School of Health Sciences

CSJM University, Kanpur

Ordinance & Syllabus

for

Bachelor in Operation Theatre Technology (BOTT)

Academic Programme

Ordinance according to NEP-2020

Duration :

3 Years (06 Semesters) & 01 Year (02 Semesters) Internship

Bachelor in Operation Theatre Technology (BOTT)

ORDINANCE

Chapter

"A"

Preamble:

The Bachelor in Operation Theatre Technology (BOTT) is an undergraduate program designed to produce skilled professionals capable of managing and assisting in surgical procedures. Operation Theatre Technologists (OTTs) play a pivotal role in the healthcare system, working closely with surgeons, anesthesiologists, and nurses to ensure seamless surgical procedures. Their expertise encompasses preparing operation theatres, managing equipment, and maintaining patient safety. The increasing demand for surgical services, driven by advancements in medical technology and the growing need for healthcare services, underscores the importance of OTTs. The Bachelor in Operation Theatre Technology (BOTT) program is a comprehensive undergraduate degree designed to equip students with the essential knowledge, skills, and competencies required to excel in the field of operation theatre technology. The BOTT program combines theoretical foundations with practical training, enabling students to develop expertise in operation theatre management, surgical procedures, and patient care. Students learn about human anatomy and physiology, surgical techniques and procedures, anaesthesia and pain management, operation theatre management, patient assessment and care, medical ethics and law, and infection control and sterilization. Upon completion of the program, graduates can pursue exciting career opportunities in various healthcare settings, including operation theatres in hospitals and clinics, surgical departments, ICU and emergency units, research institutions, and medical equipment manufacturing and sales. They can work as operation theatre technicians, surgical assistants, anaesthesia technicians, operation theatre managers, or medical equipment specialists. The BOTT program offers a unique blend of technical expertise and hands-on training, preparing students for a rewarding career in operation theatre technology. With the increasing demand for skilled operation theatre technicians, this program provides a promising career outlook and opportunities for advancement. The program's curriculum is designed to meet the industry's needs, focusing on developing skilled professionals who can work effectively in operation theatres.

Title of the Programme: The Programme shall be called "Bachelor in Operation Theatre Technology (BOTT)".

Programme Objectives:

At the completion of this course, the student should be —

- Able to help the anaesthesiologist in administering anesthesia, assist in various procedures and also help in continuous monitoring of patients during surgery.
- Able to train and develop an individual to independently handle the latest technology and high end biomedical equipment in Operation Theatre
- Able to assist anaesthesiologists in developing and plummeting patient anesthesia care plans, including pre-operative, surgical theatre, recovery room, and post-operative intensive care procedures.
- Able to do- patient data collection, catheter insertion, airway management , assisting the administration and monitoring of regional and peripheral nerve blockades, support therapy, adjusting anesthetic levels during surgery, inter-operative monitoring, postoperative procedures, pain clinics and patient education, and administrative tasks.
- Able to manage medical gases and pipeline system
- Able to assist in Intensive care unit
- Able to manage Central sterile supply department
- Able to assist during Disaster and emergency situations.

Programme Outcomes:

- The Course prepares the operating theatre technologist to work as a competent, reliable member of the health care team under the guidance and supervision of doctors in their delivery of patient care, training also focuses on the knowledge and skills of monitoring infection control policy and procedures in the operating theatre.
- Employment opportunities can be found in hospitals in both private and public sectors as well as in independent trauma centres.
- OTT graduate is encouraged to pursue further qualification to attain senior position in the professional field, also to keep abreast with the advance and new technology; the professional should opt for continuous professional education credits offered by national and international institutes.

Programme Specific Outcomes:

- Understand and apply principles of surgical procedures, patient care, and operation theatre protocols for efficient perioperative management.
- Acquire proficiency in handling surgical instruments, equipment, and supplies, ensuring sterility and safety.
- Apply infection control and sterilization techniques, adhering to regulatory standards and minimizing hospital-acquired infections.
- Deliver patient-centered care, respecting ethical standards, patient privacy, and informed consent during surgical procedures.
- Use comprehensive knowledge of human anatomy, physiology, and pharmacology to identify and respond to emergency situations.
- Utilize and adapt to advanced medical technologies, including anaesthesia machines, ventilators, and monitoring systems.
- Implement and monitor quality control measures for operation theatre equipment, supplies, and staff to maintain high standards of patient care.
- Collaborate effectively with surgical teams, sharing knowledge and expertise for integrated patient care.
- Apply research principles to operation theatre management and stay updated on advancements in surgical technology and patient safety.
- Demonstrate critical thinking and problem-solving skills in addressing surgical emergencies and complex patient care scenarios.

Bachelor in Operation Theatre Technology (BOTT)

1. Bachelor in Operation Theatre Technology degree will be under the **faculty of Medicine** of C.S.J.M. University, Kanpur.

2. **Duration of Course :**
   - Bachelor in Operation Theatre Technology will be a full-time course.
   - Duration will be three years (06 Semesters) followed by a compulsory 01 Year (02 Semester) internship.

3. **No. of Seats :**
   40 (forty)

4. **Admission.**

   Eligibility Criteria:
   For admission in this course candidate has to pass 10 + 2 or its equivalent examination conducted by any Board or University incorporated by law and recognized by this University with a pass marks (45%) in Physics, Chemistry & Biology/mathematics (relaxation of 5% marks for SC/ST student).

   Mode of Admission:
   The candidates for admission to this course shall be selected through an entrance test conducted by the University/ procedure decided by the governing body of the institute or on the basis of merit of marks obtained (Physics, Chemistry & Biology) in 10 + 2 or its equivalent examination.

5. **Medium of instruction :**
   English shall be the medium of instruction in the class and in the University examination.

6. **Method of Teaching :**
   The method of teaching adopted shall be a combination of lectures, demonstrations and practical's by the full time faculty, visiting or part time or guest faculty.

7. **Examination:**
   As per the University norms.

   Duration of Examination:
   Each theory paper shall be of three-hours duration OR as per the University norms.

8. **Attendance to appear in the end semester examination :**
   The permission to appear in end semester examination shall be granted to such candidate only who have fulfill the condition of 75% attendance in each subject separately in theory and practical as per the university rule.
   Regarding attendance requirements students will have to fulfill the condition of 75% attendance. 15% relaxation in attendance, in exceptional circumstances can be made by the Vice Chancellor on the recommendation of the Director of the School.

