विद्या विमुक्तिदायिनी
Bhaikaka University
Instilling Purpose in Healthcare
Charutar Arogya Mandal, Karamsad

A Curriculum

For

B.Sc. (Honours) in Medical Technology

(Operation Theatre & Anaesthesia Technology)

CAM Institute of Allied Health Sciences & Technology

(A constituent Institute of Bhaikaka University)

(Academic Year 2024-25)

Vision

Our institute will be the most preferred destination for the aspirants who want to achieve the highest standard of excellence in the field of allied health sciences.

Mission

- To promote a collaborative working environment for the academicians and the students.
- To offer a curriculum emphasizing practical knowledge and clinical experience as to be implemented in authentic settings.
- To collaborate with clinicians and experts from basic biomedical sciences for education and research.

CURRICULUM

Discipline	Medical Technology
Program	B.Sc. (Honours) Medical Technology
Specialization	Operation Theatre & Anaesthesia Technology
Subject Code	---
Tenure	4 years (Including 1 year of Internship)
Last Revised	July 2024

NOTIFICATION

Subject: Regulations and Curriculum pertaining to B.Sc. (Honours) Medical Technology (Operation Theatre & Anaesthesia Technology)Program

In exercise of the power conferred under section 22(3) of the Gujarat State Private Universities Act 2009, the Academic Council in its 9th meeting heldon22nd August 2024Underthe agenda item no. 24.02.10ispleased to approve the curriculum of B.Sc.(Honours) Medical Technology **(Operation Theatre & Anaesthesia Technology)** Program at Bhaikaka University. The curriculum shall come into force from the Academic Year 2024-2025.

By Order,
REGISTRAR

ACADEMIC REGULATIONS

1. TITLE OF THE PROGRAM:

This program shall be called as per the name given below under the discipline of Medical Technology at Bhaikaka University, Karamsad. It comes into effect from the Academic Year 202425. The relevant regulatory bodies reserve the right to make changes to the regulations at any period of time.

Name of the program shall be;
1) B. Sc. (Honours) Medical Technology (Respiratory Care Technology)

2. ELIGIBILITY FOR THE ADMISSION:

The candidate who has passed 10+2 (Science) examination conducted by any recognized School Certification Board or Equivalent Examination; with principal subjects like Physics, Chemistry, Biology and/or Maths and English. The student should have complete minimum of 17 years at the time of securing admission.

2.1 DURATION OF THE PROGRAM:

The program of B.Sc. (Honours) in Medical Technology (Respiratory Care Technology) comprises of 4 (four) academic years including 1 (one) year of internship at the respective area of Shree Krishna Hospital affiliated with Bhaikaka University.

2.2 MEDIUMOFINSTRUCTION:

English will be the medium of instruction for all the subjects and also for the examination of the program.

3. METHOD[S]OFINSTRUCTIONS:

- This program shall include teaching through lectures, practical, demonstration, group discussion, individual learning, kinaesthetic or participative learning through traditional methods or by using ICT tools.
- Structuredproblem-basedexercisesshallbeprovidedtosimulatespecific case examples
- Audio visual material and/or printed handouts shall be provided to supplement reading and classroom instruction.

4. CREDIT SYSTEM:

This program will have a curriculum in which every course will be assigned certain credits reflecting its weightage and contact periods per week as given below:

1 lecture (L)/week (15 Hours)* = 1 credit

1 Tutorial (T)/week (15 Hours)* = 1 credit

1 Practical (P)/week (30 Hours)* = 1 credit

* 1 credit of class room theory, tutorial and demonstration is equal to 15 hours of engagement in a year and 1 credit of practical class is equal to 30 hours of engagement in a year.

In addition to theory and laboratory practicals there may be other courses such as seminal. Clinical training/Hospital posting, projects etc., which will be assigned credits as per their contribution in the program without regards to contact period.

5. ELIGIBILITY TO APPEAR IN ANNUAL EXAMINATION:

- The student must have attended at least 75% of the total classes conducted in each course of the year separately in theory, practical and clinical postings.
- The students must have secured 35% of the total marks in each course of the academic year separately in theory and practical.

6. ASSESSMENT:

Assessments should be completed by the academic staff, based on the compilation of the student 's theoretical & clinical performance throughout the academic programme. To achieve this, all assessment forms and feedbacks should be included and evaluated.

5.1 INTERNAL ASSESSMENT

Internal assessment shall be done based on continuous evaluation of the student. It includes mainly two internal examinations (one terminal examination & one preliminary examination). It may also include several unit tests and assignments submitted by the students throughout the year in each subject of the program. In order to award the internal marks in theory and practical, the average of the two internal examinations as well as unit tests, assignments, attendance and participation in curricular/extra-curricular activities shall be considered.

5.2 EXTERNAL ASSESSMENT

- External assessment shall include theory and practical examination conducted as a part of the annual examination of each subject (course) as per the schedule decided by the college and university.
- The scheme of question paper for theory and practical examination will be as prescribed by the regulatory body from time to time.

7. ACADEMIC PROGRESSION:

- The student will not be allowed to appear for the annual examination of the third year if he/she has not cleared all the courses of the first and second year of the program.
- The student will not be allowed to enter in the internship (fourth year) of the program, if he/she has not cleared all the courses of final year of the program.
- These rules will be strictly applicable and no complaint/request will be entertained from the students who may be detained under these rules.

8. INTERNSHIP:

- There shall be one year of internship after the successful completion of third year of the program. Internship should be done at the hospital recognized by Bhaikaka University only.
- The student shall be awarded the degree only after successful completion of the internship.

9. AWARD OF GRADES:

- The student must secure minimum 35 % of marks in theory and practical examination separately to pass in the final University Examination.
- In case a student fails to secure minimum 35% marks in any theory or practical course, he/she shall reappear for the supplementary examinations or the annual examination of that course. However, his/her marks of the internal assessment shall be carried over and he/she shall be entitled for the grade obtained on passing the examinations.

9.1 ALLOCATION OF GRADE POINTS:

The student shall be awarded a final letter grade at the end of the academic year for each course as per the table shown below;

Table 1: Letter grades and Grade Points

Letter Grade	Grade Points	Marks
O (Outstanding)	10	≥90
A+ (Excellent)	9	80-89
A (Very Good)	8	70-79
B+ (Good)	7	60-69
B (Above Average)	6	50-59
C+ (Average)	5	40-49
P (Pass)	4	35-39
F (Fail)	3	<35
Ab (Absent)	0	--

9.2 DECLARATION OF CLASS:

The class shall be awarded on the basis of CGPA as follows;

Class	CGPA
First Class with Distinction	**≥ 7.50**
First Class	**6.00 to 7.49**
Second Class	**4.8 to 5.59**
Pass Class	**<4.8**

The class shall be awarded on the basis of following;

Class	Details
First Class with Distinction	A successful candidate obtaining 75% and more marks of the grand total aggregate in the first attempt shall be declared to have passed these subjects with Distinction
First Class	A successful candidate obtaining 60% and more and less than 75% of the marks of the grand total aggregate in the first attempt shall be declared to have passed these subjects with first class
Second Class	A successful candidate obtaining 50% and more and less than 60% of the marks of the grand total aggregate in the first attempt shall be declared to have passed these subjects with Second class
Pass Class	Those candidates who do not fall in any above criteria's, but fulfil the requirement of passing of the whole course, will be shown as "PASS" in the grade card/mark sheet

10. PROGRAM OBJECTIVES:

Program objectives aim at making the students being able to:

- Perform objective self-assessments of their knowledge and skills; learn and refine existing skills; and acquire new skills
- Apply newly gained knowledge or skills to patient care
- Enhance their personal and professional growth and learning by constant introspection and utilizing experiences
- Search (including through electronic means), and critically evaluate medical literature to enable its application to patient care
- Develop a research question and be familiar with basic, clinical and translational research in its application to patient care

11. PROGRAM OUTCOMES:

PO1: **Improvement and understanding of paramedical science:**

Students will make use of their subject-matter expertise to effectively render healthcare services.

PO2:Patient treatment methods and clinical services:

Students will use fundamental scientific concepts to choose pertinent investigations while offering patient care in an effective and economical manner. They ought to establish plans for sickness avoidance alongside healthcare improvement**.**

PO3: Intellectual proficiency:

The student will be competent to supervise diagnostics and clinical administration procedures and troubleshoot concerns.

PO4: Aptitudes for interaction:
In order to give stakeholders and the healthcare team pertinent information, students will be able to express themselves concisely and adaptably. They will be provided with purposeful counselling approaches to promoting lifestyle changes that will optimize health.

PO5: Research/ Exploration:
The ability for students to think critically on their own will be significant, as will be their ability to communicate verbally as well as in writing.

PO6: Ethics and accountability:
Students will comprehend the fundamental principles of clinical ethics and legislation so they may use them in their practice as healthcare practitioners.
Students should be able to:

- Describe and apply the fundamental ideas of clinical ethics to real-world scenarios and circumstances
- To provide patients with access to healthcare resources fairly, equally, and without bias, discrimination, or undue influence.
- Establish an understanding and effectively apply fundamental legal principles to their practice.
- Embrace professional responsibility for the beginning, maintaining, and closure of patient provider conversations.

PO7: Leadership, mentor-ship and teamwork:
Where necessary, the student must assume a leadership position to assure optimal clinical outcomes and patient satisfaction. They must be able to effectively manage both themselves and other people, as well as respond to planned and unknown circumstances on their own and with confidence.

PO8: Responsibility and public accountability
The students will be exposed to community service that is guided by study and the practice of medicine. They will encourage creative solutions to effectively address community requirements. They will do their duties with a focus towards an emerging and enduring healthcare system.

PO9: Sustainability and the surroundings
Students will apply effective biological waste management and disposal strategies in order to preserve the environment, community wellness, and safety.

PO10: Continuous learning
The student should be committed to continuous improvement in skills and knowledge while harnessing modern tools and technology.

