

SARDAR PATEL UNIVERSITY

Rules/Regulations & Syllabus

[Including all revisions/amendments till June, 2013]

For the course of

**B.Sc.- Medical Technology**  
**[Operation Theater & Anesthesia Technology]**

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# SARDAR PATEL UNIVERSITY

F.Y.B.Sc.- Medical Technology  
[Operation Theater & Anesthesia Technology]  
Proposed Revision in the Curriculum

Sr. No.	Subject	Course No.	Teaching Hours
<b>Main Subjects</b>			
1	Human Anatomy	BMT-101	60
	Practical – Anatomy	BMT-101(P)	30
2	Human Physiology	BMT-102	60
	Practical – Physiology	BMT-102(P)	30
3	Pathology	BMT-103	60
	Practical-Pathology	BMT-103(P)	30
4	Microbiology	BMT-104	60
	Practical- Microbiology	BMT-104(P)	30
5	Biochemistry	BMT-105	60
	Practical- Biochemistry	BMT-105(P)	30
Main Subjects- Teaching hours			450
<b>Subsidiary subjects</b>			
6	English	E-101	60
	Practical-English	E-102(P)	30
7	Health-Care	BMT-S-101	30
Subsidiary subjects- Teaching hours			120
Teaching hours-Theory/Practicals			570
Hospital Posting			360
Total Teaching hours			930

# SARDAR PATEL UNIVERSITY

## B.Sc.- Medical Technology (First Year)

Table 1. Subjects, Credits and Scheme of Examination

<b>Sr. No.</b>	<b>Subject</b>	<b>Course No.</b>	<b>No. Credits per week</b>	<b>Duration of Uni. Exam</b>	<b>External Marks</b>	<b>Internal Marks</b>	<b>Total</b>	<b>Grand Total</b>
1	Human Anatomy	BMT-101	2	3	80	20	100	100
	Practical – Anatomy	BMT-101(P)	1	-	-	-	-	
2	Human Physiology	BMT-102	2	3	80	20	100	100
	Practical – Physiology	BMT-102(P)	1	-	-	-	-	
3	Pathology	BMT-103	2	3	80	20	100	100
	Practical-Pathology	BMT-103(P)	1	-	-	-	-	
4	Microbiology	BMT-104	2	3	80	20	100	100
	Practical- Microbiology	BMT-104(P)	1	-	-	-	-	
5	Biochemistry	BMT-105	2	3	80	20	100	100
	Practical- Biochemistry	BMT-105(P)	1	-	-	-	-	
6	English	E-101	2	3	80	20	100	100
	Practical-English	E-102(P)	1	-	-	-	-	
7	Health-Care	BMT-S-101	1	2	40	10	50	50
							<b>Total</b>	<b>650</b>

# Rules & Regulations for the course of F.Y.B.Sc.- Medical Technology

## B.Sc.- Medical Technology (First Year)

With the increasing use of advanced diagnostic and therapeutic technologies in medicine; there has been a challenging career for well-trained Medical technologists in different specialties of **Medical Technology**.

Proposed course of First Year of **B.Sc. – Medical Technology** offers a sound foundation to pursue further, in second and third year of B.Sc. MT, any of the several specialties of Medical; Technology; some of them have been mentioned hereunder:

- a. Clinical Laboratory Technology
- b. Operation Theatre & Anaesthesia Technology
- c. Respiratory Care Technology
- d. Imaging Technology
- e. Cardiac Care Technology
- f. Perfusion Technology
- g. Neuro Science Technology
- h. Renal Dialysis Technology
- i. Radiotherapy Technology

### **R. BMT. 1: Eligibility for the admission:**

Candidates who have passed 10+2 examination conducted by any recognized School Certification Board or Equivalent Examination; with principal subjects Physics, Chemistry, Biology/Maths and English (A or B or AB group student).

### **R. BMT. 2: Duration of the course:**

Duration shall be for a period of **three years** for the course of B.Sc.- Medical Technology in *Clinical Laboratory Technology*.

All other courses will be of **four years** duration; having a compulsory stipendiary Internship during the fourth year.

### **R. BMT. 3: Medium of instruction:**

The medium of instruction and examination shall be in English.

### **R. BMT. 4: Attendance**

Candidate shall be required to attend at least 75% of the Lectures and Practical separately in each year.

**R. BMT. 5:**

**Subjects, Credits and Scheme of examination**

Main and Subsidiary subjects are common in first year for all the courses of Medical Technology. The subject-wise details of examination for the first year have been given in Table 1.

There shall be three examinations one each at the end of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> year.

**There shall be no University Practical Exam in the First Year.**

It is however necessary that candidates score at least 35% internal marks in all main as well as subsidiary subjects - theory and practical - to become eligible to appear in the University examination.

**R. BMT. 6:**

Eligible candidate desirous for appearing in the University examination of any/all theory papers must forward his/her application in the prescribed form from the respective college to the University on or before the date prescribed for the purpose under the relevant ordinance.

**R. BMT.7:**

**Standard of passing:**

The standard of passing the F.Y.B.Sc. degree examination will be as under:

- (a) To pass the B.Sc. Degree examination, a candidate must obtain at least **35% marks** (aggregate of external and internal) in each of the main and subsidiary subjects **separately**.
- (b) Award of class will be as per the other degree examinations of faculty of Medicine, S.P. University.

**R. BMT. 8:**

**Promotion and A.T.K.T.**

- a. Candidates, who have passed separately in theory and practical of all subject heads (course) in F.Y.B.Sc. and S.Y.B.Sc. Shall be promoted to S.Y.B.Sc. And T.Y.B.Sc. Respectively.
- b. Candidates, who fail in **any three** of the subject heads (courses) in F.Y.B.Sc. Or S.Y.B.Sc. Shall be granted A.T.K.T. And shall be allowed to attend S.Y.B.Sc. Or T.Y.B.Sc.; as the case may be. Candidate can re-appear in the following subject-heads in the subsequent exam.
- c. Candidate would however not be allowed for the promotion from S.Y.B.Sc. to T.Y.B.Sc. unless and until s/he passes all subjects of F.Y.B.Sc.

# SYLLABUS FOR F.Y.B.Sc. – Medical Technology

**Course code: BMT 101**

## **HUMAN ANATOMY**

Theory classes: 60 hours

Practical classes : 30 hours

### **Unit 1. Introduction: human body as a whole**

#### **Theory:**

- Definition of anatomy and its divisions
- Terms of location, positions and planes
- Cell and its organelles
- Epithelium-definition, classification, describe with examples, function
- Glands- classification, describe serous & mucous glands with examples
- Basic tissues – classification with examples

#### **Practical:**

- Histology of types of epithelium
- Histology of serous, mucous & mixed salivary gland

### **Unit 2. Locomotion and support**

#### **Theory:**

- Cartilage – types with example & histology
- 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
- Joints – Classification of joints with examples, synovial joint (in detail for radiology)
- Muscular system: Classification of muscular tissue & histology
- Names of muscles of the body

#### **Practical:**

- Histology of the 3 types of cartilage
- Demo of all bones showing parts, radiographs of normal bones & joints
- Histology of compact bone (TS & LS)
- Demonstration of muscles of the body (as functional groups)
- Histology of skeletal (TS & LS), smooth & cardiac muscle

### **Unit 3. Cardiovascular system**

#### **Theory:**

- Heart-size, location, chambers, exterior & interior
- Blood supply of heart
- Systemic & pulmonary circulation
- Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery
- Peripheral pulse
- Inferior venacava, portal vein, portosystemic anastomosis
- Great saphenous vein
- Dural venous sinuses
- Lymphatic system- cisterna chyli & thoracic duct
- Histology of lymphatic tissues
- Names of regional lymphatics, axillary and inguinal lymph nodes in brief