CHHATRAPATI SHAHU JI MAHARAJ UNIVERSITY, KANPUR

STRUCTURE OF SYLLABUS FOR THE

PROGRAM: Bachelor in Operation Theatre Technology (BOTT)

Syllabus Developed by			
Name of BoS Convenors / BoS Members	**Designation**	**Department**	**College/University**
Prof. Sanjay Kala	Principal	Dean, Faculty of Medicine	GSVM. Medical College, Kanpur
Prof. Dolly Rastogi	Professor	Physiology	GSVM Medical College, Kanpur
Prof. Parvez Khan	Head	Ophthalmology	GSVM Medical College, Kanpur
Prof. Sanjay Kumar	Head	Orthopaedics	GSVM Medical College, Kanpur
Prof. MP Mishra	Ex. Director	JK Cancer Institute	GSVM Medical College, Kanpur
Dr. Chayanika Kala	Associate Professor	Pathology	GSVM Medical College, Kanpur
Dr. Ashok Verma	Head & Associate Professor	Radiology	GSVM Medical College, Kanpur
Dr. Digvijay Sharma	Director	School of Health Sciences	CSJM University, Kanpur
Dr. Munish Rastogi	Assistant Director	School of Health Sciences	CSJM University, Kanpur
Dr. Versha Prasad	Assistant Professor	School of Health Sciences	CSJM University, Kanpur
Dr. Ram Kishor	Assistant Professor	School of Health Sciences	CSJM University, Kanpur

I YEAR / I SEM						
COURSE CODE	**TYPE**	**COURSE TITLE**	**CREDITS**	**CIA**	**ESE**	**MAX. MARKS**
BOT25101	CORE	Introduction to Healthcare Delivery System in India	04	25	75	100
BOT25102	CORE	Fundamentals of Anatomy & Physiology-I	04	25	75	100
BOT25103	CORE	General Biochemistry	04	25	75	100
BOT25104	PRACTICAL	Fundamentals of Anatomy & Physiology-I	02	25	75	100
BOT25105	PRACTICAL	General Biochemistry	02	25	75	100
		Basics Computer and Information Sciences*	02	-	-	-
		Communication and Soft Skills*	02	-	-	-
	TOTAL		**20**			**500**
I YEAR / II SEM						
BOT25201	CORE	Medical Terminology and Record Keeping.	04	25	75	100
BOT25202	CORE	Fundamentals of Anatomy & Physiology-II	04	25	75	100
BOT25203	CORE	Principle of Management	04	25	75	100
BOT25204	ELECTIVE	First Aid and Emergency Care	04	25	75	100
BYOG 101		Foundations of Yoga				
BOT25205	PRACTICAL	Fundamentals of Anatomy & Physiology-II	02	25	75	100
	TOTAL		**18**			**500**

II YEAR / III SEM						
COURSE CODE	**TYPE**	**COURSE TITLE**	**CREDITS**	**CIA**	**ESE**	**MAX. MARKS**
BOT25301	CORE	General Pathology	04	25	75	100
BOT25302	CORE	General Microbiology	04	25	75	100
BOT25303	CORE	Principles of Anesthesia	04	25	75	100
BOT25304	PRACTICAL	General Pathology	02	25	75	100
BOT25305	PRACTICAL	General Microbiology	02	25	75	100
BOT25306	PRACTICAL	Principles of Anesthesia	02	25	75	100
	TOTAL		**18**			**600**
II YEAR / IV SEM						
BOT25401	CORE	Medicine relevant to OT Techniques	04	25	75	100
BOT25402	CORE	Basic techniques of Anesthesia	04	25	75	100
BOT25403	CORE	Research Methodology and Biostatics	04	25	75	100
BOT25404	CORE	General Pharmacology	04	25	75	100
BOT25405	PRACTICAL	Basic techniques of Anesthesia	02	25	75	100
	TOTAL		**18**			**500**

III YEAR / V SEM						
COURSE CODE	**TYPE**	**COURSE TITLE**	**CREDITS**	**CIA**	**ESE**	**MAX. MARKS**
BOT25501	CORE	Basics of Surgical procedures	04	25	75	100
BOT25502	CORE	CSSD Procedures	04	25	75	100
BOT25503	CORE	Advance anesthetic techniques	04	25	75	100
BOT25504	PRACTICAL	Basics of Surgical procedures	02	25	75	100
BOT25505	PRACTICAL	CSSD Procedures	02	25	75	100
BOT25506	PRACTICAL	Advance anesthetic techniques	02	25	75	100
BOT25507	PRACTICAL	BOTT Directed clinical Education-I	08	25	75	100
	TOTAL		**26**			**700**
III YEAR / VI SEM						
BOT25601	CORE	Specialized surgery and anesthesia	04	25	75	100
BOT25602	CORE	Electronics and technology in surgery and anesthesia	04	25	75	100
BOT25603	CORE	Basic Intensive care	04	25	75	100
BOT25604	PRACTICAL	Specialized surgery and anesthesia	02	25	75	100
BOT25605	PRACTICAL	Electronics and technology in surgery and anesthesia	02	25	75	100
BOT25606	PRACTICAL	Basic Intensive care	02	25	75	100
BOT25607	PRACTICAL	BOTT Directed clinical Education-II	08	25	75	100
	TOTAL		**26**			**700**
	Grand Total		**126**			**3500**

***Not included in University Examination.**

NOTE:

1. **Do not mark any Code/Information in Column-A, it will be endorsed by the University.**
2. **CIA** in Column-E stands for **'Continuous Internal Assessment'** and depicts the maximum internal marks. Respective examination will be conducted by subject teacher. **ESE** in Column F stands for **'End Sem Examination/Evaluation'** and depicts the maximum external marks. Respective examination will be conducted by the University.
3. Column-B defines the nature of course/paper. The word **CORE** herein stands for **Compulsory Subject Paper**.
4. Column-D depicts the credits assigned for the corresponding course/paper.
5. **Elective:** It will be a Subject Elective. Students may accordingly select one or more subject papers under this category.
6. **Amongst the electives, one or two electives may be declared as Open (Generic) electives that shall be open as Minor Elective to students of other faculty in 1st or 2nd semester of a UG program.**

INTERNAL ASSESSMENT

- It will be for theory and practical both.
- It will be done through the whole semester.
- Candidate must obtain at least 40% marks in theory and practical's separately in internal assessment to be eligible for the semester university examination.

- **Internal assessment (Theory)** will be done as follows:

a)	Mid-term/ class test etc.	= 10 marks
b)	Assignments/Project/Quiz/ Presentations etc.	= 10 marks
c)	Attendance	= 05 marks
	Total	**= 25 marks**

- **Internal assessment (Practical)** will be done as follows:

a)	Laboratory Manual/Assignments/Class test etc.	= 10 marks
b)	Day to day performance/continuous evaluation/record etc.	= 10 marks
c)	Attendance	= 05 marks
	Total	**= 25 marks**

CRITERIA FOR PASSING

- As per the University Norms.

DIVISION:

- As per the University Norms.

INTERNSHIP

- A candidate will have to undergo internship for a period of one year in a medical college/hospital equipped with modern laboratory facility or in a fully equipped operation theatre, which fulfills the norms decided by the University .

DEGREE:

The degree of Bachelor in Operation Theatre Technology (BOTT) course of the University shall be conferred on the candidates, who have pursued the prescribed course of study for not less than six semesters and have passed examinations as prescribed under the relevant scheme and completed 01 year of compulsory internship.