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons.) in Medical Technology (Operation Theatre & Anaesthesia Technology)
Year of the Program: First year

	Regular Subjects	Elective Subjects	Total
Subjects	07	01	08
Credit	40	02	42

CURRICULUM & CREDIT FRAME WORK

Regular Subjects

Course Code	Course Title	Hours/week			Marks		Total Marks	Credit
		L	T/D	P	Internal	External		
Core/Major Courses								
24BMT0101	Human Anatomy	3	1	-	30	70	**100**	**4**
24BMT0102	Human Physiology	3	1	--	30	70	**100**	**4**
24BMT0103	General Pathology	3	1	-	30	70	**100**	**4**
24BMT0104	General Microbiology	3	1	-	30	70	**100**	**4**
24BMT0105	General Biochemistry	3	1	-	30	70	**100**	**4**
24BMT0106	English	3	1	-	30	70*	**100**	**4**
24BMT0107	Health Care	2	--	-	20	40*	**60**	**2**
24BMT0108	Introduction to Medical Technology	1	-	-	60	--	**60**	**1**
24CES0101	Clinical Education (studentship)	--	**13**	-	**100**	--	**100**	**13**
	Total	**21**	**19**	-	**360**	**460**	**820**	**40**
	Total hours	**1280**						

Elective Subjects

Course Code	Course Title	Hours/week		Marks		Total Marks	Credit
		L	T/D	Internal	External		
24ELC0101	Yoga and Health	--	2	20	40*	**60**	**2**
24ELC0102	Basic emergency care and life support	--	2	20	40*	**60**	**2**

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre & Anaesthesia Technology)
Year of the Program: Second year

	Regular Subjects	Elective Subjects	Total
Subjects	07	01	**08**
Credit	40	02	**42**

CURRICULUM & CREDIT FRAME WORK

(Regular Subjects)

Course Code	Course Title	Hours			Marks		Total Marks	Credit
		L	T/D	P	Internal	External		
Core/Major Courses								
24BRC0201	Applied Pathology & Applied Microbiology	4	--	--	30	70	**100**	**4**
24BRC0202	Applied Pathology & Applied Microbiology- Practical	--	1	2	20	40	**60**	**2**
24BRC0203	Applied Pharmacology & Medicine	4	--	---	30	70	**100**	**4**
24BOA0204	Introduction to Operation Theatre & Anaesthesia Technology	4	--	--	30	70	**100**	**4**
24BOA0205	Introduction to Operation Theatre & Anaesthesia Technology- Practical	--	4	4	20	40	**60**	**4**
24BSC0201	Basic of Research Methodology	2	1	--	20	40	**60**	**3**
24CES0201	Clinical Education (Studentship)	--	19	--	--	--	**100**	**19**
	Total	**14**	**25**	**6**	**150**	**330**	**580**	**40**
	Total hours	**1280**						**40**

Elective Subjects

Course Code	Course Title	Hours / week		Marks		Total Marks	Credit
		L	T/D	Internal	External		
24ELC0201	Phlebotomy		2	20	40*	**60**	**2**
24ELC0202	Computer		2	20	40*	**60**	**2**

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre & Anaesthesia Technology)
Year of the Program: Third year

	Regular Subjects	Elective Subjects	Total
Subjects	04	01	**05**
Credit	40	02	**42**

CURRICULUM & CREDIT FRAME WORK

(Regular Subjects)

Course Code	Course Title	Hours			Marks		Total Marks	Credit
		L	T/D	P	Internal	External		
Core/Major Courses								
24BOT0301	Operation Theatre & Anaesthesia Technology – Clinical	4	-	-	30	70	**100**	**4**
24BOT0302	Operation Theatre & Anaesthesia Technology – Applied	4	-	-	30	70	**100**	**4**
24B0T0303	Operation Theatre & Anaesthesia Technology – Advanced	4	-	-	30	70	**100**	**4**
24B0T0304	Practical - OT & AT	-	6	4	40	160	**200**	**6**
24CES0301	Clinical Education (Studentship)	--	20	--	--	--	**100**	**20**
	Total	**12**	**26**	**4**	**130**	**370**	**600**	**20**
		1280						**40**

Elective Subjects

Course Code	Course Title	Hours/week		Marks		Total Marks	Credit
		L	T/D	Internal	External		
24ELC0301	Leadership and Management Skills		2	20	40*	**60**	**2**
24ELC0302	AI in Health care		2	20	40*	**60**	**2**

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre & Anaesthesia Technology) Year of the Program: Fourth year

CURRICULUM & CREDIT FRAME WORK

Corse Code	Corse Title	Hours/ week			Marks		Total Marks	Credit
		L	T/D	P	Internal	External		
Core/Major Courses								
24BRT0401	Clinical Internship	--	28	--	50	150	**200**	**28**
24BRT0402	Research Project	--	12	--	30	70	**100**	**12**
	Total Hours	**1280**			--	--	**300**	**40**

ROTATION DURING INTERNSHIP

(1 credit = 30 hours of clinical postings) (Reference)

OT area at hospital	Hours	Credit
ENT	180 hours	6credits
Cardiac	180 hours	6credits
Gynaec	150 hours	5credits
Ortho	60 hours	2credits
OPD	150 hours	5credits
Surgery	60 hours	2credits
Neuro	60 hours	2credits
2nd Floor Recovery		
1st Floor Recovery		
Total	**840 hours**	**28 credits**
Research Project	360 hours	12 credits
TOTAL	**1200 hours**	**40 credits**

Note:

1) **Abbreviations: L-Lecture, T-Tutorial and P-Practical**
2) **Considering eight months per academic year as working months, total contact hours per year shall be 1280 (One thousand two hundred and eighty)**
3) **There shall be no annual Practical Examination in the first year of the program.**

*The external examination will be taken at the institute level.

**The credit of the course "Introduction to Medical Technology" shall not be reflected in the annual marksheet. However, it will be reflected in the transcript.

Detailed Curriculum of
B.Sc.(Honours) Medical Technology
(Operation Theatre & Anaesthesia Technology)

First Year

24BMT0108 (Introduction to Medical Technology)

Name of the Institute: CAM Institute of Allied Health Sciences & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology
Year of the Program: First year

Course Code	24BMT0108	Total Credit	1
Title of Subject	Introduction to Medical Technology	Total Hours	15

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
10	05	05	40	60

Course Objectives	1) To introduce the medical technology field and its applications. 2) To enhance understanding of basic medical concepts, techniques, and equipment. 3) To develop critical thinking and problem-solving skills related to medical technology. 4) To prepare students for advanced studies and practical applications in the respective field.

Course Content

Sessions	Description	Weightage
	Introduction to Medical Technology History and Evolution of Medical Technology Overview of Medical Technology Applications Role of Medical Technologists in Healthcare	1 Hour 10%
2	**Medical Terminology** Common Medical Terms and Abbreviations Understanding routine laboratory procedures Communication in Medical Settings	2 hours 20%
3	**Basic Human Anatomy and Physiology** Introduction to Human Body Systems Major Organs and Their Functions Basic Physiological Processes	3 Hours 20%
4	**Biochemistry** Introduction Key Areas Importance Terms and Abbreviations	2 hour 10%
5	**Clinical Microbiology and Immunology** Introduction Key Areas Importance Terms and Abbreviations	2 hour 10 %
6	**Pathology** Introduction	2 hour 10%

	Key Areas Importance Terms and Abbreviations	
7	**Communication Skills** Etiquettes in Communication Oral Communication Written Communication	1 hour 10%
8	**Professionalism and Values** Institutional/ organizational values Institutional Rules & Regulations Maintaining Discipline: During College Hours(Theory & Laboratory Postings) Behaviour Etiquettes: During College Hours(Theory & Laboratory Postings)	2 hour 10%

Learning Activities:

- **Lecture and Presentation Group Discussion**
- **Class Participation**:
  - Engage in discussions and role-playing exercises, demonstrating an understanding of the material

Assessment:

- Quiz
- Multiple-choice and short-answer questions

24BMT0101 (Human Anatomy)

Course Code	24BMT0101	Total Credit	4
Title of Subject	Human Anatomy	Total Hours/week	4

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
20	05	05	70	100

Course Objectives	To provide students with basic knowledge of anatomical terminology, basic histology, and understanding of the structural and functional organization of the normal human body.

Course Content

Unit	Description	Weightage
1	**Introduction-Human body as a whole** 1.1 Definition of anatomy and its divisions 1.2 Terms of location, positions and planes 1.3 Cell and its organelles 1.4 Epithelium-definition, classification, function, describe with examples 1.5 Glands- classification, describe serous & mucous glands with examples 1.6 Basic tissues – classification with examples **Demonstration &Tutorials:** **1.7** Histology & types of epitheliums 1.8 Histology of serous, mucous & mixed salivary gland	10%
2	**Locomotion and support** 2.1 Cartilage- Types with example 2.2 Bone- Classification, names of bone cells, parts of long bone, microscopy of compact bone, names of all bones, vertebral column, intervertebral disc, fontanelles of fetal skull 2.3 Joints- Classification of joints with examples, synovial joint 2.4 Muscular system: Classification of muscular tissue 2.5 Names of muscles of the body **Demonstration &Tutorials:** 2.6 Demonstration of all bones showing parts, radiographs of normal bones & joints 2.7 Demonstration of muscles of the body (as functional groups)	10%

3	**Cardiovascular system** 3.1 Heart-size, location, chambers, exterior & interior 3.2 Blood supply of heart 3.3 Systemic & pulmonary circulation	10%
	3.4 Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery 3.5 Inferior venacava, portal vein, portosystemic anastomosis 3.6 Great saphenous vein 3.7 Lymphatic system- cisterna chyli & thoracic duct 3.8 Names and brief of regional lymphatics, axillary and inguinal lymph nodes **Demonstration &Tutorials:** 3.9 Demonstration of heart and vessels in the body 3.10 Normal chest radiograph showing heart shadows	
4	**Gastro-intestinal system** 4.1 Parts of GIT, Oral cavity [lip, tongue (with histology)], tonsil, dentition, pharynx, salivary glands, Waldeyer's ring 4.2 Esophagus, stomach, small and large intestine, liver, gall bladder, pancreas 4.3 Radiographs of abdomen	10%
5	**Respiratory system** 5.1 Parts of upper and lower Respiratory System: nose, nasal cavity, larynx, trachea, lungs 5.2 Names of paranasal air sinuses **Demonstration &Tutorials:** 5.3 Demonstration of parts of respiratory system 5.4 Normal radiographs of chest	10%
6	**Urinary system** 6.1 Kidney, ureter, urinary bladder, male and female urethra **Demonstration &Tutorials:** 6.2 Demonstration of parts of urinary system 6.3 Radiographs of abdomen-IVP, retrograde cystogram	10%
7	**Reproductive system** 7.1 Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology) 7.2 Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology) 7.3 Mammary gland – gross **Demonstration &Tutorials:** **7.4** Demonstration of section of male and female pelvis with organs *in situ* 7.5 Radiographs of pelvis – hysterosalpingogram	10%

8	**Endocrine glands** 8.1 Pituitary gland 8.2 Thyroid gland, parathyroid gland, 8.3 Suprarenal gland- (gross) **Demonstration &Tutorials:** 8.4 Demonstration of the endocrine glands	10%
9	**Nervous system** 9.1 Neuron	10%
	9.2 Classification of Nervous System 9.3 Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (Gross Anatomy) 9.4 Meninges, Ventricles & cerebrospinal fluid **9.5** Blood supply of brain (in brief) 9.6 Cranial nerves (only names) **Demonstration &Tutorials:** 9.7 Demonstration of all parts of brain	
10	**Sensory organs** 10.1 Skin: histology and appendages of skin 10.2 Eye: Parts of eye & lacrimal apparatus 10.3 Extra-ocular muscles & nerve supply 10.4 Ear: parts of ear- external, middle & inner ear and contents **Demonstration &Tutorials:** 10.5 Demonstration and histology of eyeball	10%

REFERENCE BOOKS

1. William Davis (P) understanding Human Anatomy and Physiology MC Graw Hill
2. Human Anatomy for Nursing & Allied Sciences - 1st edition, Dr. M.K.Anand, Dr. Meena Verma, The Arora Medical Publishers Pvt. Ltd.
3. Fattana, Human anatomy,(Description and applied), Saunder's & C P Prism Publishers, Bangalore – 1991
4. ESTER, M. Grishcimer, Physiology & Anatomy with Practical, Considerations, J.P. Lippin Cott. Philadelphia

Course Outcome: At the end of the course, Students will be able to:

CO1	Define and use basic anatomical terminology of location, positions and planes of human body
CO2	Identify and describe locations, relations, and functions of major organ system of human body
CO3	Correlate structural and functional organization of cells and basic tissue of human body
CO4	Execute this knowledge during their health care practice

24BMT0102 (Human Physiology)

Course Code	24BMT0102	Total Credit	4
Title of Subject	Human Physiology	Total Hours /week	4

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
20	05	05	70	100

Course Objective	To provide a comprehensive understanding about functioning of the human body at the cellular, tissue, organ and system levels including mechanism of homeostasis, integration of various physiological processes with applications.