**Practical:**

- Demonstration of heart and vessels in the body
- Histology of large artery, medium sized artery & vein, large vein
- Microscopic appearance of large artery, medium sized artery & vein, large vein
- pericardium
- Histology of lymph node, spleen, tonsil & thymus
- Normal chest radiograph showing heart shadows
- Normal angiograms

**Unit 4. Gastro-intestinal system****Theory:**

- Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring)
- Oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas
- Radiographs of abdomen

**Unit 5. Respiratory system****Theory:**

- Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments
- Histology of trachea, lung and pleura
- Names of paranasal air sinuses

**Practical:**

- Demonstration of parts of respiratory system.
- Normal radiographs of chest
- Histology of lung and trachea

**Unit 6. Urinary system****Theory:**

- Kidney, ureter, urinary bladder, male and female urethra
- Histology of kidney, ureter and urinary bladder

**Practical:**

- Demonstration of parts of urinary system
- Histology of kidney, ureter, urinary bladder
- Radiographs of abdomen-IVP, retrograde cystogram

**Unit 7. Reproductive system****Theory:**

- Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology)
- Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology)
- Mammary gland – gross

**Practical:**

- Demonstration of section of male and female pelvis with organs *in situ*
- Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary
- Radiographs of pelvis – hysterosalpingogram

**Unit 8. Endocrine glands****Theory:**

- Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland, suprarenal glad – (gross & histology)

**Practical:**

- Demonstration of the glands
- Histology of pituitary, thyroid, parathyroid, suprarenal glands

## **Unit 9. Nervous system**

### **Theory:**

- Neuron
- Classification of NS
- Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (Gross Anatomy)
- Histology of Cerebrum, cerebellum and spinal cord
- Meninges, Ventricles & cerebrospinal fluid
- Blood supply of brain ( In Brief)
- Cranial nerves ( Only Names)

### **Practical:**

- ◆ Histology of peripheral nerve & optic nerve
- ◆ Demonstration of all plexuses and nerves in the body
- ◆ Demonstration of all part of brain
- ◆ Histology of cerebrum, cerebellum, spinal cord

## **Unit 10.Sensory organs:**

### **Theory:**

- Skin:Skin-histology
- Appendages of skin
- Eye:Parts of eye & lacrimal apparatus
- Extra-ocular muscles & nerve supply
- Ear:parts of ear- external, middle and inner ear and contents

### **Practical:**

- Histology of thin and thick skin
- Demonstration and histology of eyeball
- Histology of cornea & retina

## **Unit 11.Embryology:**

### **Theory:**

- Spermatogenesis & oogenesis
- Ovulation, fertilization
- Fetal circulation
- Placenta

**There shall be no University Practical Examination.**

## **REFERENCE BOOKS**

1 William Davis (P) understanding Human Anatomy and Physiology MC Graw Hill

2. Human Anatomy for Nursing & Allied Sciences - 1<sup>st</sup> 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 code: BMT 102**  
**HUMAN PHYSIOLOGY**

Theory classes: 60 hours

Practical classes : 30 hours

**Theory:**

**Unit 1. Blood and Muscle Physiology:**

- Composition & Function of Blood
- Erythropoiesis and Leucopoiesis
- Hemostasis
- Action potential and mechanism of Muscle contraction
- Neuromuscular junction

**Unit 2. Digestive System and Excretory System**

- Movement and Alimentary tract
- Deglutition and Mechanism of Vomiting
- Digestive juices
- Micturition
- Mechanism of Urine formation
- Regulation of acid-base balance

**Unit 3. Cardiovascular and Respiratory System**

- Heart rate and sound
- Blood pressure
- Cardiac cycle and output
- Mechanism of breathing
- Oxygen and Carbon dioxide Transport
- Pulmonary volume and capacity

**Unit 4. Endocrinology and Reproductive System**

1. Spermatogenesis and Menstrual cycle
2. Puberty
3. Pregnancy and Lactation
4. Hormones of Pituitary, Thyroid & Parathyroid Glands
5. Hormones of Adrenal Gland and Pancreas

**Unit 5. Nervous System and Special Senses**

- Neuron and Neuroglia
- Properties of nerve fibre
- Reflex mechanism and Receptors
- Mechanism of vision and hearing
- Taste and smell

**Practical:**

- Estimation of Haemoglobin
- Bleeding time
- Clotting time
- Blood Grouping
- Erythrocyte Sedimentation rate
- Packed Cell Volume
- Arterial Blood Pressure
- Pulse
- Heart rate
- Breathing rate

**There shall be no University Practical Examination.**

**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 code: BMT 103**

# **PATHOLOGY**

Theory classes: 60 hours

Practical classes : 30 hours

## **Theory**

### **Unit 1. Histo Pathology**

- Introduction to Histo Pathology
- Receiving of Specimen in the laboratory
- Grossing Techniques
- Mounting Techniques – various Mountants
- Maintenance of records and filing of the slides.
- Use & care of Microscope
- Various Fixatives, Mode of action, Preparation and Indication.
- Section Cutting
- Tissue processing for routine paraffin sections
- Decalcification of Tissues.
- Staining of tissues - H& E Staining
- Bio-Medical waste management

### **Unit 2. Clinical Pathology**

- Introduction to Clinical Pathology
- Collection, Transport, Preservation, and Processing of various clinical Specimens
- 1. Urine Examination – Collection and Preservation of urine.
- 2. Physical, chemical, Microscopic Examination
- 3. Examination of CSF and other body fluids.
- 4. Sputum Examination.
- 5. Examination of feces

### **Unit 3. Haematology**

- Introduction to Haematology
- Normal constituents of Blood, their structure and function.
- Collection of Blood samples
- Various Anticoagulants used in Haematology
- Various instruments and glassware used in Haematology, Preparation and use of glassware
- Laboratory safety guidelines
- SI units and conventional units in Hospital Laboratory
- Hb, PCV
- ESR
- Normal Haemostasis
- Bleeding Time, Clotting Time, Prothrombin Time, Activated Partial Thromboplastin Time.

### **Unit 4. Blood Bank**

- Introduction
- Blood grouping and Rh Types
- Cross matching

### **Practical:**

- Urine Examination.
- Physical
- Chemical
- Microscopic
- Blood Grouping Rh typing.
- Hb Estimation, Packed Cell Volume[PCV], Erythrocyte Sedimentation rate{ESR}
- Bleeding Time, Clotting Time.
- Histopathology – Section cutting and H &E Staining.[For BSc MLT only ]

**There shall be no University Practical Examination.**

### **REFERENCE BOOKS**

1. Silvertone : Introduction to Medical Lab. Technology
2. Bancroft : Theory and Practical of Histology techniques
3. Textbook of Clinical Blood Banking Science by Zmijewski.
4. Manual for Clinical Pathology by Sabitry Sanyal
5. Practical Pathology by Dr.P.Chakraborty & Gargi Chakraborty
6. Haematology for students and practitioners by Ramnik Sood
7. Histological techniques by K.Laxminarayan
8. Practical Pathology by Dr.K.Uma Chaturvedi & Tejsindersingh

## Course code: BMT 104

### MICROBIOLOGY

Theory classes: 60 hours

Practical classes : 30 hours

#### Theory

##### Unit 1. Morphology

- Classification of microorganisms,
- Size, shape and structure of bacteria.
- Use of microscope in the study of bacteria.