Course of Study

Bachelor in Operation Theatre Technology (First Semester)

S.N.	COURSE CODE	TYPE	COURSE TITLE	Teaching Hours
1	BOT25101	CORE	Introduction to Healthcare Delivery System in India	60
2	BOT25102	CORE	Fundamentals of Anatomy & Physiology-I	60
3	BOT25103	CORE	General Biochemistry	60
4	BOT25104	PRACTICAL	Fundamentals of Anatomy & Physiology-I	60
5	BOT25105	PRACTICAL	General Biochemistry	60
6			Basics Computer and Information Sciences*	40
7			Communication and Soft Skills*	40
		TOTAL		**380**

Bachelor in Operation Theatre Technology (Second Semester)

S.N.	COURSE CODE	TYPE	COURSE TITLE	Teaching Hours
1	BOT25201	CORE	Medical Terminology and Record Keeping.	60
2	BOT25202	CORE	Fundamentals of Anatomy & Physiology-II	60
3	BOT25203	CORE	Principle of Management	60
4	BOT25204	ELECTIVE	First Aid and Emergency Care	60
5	BYOG 101		Foundations of Yoga	
6	BOT25205	PRACTICAL	Fundamentals of Anatomy & Physiology-II	60
		TOTAL		**300**

Bachelor in Operation Theatre Technology (Third Semester)

S.N.	COURSE CODE	TYPE	COURSE TITLE	Teaching Hours
1	BOT25301	CORE	General Pathology	60
2	BOT25302	CORE	General Microbiology	60
3	BOT25303	CORE	Principles of Anesthesia	60
4	BOT25304	PRACTICAL	General Pathology	60
5	BOT25305	PRACTICAL	General Microbiology	60
6	BOT25306	PRACTICAL	Principles of Anesthesia	60
		TOTAL		**360**

Bachelor in Operation Theatre Technology (Fourth Semester)

S.N.	COURSE CODE	TYPE	COURSE TITLE	Teaching Hours
1	BOT25401	CORE	Medicine relevant to OT Techniques	60
2	BOT25402	CORE	Basic techniques of Anesthesia	60
3	BOT25403	CORE	Research Methodology and Biostatics	60
4	BOT25404	CORE	General Pharmacology	60
5	BOT25405	PRACTICAL	Basic techniques of Anesthesia	60
		TOTAL		**300**

Bachelor in Operation Theatre Technology (Fifth Semester)

S.N.	COURSE CODE	TYPE	COURSE TITLE	Teaching Hours
1	BOT25501	CORE	Basics of Surgical procedures	60
2	BOT25502	CORE	CSSD Procedures	60
3	BOT25503	CORE	Advance anesthetic techniques	60
4	BOT25504	PRACTICAL	Basics of Surgical procedures	60
5	BOT25505	PRACTICAL	CSSD Procedures	60
6	BOT25506	PRACTICAL	Advance anesthetic techniques	60
7	BOT25507	PRACTICAL	BOTT Directed clinical Education-I	240
		TOTAL		**600**

Bachelor in Operation Theatre Technology (Six Semester)

S.N.	COURSE CODE	TYPE	COURSE TITLE	Teaching Hours
1	BOT25601	CORE	Specialized surgery and anesthesia	60
2	BOT25602	CORE	Electronics and technology in surgery and anesthesia	60
3	BOT25603	CORE	Basic Intensive care	60
4	BOT25604	PRACTICAL	Specialized surgery and anesthesia	60
5	BOT25605	PRACTICAL	Electronics and technology in surgery and anesthesia	60
6	BOT25606	PRACTICAL	Basic Intensive care	60
7	BOT25607	PRACTICAL	BOTT Directed clinical Education-II	240
		TOTAL		**600**

***Not included in University Examination.**

INTERNSHIP

- There shall be one year (Two Semester) of Internship after the final year examination for candidates declared to have passed the examination in all the subjects.
- During the internship candidate shall have to work full time average 7 hours per day (each working day) for one year.
- Each candidate is allowed maximum of 6 holidays during the entire Internship Program and in case of any exigencies during which the candidate remains absent for a period more than 6 days, he/she will have to work for the extra days during which the candidate has remained absent.
- The Internship should cover all the services provided by the Operation Theatre/Surgery department of the medical college/hospital. Based on the attendance and work done during posting the Director/Principal/ head of institution/department shall issue a '**Certificate of Satisfactory Completion**' of training following which the University shall award the Bachelor in Operation Theatre Technology degree or declare the candidate eligible for the same.
- **No candidate shall be awarded degree without successfully completing one year internship**.
- The institution shall have to satisfy themselves that satisfactory infrastructure facilities of the Operation Theatre/Surgery department exist in the Institute / Hospital where the internship training has to be undertaken. The following parameters/guidelines have been suggested:
  a. It is mandatory for the Institution to have its own well-equipped and modern Bachelor in Operation Theatre/Surgery b. Senior Surgeons should manage the operation Theatre/Surgery department in the Institutes/Hospitals.
- The institute's Director / Principal can at his discretion grant NOC to the students to do the Internship at the place of his choice provided the concerned Hospital fully satisfies the above criteria. For the purpose of granting NOC, the candidate shall have to submit to the Institution the status of OT available at the place where he intends to do his/her Internship.

Bachelor in Operation Theatre Technology First Semester
Introduction to Healthcare Delivery System in India
Subject code: BOT25101
Minimum hours: Theory-60 Hr.

Course Objectives:

Upon completion of this course, students will be able to:

1. Understand the organization, structure, and functioning of the healthcare delivery system in India.
2. Identify the key stakeholders and their roles in the healthcare delivery system.
3. Analyze the strengths, weaknesses, opportunities, and threats (SWOT analysis) of the Indian healthcare delivery system.
4. Recognize the importance of healthcare policies, laws, and regulations governing healthcare services in India.
5. Appreciate the challenges and issues faced by the healthcare delivery system in India.

Course Outcomes:

1. Describe the evolution and development of the healthcare delivery system in India.
2. Explain the role of government, private sector, and non-governmental organizations (NGOs) in healthcare delivery.
3. Identify the different levels of healthcare delivery (primary, secondary, tertiary) and their characteristics.
4. Understand the concept of Universal Health Coverage (UHC) and its relevance to India.
5. Familiarize themselves with key healthcare policies and programs in India (e.g., National Health Mission, Ayushman Bharat).

Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system
   a. Healthcare delivery system in India at primary, secondary and tertiary care
   b. Community participation in healthcare delivery system
   c. Health system in developed countries.
   d. Private Sector
   e. National Health Mission
   f. National Health Policy
   g. Issues in Health Care Delivery System in India
2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programmes.
3. Introduction to AYUSH system of medicine
   a. Introduction to Ayurveda.
   b. Unani
   c. Siddha
   d. Homeopathy
   e. Need for integration of various system of medicine
4. Health scenario of India- past, present and future
5. Demography & Vital Statistics
   a. Demography— its concept
   b. Vital events of life & its impact on demography
   c. Significance and recording of vital statistics
   d. Census & its impact on health policy
6. Epidemiology

a. Principles of Epidemiology
b. Natural History of disease
c. Methods of Epidemiological studies
d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

Bachelor in Operation Theatre Technology First Semester
Fundamentals of Anatomy and Physiology-I
Subject Code: BOT25102
Minimum Hours: Theory-60 Hr.

Course Objectives :

1. Students will be able to learn the terminology of the subject**.**
2. To Provide basic knowledge of cells, tissues, blood and to understand anatomy and physiology of human body**.**
3. This subject will develop an understanding of the structure and function of organs and organ systems in normal human body**.**

Course Outcomes:

1. Identify and describe the basic structure and function of human cells, tissues, and organs.
2. Explain the organization of the human body, including the skeletal, muscular, and nervous systems.
3. Describe the functions of the integumentary, skeletal, and muscular systems.
4. Understand the principles of homeostasis and regulation in the human body.
5. Recognize the relationship between anatomy and physiology.