Course Content

1	**Blood and Muscle Physiology** 1.1 Blood 1.1.1 Composition & Function of Blood 1.1.2 Erythropoiesis 1.1.3 Blood group 1.1.4 Hemostasis 1.2 Muscle 1.2.1 Structure & classification 1.2.2 Neuromuscular junction 1.2.3 Muscle contraction: Mechanism & action **Demonstration &Tutorials:** 1.3 Hb Estimation 1.4 RBC & WBC Count 1.5 Blood Group **1.6** Bleeding Time & Clotting Time	15%
2	**Digestive System and Excretory System** 2.1 Movement and Alimentary tract 2.2 Deglutition and Mechanism of Vomiting, Diarrhea 2.3 Digestive juices 2.4 Micturition 2.5 Function of Kidney 2.6 Regulation of acid-base balance	15%

3	**Cardiovascular and Respiratory System** 3.1 Heart rate and sound 3.2 Blood pressure 3.3 Mechanism of breathing 3.4 Transportation of Oxygen and Carbon dioxide 3.5 Pulmonary volume and capacity **Demonstration &Tutorials:** **3.6** Arterial Blood Pressure 3.7 Pulse, Heart rate, Breathing rate	20%
	3.8 Thermometry	
4	**Endocrinology and Reproductive System** 4.1 Contraceptives Measures and Menstrual cycle 4.2 Puberty 4.3 Pregnancy and Lactation 4.4 Hormones of Pituitary gland, **4.5** Hormones of Thyroid & Parathyroid Glands 4.6 Hormones of Adrenal Gland and Pancreas **Demonstration &Tutorials:** 4.7 Pregnancy Test	20%
5	**Embryology** 5.1 Spermatogenesis & oogenesis 5.2 Ovulation, fertilization 5.3 Placenta	15%
6	**Nervous System and Special Senses** 6.1 Neuron and Neuroglia 6.2 Properties of nerve fiber 6.3 Reflex mechanism and Receptors 6.4 Mechanism of vision and hearing 6.5 Taste and smell **Demonstration &Tutorials:** 6.6 1st, 2nd & 8th Cranial nerve **6.7** Examination of sensory system, motor system & reflex	15%

REFERENCE BOOKS

1. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism publishers
2. Ganong (William F) Review of Medical Physiology. Latest Ed. Appleton
3. Jain AK, Concise Physiology, Latest Ed.

Course Outcome: At the end of the course, Students will be able to:

CO1	State the basic terminology & functions of each organ system of the human body
CO2	Define, explain, and correlate basic physiological processes of each organ system of human body
CO3	Correlate and explain the integrated responses of the organ systems of the body to physiological and pathological stresses
CO4	Execute this knowledge during their health care practice

24BMT0103 (General Pathology)

Course Code	24BMT0103	Total Credit	4
Title of Subject	General Pathology	Total Hours/Week	4

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
20	05	05	70	100

Course Objectives	• To equip the students with the knowledge of basic steps of histopathology including sample receiving, fixation, tissue processing, section cutting, staining and bio-medical waste management • To understand basic concepts of haematology, clinical pathology, and blood banking including routine laboratory investigations like collection, transport and processing of various samples or specimen including blood and urine, blood grouping and Rh typing.

Course Content

Unit	Description	Weightage
1	**Histopathology** **1.1** Introduction to Histopathology 1.2 Receiving of specimen in the laboratory 1.3 Use & care of Microscope 1.4 Various Fixatives: Mode of action, Preparation and Indication 1.5 Tissue processing for routine paraffin sections 1.6 Section Cutting 1.7 Staining of tissues- H & E Staining 1.8 Bio-Medical waste management	25%
2	**Clinical Pathology** 2.1 Introduction to Clinical Pathology 2.2 Collection, Transport, Preservation, and Processing of various clinical specimens 2.3 Urine Examination- 2.3.1 Collection and Preservation of Urine 2.3.2 Physical, Chemical, Microscopic Examination	30%
3	**Hematology** 3.1 Introduction to Haematology 3.2 Normal constituents of Blood, their structure and function 3.3 Collection of Blood samples 3.4 Various Anticoagulants used in Haematology 3.5 Laboratory safety guidelines 3.6 SI units and conventional units in Clinical Pathology Laboratory 3.7 Hb Estimation , PCV, ESR	25%
4	**Blood Bank** 4.1 Introduction of blood banking 4.2 Blood grouping and Rh Types	20%

	Tutorial/ Demonstration 1) Blood Grouping Rh typing	

	2) Hb Estimation 3) Packed Cell Volume [PCV], 4) Erythrocyte Sedimentation rate [ESR] 5) Bleeding Time, Clotting Time 6) Histopathology- Section cutting and H & E Staining [For B.Sc. MLT only]	

REFERENCE BOOKS

- Bancroft : Theory and Practical of Histology techniques
- Textbook of Clinical Blood Banking Science by Zmijewski
- Manual for Clinical Pathology by Sabitry Sanyal
- Practical Pathology by Dr.P.Chakraborty & Gargi Chakraborty
- Haematology for students and practitioners by Ramnik Sood
- Histological techniques by K.Laxminarayan
- Practical Pathology by Dr. K.Uma Chaturvedi & Tejiindersingh

Course Outcome: At the end of the course, Students will be able to:

CO1	Demonstrate basic steps of histopathology including sample receiving, fixation, tissue processing, section cutting, staining and bio-medical waste management
CO2	Explain basic concepts of haematology & routine clinical investigations of Haematology laboratory
CO3	Describe composition of blood and methods of estimating different components of blood
CO4	Perform samples collection, processing, transportation and urine examination
CO5	Explain blood banking and perform blood grouping and Rh typing

24BMT0104 (General Microbiology)

Course Code	24BMT0104	Total Credit	4
Title of Subject	General Microbiology	Total Hours/Week	4

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
20	05	05	70	100

Course Objectives

- To provide basic knowledge of history & development of microbiology, application of various microscopes, morphology & physiology of bacteria.
- To explain relationships between the microorganisms, infection and immunity
- To introduce various methods as well as instruments for sterilization and disinfection
- To incorporate the concept of different culture media, methods and biochemical tests
- To provide knowledge about hospital acquired infection and biomedical waste management

Course Content

Unit	Description	Weightage
1	**Historical development & microbiology** 1.1 History and Pioneers in Microbiology: Contributions of Antony Van Leeuwenhoek, Louis Pasteur, Joseph Lister, Robert Koch (Koch's Postulates).Nobel prize awarded for research in Microbiology 1.2 Development in medical microbiology & immunology	10%
2	**Microscopy** 2.1 Microscopy: instruments ,Types of microscopic techniques 2.2 Details of Light Microscope (Principles, Techniques & Applications) 2.3 Principle & Application of following microscope: Dark Field Microscopy, Phase contrast Microscopy, Fluorescent Microscopy, Confocal Microscopy & Electron Microscopy	15%
3	**Morphology & Classification** 3.1 Nomenclature and classification of microbes (in brief) 3.2 Size & Shape 3.3 Morphology of bacteria: Structures of a bacterial cell and their functions 3.4 Physiology of Bacteria: Nutrition, Gaseous requirement, temperature requirement and other growth requirements	15%

4	**Immunology** 4.1 Immunity (in brief) 4.2 Infection: Sources of infection, Modes of transmission, Factors predisposing to microbial pathogenicity, Types of infectious diseases 4.3 Types of Vaccine & Immunization schedule	15%

5	**Sterilization and Disinfection** 5.1 Sterilization and Disinfection (in detail) 5.2 Principles and use of equipments of sterilization (Namely Hot Air Oven, Autoclave, Incinerator & Pasteurization) 5.3 Anti septic and disinfectants	15%
6	**General Microbiology** 6.1 Culture media in diagnostic bacteriology 6.2 Culture methods **6.3** Identification of bacteria-biochemical tests 6.4 Antimicrobial sensitivity test	15%
7	**Hospital infection** 7.1 Causative agents, transmission methods 7.2 Prevention and Control Hospital Infection 7.3 Blood Borne Infections 7.4 Principles and practice Biomedical Waste Management	15%
	Tutorial/ Demonstration 1) Compound Microscope 2) Grams stain 3) Acid Fast staining 4) Demonstration and sterilization of equipments- Hot Air oven, Autoclave, Bacterial filters 5) Demonstration of commonly used culture media, culture methods: Nutrient broth, Nutrient agar, Blood agar, Chocolate agar, MacConkey medium, LJ media, Robertson Cooked meat media 6) Visit to hospital for demonstration of Biomedical waste management	

REFERENCE BOOKS

- Ananthanarayana & Panikar's Textbook of Microbiology
- Roberty Cruckshank – Medical Microbiology – The Practice of Medical Microbiology
- Essentials of Medical Microbiology by Apurba S. Sastry & Sandhya Bhat
- Silverton: Introduction to Medical Laboratory Technology

Course Outcome: At the end of the course, Students will be able to:

CO1	Explain history and development of microbiology
CO2	Use and handle various types of microscopes with proper technique and care
CO3	Identify and differentiate various types of bacteria
CO4	Describe the role of immunity against pathogens, types of infection and importance of Immunization
CO5	Select and operate various sterilization and disinfection techniques/instruments used in clinical laboratory
CO6	Select specific culture media, perform different culture methods and biochemical test for isolation and identification of specific microorganisms
CO7	Prevent and control hospital infections and manage biomedical wastes in health care settings
CO8	Perform Antibiotic Sensitivity Test and interpret the results

24BMT0105 (General Biochemistry)

Course Code	24BMT0105	Total Credit	4
Title of Subject	General Biochemistry	Total Hours/Week	4