##### Unit 2. Sterilisation and Disinfection

- Principles and use of equipments of sterilization namely Hot Air oven, Autoclave and serum inspissator. Pasteurization,
- Anti septic and disinfectants

##### Unit 3. Growth and nutrition

- Nutrition, growth and multiplications of bacteria,
- Use of culture media in diagnostic bacteriology.
- Antimicrobial sensitivity test

##### Unit 4. Immunology

- Infection & Immunity
- Antigen, Immunoglobulins (in brief)
- Principles and interpretation of commonly done serological tests namely Widal, VDRL, ASO, CRP, RF & ELISA. Rapid tests for HIV and HBsAg (Technical details to be avoided)
- Types of Vaccine and immunization schedule

##### Unit 5. Systematic Bacteriology

- Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria (the classification, antigenic structure and pathogenicity to be avoided)
  - *Staphylococci, Streptococci, Pneumococci,*
  - *Gonococci, Meningococci,*
  - *C. diphtheriae, Clostridia, Bacillus,*
  - *Shigella, Salmonella, Esch coli,*
  - *Klebsiella, Proteus, Pseudomonas*
  - *Mycobacteria*
  - *Vibrio cholerae, &*
  - *Spirochetes-Treponema pallidum & Leptospira*

##### Unit 6. Parasitology

- Morphology, life cycle, laboratory diagnosis of following parasites
  - Protozoa - *E. histolytica, Plasmodium,*
  - Tape worms –*Taenia*
  - Intestinal nematodes – Round worm, Hookworm,

##### Unit 7. Mycology

- Morphology, diseases caused and lab diagnosis of following fungi.
  - *Candida, Cryptococcus,*
  - Dermatophytes ,
  - opportunistic fungi.

### **Unit 8. Virology**

- General properties of viruses, diseases caused, lab diagnosis and prevention of following viruses,
  - Herpes,
  - Hepatitis,
  - HIV
  - Rabies and
  - Poliomyelitis.

### **Unit 9. Hospital infection**

- ◆ Causative agents, transmission methods,
- ◆ Prevention and control Hospital infection.

### **Unit 10. Principles and practice Biomedical waste management**

#### **Practical**

- Compound Microscope.
- Grams stain
- Acid Fast staining
- Demonstration and sterilization of equipments – Hot Air oven, Autoclave, Bacterial filters.
- Demonstration of commonly used culture media, culture methods
  - Nutrient broth, Nutrient agar, Blood agar, Chocolate agar, Mac conkey medium, LJ media, Robertson Cooked meat media, Potassium tellurite media with growth, Mac with LF & NLF, NA with staph
- Demonstration of commonly used Biochemical Reactions for identification of bacteria
  - Coagulase test
  - Catalase test
  - IMViC
  - TSI
  - Urease, Oxidase
- Antibiotic susceptibility test
- Anaerobic culture methods.
- Demonstration of common serological tests – Widal, VRDL, ELISA.
- Stool exam for Helminthic ova
- Visit to hospital for demonstration of Biomedical waste management.

**There shall be no University Practical Examination.**

#### **REFERENCE BOOKS**

1. Anathanarayana & Panikar Medical Microbioloty
2. Roberty Cruckshank – Medical Microbiology – The Practice of Medical Microbiology
3. Chatterjee – Parasitology – Interpretation to Clinical medicine.
4. Rippon – Medical Mycology
5. Monica Cheesebrough,

## Course code: BMT 105

### BIOCHEMISTRY

Theory classes: 60 hours

Practical classes : 30 hours

#### Theory

##### Unit.1 Introduction, specimen collection and Handling

- ◆ Introduction to Bio-chemistry including code of ethics for Medical Lab technicians and Medical Lab Organization.
- ◆ Reception, Registration and Bio-chemical parameters investigated.
- ◆ Types of vials used in blood /specimen collection
- ◆ Anticoagulants
- ◆ Preservatives
- ◆ Blood collection
- ◆ Precautions
- ◆ Safety, first aid, Biological and chemical hazards
- ◆ Processing of samples
- ◆ Preservation
- ◆ Disposal of samples
- ◆ Introduction to laboratory apparatus :
  - Pipettes - different types (Graduated, volumetric, Pasteur, Automatic etc.), Calibration of glass pipettes
  - Burettes, Beakers, Flasks, Funnels, Cuvettes,

##### Unit 2. Units of measurements and Basics of Instrumentation

- ◆ Conventional and SI units
  - Molecular weight, equivalent weight of elements and compounds, normality, molarity,
  - Preparation of molar solutions, normal solutions, Percent solutions
- I. Colorimetry : Photoelectric methods, instrumentation, principles and laws involved, Operation, maintenance, applications.
- II. Spectrophotometry : Principle ,types and applications.
- III. Weighing : Different types of balances used, care and maintenance.
- IV. pH meter-Principle, Use, care and maintenance of pH meter and electrodes
- ◆ Basic lab operations like -Separation of Solids from liquids,
  - a) Centrifugation : Principle, Different types of Centrifuges, care and maintenance, applications
  - b) Filtration using funnel

##### Unit.3 Carbohydrates :

Definition, biological importance, classification, qualitative tests, Metabolism(brief), Blood glucose.

##### Unit.4 Lipids :

Definition, biological importance, classification, Acid value, Iodine value, saponification value, Metabolism(brief).

##### Unit.5 Aminoacids and Proteins :

Definition, biological importance, classification, qualitative tests.

##### Unit.6 Vitamins and Minerals :

Vitamins : Classification of Vitamins, Sources, Daily requirements, Deficiency diseases. (In Brief)  
Minerals ( Iron, calcium, Iodine): Sources, Daily requirements, Deficiency diseases .

##### Unit.7 Enzymes

Nature, Classification and Clinical enzymes.

##### Unit.8 Nucleic acids- Chemistry and functional aspects

Purine bases, Pyrimidine bases, nucleosides, Nucleotides, DNA & RNA, Their functions  
Brief outline of Replication, Transcription, translation.

### Unit.9

- ◆ PH, buffers, acid-base balance, disorders.
- ◆ Digestion and absorption of Biomolecules
- ◆ Water, Chemicals and related substances
  - ★ Purity of chemicals
  - ★ Corrosives

### Practical:

- ◆ Reception and registration
- ◆ Collection of Capillary blood
- ◆ Collection of Venous blood
- ◆ Separation of Serum from clotted blood
- ◆ Separation of plasma from blood
- ◆ Lab glass ware
  - a) Identification
  - b) Handling
  - c) Care and Maintenance
  - d) Uses
- ◆ Lab instruments
  - a) Centrifuges
  - b) Balances
  - c) Photo Electric colorimeter
  - d) Spectrophotometer
- ◆ Preparation of
  - a) Percentage solutions
  - b) Normal solutions
  - c) Molar solutions
- ◆ Qualitative identification of tests of sugars
- ◆ Qualitative identification of tests of proteins
- ◆ Qualitative identification of tests for amino acids
- ◆ Estimation of Blood glucose
- ◆ Estimation of Blood urea
- ◆ Normal and pathological urine.

**There shall be no University Practical Examination.**

### REFERENCE BOOKS

1. TEITZ – Clinical chemistry
2. Vasudevan (DM) Sreekumari(S) Text book of Biochemistry for Medical students ,Latest Ed
3. Varley – Clinical chemistry
4. 3. Kaplan – Clinical chemistry

## **Course code: BMT-S-101**

### **HEALTH CARE**

Theory classes: 30 hours

#### **Unit 1. Introduction to Health**

- ◆ Definition of Health
- ◆ Determinants of Health
- ◆ Health Indicators of India
- ◆ Health Team

#### **Unit 2. Health Policy and Programmes**

- Concept.
- National Health Policy
- National Health Programmes ( Briefly Objectives and scope)
- Population of India and Family welfare programme in India

#### **Unit 3. Introduction to Nursing**

- What is Nursing ? Nursing principles.
- Inter-Personnel relationships.
- **Bandaging** : Basic turns; Bandaging extremities; Triangular Bandages and their application.
- Nursing Position, Bed making, prone, lateral, dorsal, dorsal re-cumbent, Fowler's positions, comfort measures, Aids and rest and sleep.
- **Lifting And Transporting Patients:** Lifting patients up in the bed. Transferring from bed to wheel chair. Transferring from bed to stretcher.