Topics to be covered under the subject are as follows:

Anatomy

1. **General Anatomy**
   a) Introduction & Subdivisions of Anatomy
   b) Anatomical Nomenclature planes, Positions, Body Parts & Movements.
   c) Cell - structure & function
   d) Tissue
      - Epithelium
      - Connective
      - Sclerous
      - Muscular
      - Nervous
   e) Lymphatic System

Physiology

1. **Cell :** Structure & function
2. **Blood**
   a) Blood cells
   b) Haemoglobin
   c) Blood groups
   d) Coagulation Factors
   e) Anaemia & Immunoglobulins
3. **Cardiovascular system**
   Heart rate, cardiac cycle, cardiac output, blood pressure, hypertension, radial pulse
4. **Respiratory System**
   a) Ventilation
   b) Functions
   c) Lungs Volumes and capacities
5. **Gastrointestinal System**
   Process of digestion in various parts

Text Books

1. Rizzo, Donald C. (2015). *Fundamentals of Anatomy and Physiology*. 4th ed. Florence, AL: Cengage Learning.
2. B.D. Chaurasiya (2022). Human Anatomy, 9th Ed., CBS Publication.

Reference Books

1. Gray, Henry. (2013). Grays Anatomy. London, England: Arcturus Publishing.
2. Hall, J. E. (2015). Guyton and hall textbook of medical physiology (13th ed.). W B Saunders.
3. Moore, K. L., Dalley, A. F., & Agur, A. (2017). Clinically oriented anatomy (8th ed.). Lippincott Williams and Wilkins.

Bachelor in Operation Theatre Technology First Semester
General Biochemistry
Subject Code: BOT25103
Min. Hrs. - Theory: 60 Hrs.

Course Objective

1. To enable the student to understand the chemical characteristics of different classes of nutrients.
2. To explain the process of digestion, absorption and metabolism of macronutrients and micronutrients.

Course Outcome

3. The student will have knowledge of biochemical pathways of different nutrients, how they function biochemically and physiologically.
4. The student will get information about the role of diet and the nutrients present in them.

Topics to be covered under the subject are as follows:

1. **Basics of energy metabolism, nutrition & dietetics** -Unit of measuring energy, calorific value of food, BMR & factors affecting it, SDA of food, calculation of energy requirement, balanced diet, nutrition in health & diseases (protein energy malnutrition).
2. **Chemistry of carbohydrates & their related metabolism** - Introduction, definition, classification, biomedical importance Brief outline of metabolism: Glycogenesis & glycogenosis (in brief), Glycolysis, citric acid cycle & its significance, HMP shunt & Gluconeogenesis (in brief), regulation of blood glucose level.
3. **Amino acids** - Definition, classification, essential & non-essential amino acids.
4. **Chemistry of Proteins & their related metabolism -** Introduction, definition, classification, biomedical importance Metabolism: Transformation, Decarboxylation, Ammonia formation & transport, Urea cycle.
5. **Chemistry of Lipids & their related Metabolism-**Introduction, definition, classification, biomedical importance, essential fatty acids, identification of fats & oils (saponification no, acid no, iodine no, acetyl no, reichert- miesel no. etc.) Brief out line of metabolism: Beta oxidation of fatty acids, Ketosis, Cholesterol & it's clinical significance, Lipoproteins in the blood composition & their functions in brief, Atherosclerosis.
6. **Enzymes**-Introduction, definition, classification, coenzymes, isoenzymes, properties, factors affecting enzyme action, enzyme inhibition, diagnostic value of serum enzymes - Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT, Amylase, Lipase, Carbonic anhydrase etc.
7. **Acid base balance concepts & disorders** - pH, Buffers, Acidosis, Alkalosis

Suggested Readings

- Murray RK, Bender DA, Botham KA, Mayes PA and Rodwel lVW (2015):
- Harper's Biochemistry, 30th Ed. Lange Medical Book.
- Handler P, Smith EI, Stelten DW: Principles of Biochemistry, McGraw Hill Book Co.
- Nelson DL and Cox MM (2017): Lehninger Principles of Biochemistry. 7th Ed. WH Freeman.
- Devlin TM (2010): Text Book of Biochemistry with Clinical Correlations. John Wiley and Sons.
- Berg JM,Tymoczko JL, Gatto GJ and Stryer (2015): Biochemistry, 8th Ed WH Freeman and Co
- AcDeb : Fundamentals of Biochemistry.

Bachelor in Operation Theatre Technology First Semester
FUNDAMENTALS OF ANATOMY & PHYSIOLOGY-I
Subject Code: BOT25104
Min. Hrs. - Practical: 60 Hrs.

Course Objectives :

1. Students will be able to learn the terminology of the subject**.**
2. To Provide basic knowledge of cells, tissues, blood and to understand anatomy and physiology of human body**.**

Course Outcomes:

1. Identify and describe the basic structure and function of human cells, tissues, and organs.
2. Explain the organization of the human body, including the skeletal, muscular, and nervous systems.
3. Describe the functions of the integumentary, skeletal, and muscular systems.

Topics to be covered under the subject are as follows:

Anatomy

1. Identification and description of all anatomical structures.
2. The learning of Anatomy by demonstration only through dissected parts, slides, models, charts etc.

Physiology

1. Measurement of pulse, blood pressure.
2. Elicitation of Reflexes & jerks.
3. Identification of blood cells by study of peripheral blood smear.

Bachelor in Operation Theatre Technology First Semester
GENERAL BIOCHEMISTRY
Subject code: BOT25105
Minimum hours- Practical:60 Hrs.

Course Objective

1. To enable the student to understand the chemical characteristics of different classes of nutrients.
2. To explain the process of digestion, absorption and metabolism of macronutrients and micronutrients.

Course Outcome

1. The student will have knowledge of biochemical pathways of different nutrients, how they function biochemically and physiologically.
2. The student will get information about the role of diet and the nutrients present in them.

Topics to be covered under the subject are as follows:

1. Biomedical Waste Management
2. Laboratory Organization – Glassware, Plastic-ware, Instruments etc.
3. Identification of Carbohydrates (qualitative tests).
4. Identification of Proteins
5. Estimation of Glucose in urine by Benedict's method.

Bachelor in Operation Theatre Technology First Semester
BASIC COMPUTERS AND INFORMATION SCIENCE
Minimum hours: 40

The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation. Topics to be covered under the subject are as follows:

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
2. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).
3. Processor and memory: The Central Processing Unit (CPU), main memory.
4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
6. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
7. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
9. Introduction of Operating System: introduction, operating system concepts, types of operating system.
10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
11. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.
12. Application of Computers in clinical settings.

Bachelor in Operation Theatre Technology First Semester
COMMUNICATION AND SOFT SKILLS
Minimum hours: 40

Major topics to be covered under Communication course —

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
4. Basic concepts & principles of good communication
5. Special characteristics of health communication
6. Types & process of communication
   Barriers of communication & how to overcome Introduction to Quality and Patient Safety.

Bachelor in Operation Theatre Technology Second Semester
Medical terminologies and record keeping
Subject code: BOT25201
Minimum hours: Theory-60 Hrs.

Course Objectives:

1. To understand and interpret medical terminology used in healthcare settings.
2. To learn the principles of medical record keeping and documentation.
3. To develop skills in recording and maintaining accurate patient information.
4. To recognize the importance of confidentiality and security in medical records.
5. To apply medical terminology and record-keeping skills in real-world healthcare scenarios.