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
20	05	05	70	100

Course Objectives	• To provide basic concepts of routine laboratory investigations and volumetric analysis required of clinical biochemistry laboratory • To sensitize about code of ethics for Medical Laboratory Technician at Health care organizations • To provide fundamental knowledge of different bio-molecules like carbohydrate, protein, lipid, enzymes, vitamins and nucleic acids

Course Content

Unit	Description	Weightage
1	**Introduction, Specimen collection and Handling** 1.1 Introduction to Bio-chemistry including code of ethics for Medical Lab technicians and Medical Lab Organization a) Duties to Patient b) Duties to colleagues and other professionals c) Duties to yourself d) Duties to society **e)** Duties to your profession 1.2 Reception, Registration and Bio-chemical parameters investigated 1.3 Sample Collection and Handling 1.3.1 Types of vials used in blood /specimen collection 1.3.2 Anticoagulants 1.3.3 Preservatives 1.3.4 Blood collection 1.3.5 Processing of samples 1.3.6 Preservation & Disposal of samples 1.4 Biological and chemical hazards: Safety and first aid 1.5 Introduction to laboratory apparatus: 1.5.1 Pipettes - different types (Graduated, volumetric, Pasteur, Automatic etc.), Calibration of glass pipettes 1.5.2 Burettes, Beakers, Flasks, Funnels, Cuvettes	15%
2	**Units of measurements and Preparation of solutions** 2.1 Conventional and SI units 2.2 Preparation of solutions 2.2.1 Molecular weight, equivalent weight of elements and compounds, Normality, Molarity 2.2.2 Molar solutions, Normal solutions, Percent solutions	10%

3	**Carbohydrates** 3.1 Definition, biological importance, classification, 3.2 Qualitative tests of carbohydrates 3.3 Digestion & Absorption of carbohydrates	15%

4	**Lipids** 4.1 Definition, biological importance, classification, 4.2Acid value, Iodine value, saponification value 4.3 Digestion & Absorption of lipids	15%
5	**Amino acids and Proteins** 5.1 Definition, biological importance, classification 5.2 Qualitative tests of proteins 5.3 Digestion & Absorption of proteins	15%
6	**Vitamins** Classification of Vitamins, Sources, Daily requirements, Deficiency diseases (In Brief)	10%
7	**Enzymes** **7.1** Nature, Classification of Enzymes 7.2 Factors affecting enzyme activity 7.3 Enzyme Inhibition	10%
8	**Nucleic acids- Structure and functional aspects** **8.1** Purine bases, Pyrimidine bases, Nucleosides, Nucleotides 8.2 DNA: Types, Structure & functions 8.3 RNA: Types, Structure & functions	10%
	Tutorial/ Demonstration 1) Reception and registration 2) Collection of Capillary blood & Venous blood 3) Separation of Serum and plasma from blood 4) Laboratory glass ware: Identification, Handling, Care and Maintenance, Uses 5) Lab instruments: Centrifuges, Balances, Photo Electric colorimeter, Spectrophotometer 6) Preparation of Solutions: Percentage solutions, Normal solutions, Molar solutions 7) Qualitative identification tests of sugars 8) Qualitative identification tests of proteins and amino acids	

REFERENCE BOOKS

- Text book of Biochemistry by Satyanarayana
- TEITZ – Clinical chemistry
- Vasudevan (DM) Sreekumari (S) Text book of Biochemistry for Medical students
- Varley – Clinical chemistry
- Kaplan – Clinical chemistry

Course Outcome: At the end of the course, Students will be able to:

CO1	Execute codes of ethics for Medical Laboratory Technologists at respective health care settings
CO2	Collect, process, preserve and dispose various samples used in clinical biochemistry laboratory
CO3	State all the biochemical parameters with its clinical conditions and interpret the diagnostic tests.
CO4	Manage and handle safety, first aid and hazards of the clinical biochemistry laboratory.
CO5	Prepare and handle each reagent and samples used in clinical biochemistry laboratory.
CO6	Describe fundamental concepts of all the bio-molecules like carbohydrates, proteins, lipids, enzyme, vitamins and nucleic acids
CO7	Analyze and interpret qualitative tests of bio-molecules independently.

24BMT0106 (English)

Course Code	24BMT0106	Total Credit	4
Title of Subject	English	Total Hours/Week	4

Examination Scheme

Continuous Assessment (30 marks)			External *	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
20	05	05	70	100

Course Objectives	• Develop communication skills in English by training them in handling all the four language skills effectively. The learners will be able to listen, speak, read and write in English adequately so that they could participate in various activities and perform satisfactorily.

Course Content

Unit	Description	Weightage
1	**Reading** Short stories from the text: 1.1 The happy Prince 1.2 A Horseman in the sky 1.3 The Wolves of Cernogratz 1.4 The Mark of Vishnu 1.5 The Trust Property	25%
2	Grammar Part: 2.1 Prefixes / Suffixes 2.2 Phrasal Verbs 2.3 Registers 2.4 Writing paragraphs, developing points / ideas 2.5 Writing resume, Job applications, Leave Application. 2.6 Letters of invitations (inviting / accepting/ declining), 2.7 Letters of complaint to civil authorities 2.8 Connectives 2.9 Concords- Subject-Verb Agreement. 2.10 Homophones and Homonyms 2.11 Reading Comprehension	50%

3	**Ability Enhancement** 3.1 Use various notions and function of everyday usage: 3.1.1 Dialogue Writing 3.1.2 Notions and Function of Language 3.2 Give short formal and informal talks, speeches 3.2.1 Self-Introduction. 3.2.2 Welcome speech. 3.2.3 Vote of thanks. 3.2.4 Describing People / Object / Scene. 3.2.5 Asking questions (Wh'/Interrogative/Choice (Disjunctive)/ Question tags (tail question)) 3.2.6 Expansion of idea.	25%

	3.2.7 Discuss topic in Group Discussion.	
	There shall be no University Practical Examination. ***External exam will be taken at institute level**	

REFERENCE BOOKS

- Grant Taylor. English Conversation Practice. New Delhi: Tata McGraw Hill
- R.P.Bhatnagar and R.T.Bell (1999) **Communication in English**, Hyderabad: Orient Longma

Course Outcome: At the end of the course, Students will be able to:

CO1	Listen, speak, read, and write in English effectively, enabling to participate in various academic and professional activities proficiently.
CO2	Understand and apply key grammatical concepts enhancing vocabulary and language precision.
CO3	Be proficient in composing structured paragraphs, developing points/ideas, and crafting various types of formal and informal letters
CO4	Enhance their reading comprehension skills, enabling them to understand and interpret a variety of texts accurately and efficiently.
CO5	Practice and perform various everyday communication functions and participate in group discussion

24BMT0107 (Health Care)

Course Code	24BMT0107	Total Credit	2
Title of Subject	Health Care	Total Hours/Week	2

Examination Scheme

Continuous Assessment (20 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
10	05	05	40	60

Course Objectives	• To provide a foundational understanding of health and nursing, covering health definitions, determinants, national policies, and key health programs in India. • To emphasize nursing principles, patient care techniques, bedside management, and first aid skills, equipping students with essential knowledge and practical abilities for effective healthcare delivery.

Course Content

Unit	Description	Weightage
1	**Introduction to Health** 1.1 Definition of Health 1.2 Determinants of Health 1.3 Health Indicators of India 1.4 Health Team	10%
2	**Health Policy and Programmes** 2.1 Concept 2.2 National Health Policy 2.3 National Health Programmes (Briefly Objectives and scope) 2.4 Population of India and Family welfare Programme in India	10%
3	**Introduction to law and ethics in health care** **1.1** Medical ethics - Definition - Goal - Scope **1.2** Introduction to Code of conduct **1.3** Basic principles of medical ethics – Confidentiality **1.4** Malpractice and negligence - Rational and irrational drug therapy **1.5** Autonomy and informed consent - Right of patients **1.6** Care of the terminally ill- Euthanasia **1.7** Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information- Unauthorized disclosure - retention of medical records - other various aspects.	20%

4	**Introduction to Nursing** 4.1 What is Nursing? Nursing principles 4.2 Inter-Personnel relationships 4.3 Bandaging: Basic turns; Bandaging extremities; Triangular Bandages and their application 4.4 Nursing Position, Bed making, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, Aids and rest and sleep 4.5 Lifting and Transporting Patients: Lifting patients up in the bed.	20%
	Transferring from bed to wheel chair. Transferring from bed to stretcher	
5	**Bed Side Management** 5.1 Giving and taking Bed pan, Urinal 5.2 Observation of stools, urine and sputum 5.3 Understand use and care of catheters, enema giving 5.4 Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion 5.5 Recording of body temperature, respiration and pulse **5.6** Simple aseptic technique: Sterilization and disinfection 5.7 Surgical Dressing: Observation of dressing procedures	20%
6	**First Aid** 6.1 Introduction to first aid: Definition and importance, Legal and Ethical consideration 6.2 Initial assessment and response 6.3 Common first aid procedures: Cardiopulmonary Resuscitation (CPR) Techniques for adults, children, and infants, Choking (Recognition and response), Bleeding and Wound care 6.3 Handling specific emergencies: Burns, Fractures & sprains, poisoning 6.4 Shock management: Recognizing shock and initial treatment	20%

REFERENCE BOOKS

1. Medical Ethics, by C.M. Francis, Jaypee Brothers
2. Current Problems in Medical Ethics, by George V. Lobo, St. Paul's Society, Allahabad.
3. Ethics for doctors, nurses & patients by H.P. Dunn, St. Pauls Bandar, Mumbai

Course Outcome: At the end of the course, Students will be able to:

CO1	Define health, identify its determinants, and assess health indicators specific to India, understanding the roles and functions within a healthcare team.
CO2	Analyze the national health policy and major health programs in India, including family welfare initiatives, and evaluate their objectives and scope.
CO3	Acquire and demonstrate fundamental nursing principles, including patient positioning, bandaging, and safe lifting and transporting techniques, ensuring effective and compassionate care.
CO4	To perform bed side management and aseptic techniques
CO5	To provide basic first aid techniques and respond to emergency situations with essential life-saving skills

Detailed Curriculum of
B.Sc.(Hons) Medical Technology
(Operation theatre and Anaesthesia Technology)

Second Year

24BRC0201 (Applied Pathology & Applied Microbiology)

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation theatre and Anaesthesia Technology) **Year of the Program:** Second year

Course Code	24BRC0201	Total Credit	4
Title of Subject	Applied Pathology & Applied Microbiology	Total Hours/Week	4

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual Examination	
20	05	05	70	100

Course Objectives

Applied Pathology:

- To understand atherosclerosis and hypertension.
- To explore diagnostic approaches for cardiovascular diseases.
- To examine anaemia types and haematological disorders.
- To emphasize diagnostic methods for haematological conditions.
- To investigate obstructive airway diseases (COPD, asthma).
- To analyse diagnostic tools for respiratory conditions.
- To examine chronic kidney disease and glomerulonephritis.
- To explore factors contributing to renal disorders.
- To understand types and consequences of head injuries.
- To analyse diagnostic methods for assessing head injuries.
- To Define key terms for each system.
- To explore causes and risk factors.
- To emphasize accurate diagnosis and common diagnostic tools.
- To analyse the significance of early detection.