#### **Unit 4. Bed Side Management:**

- Giving and taking Bed pan, Urinal :
- Observation of stools, urine.Observation of sputum,
- Understand use and care of catheters, enema giving.
- **Methods Of Giving Nourishment:** Feeding, Tube feeding, drips, transfusion
- Recording of body temperature, respiration and pulse,
- **Simple aseptic technique:** Sterlization and disinfection.
- Surgical Dressing: Observation of dressing procedures

#### **Unit 5. First Aid :**

- Syllabus as for Certificate Course of Red Cross Society

## **Course Code: E - 101**

### **ENGLISH**

Theory classes: 60 hours

Practical classes: 30 hours

There will be two papers in English at the FYBSc as per the revised syllabus E-101 (Theory) will be taught for two hours a week and E-102 (Practical) will also be taught for two hours a week/per Batch each form the academic year 2009-10

Language Skills like Reading and Writing will be covered in E-101 and Listening and Speaking will be covered in E-102 which will also have Lab Session of two hours per week.

#### **Aim**

These two course will aim at helping the course participants develop their 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 satisfactory the different tasks listed below.

#### **Overall Objectives**

The objectives are to develop abilities

- ◆ To process information using a variety of media
- ◆ To use appropriate phrases for performing language functions
- ◆ To edit, select and present information in a format / perspective
- ◆ To listen and reduce information to a point form
- ◆ To read and to expand from points to paragraph
- ◆ To predict, comprehend, infer and synthesize information
- ◆ To question, probe and arrive at information through discussions, dialogues and interviews
- ◆ To answer questions, choose and provide data etc.



## **E-101 (Theory) : 2 Credits : 2 hours week**

### **A. Reading**

The objectives are to enable the students to

- Read for information news features, articles, newspaper and text
- Read intensively a collection of short stories given in a compiled text ( See for the text and the lessons selected from it below)

### **Book prescribed**

- ◆ L.A.Hill (1970), **Contemporary Short Stories**. Chennai: Oxford University Press. The following stories have been selected for use on the course.

- ◆ The happy Prince
- ◆ A Horseman in the sky
- ◆ The Wolves of Cernogratz
- ◆ The half Mile
- ◆ The Mark of Vishnu
- ◆ The Halfyard Ham
- ◆ Locomation 38
- ◆ The Ghost Ship
- ◆ Uneasy Homecoming
- ◆ The Trust Property

### **B. Writing**

The objectives are to enable the students to

- ◆ Form words properly using prefixes / suffixes (See list 4 in the Appendix)
- ◆ Use phrasal verbs (See list 3 in the Appendix)
- ◆ Use appropriate and related registers (See list 5 in the Appendix)
- ◆ Writing paragraphs, developing points / ideas
- ◆ Writing resume, job applications, letters of invitations (inviting / accepting/ declining), letters of complaint to civil authorities
- ◆ Answering questions based on the prescribed text: **Contemporary Short Stories**

### **Books Recommended**

- Champa Tickoo and Jaya Sasikumar (2000). **Writing with a Purpose**, Chennai, OUP
- David Jolly (1988). **Writing Tasks**: An authentic task approach to individual writing needs.

## **E-102 (Practicals) : 2 hours week**

### **C. Listening**

The objectives are to enable the students to listen and understand

- Short lecture, descriptions, and narrations, rapid talks, passages read aloud and/or dictated and identify Language functions (See list 2 in the Appendix)
- Conversations based on familiar situations, and
- Note Making

### **Books Recommended**

- Spoken English-D Sasikumar and PV Dhamija (with Audio Cassette) Tata Mcgraw Hill

### **D. Speaking**

The objectives are to enable the students to

- Use greeting and formula in everyday conversations.
- Use various notions and function of everyday usage (See list 2 in the Appendix)
- Use grammatically correct and appropriately structures to organize thought ( See list 1 Containing Syntactic items in the Appendix)
- Give short formal and informal talks, speeches

### **Books Recommended**

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

## **Testing: Division of Marks**

### **E – 101 (Theory)**

<b>Q.1</b>	Answer in Brief. (In not more than three sentences)	14 marks
<b>Q.2</b>	Short Notes (Any Two)	06 marks
<b>Q.3</b>	Multiple Choice	
	• Content based questions	05 marks
	• Expressions / Idioms / Difficult words	05 marks
	• Connectives	04 marks
	• Concord	04 marks
<b>Q.4</b>	(A) Comprehension (Unseen Passage) OR Paragraph Writing	08 marks
	(B) Letter Writing	08 marks
	• Formal Letters- Letters of complaint, Invitation- Extending/declining, Resume building/ Applications	
<b>Q.5</b>	(A) Phrasal Verbs	04 marks
	(B) Registers	02 marks

### **E – 102 (Practical)**

- Listening 15 marks
- Dictation 05 marks
- Reading A loud 10 marks
- Viva + Journal 10 + 5 marks
- Note Making 10 marks
- Vocabulary 05 marks

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60 marks (60/2 = 30)

SARDAR PATEL UNIVERSITY

**S.Y. B. Sc.- Medical Technology in  
Operation Theatre and Anaesthesia Technology**

Curriculum

<b>Sr. No.</b>	<b>Subject</b>	<b>Course No.</b>	<b>Teaching Hours</b>
<b>Main Subjects</b>			
1	Section A -Applied Pathology	BMT-201	30
	Section B- Applied Microbiology		30
	Practical-Pathology & Microbiology	BMT-201-P	45
2	Introduction to Operation Theatre & Anaesthesia Technology	BMT-OTAT-202	60
	Practical	BMT-OTAT-202-P	90
3	Applied Pharmacology & Medicine	BMT-203	60
Main Subjects- Teaching hours			315
<b>Subsidiary subjects</b>			
4	Bio-ethics	BMT-S-201	20
5	Computer Organization & PC Software	BMT-S-202	25
6	Practical - Computer Organization & PC Software	BMT-S-203-(P)	25
Subsidiary subjects- Teaching hours			70
Teaching hours-Theory/Practicals			385
Clinical Posting			540
Total Teaching hours			925

**S.Y.B.Sc.- Medical Technology  
(in Operation Theatre & Anaesthesia Technology)**

**Table 1. Subjects, Credits and Scheme of Examination**

Sr. No.	Subject	Course No.	No. Credits per week	Duration of Uni. Exam	External Marks	Internal Marks	Total	Grand Total
1	Section A: Applied Pathology	BMT-201	2	3	80	20	100	150
	Section B: Applied Microbiology							
	Practical- Pathology & Microbiology	BMT-201-(P)	1	1 day	40	10	50	
2	Introduction to Operation Theatre & Anaesthesia Technology	BMT-OTAT-202	2	3	80	20	100	150
	Practical- Operation Theatre & Anaesthesia Technology	BMT-OTAT-202-(P)	1	1 day	40	10	50	
3	Applied Pharmacology & Medicine	BMT-OTAT-203	2	3	80	20	100	100
4	Bioethics	BMT-S-201	1	2	40	10	50	50
	No practical Exam	-	-	-	-	-	-	
5	Computer Organization & PC Software	BMT-S-202	1	2	40	10	50	80
	Practical- Computer Organization & PC Software	BMT-S-202(P)	1	1 day	25	5	30	
Total								530

# **Syllabus for Second Year B.Sc. - Medical Technology in Operation Theatre and Anaesthesia Technology**

**Course code: BMT-OTAT- 201**

## **SECTION A - APPLIED PATHOLOGY**

### **I. CARDIOVASCULAR SYSTEM**

- Atherosclerosis- Definition, risk factors, briefly Pathogenesis & morphology, clinical significance and prevention.
- Hypertension- Definition, types and briefly Pathogenesis and effects of Hypertension.
- Aneurysms – Definition, classification, Pathology and complications.
- Pathophysiology of Heart failure.
- Cardiac hypertrophy – causes, Pathophysiology & Progression to Heart Failure.
- Ischaemic heart diseases- Definition, Types. Briefly Pathophysiology, Pathology & Complications of various types of IHD.
- Valvular Heart diseases- causes, Pathology & complication. Complications of artificial valves.
- Cardiomyopathy – Definition, Types, causes and significance.
- Pericardial effusion- causes, effects and diagnosis.
- Congenital heart diseases – Basic defect and effects of important types of congenital heart diseases.