Course Outcomes:

1. Define and explain medical terminology related to body systems, diseases, and treatments.
2. Identify and describe different types of medical records (e.g., SOAP notes, progress notes).
3. Understand the legal and ethical considerations of medical record keeping.
4. Recognize the role of medical terminology in healthcare communication.
5. Explain the importance of accurate and complete medical records.

Topics to be covered under the subject are as follows:

1. Derivation of medical terms,
2. Define word roots, prefixes, and suffixes.
3. Conventions for combined morphemes and the formation of plurals.
4. Basic medical terms.
5. Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
6. Interpret basic medical abbreviations/symbols.
7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
8. Interpret medical orders/reports.
9. Data entry and management on electronic health record system.

Bachelor in Operation Theatre Technology Second Semester
FUNDAMENTALS OF ANATOMY & PHYSIOLOGY-II
Subject Code: BOT25202
Minimum Hours: Theory-60 Hrs.

Course Objectives:

1. To understand the anatomy and physiology of the nervous, endocrine, and reproductive systems.
2. To explain the mechanisms of nervous transmission, muscle contraction, and hormone regulation.
3. To identify and describe the structure and function of the brain, spinal cord, and peripheral nerves.
4. To recognize the relationships between anatomy and physiology in maintaining homeostasis.
5. To apply knowledge of anatomy and physiology to operation theatre procedures.

Course Outcomes:

1. Describe the structure and function of the nervous, endocrine, and reproductive systems.
2. Explain the mechanisms of synaptic transmission, muscle contraction, and hormone regulation.
3. Identify and label the major structures of the brain, spinal cord, and peripheral nerves.
4. Understand the role of the autonomic nervous system in maintaining homeostasis.
5. Recognize the relationships between anatomy and physiology in operation theatre procedures.

Topics to be covered under the subject are as follows:

Anatomy

1. Systemic

Basic Features of:

a) Cardiovascular system
b) Respiratory system
c) Digestive system
d) Excretory system
e) Genital (Male & Female) system
f) Nervous system

Physiology

1. Endocrinology

a) List of Endocrine Glands
b) Hormones: Their secretion and functions (in brief)

2. Excretion system

a) Structure of nephron
b) Urine formation

3. Central Nervous System

a) Parts
b) Sliding Filament Theory
c) Neuro Muscular Junction
d) Wallerian Degeneration
e) Motor Nervous system
   - Upper motor neuron system
   - Lower motor neuron system
f) Sensory nervous system
g) Sympathetic Nervous system
h) Parasympathetic nervous system

4. **Skin -** Function & Structure

5. Muscular System

Classification of muscles & their functions

6. **Special Senses -** Eye & ear (in brief)
7. **Reproductive System –** Structure & Function of male & female reproductive organs, menstruation, puberty, menopause, fertilization & Development of fertilized ovum, placenta & its function.

Text Books

1. B.D. Chaurasiya (2022). Human Anatomy, 9th Ed., CBS Publication.
2. Rizzo, Donald C. (2015). *Fundamentals of Anatomy and Physiology*. 4th ed. Florence, AL: Cengage Learning.
3. Ghai's (2022). Ghai's Text Book of Practical Physiology, 10th Ed., J.P. Brothers.

Reference Books

1. Gray, Henry. (2013). Grays Anatomy. London, England: Arcturus Publishing.
2. Hall, J. E. (2015). Guyton and hall textbook of medical physiology (13th ed.). W B Saunders.
3. Moore, K. L., Dalley, A. F., & Agur, A. (2017). Clinically oriented anatomy (8th ed.). Lippincott Williams and Wilkins.

Bachelor in Operation Theatre Technology Second Semester
PRINCIPLES OF MANAGEMENT
Subject code – BOT25203
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. To understand the fundamental principles and concepts of management.
2. To develop skills in planning, organizing, leading, and controlling.
3. To analyze the role of management in achieving organizational goals.
4. To recognize the importance of leadership, communication, and teamwork.
5. To apply management principles to real-world scenarios.

Course Outcomes:

1. Define and explain management concepts, theories, and models.
2. Identify and describe the functions of management (planning, organizing, leading, controlling).
3. Understand organizational behavior, motivation, and leadership.
4. Recognize the impact of external factors on organizational performance.
5. Explain the importance of ethics and social responsibility in management.

Topics to be covered under the subject are as follows:

1. Principles of management:
   a. . Development of Management: Definitions of Management, Contributions of F.W. Taylor, Henry Fayol and others.
   b. Functions of Management: Planning, Organizing, Directing, Controlling Planning: Types of planning, Short term and long plans, Corporate or Strategic Planning, Planning premises, Polices, Characteristics and sources, principles of policy making, Strategies as different from policies, Procedures and method, Limitations of planning.
   c. Organizing: Importance of organization, Hierarchy, Scalar chain, Organization relationship, Line relationship, Staff relationship - Line staff relationship, Functional relationship, Committee organization, Management committees, Depart mentation.
   d. Motivation: Motivation theories, McGregor's theory X and theory Y, Maslow's and Herzberg's theory, Porter and Lawler model of complex view of motivation, Other theories, Diagnostic signs of motivational problems, Motivational Techniques.
   e. Communication: Types of communication, Barriers of effective communication, Techniques for improved communication.
   f. Directing: Principles relating to Direction process, Principles and theories of leadership, Leadership Styles, Delegation of authority.
   g. Controlling: Span of control, Factors limiting effective span of control, Supper management, General managers, Middles managers and supervisors, Planning and controlling relationships, Management control process, Corrective measures, Strategic control points, Budgetary control, Types of budgets.
   h. Co-ordination: Co-ordination and co-operation, Principles of co-ordination, Techniques of co-ordination charts and records, Standard procedure instructions.
   2. Personnel management: Objective of Personnel Management, Role of Personnel Manager in an organization, Staffing and work distribution techniques, Job analysis and description, Recruitment and selection processes, Orientation and training, Coaching and counselling, disciplining, Complaints and grievances, Termination of

employees, Performance appraisal, Health and safety of employees - Consumer Protection Act as applicable to health care services.

a. Strategic Management
b. Decision Making, conflict and stress management
c. Managing Change and Innovation
d. Understanding Groups and Teams
e. Leadership
f. Time Management
g. Cost and efficiency

Bachelor in Operation Theatre Technology Second Semester
FIRST AID AND EMERGENCY CARE (ELECTIVE)
Subject code – BOT25204
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. To understand the principles and practices of first aid and emergency care.
2. To develop skills in assessing and managing medical emergencies.
3. To recognize the importance of timely and effective first aid interventions.
4. To apply first aid techniques in various settings (operation theatre, community, workplace).
5. To integrate first aid knowledge into healthcare practice.

Course Outcomes:

1. Define and explain first aid concepts, theories, and models.
2. Identify and describe common medical emergencies (cardiac arrest, bleeding, shock).
3. Understand the principles of wound management and injury care.
4. Recognize the signs and symptoms of medical conditions requiring immediate attention.
5. Explain the importance of infection control and personal protective equipment.

Topics to be covered under the subject are as follows:

1. **Introduction of First Aid**
   Definition, aims and importance of First Aid.
   Rules/General Principles of First Aid
   Concepts of Emergency.

