Public Health-Project (MPH 305P)

Name of the student: _____ . _____ Date: _____

Program: _____

Semester: _____ Name of the internal faculty/Observer: _____

Core Competencies	Marks allotted	Marks obtained
Students will develop critical thinking abilities utilizing the healthpersonnel roles of problem solver and public health manager. Students will take initiative to analyse the program / activity and completes a project demonstrating the expertise in public health practice.		
Field Teaching		
a. Demonstrate competency in technical skills.	15	
Independent Work by Student guided by faculty		
a. Develop effective communication skills (verbally and through charting) with patients, team members, and family	05	
b. Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.	05	
Hands on practical work by students		
a. Protect confidentiality of electronic/manual health records data, information, and knowledge of technology in an ethical manner	05	
Independent work by student		
b. Demonstrate expected behaviors and complete tasks in a timely manner. Arrive to field experiences at assigned times. Maintain professional behavior and appearance and Logbook	20	
PROJECT REPORT	25	
Viva	20	
Attendance	05	
Total	100 Marks	
Sign of Internal Examiner: _____		
Sign of External Examiner: _____		

21.10: Scheme of Evaluation for MGMSBS for Subjects like Dissertation/ Project Work/ Report (Semester IV)

Evaluation parameter (Semester IV)	Continuous Internal Evaluation (CIE)	Semester End Evaluation (SEE)	
	Guide	Internal examiner	External examiner
Thesis preparation, Novelty, Overall Lab Work Culture	25	-	-
Dissertation/Project work book	25	25	25
Evaluation of thesis including Viva Voce	-	50	50
Total	50	75	75
Overall Total = 200 Marks			

22. Dissertation/ Project Work/ Report Evaluation Guidelines for PG courses:

The Dissertation allows the student to develop and display in-depth understanding of a theme in International Studies, as well as an in-depth understanding of the appropriate research tools, approaches and theories applicable to that theme. The dissertation should be based on a well-defined and clear research question of scholarly significance, and that the dissertation develops a theoretically and methodologically informed and evidence-based answer to that question.

Scheme of Evaluation for MGMSBS for Subjects like Dissertation/ Project Work/ Report:

The assignment of marks for Project/Dissertation is as follows:

Part I- III semester

As per proforma Point No. 20.9.

Part-II- IV semester

As per proforma Point No. 20.10 & 21.10.

23. Eligibility for award of degree

23.1 A candidate shall have passed in all the subjects of all semesters (I - VIII) including compulsory embedded internship (One Year) to be eligible for award of Under Graduate degree.

23.2 A candidate shall have passed in all the subjects of all semesters (I – IV) to be eligible for award of Post Graduate degree.



MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

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