### **II. HAEMATOLOGY**

- Anaemia – Definition, morphological types and diagnosis of anaemia. Brief concept about Haemolytic anaemia and polycythaemia.
- Leukocyte disorders- Briefly leukaemia, leukocytosis, agranulocytosis etc.,
- Bleeding disorders- Definition, classification, causes & effects of important types of bleeding disorders. Briefly various laboratory tests used to diagnose bleeding disorders.

### **III. RESPIRATORY SYSTEM**

- Chronic obstructive airway diseases – Definition and types. Briefly causes, Pathology and complications of each type of COPD.
- Briefly concept about obstructive versus restrictive pulmonary disease.
- Pneumoconiosis- Definition, types, Pathology and effects in brief.
- Pulmonary congestion and edema.
- Pleural effusion – causes, effects and diagnosis.

### **IV. RENAL SYSTEM**

- Clinical manifestations of renal diseases. Briefly causes, mechanism, effects and laboratory diagnosis of ARF & CRS. Briefly Glomerulonephritis and Pyelonephritis.
- End stage renal disease – Definition, causes, effects and role of dialysis and renal transplantation in its management.
- Brief concept about obstructive uropathy.

## V. Central Nervous System

- Increased Intracranial tension
- Head Injury

### PRACTICALS

1. Description & diagnosis of the following gross specimens.
  - a. Atherosclerosis.
  - b. Aortic aneurysm.
  - c. Myocardial infraction.
  - d. Emphysema
  - e. Chronic glomerulonephritis.
  - f. Chronic pyelonephritis.
2. Interpretation & diagnosis of the following charts.
  - a. hematology Chart - AML, CML, Hemophilia, neutrophilia, eosinophilia.
  - b. Urine Chart - ARF, CRF, Acute glomerulonephritis.
3. Estimation of Hemoglobin.
4. Estimation Bleeding & Clotting time.

### SECTION B-APPLIED MICROBIOLOGY

**1. Health care associated infections and Antimicrobial resistance:** 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 difficile, Vancomycin resistant enterococci etc. 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.

**2. Disease communicable to Healthcare workers in hospital set up and its preventive measure:** 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), oro faecal route ( Salmonella, Hepatitis A etc), direct contact ( Herpes Simplex Virus etc). Preventive measures to combat the spread of these infections by monitoring and control.

**3. Microbiological surveillance and sampling:** 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

**4. Importance of sterilization:**

- a. Disinfection of instruments used in patient care: Classification, different methods, advantages and disadvantages of the various methods.
- b. Disinfection of the patient care unit
- c. Infection control measures for ICU's

**5. Sterilization:**

- a. Rooms: Gaseous sterilization,
- b. Equipments: classification of the instruments and appropriate methods of sterilization.

c. Central supply department: the four areas and the floor plan for instrument cleaning, high-level disinfecting and sterilizing areas.

6. Preparation of materials for autoclaving: Packing of different types of materials, loading, holding time and unloading.

7. Biomedical waste Management: Biomedical waste handling and disposal

### **PRACTICALS**

1. Principles of autoclaving & quality control of Sterilization.
2. Collection of specimen from outpatient units, inpatient units, minor operation theater and major operation theater for sterility testing.
3. The various methods employed for sterility testing.
4. Interpretation of results of sterility testing.
5. Disinfection of wards, OT and Laboratory.

### **PRACTICAL EXAMINATION**

There will be a Combined Practical examination for Applied Pathology & Applied Microbiology.

**INTRODUCTION TO OPERATION THEATRE & ANAESTHESIA TECHNOLOGY**

**SECTION A - INTRODUCTION TO OPERATION THEATRE TECHNOLOGY**

**1. C.S.S.D, and logistics**

- Cleaning and dusting – methods of cleaning, composition of dust.
- General care and testing of instruments-forcups haemostatic, needle, holders, Knife, blade, scissor, use/ abuse, care during surgery.
- Disinfectants and of there instruments and Sterilization- Definition, Methods cleaning agents detergents, Mechanical washing, ultrasonic cleaner, lubrication inspection and pitfalls
- Various methods of chemical treatment- formalin, glutraidehavde etc, thermal. Hot Air oven- dry heat, Autoclaving, steam Sterilization water etc,. UV treatment.
- Instrument's Etching, care of micro surgical and titanium instruments
- Sterilization of equipments – Arthroscope, Gastroscope, imago Lamp, Apparatus, suction Apparatus Anaesthetic equipments including endotracheal tubes – OT Sterilization including laminar Air flow
- Trouble shooting – colored spots and corrosion, staining, dust deposit, recent amendment in EPA with reference to waste disposal.

**2. Blood Transfusion**

**3. Monitoring in the Operation Theatre**

**4. Positioning of Patient**

**5. Instrument planning for various surgical procedure and Auxillary instrumentation.**

**6. O.T. Techniques**

- O.T. environment, control of infection scrubbing, theatre cloths including lead apron and goggles.

**7. Duties of Nurses – Ethics, behaviour during surgery, etc,**

**SECTION B - INTRODUCTION TO ANAESTHESIA TECHNOLOGY**

**1. Gas physics**

- States of matter, Temperature conversion, Humidity, Pressure measurement, Gas flows and diffusion, Gas law, Miscellaneous concepts such as density and specific gravity

**2. Medical Gas Supply**

- 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

**3. Gas Administration Devices**

- Simple oxygen administration devices, Methods of controlling gas flow, Reducing valves, Flow meters, Regulators, Flow restrictors



#### **4. Oxygen Therapy**

- Definition, Causes and responses to hypoxemia, Clinical signs of hypoxemia, Goals of oxygen therapy, Evaluation of patients receiving oxygen therapy, Hazards of oxygen therapy

#### **5. Anaesthesia Machine**

- Hanger and yoke system, Cylinder pressure gauge, pin index, Pressure regulator, Flow meter assembly, Vaporizers – Types, hazards, maintenance, filling and draining.

#### **6. Breathing System**

- General considerations, Classification and breathing system, Mapleson system, Jackson Rees system of Bain circuit, Non breathing valves – Ambu valves, Others

#### **7. Gas Analysers Pulse Oximeter CO2 Monitor**

- Gas analysis, Types and care, Transcutaneous oxygen monitors, Pulse oximeters, Capnographs

#### **8. Manual Resuscitators**

- Types of resuscitator bags, Indications, Hazards, Methods of increasing oxygen delivery capabilities while using oxygen with resuscitator bags.

#### **9. Artificial air ways (oral and Nasal endotracheal tubes, tracheostomy tubes)**

- Parts of airway and features, Types, sizes and methods of insertion, Indications for use, Care of long term airways and complications, Protocol for tracheostomy decannulation, Face masks – Types, sizes and its usage

#### **10. Methods of cleaning and sterilization of anesthetic equipments.**

#### **11. History of Anesthesia**

Prehistoric (Ether) era, Inhalational anesthetic era, Regional anesthetic era, Intravenous anesthetic era, Modern anesthetic era

#### **12. Minimum Standards for anaesthesia**

- Who should give anaesthesia
- Ten golden rules of anesthesia
- Patient assessment and preparation
- Checking the drugs and equipment
- Keeping the airway clear
- Be ready to control ventilation
- Monitor pulse and BP
- Anaesthesia Service: pre-operative, Intra operative & post operative care
- General Anaesthesia Techniques
- Local Anaesthesia Techniques

**Course code: BMT- 203**

## **(A) APPLIED PHARMACOLOGY**

- General concepts about pharmacodynamic and Pharmacokinetic Principles involved in drug activity.