2. **Procedure and Techniques in First Aid**
   Preparation of First Aid kit, Dressing bandaging and splinting
   Transpiration of injured patient
   CPR-Mouth to mouth, Sylvesster, Schafer, External Cardiac Massage

3. **First Aid in Emergency**
   Aspyxia, Drowning, Shock
   Wound and bleeding, Injuries of the Soft and dense tissue
   Injury of joint and bone, Falls, Hanging
   Foreign body ear, ear and nose and throat
   Burns and Scalds
   Poisoning – Ingestion, inhalation, bite and stings

4. **Assessing a Casualty and vitals parameters**
   Assessing the sick or injured, Mechanisms of injury
   Primary Survey, Secondary survey
   Head-to-toe examination, monitoring vital sings

5. **Emergency Management**
   Principle of Emergency care
   Triage
   Airways obstruction, Basic knowledge of Firs and management of burn
   Basic Knowledge of First Aid for medical and Surgical emergency
   Basic knowledge of first aid management of heat stroke
   Basic knowledge of first aid management of snake bite and poisoning
   Unconscious adult, Unconscious child, Unconscious infant, How to use an AED

6. **Techniques and Equipment**
   Removing clothing, removing headgear, casualty handling, First Aid materials, Dressing, Cold compresses, Principles of bandaging, Roller bandages, Tubular gauze bandages, square knots, hand and foot cover, Arm sling, Elevation sling, improvised slings.

7. **BLS and ACLS**
   BLS guideline for adult and paediatrics
   CPR techniques, choking
   ACLS basic guidelines

Text Books:

1. Hoon R.S, First aid to the injured, St.John Ambulance Association,10th Ed, 2014.
2. Gardner Ward & Peter J. Roylance, New Advanced First Aid, London Butter Worths, 3rd edition, 2001.

Reference Books:

1. Raine Hardhins and Hunt Vaheirs,Urgencies and emergencies for Nurses, English Universities Press Ltd, 1965.
2. First Aid, American Red Cross, The Balckiston company, Philadephia, 1945.
3. Golqalla Asoi, A handbook of emergencies, Bombay sam and company, 1986.

Bachelor in Operation Theatre Technology Second Semester
FOUNDATIONS OF YOGA (ELECTIVE)
Subject code – BYOG 101
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. The subject entitled 'Foundation of Yoga' has the following objectives:
2. Students of the UG course will have an understanding about origin, history and development of Yoga.
3. They will have an idea about the insights of Indian philosophy and Astika & Nastika darshanas.
4. Introduction about Yoga according to various yogic texts.

Course Outcome:

1. Students gain newer insight regarding the introduction & importance of Yoga for day today life.
2. This forms the basis of the development of concept of Indian Philosophy.
3. Also, the content dealing with the ancient Indian literature in yogic perspective

Topics to be covered under the subject are as follows:

1. **General introduction to yoga**
   Brief about origin of Yoga: Psychological aspects and Mythological concepts; History and Development of Yoga: prior to the Vedic period, Vedic period, Medival period, modern era; Etymology and Definitions of Yoga, Aim and Objectives of Yoga, Misconceptions of Yoga; Brief about Streams of Yoga; Principles of Yoga, Importance of Yoga
2. **General introduction to Indian philosophy**
   Philosophy: meaning, definitions and scope; Indian Philosophy: Salient features, Branches (Astika and Nastika Darshanas), Distinction from Religion and Science, Brief introduction to Prasthanatrayee and Purushartha Chatushtaya; Relationship between Yoga and Indian Philosophy
3. **Brief about Yoga in texts –I**
   Brief to Upanishads and Yoga in Principal Upanishads, Yoga in Yogopanishad; Yogic perspective of Epics: Ramayana, Adhyatma Ramayana and Mahabharata; Yogic perspective: Bhagavad Gita, Yoga Vasishtha, Narada Bhakti Sutras
4. **Brief about Yoga in texts – II**
   Yogic perspective: Smritis, Puranas with emphasis to Bhagavat Purana; Yogic perspective to Shad-darshanas; Emphasis to Vedantic approach of Shankara, Ramanuja, Madhva and Vallabha; Brief: Agamas, Tantras, Shaiva Siddhanta.

Text Books

1. Lal Basant Kumar: Contemporary Indian Philosophy, Motilal Banarsidas Publishers Pvt. Ltd, Delhi, 2013.
2. Dasgupta S. N: History of Indian Philosophy, Motilal Banarsidas, Delhi, 2012.
3. Singh S. P: History of Yoga, PHISPC, Centre for Studies in Civilization Ist, 2010.
4. Singh S. P & Yogi Mukesh: Foundation of Yoga, Standard Publication, New Delhi, 2010

Books for Reference

1. Agarwal M M: Six systems of Indian Philosophy, Chowkhambha Vidya Bhawan, varanai, 2010
2. Swami Bhuteshananda: Nararad Bhakti Sutra, Advaita Ashrama Publication-Dept., II Edition,2009.
3. Hiriyanna M: Outlines of Indian Philosophy, Motilal Banarsidas, Delhi, 2009.
4. Hiriyanna M: Essentials of Indian Philosophy, Motilal Banarsidas, Delhi, 2008.
5. Radhakrishnan S: Indian Philosophy, Oxford University, UK (Vol. I & II) II Edition, 2008.
6. Max Muller K.M: The six system of Indian Philosophy, Chukhambha, Sanskrit series, Varanasi, 6th Edition, 2000.

Bachelor in Operation Theatre Technology Second Semester
FUNDAMENTALS OF ANATOMY & PHYSIOLOGY-II
Subject code – BOT25205
Min. Hrs. - Practical: 60 Hrs.

Course Objectives:

1. To understand the anatomy and physiology of the nervous, endocrine, and reproductive systems.
2. To explain the mechanisms of nervous transmission, muscle contraction, and hormone regulation.
3. To identify and describe the structure and function of the brain, spinal cord, and peripheral nerves.

Course Outcomes:

1. Describe the structure and function of the nervous, endocrine, and reproductive systems.
2. Explain the mechanisms of synaptic transmission, muscle contraction, and hormone regulation.
3. Identify and label the major structures of the brain, spinal cord, and peripheral nerves.

Topics to be covered under the subject are as follows:

Anatomy

1. Demonstration of skeleton - articulated and disarticulated.
2. Demonstration of dissected parts (upper extremity, lower extremity, thoracic & abdominal viscera, face and brain).

Physiology

1. Measurement of pulse, blood pressure.
2. Elicitation of Reflexes & jerks.
3. Identification of blood cells by study of peripheral blood smear.

Bachelor in Operation Theatre Technology Third Semester
General Pathology
Subject code – BOT25301
Min. Hrs. - Theory: 60 Hrs.

Course Objectives-

1. To provide general insight into the history and basics of General Pathology**.**
2. To Impart knowledge about general outline of pathology**.**
3. To provide brief knowledge about basic procedure done in pathology laboratory.

Course outcome-

1. At the end of the course, the students will have knowledge in inflammation and repair aspects as well as the various pathological change of the human body.

Topics to be covered under the subject are as follows:

1. Cell Injury and Cellular Adaptations.

a) Normal Cell
b) Cell Injury- types of cell injury, etiology of cell injury, morphology of cell injury, cellular swelling.
c) Cell death: types- autolysis, necrosis, apoptosis & gangrene.
d) Cellular adaptations-atrophy, hypertrophy, hyperplasia & dysplasia.