Applied Microbiology:

- To understand the principles and practices of infection control in healthcare settings.
- To identify common healthcare-associated infections and strategies for prevention.
- To Explore the concept of antimicrobial resistance and its implications in healthcare
- To recognize diseases communicable to healthcare workers and implement preventive measures.
- To learn the essentials of microbiological surveillance for early detection and management of infections.
- To understand various sterilization techniques applicable in healthcare settings

	• To Explore protocols and best practices for the safe management of biomedical waste. • To Implement preventive measures to control the spread of infections in healthcare environments. • To acquire skills in effective sampling techniques for microbiological analysis. • To develop proficiency in the application of protocols for disinfection and sterilization.

Course Content		
Unit	**Description**	**Weightage**
	Section A: Applied Pathology	
1	**Cardiovascular System** **1.1** Atherosclerosis- Definition, Risk Factors, Briefly Pathogenesis & Morphology, Clinical Significance and Prevention. **1.2** Hypertension- Definition, Types and Briefly Pathogenesis and Effects of Hypertension. **1.3** ischemic heart diseases- Definition, Types. Briefly Pathophysiology, Pathology & Complications of various types of IHD. **1.4** Valvular Heart diseases- causes, Pathology & complication. Complications of artificial valves. **1.5** congenital heart diseases – Basic defect and effects of important types of congenital heart diseases.	15%
2	**Haematology** **2.1** Anaemia – Definition, morphological types and diagnosis of anaemia. Brief concept about Haemolytic anaemia and polycythaemia. **2.2** Bleeding disorders- Definition, classification, causes & effects of important types of bleeding disorders. Briefly various laboratory tests used to diagnose bleeding disorders.	10%
3	**Respiratory System** **3.1** Chronic obstructive airway diseases – Definition and types. Briefly causes, Pathology and complications of each type of COPD. **3.2**Briefly concept about obstructive versus restrictive pulmonary disease.	5%
4	**Renal System** **4.1** Clinical manifestations of renal diseases. Briefly causes, mechanism, effects and laboratory diagnosis of ARF & CRS. Briefly Glomerulonephritis and Pyelonephritis. **4.2** End stage renal disease – Definition, causes, effects and role of dialysis and renal transplantation in its management. **4.3** Brief concept about obstructive neuropathy.	10%
5	**Central Nervous System** **5.1** Head Injury	5%

Unit	**Description**	**Weightage**
	Section B: Applied Microbiology	
6	**Health care associated infections and antimicrobial resistance:** **6.1** Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting like Methicillin Resistant Staphylococcus aureus infections, Infections caused by Clostridium difficle, Vancomycin resistant enterococci etc. **6.2** Catheter related blood stream infections; Ventilator associated pneumonia, Catheter Related urinary tract infections, Surveillance of emerging resistance and changing flora. The impact and cost attributed to Hospital Associated infection.	15%
7	**Disease communicable to healthcare workers in hospital set up and its preventive measure:** **7.1** Occupationally acquired infections in healthcare professionals by respiratory route (tuberculosis, varicella-zoster, respiratory syncytial virus etc), blood borne transmission (HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc), orofecal route (Salmonella, Hepatitis A etc), direct contact (Herpes Simplex Virus etc). Preventive measures to combat the spread of these infections by monitoring and control.	10%
8	**Microbiological surveillance and sampling:** **8.1** Required to determine the frequency of potential bacterial pathogens including Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis and also to assess the antimicrobial resistance. Sampling :rinse technique, direct surface agar plating technique	10%
9	**Importance of sterilization:** **9.1** Disinfection of instruments used in patient care: Classification, different methods, advantages and disadvantages of the various methods. **9.2** Disinfection of the patient care unit **9.3** Infection control measures for ICU's	10%
10	**Sterilization:** **10.1** Rooms: Gaseous sterilization **10.2** Equipments: classification of the instruments and appropriate methods of sterilization. **10.3** Central supply department: the four areas and the floor plan for instrument cleaning, high-level disinfecting and sterilizing areas. **Preparation of materials for autoclaving:** **10.4**Packing of different types of materials, loading, holding time and unloading.	10%
11	**Biomedical waste Management:** **11.1**Biomedical waste handling and disposal	5%

Course Outcome: At the end of the course, Students will be able to:

C01	Cardiovascular: Understand atherosclerosis, hypertension, and prevention. Explore diagnostics. Haematological: Know anaemia types, disorders, and advanced diagnostics.
C02	Respiratory: Analyse obstructive airway diseases, explore diagnostics, and emerging technologies. Renal: Explore chronic kidney disease, glomerulonephritis, prevention, and early detection.
C03	Neurological: Recognize head injury consequences, explore diagnostics, neuroimaging, and interventions. Comprehensive: Define medical terms, explore causes, risk factors, assessments, and common diagnostics.
C04	Diagnostic Precision: Emphasize accurate diagnosis, collaboration, and common tools. Early Detection Impact: Understand its significance, prevention strategies, and societal benefits.
C05	Understand principles and practices. Identify common healthcare-associated infections and prevention strategies.
C06	Explore antimicrobial resistance and its healthcare implications.
C07	Recognize communicable diseases to healthcare workers. Implement preventive measures.
C08	Learn essentials for early infection detection. Acquire skills in effective microbiological sampling.
C09	Understand various sterilization techniques.
C010	Explore protocols and best practices for safe waste management. Implement preventive measures for infection control.

24BRC0202 (Practical- Pathology and Microbiology)

Course Code	24BRC0201		Total Credit	2
Title of Subject	Applied Pathology & Applied Microbiology-Practical		Total Hours/Week	
Examination Scheme				
Continuous Assessment (40 marks)			**External**	**Total**
Internal Examination	Projects/Assignments	Attendance		
30	05	05	60	100

Course Objectives	➢ This course provides an in-depth understanding of cardiovascular, respiratory, renal, and hematologic disorders, focusing on the pathophysiology, risk factors, and clinical manifestations associated with conditions like atherosclerosis, myocardial infarction, emphysema, and glomerulonephritis. Students will explore diagnostic criteria, treatment options, and preventive strategies, with an emphasis on effective management of kidney infections, hematologic conditions, and urine disorders. The goal is to equip students with comprehensive knowledge of disease mechanisms and the skills necessary for accurate diagnosis and treatment.	

Course Content

Unit	Description	Weightage
1	**Applies Pathology** **Description & diagnosis of the following gross specimens.** 1.1 Atherosclerosis. 1.2 Aortic aneurysm. 1.3 Myocardial infraction. 1.4 Emphysema 1.5 Chronic glomerulonephritis. 1.6 Chronic pyelonephritis. **Interpretation & diagnosis of the following charts**. 1.7 Haematology Chart - AML, CML, Haemophilia, neutrophilia, eosinophilia. 1.8 Urine Chart - ARF, CRF, Acute glomerulonephritis	

2	**Applied Microbiology** 2.1 Principles of autoclaving & quality control of Sterilization. 2.2 Collection of specimen from outpatient units, inpatient units, minor operation theatre and major operation theatre for sterility testing. 2.3 The various methods employed for sterility testing. 2.4 Interpretation of results of sterility testing.	
	2.5 Disinfection of wards, OT and Laboratory.	

Course outcomes:

CO1	Atherosclerosis: Buildup of plaque in arteries, narrowing them.
CO2	Aortic Aneurysm: Abnormal bulging of the aortic wall.
CO3	Myocardial Infarction: Necrosis of myocardial tissue due to blocked coronary arteries.
CO4	Emphysema: Destruction of alveolar walls, leading to reduced gas exchange.
CO5	Chronic Pyelonephritis: Persistent bacterial infection leading to kidney inflammation and scarring.
C06	Chronic Glomerulonephritis: Progressive inflammation of kidney glomeruli.
C07	Haematology disorders: Require appropriate treatment such as chemotherapy for leukaemia, clotting factor replacement for haemophilia, and management of underlying causes for neutrophilia and eosinophilia.
C08	Urine disorders: Management involves addressing underlying causes and may include fluid/electrolyte management, medication adjustments, and potentially renal replacement therapy in severe cases.

Reference Books: .

1. Ramadas Nayak, Textbook of Pathology for Allied Health Sciences.
2. Essential of Hospital Infection Control,Aprba S Sastry and Deepashree R.

24BRC0203 (Applied Pharmacology and Medicine)

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre and Anaesthesia Technology)
Year of the Program: Second year

Course Code	24BRC0203	Total Credit	4
Title of Subject	Applied Pharmacology & Medicine	Total Hours/Week	4

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
20	05	05	70	100

Course Objectives	• To Gain comprehensive knowledge of pharmacology, cardiovascular pharmacotherapy, and respiratory care medicine effectively. • To assess, manage, and treat various medical conditions in diverse patient populations.	

Course Content

SECTION A (APPLIED PHARMACOLOGY)

Unit	Description	Weightage
1	**General Pharmacology** 1.1 Introduction to Pharmacology & Routes of administration of drugs 1.2. Pharmacokinetics 1.3. Pharmacodynamics 1.4. Adverse drug reactions	
2	**Autonomic nervous system** 2.1. Drugs acting on cholinergic system 2.2. Drugs acting on sympathetic system 2.3. Skeletal muscle relaxants	
3	**Cardiovascular system** 3.1. Drugs used in hypertension 3.2. Drugs used in angina pectoris 3.3. Drugs used in Heart failure	

4	**Respiratory System** 4.1. Drug used in Bronchial asthma 4.2. Drug therapy for cough including antihistaminic 4.3. Drugs for respiratory tract infection including tuberculosis	
5	**Miscellaneous** 5.1 Antiemetic drugs	
	5.2. Nonsteroidal anti-inflammatory drugs and opioid analgesics 5.3. Sedative hypnotic drugs 5.4. Corticosteroids 5.5. Chemoprophylaxis and Surgical prophylaxis 5.6. Emergency medicine	
SECTION B (APPLIED MEDICINE)		
2	**MEDICINE RELEVANT TO RESPIRATORY CARE TECHNOLOGY** • Diabetes Mellitus • Hypertension • Ischaemic heart disease • Obesity • Elderly Patient • Pregnancy • Shock • COPD • Chronic renal failure • Chronic liver disease/failure • Anaemia • Paediatric patient Infant/Neonate • Epilepsy • CVA	

Course outcomes:

C01	Understand pharmacokinetics, including drug absorption, distribution, metabolism, and excretion.
C02	Explain pharmacodynamics, covering drug-receptor interactions and dose-response relationships.
C03	Identify and manage common adverse drug reactions.
C04	Describe the autonomic nervous system and its modulation by cholinergic and sympathetic drugs.
C05	Evaluate drug therapy for cardiovascular conditions, respiratory diseases, pain management, and emergency situations.
C06	Understand diabetes mellitus, hypertension, and ischaemic heart disease pathophysiology and management.