### **I. Autonomic nerves system.**

- Anatomy & functional organisation.
- List of drugs acting on ANS including dose, route of administration, indications, contra indications and adverse effects.

### **II. Cardiovascular drugs- Enumerate the mode of action, side effects And therapeutic uses of the following drugs.**

#### a. Antihypertensives

- Beta Adrenergic antagonists
- Alpha Adrenergic antagonists
- Peripheral Vasodilators
- Calcium channel blockers

#### b. Antiarrhythmic drugs

#### c. Cardiac glycosides

#### d. Sympathetic and nonsympathetic inotropic agents.

#### e. Coronary vasodilators.

#### f. Antianginal and anti failure agents

#### g. Lipid lowering & anti atherosclerotic drugs.

#### h. Drugs used in Haemostasis – anticoagulants Thrombolytics and antithrombolytics.

#### i. Cardioplegic drugs- History, Principles and types of cardioplegia.

#### j. Primary solutions – History, principles & types.

#### k. Drugs used in the treatment of shock.

### **III. Anaesthetic agents.**

- ◆ Definition of general and local anaesthetics.
- ◆ Classification of general anaesthetics.
- ◆ Pharmacokinetics and Pharmacodynamics of inhaled anaesthetic agents.
- ◆ Intravenous general anaesthetic agents.
- ◆ Local anaesthetics – classification mechanism of action, duration of action and methods to prolong the duration of action. Preparation, dose and routes of administration.

### **IV Analgesics**

- Definition and classification
- Routes of administration, dose, frequency of administration, Side effects and management of non opioid and opioid analgesics

### **V. Antihistamines and antiemetics-**

- Classification, Mechanism of action, adverse effects, Preparations, dose and routes and administration.

## **VI. CNS stimulants and depressants**

- Alcohol
- Sedatives, hypnotics and narcotics
- CNS stimulants
- Neuromuscular blocking agents and muscle relaxants.

## **VII. Pharmacological protection of organs during CPB**

## **VIII. Inhalational gases and emergency drugs.**

## **IX. Pharmacotherapy of respiratory disorders**

- Introduction – Modulators of bronchial smooth muscle tone and pulmonary vascular smooth muscle tone
- Pharmacotherapy of bronchial asthma
- Pharmacotherapy of cough
- Mucokinetic and mucolytic agents
- Use of bland aerosols in respiratory care.

**X. Corticosteroids** – Classification, mechanism of action, adverse effects and complications. Preparation, dose and routes of administration.

## **XI Diuretics**

- Renal physiology
- Side of action of diuretics
- Adverse effects
- Preparations, dose and routes of administration.

## **XII. Chemotherapy of infections**

- Definition
- Classification and mechanism of action of antimicrobial agents
- Combination of antimicrobial agents
- Chemoprophylaxis.
- Classification, spectrum of activity, dose, routes of administration and adverse effects of penicillin, cephalosporins, aminoglycosides, tetracyclines, chloramphenicol, antitubercular drugs.

## **XIII. Miscellaneous.**

- IV fluids- various preparations and their usage.
- Electrolyte supplements
- Immunosuppressive agents
- New drugs included in perfusion technology.
- Drugs used in metabolic and electrolyte imbalance.

## **(B) MEDICINE RELEVANT TO TECHNOLOGY**

- Diabetes Mellitus
- Hypertension
- Ischaemic heart disease
- Obesity
- Elderly Patient
- Pregnancy
- Shock
- COPD
- Chronic renal failure
- Chronic liver disease/failure
- Anaemia
- Pediatric patient Infant/Neonate
- Epilepsy
- CVA

### **PRACTICALS:**

1. Preparation and prescription of drugs of relevance.
2. Experimental pharmacology directed to show the effects of commonly used drugs of relevance and interpretation of few charts.

### **NO PRACTICAL EXAMINATION**

Recommended 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.

# SARDAR PATEL UNIVERSITY

## S.Y.B.Sc. - Medical Technology

### Bioethics

(Common to all specializations of Medical Technology)

#### **Course Code: BMT-S-201**

#### **Goals**

1. Provide a sense of responsibility and professionalism when interacting with patients, peers, fellow employees, and other health care providers.
2. Communicate effectively and professionally.
3. Instill the importance of honesty and professionalism in the workplace.

#### **By the end of this module, the student should be able to:**

1. Exhibit behavior consistent with the ethical practice of Medical Technologist.
2. Maintain confidentiality of all patients and test results.
3. Demonstrate an appreciation for the special knowledge and talent of other members of the health care team.
4. Explain the transmission of the AIDS/HIV and state how the virus affects the Immune system.

#### **Methods of Presentation**

Lecture, Discussion, Audio-Visual materials

#### **Duration : 20 hours**

#### **COURSE CONTENT**

1. Values of life (Philosophy)/in clinical practice & Definition of medical ethics. **1 hour**
2. History of Medical Ethics: **2 hour**
  - Indian perspectives : Charaka, Susruta
  - The Hippocratic Oath
  - Declaration of Helsinki
  - WHO Declaration of Geneva
  - International code of Medical Ethics
3. Ethical problems of life **2 hour**
  - Right to life, prenatal screening / sex selection Abortion, feticide
  - Assisted reproductive technologies
  - Genetic testing
  - Genetic engineering, cloning
  - Care of terminally ill
  - Death and dying
  - Euthanasia

- |    |  |               |
|----|--|---------------|
| 4. | Family and society in medical ethics :   | <b>2 hour</b> |
|    | <ul style="list-style-type: none"> <li>• Children : Age to consent for treatment parent- Child – clinician conflict</li> <li>• Mental Disorders and disabilities</li> <li>• HIV / AIDs</li> </ul>  |               |
| 5. | Etiquette and mannerism  | <b>2 hour</b> |
| 6. | Good communication skill   | <b>2 hour</b> |
|    | <ul style="list-style-type: none"> <li>• Truthfulness, Building trust, Honesty with patients</li> <li>• Communication with colleagues, seniors and subordinates</li> </ul>   |               |
| 7. | Confidentiality  | <b>1 hour</b> |
|    | <ul style="list-style-type: none"> <li>• Malpractice, negligence</li> <li>• Medical ethics and law</li> </ul>  |               |
| 8. | Code of ethics: (Please refer Annexure for elaborations)   |               |
|    | <ul style="list-style-type: none"> <li>• Duties to Patients <span style="float: right;"><b>1 hour</b></span></li> <li>• Duties to Colleagues and other Professionals: <span style="float: right;"><b>1 hour</b></span></li> <li>• Duties to Yourself: <span style="float: right;"><b>1 hour</b></span></li> <li>• Duties to Society: <span style="float: right;"><b>1 hour</b></span></li> <li>• Duties to your Profession: <span style="float: right;"><b>1 hour</b></span></li> <li>• Specific issues: <span style="float: right;"><b>1 hour</b></span></li> </ul> |               |

Internal Evaluation:  
(Problem based questions, Short notes, MCQ, Viva) **2 hour**

**EVALUATION : TOTAL: 50 marks**

**Internal evaluation: 10 marks**

**External Exam (One paper of 2 hours): 40 marks**

- Problem oriented question
- Short notes
- Short answer questions

**There will no Practical Exam for this course.**

**SUGGESTED BOOKS/LITERATURE:**

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.
-

## ANNEXURE

### **CODE OF ETHICS: Medical Technology**

Code of Ethics, under different categories, has been elaborated hereunder as applied to the profession of Medical Technician/Technologist. It is however suggested that these elaborations are only indicative and not exclusive. There could be many more situations/events, depending on the nature of work involved in different types of specialization of Medical Technology; which would also be deemed to be a part of the curriculum as and when identified.