2. Inflammation

a) Acute inflammation - vascular event, cellular event, inflammatory cells.
b) Chronic Inflammation - general features, granulomatous inflammation, tuberculoma.

3. Hemodynamic Disorders:

Edema, hyperemia, congestion, hemorrhage, circulatory disturbances, thrombosis,
Ischemia & infarction.

4. Neoplasia:

Definition, how does it differ from hyperplasia, Feature of Benign Tumor and Malignant Tumor
difference between benign tumor and malignant tumor.

5. Healing

Definition, different phases of healing, factors influencing wound healing.

Bachelor in Operation Theatre Technology Third Semester
General Microbiology
Subject code – BOT25302
Min. Hrs. - Theory: 60 Hrs.

Course objective-

1. To provide knowledge of bacteria, Sterilization etc.

Course outcome-

1. At the end of the course, the students will be able to understand the pathogenesis of the diseases caused by the organisms in the human body.

Topics to be covered under the subject are as follows:

1. **General characters and classification of Bacteria.**
2. **Characteristics of Bacteria**
   Morphology- Shape, Capsule, Flagella, Inclusion, Granule, Spore.
3. **Growth and Maintenance of Microbes**
   Bacterial division, Batch Culture, Continuous culture, bacterial growth- total count, viable count, bacterial nutrition, oxygen requirement, CO_2 requirement, temperature, pH, light.
4. **Sterilization and Disinfection.**
   Physical agents- Sunlight, Temperature less than 100^0C, Temperature at 100^0C, steam at atmospheric pressure and steam under pressure, irradiation, filtration.
   Chemical Agents- Alcohol, aldehyde, Dyes, Halogens, Phenols, Ethylene oxide.
5. **Culture Media**
   Definition, uses, basic requirements, classification, Agar, Peptone, Transport Media, Sugar Media, Anaerobic Media, Containers of Media, Forms of Media
6. **Staining Methods**
   Simple, Grams staining, Ziehl-Neelsen staining or AFB staining, Negative Impregnation
7. **Collection and Transportation of Specimen**
   General Principles, Containers, Rejection, Samples- Urine, Faeces, Sputum, Pus, Body fluids, Swab, Blood.
8. **Care and Handling of Laboratory Animals**
   Fluid, Diet, Cleanliness, Cages, ventilation, Temperature, Humidity, handling of Animals, Prevention of disease.
9. **Disposal of Laboratory/Hospital Waste**
   Non-infectious waste, Infected sharp waste disposal, infected non-sharp waste disposal.

Bachelor in Operation Theatre Technology Third Semester
PRINCIPLES OF ANESTHESIA
Subject code – BOT25303
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. To understand the fundamental principles and concepts of anesthesia.
2. To develop knowledge of anesthesia techniques, equipment, and medications.
3. To recognize the importance of patient assessment and preparation for anesthesia.
4. To apply anesthesia principles to various surgical procedures.
5. To integrate anesthesia knowledge into operation theatre practice.

Course Outcomes:

1. Define and explain anesthesia concepts, theories, and models.
2. Identify and describe types of anesthesia (general, regional, local).
3. Understand anesthesia equipment, monitors, and pharmacology.
4. Recognize anesthesia-related complications and emergencies.
5. Explain anesthesia considerations for specific patient populations (pediatric, geriatric).

Topics to be covered under the subject are as follows:

1. Medical gas supply
    a. Compressed gas cylinders
    b. Color coding
    c. Cylinder valves; pin index.
    d. Gas piping system
    e. Recommendations for piping system
    f. Alarms & safety devices.
    g. Scavenging of waste anesthetic gases
2. Anesthesia machine
    a. Hanger and yoke system
    b. Cylinder pressure gauge
    c. Pressure regulator
    d. Flow meter assembly
    e. Vaporizers - types, hazards, maintenance, filling and draining, etc.
3. Breathing system
    a. General considerations: humidity & heat
    b. Common components - connectors, adaptors, reservoir bags.
    c. Capnography
    d. Pulse oximetry
    e. Methods of humidification.
    f. Classification of breathing system
    g. Mapleson system - a b c d e f
    h. Jackson Rees system, Bain circuit
    i. Non rebreathing valves - AMBU valves
    j. The circle system
4. Face masks & Airway laryngoscopes
    a. Types, sizes
    b. Endotracheal tubes - Types, sizes.
    c. Cuff system
    d. Fixing, removing and inflating cuff, checking tube position, complications.
5. Anesthesia ventilator and working principles.
6. Monitoring
    a. Electrocardiography (ECG)

b. Pulse oximetry (Sp02)
c. Temperature- central and peripheral
d. End tidal carbon dioxide (EtC02)
e. Anesthesia gas monitoring
f. Non-invasive blood pressure (NIPB) and Invasive blood pressure(IBP)
g. Central venous pressure (CVP)
h. PA Pressure, LA Pressure & cardiac output
i. Anesthesia depth monitor
j. Neuromuscular transmission monitor

Bachelor in Operation Theatre Technology Third Semester
General Pathology
Subject code – BOT25304
Min. Hrs. - Practical: 60 Hrs.

Course Objectives-

1. To provide general insight into the history and basics of General Pathology**.**
2. To Impart knowledge about general outline of pathology**.**
3. To provide brief knowledge about basic procedure done in pathology laboratory.

Course outcome-

1. At the end of the course, the students will have knowledge in inflammation and repair aspects as well as the various pathological change of the human body.

Topics to be covered under the subject are as follows:

1. Components & setting of the Compound microscope.
2. Focusing of object.
3. Use of low & high power objectives of microscope.
4. Use of oil immersion lens.
5. Care and Maintenance of the microscope.
6. Different types microscopy

- Dark field microscopy
- Fluorescence Microscopy

7. Electron Microscopy in brief.1. Introduction to Pathology

Bachelor in Operation Theatre Technology Third Semester
General Microbiology
Subject code – BOT25305
Min. Hrs. - Practical: 60 Hrs.

Course objective-

1. To provide knowledge of bacteria, Sterilization etc.

Course outcome-

1. At the end of the course, the students will be able to understand the pathogenesis of the diseases caused by the organisms in the human body.

Topics to be covered under the subject are as follows:

1. Preparation of swabs/sterile tubes & bottles.
2. Preparation of smear.
3. Staining.: Gram & Ziehl -Neelsen staining.
4. Identification of Culture media.
5. Identification of instruments.
6. Identification of common microbes

Bachelor in Operation Theatre Technology Third Semester
PRINCIPLES OF ANESTHESIA
Subject code – BOT25306
Min. Hrs. - Practical: 60 Hrs.

Course Objectives:

1. To understand the fundamental principles and concepts of anesthesia.
2. To develop knowledge of anesthesia techniques, equipment, and medications.
3. To recognize the importance of patient assessment and preparation for anesthesia.
4. To apply anesthesia principles to various surgical procedures.
5. To integrate anesthesia knowledge into operation theatre practice.

Course Outcomes:

1. Define and explain anesthesia concepts, theories, and models.
2. Identify and describe types of anesthesia (general, regional, local).
3. Understand anesthesia equipment, monitors, and pharmacology.
4. Recognize anesthesia-related complications and emergencies.
5. Explain anesthesia considerations for specific patient populations (pediatric, geriatric).