C07	Recognize respiratory implications of obesity, elderly age, pregnancy, and shock, implementing appropriate interventions.
C08	Evaluate COPD, chronic renal failure, chronic liver disease/failure, and anaemia in respiratory care.
C09	Provide specialized care for paediatric patients, including infants and neonates, addressing their unique respiratory needs.
C010	Manage respiratory complications of epilepsy and cerebrovascular accidents (CVA), ensuring appropriate support and intervention.

Reference Books:

1. R. S. Satoskar, S.D. Bhandarkar, S. S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th Edition, single Volume, M/S Popular Prakashan,350, Madan Mohan Marg, Tardeo, Bombay – 400 034.
2. K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee

Brothers, Post Box, 7193, G-16, EMCA House, 23/23, Bansari Road, Daryaganj, New Delhi.

3. Laurence and Bennet, Clinical Pharmacology, ELBS Edition, 9th Edition.

24BOA0201 (Introduction to Operation Theatre & Anaesthesia Technology)

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre and Anaesthesia Technology)
Year of the Program: Second year

Course Code	24BOA0204	Total Credit	4
Title of Subject	Introduction to Operation Theatre & Anaesthesia Technology	Total Hours/Week	4

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
20	**05**	**05**	**70**	**100**

Course Objectives	• To develop proficiency in sterilization, infection control, and operating theatre procedures, including care and maintenance of surgical instruments. • To Provide foundational knowledge of anaesthesia practice, including gas physics, medical gas supply, equipment operation, and patient monitoring. • To Emphasize safety, ethical responsibilities, and professional behavior in surgical and anesthesia settings.	

Course Content

Unit	Description	Weightage
	Section-A	
1	**C.S.S.D. and logistics** 1.1 Cleaning and dusting – methods of cleaning, composition of dust. 1.2 General care and testing of instruments- forceps haemostatic, needle, holders, Knife, blade, scissor, use/ abuse, care during surgery. 1.3 Disinfectants and of their instruments and Sterilization- Definition, Methods cleaning agents detergents, Mechanical washing, ultrasonic cleaner, lubrication inspection and pitfalls	

	1.4 Various methods of chemical treatment- formalin, glutaraldehyde etc, thermal. Hot Air oven- dry heat, Autoclaving, steam Sterilization water etc, UV treatment. 1.5 Instrument's Etching, care of micro surgical and titanium instruments 1.6 Sterilization of equipments – Arthroscope, Gastroscope, imago Lamp, Apparatus, suction Apparatus Anaesthetic equipments including endotracheal tubes – OT Sterilization including laminar Air flow 1.7 Trouble shooting – coloured spots and corrosion, staining, dust deposit, recent amendment in EPA with reference to waste disposal.	
2	Blood Transfusion	
3	Non-invasive, Monitoring of patient under anaesthesia in the Operation Theatre	
4	Instrument planning for various surgical procedure and Auxiliary instrumentation.	
5	**O.T. Techniques** 5.1 O.T. environment, control of infection scrubbing, theatre cloths including lead apron and goggles.	
6	**Duties of Nurses** 6.1.Ethics, behaviour during surgery, etc	
Section –B		
7	**Gas physics** 7.1 States of matter, Temperature conversion, Humidity, Pressure measurement, Gas flows and diffusion, Gas law, Miscellaneous concepts such as density and specific gravity	
8	**Medical Gas Supply** 8.1 Compressed gas Cylinders, Colour coding, Cylinders and Cylinder valves, Cylinder storage, Diameter index safety system, medical gas pipeline system and station outlets, Air compressors, Oxygen concentrators, Alarms and safety devices	
9	**Gas Administration Devices** 9.1 Simple oxygen administration devices, Methods of controlling gas flow, Reducing valves, Flow meters, Regulators, Flow restrictors	

10	**Oxygen Therapy** 10.1 Definition, Causes and responses to hypoxemia, Clinical signs of hypoxemia, Goals of oxygen therapy, Evaluation of patients receiving oxygen therapy, Hazards of oxygen therapy	
11	**Anaesthesia Machine** 11.1 Hanger and yoke system, Cylinder pressure gauge, pin index, Pressure regulator,	
	Flow meter assembly	
12	**Breathing System** 12.1 General considerations, Classification and breathing system, Mapleson system, Jackson Rees system of Bain circuit.	
13	**Gas Analysers Pulse Oximeter CO2 Monitor** 13.1 Pulse oximeters	
14	**Manual Resuscitators** 14.1 Types of resuscitator bags, Indications, Hazards, Methods of increasing oxygen delivery capabilities while using oxygen with resuscitator bags.	
15	**Artificial air ways (oral and Nasal endotracheal tubes, tracheostomy tubes)** 15.1 Parts of airway and features, Types, sizes and methods of insertion, Indications for use, Care of long-term airways and complications, Protocol for tracheostomy decannulation, Face masks – Types, sizes and its usage	
16	**Methods of cleaning and sterilization of anaesthetic equipments.**	
17	**History of Anaesthesia** 17.1 Prehistoric (Ether) era, Inhalational anaesthetic era, regional anaesthetic era, Intravenous anaesthetic era, Modern anaesthetic era	

18	**Minimum Standards for anaesthesia** 18.1 Who should give anaesthesia 18.2 Ten golden rules of anaesthesia 18.3 Patient assessment and preparation 18.4 Checking the drugs and equipment 18.5 Keeping the airway clear 18.6 Be ready to control ventilation 18.7 Monitor pulse and BP 18.8 Anaesthesia Service: pre-operative, Intra operative & post operative care 18.9 General Anaesthesia Techniques 18.10Local Anaesthesia Techniques	
19	**Various types of Anaesthesia techniques practiced for commonly performed surgeries**	

Course outcomes:

CO1	Develop proficiency in sterilization, disinfection, and maintenance of surgical and anaesthesia equipment to ensure safety and infection control.
CO2	Demonstrate competence in anaesthesia techniques, including patient monitoring, oxygen therapy, and airway management during surgical procedures.
CO3	Acquire knowledge of medical gas systems, anaesthesia equipment, and perioperative care standards to
	support safe and effective anaesthesia administration.
CO4	Exhibit ethical conduct, professional behaviour, and effective collaboration with surgical teams to enhance patient care and surgical outcomes.

Reference Books: .

1.Manual of Anaesthesia of operation theatre Technicians(Pillai)
2.Textbook of Anaesthesia for technician(Saneesh PJ)

24BOA0205 (Practical- Introduction to Operation Theatre & Anaesthesia Technology)

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre & Anaesthesia Technology)
Year of the Program: Second year

Course Code	24B0A0205	Total Credit	2
Title of Subject	Introduction to Operation Theatre & Anaesthesia Technology	Total Hours/Week	

Examination Scheme

Continuous Assessment (30 marks)		External	TOTAL
Internal examinations	Attendance	Annual examination	
10	10	40	60

Course Objectives	• To develop Proficiency in BLS Manoeuvres. • To master Safe Patient Transfer Techniques. • To understand Anaesthesia and Perioperative Drugs. • To achieve Proficiency in Basic Airway Management. • To utilize Basic Anaesthesia and Monitoring Equipment.	

Course Content

Unit	Description	Weightage
1	**1.1 Demonstration of BLS on mannequin (OSCE)** **1.2 Demonstration of Shifting patient from bed to trolley to OT table using mannequin (OSCE)** **Viva voce** 1.3 **Drugs:** Commonly used induction agents, inhalation agents, muscle relaxants, Premedication drugs (Anticholinergics, Analgesics, Antacids, Antiemetics, sedatives, etc), IV fluids, Drugs given perioperatively – Antibiotics, Tranexamic acid, Pitocin, Methergine, etc **1.4 Equipment:** Basic Airway management equipment (Laryngoscope, Magill's forceps, Endotracheal tubes,	

	Tracheostomy tube, Face mask, Supraglottic devices – LMA, I gel, OPA, NPA) **1.4.1** Nasogastric tube (Ryles tube) Oxygen Delivery devices (Nasal canula, nasal prongs, simple O2 Mask, Rebreathing mask, non-rebreathing mask) **1.4.2** Manual resuscitators (Ambu bag, Laerdel bag) **1.4.3** Breathing circuits – Bain circuit, Close circuit, Magill's circuit **1.4.4** Basic anaesthesia machine **1.4.5** Cylinders – O2, N2O, CO2 **1.4.6** Basic Non-invasive monitors – SPO2, ECG, NIBP, RR **1.4.7** Operation table – operation of different positions **1.4.8** Suction machine **1.4.9** Central pipeline of Gases and suction **1.5 Questions on clinical scenarios in the workplace** 1.5.1 Preoperative room, OT, Recovery room etc.	

Course outcomes:

C01	Ability to effectively perform BLS manoeuvres on a mannequin, demonstrating proficiency in essential life-saving techniques.
C02	Competence in safely shifting patients from a bed to a trolley and then onto an operating table using a mannequin, ensuring proper handling and transfer techniques.
C03	Understanding of commonly used induction agents, inhalation agents, muscle relaxants, premedication drugs (anticholinergics, analgesics, sedatives, etc.), IV fluids, and perioperative drugs (antibiotics, tranexamic acid, Pitocin, methergine, etc.).
C04	Proficiency in utilizing basic airway management equipment such as laryngoscopes, endotracheal tubes, tracheostomy tubes, oxygen delivery devices, manual resuscitators, breathing circuits, basic anaesthesia machines, cylinders (O2, N2O, CO2), basic non-invasive monitors (SPO2, ECG, NIBP, RR), operation tables, suction machines, and central pipeline systems.
C05	Ability to answer questions and manage clinical scenarios encountered in various settings including preoperative rooms, operating theatres, and recovery rooms, demonstrating practical knowledge application in real-world situations

Reference Books: .

1.Manual of Anaesthesia of operation theatre Technicians(Pillai)
2.Textbook of Anaesthesia for technician(Saneesh PJ)

24BSC0201 (Basics of Research Methodology)

Course Code	24BSC0201	Total Credit	2
Title of Subject	Basics of Research Methodology	Total Hours/Week	2

Examination Scheme

Continuous Assessment (30 marks)			External	TOTAL
Internal examinations	Projects / Assignments	Attendance	Annual examination	
10	05	05	40	60

Course Objectives	• Understand the fundamental concepts and significance of research in Medical Technology. • Learn about different types of research designs and methodologies. • Gain knowledge on various data collection techniques and tools. • Understand basic statistical concepts and data analysis techniques. • Learn about ethical issues and guidelines in research. • Develop skills in writing research proposals, reports, and scientific papers. • Apply research methodology concepts in designing and conducting a small-scale research project.