#### 1. Code of Ethics: Duties to Patients:

- accountability for the quality and integrity of the services they provide.
  - respect patients' privacy and dignity
  - treat patients politely and with consideration
  - apply the principle of informed consent as an on-going process
  - recognize the rights of patients to maintain confidentiality of information in the course of professional duties, unless they agree to disclosure or the law demands
  - patients' permission before sharing information with their spouses, partners or relatives.
  - always seek to give priority to the service to be provided to patients solely on the basis of clinical need.
- 
- Code of Ethics: Duties to Colleagues and other Professionals:
    - Should not make a patient doubt a colleagues' knowledge or skills by making comments about them that cannot be fully justified.
    - ◆ Work with and respect other health care professionals in pursuit of the best health care possible for all patients.
    - ◆ Should not discriminate against colleagues, including professionals applying for posts, because of views of their race, culture, ethnicity, social status, lifestyle, perceived economic worth, age, gender, disability, communicable disease status, sexual orientation, religious or spiritual beliefs, or any condition of vulnerability.
    - ◆ Refrain from speaking ill of colleagues or other health care professionals.
    - ◆ Actively strive to establish cooperative and respectful working relationships with other health care professionals with the primary objective of ensuring a high standard of care for the patients they serve.
    - ◆ Share their knowledge with colleagues and promote learning.
- 
- Code of Ethics: Duties to Yourself :
    - Maintain and improve the standard of your performance by keeping your professional knowledge and skills up to date throughout your working life. In particular, regularly take part in educational activities that relate to medical laboratory science.
    - Acknowledge the limits of your professional knowledge and competence. Do not pretend to know everything.
    - Use equipment and laboratory ware correctly and with care.
    - Refrain from engaging in activities that may affect your health and lead to impairment.
    - Aware laws and regulations governing medical laboratory technology and shall apply them in the practice of your profession.
    - Not wasting reagents and other laboratory supplies unnecessarily.
- Never taking anything from place of work that does not belong to you

- Code of Ethics: Duties to Society
    - Refrain from providing a service that is not needed, whether it provides financial gain or not.
    - Refrain from unnecessary wastage, and from participating in improper financial arrangements, especially those that escalate costs and disadvantage individuals or institutions unfairly.
    - Dedicate to serve the healthcare needs of the public
  
  - Code of Ethics: Duties to your Profession
    - Uphold and maintain the dignity and respect of medical laboratory profession and strive to maintain a reputation of honesty, integrity and reliability.
    - Contribute to the advancement of the profession by improving the body of knowledge, adopting scientific advances that benefit the patient, maintaining high standards of practice and education, and seeking fair socioeconomic working conditions for members of the profession.
  
  - Specific issues: Any other issues specific to a particular specialization of Medical Technology profession not categorized in any of the above.
-



**SARDAR PATEL UNIVERSITY**  
**S.Y.B.Sc. - Medical Technology**  
**Computer Organization and PC Software**  
(Common to all specializations of Medical Technology)

**Course Code: BMT-S-202**

**Objective:**

At the end of this course, a student would be able to :

- ◆ identify various components of computer hardware and
- ◆ use some software in order to manage data related to the profession.

**Teaching hours:**            Theory:            25 hours  
   Practicals:        25 hours

**Curriculum:**

**SECTION A**

**Unit 1. Computer Organization -I**

Generations of a computer, types of a computer, some important terms: hardware, software, program, operating system, interpreter, compiler, assembler, high level languages, bits and bytes.

Introduction to number systems

**Unit 2. Computer Organization -II**

Processors, CPU organization, primary memory, memory addresses, secondary memory, memory hierarchies, magnetic disks, CDRoms, DVDs, input/output devices: keyboards, monitors, mice, printers, modems

The concept of character codes

**SECTION B**

**Unit 1: PC Software- I**

Introduction to spreadsheets, the concept of cells and cell addresses, formulas, some important functions, introduction to charts

Introduction, features and applications of a DBMS

Database objects

Tables – creation, modification, deletion

Working with data – insertion, modification, finding, sorting, grouping, viewing and sharing data

**Unit 2. PC Software- II**

Forms – creation of forms; modification, viewing and validating data using forms, subforms

Reports – creation, modification, opening, viewing

Creating mailing labels

**REFERENCE BOOKS:**

1. Tanenbaum A. S., Structured Computer Organization, 4<sup>th</sup> Edition, Prentice-Hall of India Pvt. Ltd., 2002.
2. Elmasri, Navathe, Somyajulu, Gupta, Fundamentals of Database Systems, Pearson Education, 2006.
3. Progue, Irwin, Roardon, Microsoft Office Access 2007 Bible, Wiley Publishing Inc., 2007.
4. Taxali R. K., P C Software for Windows 98 Made Simple, Tata McGraw-Hill, 2001.
5. Hall D. V., Microprocessors and Interfacing, McGraw-Hill Book Company, 1986.
6. Desai Bipin C., An introduction to Database Systems, 7<sup>th</sup> Edition, Pearson Education Asia, 2001.

**SARDAR PATEL UNIVERSITY**  
**T.Y. B. Sc.- Medical Technology**  
**in**  
**Operation Theater & Anesthesia Technology**  
**Curriculum**

Sr. No.	Subject	Course No.	Teaching Hours
<b>Main Subjects</b>			
1	Operation Theatre & Anesthesia Technology – Clinical	BMT-OTAT-301	60
2	Operation Theatre & Anesthesia Technology – Applied	BMT-OTAT-302	60
3	Operation Theatre & Anesthesia Technology – Advanced	BMT-OTAT-303	60
4	Practical – OT & AT	BMT-OTAT-304 - (P)	90
<b>Main Subjects- Teaching hours</b>			<b>270</b>
<b>Hospital Posting</b>			<b>750</b>
<b>Total Hours</b>			<b>1020</b>

**R. BMT.OTAT.1: Internship**

**With reference of Rule No. R. BMT. 2 (First Year B.Sc. - Medical Technology); the course of B.Sc. - Medical Technology in *Operation Theater & Anesthesia Technology* shall be having a compulsory Internship during the fourth year.**

- (a) Internship shall be commenced only after the candidate is declared pass in all the subjects & practical of T.Y.B.Sc. and/or previous year's A.T.K.T., if any.**
- (b) The Internship shall be commenced soon after the announcement of result of T.Y.B.Sc.- Medical Technology (Operation Theater & Anesthesia Technology) from a date as notified by the Principal of the affiliated Institute and would continue for continuous twelve months; with one leave per month permissible.**
- (c) The degree of B.Sc. will be awarded by Sardar Patel University only on successful completion of Internship.**

**T.Y.B.Sc.- Medical Technology**  
**(in Operation Theatre & Anaesthesia Technology)**

**Table 1. Subjects, Credits and Scheme of Examination**

Sr. No.	Subject	Course code No	No. Credits per week	Duration of Uni. Exam	External Marks	Internal Marks	Total
1	Operation Theater & Anesthesia Technology – Clinical	BMT-OTAT-301	2	3 hrs	80	20	100
2	Operation Theater & Anesthesia Technology – Applied	BMT-OTAT-302	2	3 hrs	80	20	100
3	Operation Theater & Anesthesia Technology – Advanced	BMT-OTAT-303	2	3 hrs	80	20	100
4	Practical	BMT-OTAT-304-(P)	2	1 day	160	40	200
<b>Grand total</b>					<b>400</b>	<b>100</b>	<b>500</b>