Course Content

Unit	Description	Weightage
1	**Introduction to Research:** 1.1 Definition and purpose of research 1.2 Types of research: Basic, Applied, Clinical, and Translational 1.3 Importance of research in medical technology 1.4 The research process: Steps from idea to publication	15%
2	**Research Design**: 2.1 Types of research designs: Descriptive, Analytical, Experimental, Quasi-experimental 2.2 Qualitative vs Quantitative research 2.3 Cross-sectional and Longitudinal studies	20%
3	**Data Collection (in brief)** 3.1 Primary vs Secondary data 3.2 Data collection methods: Surveys, Interviews, Observations, Questionnaires 3.3 Tools for data collection: Designing surveys and questionnaires	15%

4	**Data Analysis (in brief)** 4.1 Introduction to statistical concepts: Mean, Median, Mode, Standard Deviation 4.2 Data analysis techniques: Descriptive and Inferential statistics 4.3 Interpreting and presenting data: Tables, Graphs, Charts	20%
5	**Ethical Considerations in Research** 5.1 Importance of ethics in research 5.2 Informed consent and confidentiality 5.3 Plagiarism and Research misconduct	15%
6	**Research Writing**	15%
	6.1 Structure of a research proposal: Title, Abstract, Introduction, Methodology, Results, Discussion, Conclusion, References 6.2 Referencing styles: APA, MLA, Chicago, Vancouver 6.3 Presenting research findings: Oral and Poster presentations 6.4 Writing research reports and scientific papers	

REFERENCE BOOKS

- "Research Methodology: A Step-by-Step Guide for Beginners" by Ranjit Kumar
- "The Practice of Research in Health Care" by Hugh McLaughlin
- "Biostatistics: A Foundation for Analysis in the Health Sciences" by Wayne W. Daniel
- Articles from relevant medical and scientific journals

Course Outcome: At the end of the course, Students will be able to:

CO1	Apply the basic principles of research methodology in the field of Medical Technology
CO2	Design a small research project in the respective field
CO3	Effectively communicate the research findings

Detailed Curriculum of
B.Sc.(Honours) Medical Technology
(Operation Theatre and Anaesthesia Technology)

Third Year

24BOT0301 (Operation Theatre & Anaesthesia Technology – Clinical)

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre & Anaesthesia Technology)
Year of the Program: Third year

Course Code	24BOT0301		Total Credit	
Title of Subject	Operation Theatre & Anaesthesia Technology – Clinical		Total Hours/Week	
Examination Scheme				
Continuous Assessment (30 marks)			**External**	**Total**
Internal examinations	Projects / Assignments	Attendance	Annual examination	
20	05	05	70	100
Course Objectives	• Understand operation theatre layout, anaesthesia equipment, and peripheral support areas. • Learn sterile techniques, infection control measures, and patient safety during surgical and anaesthesia procedures. • Gain proficiency in surgical instrumentation, decontamination, and emergency equipment management. • Conduct preoperative assessments, manage anaesthesia induction and recovery, and ensure postoperative monitoring.			
Course Content				
Unit	**Description**			
1	**OPERATION THEATRE TECHNOLOGY – CLINICAL** 1.1 Physical Facility 1.2 Layout of Operation theatres 1.3Transition 1.4 Peripheral Support areas 1.5 Operating room 1.6 Special procedure rooms 1.7 Potential sources of injury to the caregiver & patient 1.8 Principles of aspects & sterile technologies 1.9 A sterile , surgical scrub, gowning & gloving 1.10 Decontamination & disinfections 1.11 Sterilization Assembly & packing			

	1.12 Thermal sterilization 1.13 Chemical sterilization 1.14 Radiation sterilization 1.15 Surgical instrumentation 1.16 Fabrication 1.17 Classification 1.18 Powered surgical instruments 1.19 Handling instruments 1.20 Specialized surgical equipment 1.21 Electro caretery 1.22 Laser 1.23 Microsurgery 1.24 Ultrasonography 1.25 Positioning prepping and draping the patient 1.26 General surgery 1.27 Breast procedures 1.28 Abdominal surgery 1.29LiverProcedures 1.30 Splenic procedures 1.31Pancreatic Procedures 1.32 Oesophageal	2.

Section B		
2	**ANAESTHESIA TECHNOLOGY – CLINICAL** 2.1 Pre operative preparation • Pre Anaesthetic Assessment • History of present assessment • Past history with emphasis on previous illness and surgery • Personal history – Smoking, alcohol • Physical examination – General and systemic	
3	3.1 Informed consent	
4	4.1 Premedication: Aims • Narcotics • Antihistaminic • Antacids • Others – NTG	

5	5.1 Investigations • Biochemistry – Blood, glucose, Urea, Creatinine • Haematology – Hemogram, Prothrombin Time, Patrial thromboplastin time, BT, • CT • Urine- Complete urine analysis • ECG • Chest X-ray • ABG	
6	Criteria used for accepting the case for surgery	
7	Equipment Checking the machine, laryngoscopes, tubes, airways etc. suction apparatus, oxygen Cylinder, anaesthetic drugs and emergency drugs • Vaporisers- Types , Hazards, Filling and Draining , Maintenance, Calibration • Non- rebreathing valves – AMBU, Ruben, Laerdal, etc.	

8	8.1 Monitoring system	
9	9.1 Induction – Anaesthesia • Endotracheal intubation, confirming the tube position and securing the tube • Maintenance of anaesthesia • Fluid / Blood and electrolyte balance • Reversal from anaesthesia – drugs used	
10	10.1 Preparations • Identification • Consent • NPO • Prosthesis • Lab results • Consultation • Blood	
11	11.1 Testing Machine • Gas supply • Flow meters • O2 bypass • Valves • Vaporises	

12	.12.1Emergency Drugs • Atropine • Epinephrine • Isoprenaline • Ephedrine • Aminophylline • Hydrocortisone • Soda Bicarb • Dopamine • Norepinephrine • Dobutamine	
13	13.1 I.V Infusion • Site of cannulations • Finding a vein • Technique of venepuncture • Special difficulty	
14	14.1 Protection of the Patient • The eyes • The ears • The skin • The lips, tongue, teeth • Veins, arteries	
	Peripheral nerves	
15	15.1. Intubation • Choice of ETT • Choice of Laryngoscope • Techniques of intubation • Complications • Difficult intubation	

16	16.1 Emergence, Termination and Recovery Reversal 16.1.1Oropharyngeal toilet E T Suction • Deflation of the cuff • Removal of the tube • Transfer of the patient 16.1.2In the recovery room • Patient identification • Diagnosis & Surgery • Type of anaesthesia used • Fluid balance • B P • Any complications • Instructions about ventilation, vital sings 16.1.3 Problems in RR B.P. hypo, hypertension HR- Techy, bradycardia Pallor, cyanosis, dyspnoea Restlessness o Neurological- Seizures Sweating	

Course outcomes:

CO1	Maintain sterile environments, infection control, and proper instrument sterilization.
CO2	Understand operation theatre layout, workflow, and patient preparation for surgery.
CO3	Conduct preoperative assessments, administer premedication, and manage anaesthesia procedures
CO4	Ensure patient safety during surgery, including intubation, fluid balance, and postoperative recovery.

Reference Books:

1.Manual of Anaesthesia of operation theatre Technicians(Pillai)
2.Textbook of Anaesthesia for technician(Saneesh PJ)

24BOT0302 (Operation Theatre & Anaesthesia Technology – Applied)

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre & Anaesthesia Technology)
Year of the Program: Third year

Course Code	24BOT0302		Total Credit	4
Title of Subject	Operation Theatre & Anaesthesia Technology – Applied		Total Hours/Week	2
Examination Scheme				
Continuous Assessment(30 marks)			**External**	**Total**
Internal Examinations	Projects/Assignments	Attendance	Annual Examination	
	05	05	70	100
Course Objectives	• Understand preoperative preparation, anaesthesia techniques, and the function and maintenance of anaesthesia machines. • Develop skills in patient monitoring, including the use of capnography and management of anaesthesia-related complications. • Gain knowledge of anaesthetic agents, blood transfusion protocols, and emergency management during surgeries. • Learn techniques for intraoperative and postoperative care, including airway and cardiovascular complication management.			

Course Content

Unit	Description	Weightage
1	**Operation Theatre Technology – Applied** 1.1 Preoperative preparation pf the patient 1.2 Diagnostic procedures 1.3 Pathological examination 1.4 Radiological examination 1.5 MRI 1.6 Nuclear medicine studies 1.7 Ultrasonography 1.8 Endoscopy 1.9 Anaesthesia techniques 1.10 Historical background	

	1.11 Types of Anaesthesia 1.12 Choice of Anaesthesia 1.13 General Anaesthesia 1.14 Indication of general anaesthesia 1.15 Endotracheal intubation 1.16 Maintenance 1.17 Monitoring – **Capnography** in details- Types , Interpretation of values ,graphs , calibrations ,**Peripheral nerve stimulator Invasive monitoring e.g.** CVP, intra- arterial BP, Temperature , etc 1.18 Emergency 1.19 Balanced Anaesthesia 1.20 Core of Anaesthetized patient 1.21 Local & regional anaesthesia 1.22 Spinal and epidural anaesthesia 1.23 Intravenous anaesthesia agents 1.24 In Hala trial anaesthetic agents 1.25 Anaesthetic Adjuvant drugs 1.26 Complication of general anaesthesia 1.27 Complication of local/regional anaesthesia 1.28 Blood transfusion 1.29 Anaesthesia Machine & central gas supply 1.30 Difficult intubation	
	Section B	
2	**Anaesthesia Technology – Applied** 2.1 History of anaesthesia in detail 2.2 Methods of anaesthesia 2.3 Inhalational Anaesthesia 2.4 Minimum alveolar anaesthetic concentration 2.5 Stages of ether anaesthesia 2.6 Halothane 2.7 Isoflurane 2.8 Sevoflurane 2.9 Nitrous oxide 2.10 Narcotic drugs 2.11 Opioids analgesics 2.12 Morphine 2.13 Pethidine 2.14 Fentanyl 2.15 Buprenorphine 2.16 Tramadol 2.17 Difficult intubation 2.18 Muscle relaxants	

2.19 Neuromuscular blockers
2.20 Suxamethorium
2.21 Pancuronium
2.22Vecuronium
2.23 Atracurium
2.24 Rocuronium
2.25 Reversal agents
2.26 Intravenous anaesthetic agents
2.27 Thiopentone
2.28 Propofol
2.29 Ketamine
2.30 Intraoperative management
2.31 Confirm the identity of the patient
2.32 Transferring the patient
2.33 Recovery room – setup, things needed expected problems
2.34 Post operative complications and management
2.35 CPR
2.36 Monitoring during anaesthesia and surgery
2.37 Regional anaesthesia
2.38 Spinal Anaesthesia
2.39 Epidural Anaesthesia
2.40 Nerve blocks
2.41 Benzodiazepines
2.42 Phenothiazines
2.43 Neuromuscular transmission
2.44 Nerve stimulators
2.45 Reversal of neuromuscular blockage
2.46 Drugs acting on sympathetic nervous system
2.47 Adrenaline
2.48 Noradrenaline
2.49 Dopamine
2.50 Dobutamine
2.51 Milrinone
2.52 Isoprenaline
2.53 Local anaesthetic agents
2.54 Lignocaine
2.55 Bupivacaine

Complications and accidents during anaesthesia

I. **Related to equipment**
   (a) Hypoxemia
   (b) Hypercapnia
   (c) Increased airway pressure
   (d) Decreased airway pressure
   (e) Deep anaesthesia
   (f) Thermal & electrical injuries

	(g) Monitoring instruments (h) Presenting anaesthesia equipment complications • Being prepared with back up ventilation • Pre-use checkout • Maintenance • User education • Treatment of Hypoxia – perioperatively • Treatment of Hypo/ Hyperthermia **II. Related to airway** • Difficult intubations • Airway Trauma **III. Cardiovascular System** • Hypotension • Hypertension • Tachycardia • Bradycardia • Arrhythmias • Ischemia & infarction	

Course outcomes:

CO1	Students will be able to perform preoperative patient preparation and conduct diagnostic evaluations such as MRI, ultrasonography, and endoscopy. Students will demonstrate competence in administering general, regional, and local anaesthesia. Students will interpret monitoring values and graphs from capnography and other invasive monitoring devices.
CO2	Students will identify and manage anaesthesia complications, including difficult intubations and perioperative emergencies. Students will be able to explain the mechanisms, applications, and complications of different anaesthetic agents and adjuvant drugs.
CO3	Students will be able to discuss the evolution and classification of various anaesthesia techniques and agents. Students will demonstrate proficiency in using inhalational agents such as Halothane, Isoflurane, and Sevoflurane, and intravenous agents like Propofol and Ketamine.
CO4	Students will be capable of managing patients in recovery, identifying postoperative complications, and implementing CPR. Students will analyse and manage equipment-related complications such as hypoxemia, hypercapnia, and airway pressure issues. Students will handle cardiovascular complications, such as hypertension, arrhythmias, and ischemic events during anaesthesia.

Reference Books:

1.Manual of Anaesthesia of operation theatre Technicians(Pillai)
2.Textbook of Anaesthesia for technician(Saneesh PJ)

24BOT0303 (Operation Theatre & Anaesthesia Technology – Advance)

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre & Anaesthesia Technology)
Year of the Program: Third year

Course Code	24BOT0303		Total Credit	4
Title of Subject	Operation Theatre & Anaesthesia Technology – Advance		Total Hours/Week	2
Examination Scheme				
Continuous Assessment (30Marks)			**External**	**Total**
Internal Examination	Projects/Assignments	Attendance	Annual Examination	
20	05	05	70	100
Course Objectives	• Specialized Surgery Techniques: To cover preparation and techniques for gynaecological, orthopaedic, neurosurgery, cardiac, and other specialized surgeries. • Advanced Anaesthesia Management: To address handling co-existing diseases during anaesthesia, emphasizing obstetric anaesthesia and management of respiratory, liver, renal, and endocrine disorders. • Thoracic and Cardiac Surgery Anaesthesia: To provide techniques for thoracic surgeries and detailed management for cardiac surgeries, including postoperative care.			

Course Content

Unit	Description	Weightage
1	**OPERATION THEATRE TECHNOLOGY - ADVANCED** 1.1Operation Theatre Techniques for Speciality Surgery:- 1.2 Preparation, nursing requirement, equipments including instruments, Sutures & etc 1.3 Anaesthesia techniques, patient positioning & recovery 1.4 Gynaecological /obstetric surgery 1.5 Urologic surgery 1.6 Orthopaedic surgery 1.7 Neurosurgery 1.8 Ophthalmic surgery	

	1.9 Plastic and reconstructive surgery 1.10 Otorhinolaryngologic and head and neck surgery 1.11 Thoracic surgery 1.12 Cardiac surgery 1.13 Vascular surgery 1.14 Organ procurement and transplantation 1.15 Thyroid surgery	
2	**ANAESTHESIA TECHNOLOGY – ADVANCED** 2.1Anaesthesia & co- existing diseases 2.2 Ischaemic heart disease 2.3 Hypertension 2.4 Congestive cardiac failure 2.5 Arrhythmia & heart blocks 2.6 Chronic bronchitis & COPD 2.7 Bronchial asthma 2.8 Paediatric anaesthesia 2.9 Liver disease and anaesthesia 2.10 renal disease and anaesthesia 2.11Obesity and anaesthesia 2.12 Diabetes mellitus and anaesthesia 2.13 Thyroid disease and anaesthesia 2.1.2Obstetric Anaesthesia: 1. Epidural analgesia 2. Anaesthesia for LSCS 3. Special situations: pre - eclampsia • Anaesthesia for common surgical disorders • Anaesthesia for special situations • Shock, low cardiac output & cardiac arrest • Pulmonary function tests & their significance • Ventilators – types & methods of ventilation • Humidification • Aerosol therapy 2.1.3 Resuscitation of the Newbern • Apgar scoring system • Use of drugs • Temperature control 2.1.4Anaesthesia for Thoracic Surgery 1. Use of double lumen tubes 2. Anaesthesia for bronchoscopy 3. Thymectomy 2.1.5 Anaesthesia for cardiac surgery 1. Preparations & monitoring	

	2. Heparin & Protamine 3. Care & use of arterial & venous lines 4. Maintenance of body temperature 5. Anaesthesia for open heart surgery 6. Transport to ICU	

Course outcomes:

CO1	Covers preparation, nursing requirements, and equipment for various specialty surgeries including gynaecological, obstetric, urological, orthopaedic, neurosurgery, ophthalmic, plastic and reconstructive, thoracic, cardiac, vascular, organ procurement and transplantation, thyroid surgery, among others.
CO2	Emphasizes on anaesthesia techniques, patient positioning, and post-operative recovery specific to each
	surgical specialty.
CO3	Focuses on managing anaesthesia in patients with co-existing diseases such as ischaemic heart disease, hypertension, congestive cardiac failure, arrhythmia, chronic bronchitis, COPD, bronchial asthma, liver disease, renal disease, obesity, diabetes mellitus, and thyroid disease.
CO4	Includes obstetric anaesthesia considerations such as epidural analgesia, anaesthesia for caesarean section, and management of pre-eclampsia.
CO5	Covers anaesthesia for common surgical disorders and special situations like shock, low cardiac output, cardiac arrest, as well as pulmonary function tests, ventilation methods, humidification, and aerosol therapy.
CO6	Details resuscitation procedures for newborns including Apgar scoring system, drug usage, and temperature control.
CO7	Discusses anaesthesia techniques for specific surgeries like thoracic surgery (including use of double lumen tubes, anaesthesia for bronchoscopy, and thymectomy) and cardiac surgery (covering preparations, monitoring, use of heparin and protamine, arterial and venous line care, maintenance of body temperature, anaesthesia for open heart surgery, and post-operative transport to the ICU).

Reference Books: .

1.Manual of Anaesthesia of operation theatre Technicians(Pillai)
2.Textbook of Anaesthesia for technician(Saneesh PJ)

24BOT0304 (Operation Theatre & Anaesthesia Technology- Practical)

Name of the Institute: CAM Institute of Allied Health Science & Technology
Name of the Program: B. Sc. (Hons) in Medical Technology (Operation Theatre & Anaesthesia Technology)
Year of the Program: Third year

Course Code	24BOT0304		Total Credit	4
Title of Subject	Operation Theatre & Anaesthesia Technology – Practical		Total Hours/Week	2
Examination Scheme				
Continuous Assessment (40 Marks)			**External**	**Total**
Internal examinations	Projects / Assignments	Attendance	Annual examination	
30	05	05	160	200
Course Objectives	• Demonstrate correct chest compressions, bag-mask ventilation, and use of oxygen delivery devices. • Learn patient positioning techniques for various surgeries and safely t patients from operating tables. • Understand the uses, dosages, and administration of anaesthetics, premedication, and perioperative drugs. • Become proficient in the use of advanced airway devices and ensure proper checking of anaesthesia equipment and safety systems.			

Course Content

Unit	Description	Weightage
1	**A) Demonstration on Mannequin (OSCE)** 1. Basic life support manures 1.1 Chest compressions 1.2 Bag mask ventilation 1.3 Applying oxygen delivery devices Insertion of OPA, NPA 1.4 Giving positions for surgery 1.5 Lateral, Prone, lithotomy, Head up, Headlow, etc 1.6 Shifting of patients from table to trolley	

2	**Drugs – VIVA** 2.1 Anaesthetic drugs – General anaesthesia, Local anaesthesia, Premedication drugs 2.2 Emergency drugs – in Crash cart 2.3 Other drugs used perioperatively e.g. Antibiotics, Pitocin, Methergine, Tranexamic acid, etc 2.4Drugs given through nebulisation	
3	**Equipments VIVA**	
	3.1 Airway – Basic and for difficult airway (Bougies, Video laryngoscope, airway exchange 3.2 catheters, Prosomal LMA, Supreme LMA, Laryngeal tube, Intubating LMA,) 3.3 Anaesthesia workstation - Checking – Gas supplies, Leaks, Alarms 3.4 Monitors - Checking alarms, settings (adult, paediatric), 3.5 Checking Defibrillator – proper functioning 3.6 Operation Table – Fixing to floor, checking level, Acquainted with functioning 3.7 Suction machine – checking for proper functioning 3.8 Cautery – Applying pads on patient, adjusting its function 3.9 Operation theatre lights – Adjusting to focus on area of interest	
4	**Clinical Knowledge VIVA** 4.1 WHO surgical safety list 4.2 Informed consent 4.3 Requirements of anaesthesia and surgical positioning 4.4 Knowledge about blood transfusion 4.5 Induction of anaesthesia and airway management – including difficult airway management 4.6 Monitoring under anaesthesia 4.7 Reversal / Emergence from anaesthesia – Problems	
5	**Spotters**	
6	**Chart stations**	

Course outcome:

CO1	Students will effectively perform BLS manoeuvres on a mannequin, demonstrating proficiency in emergency airway management. Students will accurately position mannequins in different surgical orientations, understanding the importance of patient safety and procedure-specific positioning. Students will execute safe patient transfer manoeuvres, minimizing risk of injury.
CO2	Students will accurately describe the pharmacology and application of anaesthetic drugs, including emergency and perioperative medications. Students will identify and explain the use of drugs stored in the crash cart, including their role in critical situations.
CO3	Students will demonstrate understanding of airway management tools and appropriate selection for difficult airways. Students will verify equipment functionality, troubleshoot common issues, and adjust settings based on patient needs.
CO4	Students will perform equipment checks and adjustments confidently, ensuring operational readiness during procedures.
CO5	Students will accurately explain the importance of safety checks and consent in the surgical setting. Students will manage anaesthesia procedures effectively, ensuring patient safety and proper monitoring throughout. Students will confidently recognize and explain the function of various surgical and anaesthetic tools and interpret clinical charts accurately.

Reference Books: .

1.Manual of Anaesthesia of operation theatre Technicians(Pillai)
2.Textbook of Anaesthesia for technician(Saneesh PJ)