**Syllabus for Third year**  
**B.Sc- Medical Technology in Operation Theater & Anesthesia Technology**

**Paper I.**

**Operation Theater & Anesthesia Technology - Clinical**

**Course Code: BMT - OTAT- 301**

**(A) Operation Theatre Technology – Clinical**

- Physical Facility
- Layout of Operation theatres
- Transition
- Peripheral Support areas
- Operating room
- Special procedure rooms
- Potential sources of injury to the caregiver & patient
- Principles of aspects & sterile technologies
- Astilse, surgical scrub, gowning & gloving
- Decontamination & disinfections
- Sterilization Assembly & packing
- Thermal sterilization
- Chemical sterilization
- Radiation sterilization
- Surgical instrumentation
- Fabrication
- Classification
- Powered surgical instruments
- Handling instruments
- Specialized surgical equipment
- Electro caretery
- Laser
- Microsurgery
- Ultrasonography
- Positioning prepping and draping the patient
- General surgery
- Breast procedures
- Abdominal surgery
- Liver Procedures
- Splenic procedures
- Pancreatic Procedures
- Osophagial

**(B) Anaesthesia Technology – Clinical**

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

2. Informed consent

3. Premedication: Aims

- Narcotics
- Antihistaminics
- Antacids

- Others - NTG
4. Investigations
    - Biochemistry – Blood, glucose, Urea, Creatinine
    - Haematology – Haemogram, Prothrombin Time, Partial thromboplastin time, BT,
    - CT
    - Urine- Complete urine analysis
    - ECG
    - Chest X-ray
    - ABG
  5. Criteria used for accepting the case for surgery
  6. Equipment
    - Checking the machine, laryngoscopes, tubes, airways etc. suction apparatus, oxygen Cylinder, anaesthetic drugs and emergency drugs.
  7. Monitoring system
  8. 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
  9. Preparations
    - Identification
    - Consent
    - NPO
    - Prosthesis
    - Lab results
    - Consultation
    - Blood
  10. Testing Machine
    - Gas supply
    - Flow meters
    - O2 bypass
    - Valves
    - Vaporises
  11. Emergency Drugs
    - Atropine
    - Epinephrine
    - Isoprenaline
    - Ephedrine
    - Aminophylline
    - Hydrocortisone
    - Soda Bicarb
    - Dopamine
    - Norepinephrine
    - Dobutamine
  12. I.V Infusion
    - ◆ Site of cannulations
    - ◆ Finding a vein
    - ◆ Technique of venepuncture
    - ◆ Special difficulty

### 13. Protection of the Patient

- The eyes
- The ears
- The skin
- The lips, tongue, teeth
- Veins, arteries
- Peripheral nerves

### 14. Intubation

- Choice of ETT
- Choice of Laryngoscope
- Techniques of intubation
- Complications
- Difficult intubation

### 15. Emergence, Termination and Recovery Reversal

#### Oropharyngeal toilet

- E T Suction
- Deflation of the cuff
- Removal of the tube
- Transfer of the patient

#### In the recovery room

- Patient identification
- Diagnosis & Surgery
- Type of anesthesia used
- Fluid balance
- B P
- Any complications
- Instructions about ventilation, vital sings

#### Problems in RR

1. B.P. hypo, hypertension
2. HR- Tachy, bradycardia
3. Pallor, cyanosis, dyspnea
4. Restlessness
5. Neurological- Seizures
6. Sweating

**Paper-II**  
**Operation Theatre Technology – Applied**

Course Code: BMT - OTAT- 302

**(A) Operation Theatre Technology – Applied**

- Preoperative preparation of the patient
- Diagnostic procedures
- Pathological examination
- Radiological examination
- MRI
- Nuclear medicine studies
- Ultrasonography
- Endoscopy
- Anaesthesia techniques
- Historical background
- Types of Anaesthesia
- Choice of Anaesthesia
- General Anaesthesia
- Indication of general anaesthesia
- Endotracheal intubation
- Maintenance
- Monitoring
- Emergency
- Balanced Anaesthesia
- Core of Anaesthetized patient
- Local & regional anaesthesia
- Spinal and epidural anaesthesia
- Intravenous anaesthesia agents
- Inhalational anaesthetic agents
- Anaesthetic Adjuvant drugs
- Complication of general anaesthesia
- Complication of local/regional anaesthesia
- Blood transfusion
- Anaesthesia Machine & central gas supply
- Difficult intubation

**(B) Anaesthesia Technology – Applied**

- History of anaesthesia in detail
- Methods of anaesthesia
- Inhalational Anaesthesia
- Minimum alveolar anaesthetic concentration
- Stages of ether anaesthesia
- Halothane
- Isoflurane
- Sevoflurane
- Nitrous oxide
- Narcotic drugs
- Opioids analgesics
- Morphine
- Pethidine
- Fentanyl
- Buprenorphine
- Tramadol
- Difficult intubation

- Muscle relaxants
- Neuromuscular blockers
- Suxamethorium
- Pancuronium
- Vecuronium
- Atracurium
- Rocuronium
- Reversal agents
- Intravenous anaesthetic agents
- Thiopentone
- Propofol
- Ketamine
- Intraoperative management
- Confirm the identity of the patient
- Transferring the patient
- Recovery room – setup, things needed expected problems
- Post operative complications and management
- CPR
- Monitoring during anaesthesia and surgery
- Regional anaesthesia
- Spinal Anaesthesia
- Epidural Anaesthesia
- Nerve blocks
- Benzodiazapines
- Phenothazines
- Neuromuscular transmission
- Nerve stimulators
- Reversal of neuromuscular blockage
- Drugs acting on sympathetic nervous system
- Adrenaline
- Noradrenaline
- Dopamine
- Dobutamine
- Milrinone
- Isoprenaline
- Local anaesthetic agents
- Lignocaine
- Bupivacaine

## **Complications and accidents during anaesthesia**

### **I. Related to equipment**

- (c) Hypoxemia
- (d) Hyercapnea
- (e) Increased airway pressure
- (f) Decreased airway pressure
- (g) Deep anesthesia
- (h) Thermal & electrical injuries
- (i) Monitoring instruments
- (j) Presenting anesthesia equipment complications
- Being prepared with back up ventilation
- Pre-use checkout
- Maintenance
- User education



## **II. Related to airway**

- Difficult intubations
- Airway Trauma

## **III. Cardiovascular System**

- Hypotension
- Hypertension
- Tachycardia
- Bradycardia
- Arrhythmias
- Ischemia & infarction

## **Paper-III**

### **Operation Theatre Technology – Advanced**

**Course Code: BMT - OTAT- 303**

#### **(A) Operation Theatre Technology - Advanced**

- Operation Theatre Techniques for Speciality Surgery:-
- Preparation, nursing requirement, equipments including instruments, Sutures & etc
- Anaesthesia techniques, patient positioning & recovery
- Gynecological /obstetric surgery
- Urologic surgery
- Orthopedic surgery
- Neurosurgery
- Ophthalmic surgery
- Plastic and reconstructive surgery
- Otorhinolaryngologic and head and neck surgery
- Thoracic surgery
- Cardiac surgery
- Vascular surgery
- Organ procurement and transplantation
- Thyroid surgery

#### **(B) Anaesthesia Technology – Advanced**

- Anaesthesia & co- existing diseases
- Ischaemic heart disease
- Hypertension
- Congestive cardiac failure
- Arrhythmia & heart blocks
- Chronic bronchitis & COPD
- Bronchial asthma
- Paediatric anaesthesia
- Liver disease and anaesthesia
- Renal disease and anaesthesia
- Obesity and anaesthesia
- Diabetes mellitus and anaesthesia
- Thyroid disease and anaesthesia

### Obstetric 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

### Resuscitation of the Newborn

- Apgar scoring system
- Use of drugs
- Temperature control

### Anaesthesia for Thoracic Surgery

1. Use of double lumen tubes
2. Anaesthesia for bronchoscopy
3. Thymectomy

### 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

## **Operation Theatre Technology – Practical**

**Course Code: BMT - OTAT- 304 (P)**

### **PRACTICAL :**

One common practical for all the three papers.