Topics to be covered under the subject are as follows:

1. Supply of compressed gases:
    a. Types of gases and their chemical and physical properties.
    b. Types of containers.
    c. Their checking and maintenance.
    d. Types of compressors.
    e. Structure and mechanism of various type of gauges, liquid oxygen storage and supply system.
2. Structure of reducing valves
    a. Mechanism of pressure reducing valves.
    b. Their maintenance and safety checks
3. Structure and mechanism of flow meters, maintenance and safety checks
4. Volatile anaesthetic agents.

    b. Structure of different types of vaporizers.
    c. Principles of various vaporizers, their maintenance and safety precautions.
5. Types of circuits:
    a. Open, Semi closed and closed circuits.
    b. Non-rebreathing valves.
    c. T-piece circuit and its modifications.
    d. To and fro system and circle absorber.
6. Types of valves used in the different circuits. Structure and working of Heidbrink's valve, Rubin valve nu-man valve etc.

Bachelor in Operation Theatre Technology Fourth Semester
Medicine relevant to OT Techniques
Subject code – BOT25401
Min. Hrs. -Theory: 60 Hrs.

Course Objectives:

1. To understand the medical principles relevant to operation theatre (OT) techniques.
2. To develop knowledge of surgical procedures and patient care.
3. To recognize the importance of medical terminology in OT settings.
4. To apply medical knowledge to OT techniques and patient management.
5. To integrate medical principles into OT practice.

Course Outcomes:

1. Define and explain medical terminology related to surgical procedures and patient care.
2. Describe the pathophysiology, diagnosis, and management of common surgical conditions.
3. Understand the pharmacology of anesthetic and surgical medications.
4. Identify and describe the pre-operative, intra-operative, and post-operative care of surgical patients.
5. Explain the principles of surgical asepsis, sterilization, and infection control.

Topics to be covered under the subject are as follows:

1. Supply of compressed gases:
    a. Types of gases and their chemical and physical properties.
    b. Types of containers.
    c. Their checking and maintenance.
    d. Types of compressors.
    e. Structure and mechanism of various type of gauges, liquid oxygen storage and supply system.
2. Structure of reducing valves
    a. Mechanism of pressure reducing valves.
    b. Their maintenance and safety checks
3. Structure and mechanism of flow meters, maintenance and safety checks
4. Volatile anaesthetic agents.
    b. Structure of different types of vaporizers.
    c. Principles of various vaporizers, their maintenance and safety precautions.
5. Types of circuits:
    a. Open, Semi closed and closed circuits.
    b. Non-rebreathing valves.
    c. T-piece circuit and its modifications.
    d. To and fro system and circle absorber.
6. Types of valves used in the different circuits. Structure and working of Heidbrink's valve, Rubin valve nu-man valve etc.

Bachelor in Operation Theatre Technology Fourth Semester
BASIC TECHNIQUES OF ANESTHESIA
Subject Code: BOT25402
Min. Hrs. : Theory - 60 Hrs.

Course Objectives:

1. To understand the fundamental principles and techniques of anesthesia.
2. To develop skills in administering anesthesia safely and effectively.
3. To recognize the importance of patient assessment and monitoring during anesthesia.
4. To apply basic anesthesia techniques to various surgical procedures.
5. To integrate anesthesia knowledge into operation theatre practice.

Course Outcomes:

1. Define and explain anesthesia concepts, theories, and models.
2. Describe the types and uses of anesthetic equipment and medications.
3. Understand patient assessment and preparation for anesthesia.
4. Identify and describe anesthesia-related complications and emergencies.
5. Explain the principles of anesthesia monitoring and record-keeping**.**

Topics to be covered under the subject are as follows:

1. Resuscitation techniques:
    a. Basic life support (Airway, breathing, circulation) and the equipment used for it.
2. Anesthesia drugs and techniques:
    a. Principles of anesthesia.
    b. Basics of general anesthesia depth, mechanism and intubation.
    c. Techniques of general anesthesia.
    d. Various intravenous and inhalational agents.
    e. Regional anesthesia, spinal and epidural, posture and drugs.
    f. Local Anaesthetic agents.
    g. Neuro muscular blocking agents.
    h. Principles of oxygen administration along with the apparatus.
    i. Care of patient in the recovery room.
    j. Post-operative pain: evaluation and management.
    k. Types of fluid and therapy.
    l. Blood and blood components transfusion.
    m. Preparation of anesthesia machine, intubation kit, suction machine, anesthesia drugs.
    n. Patient identification, marking, shifting to OT before surgery and out of OT to recovery room after surgery, complete takeover and handover of the patient with vital signs recording before and after surgical procedure to the nursing staff.

Bachelor in Operation Theatre Technology Fourth Semester
Research Methodology and Biostatistics
Subject Code: BOT25403
Min. Hrs. : Theory - 60 Hrs.

Course Objective:

1. The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings

Course Outcomes: The student will be able to

1. Describe the basic principles of research and methods applied to draw inferences from the research findings
2. Discuss the basic concepts of Biostatistics
3. Explain Design, Methodology of Experiment/Survey, Demography & vital statistics, Sampling & interpretation of Data

Topics to be covered under the subject are as follows:

Research Methodology

1. Introduction to Research methodology:
   Meaning of research, objectives of research, Motivation in research, Types of research & research approaches, Research methods vs methodology, Criteria for good research.
2. Research problem:
   Statement of research problem, Statement of purpose and objectives of research problem, Necessity of defining the problem
3. Research design:
   Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design.
4. Measurement & scaling techniques: Measurement in research-
   Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, its classification, important scaling techniques.
5. Methods of data collection: collection of primary data, collection data through questionnaires & schedules, Difference between questionnaires & schedules.
6. Computer technology:
   Introduction to Computers, computer application in research computers & researcher.

Biostatistics

1. **Introduction**: Meaning, definition, characteristics of statistics. Importance of the study of statistics, Branches of statistics, Statistics and health science , Parameters and Estimates, Variables and their types, Measurement scales.
2. **Tabulation of Data**: Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.
3. **Measures of Central Tendency**: Need for measures of central Tendency, Definition and calculation of **Mean** – ungrouped and grouped, interpretation and calculation of Median-ungrouped and grouped, Meaning and calculation of Mode, Geometric mean & Hormonic mean, Guidelines for the use of various measures of central tendency.
4. **Measures of Dispersion** : Range, mean deviation, standard deviation & variance.

5. **Probability and Standard Distributions:** Meaning of probability of standard distribution, the binominal distribution, the normal distribution, Divergence from normality – skewness, kurtosis.
6. **Correlation & regression :** Significance, correlation coefficient, linear regression & regression equation.
7. **Testing of Hypotheses , Level of significance, Degrees of freedom.**
8. **Chi-square test, test of Goodness of fit & student t-test.**
9. **Analysis of variance & covariance:** Analysis of variance (ANOVA), what is ANOVA? Basic principle of ANOVA, ANOVA technique, Analysis of Co variance (ANCOVA)
10. **Sampling:** Definition, Types- simple, random, stratified, cluster and double sampling. Need for sampling - Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling designs errors.

Bachelor in Operation Theatre Technology Fourth Semester
General Pharmacology
Subject code – BOT25404
Min. Hrs. : Theory- 60 Hrs.

Course objectives-

1. The objective of this course is to help the students understand the basic concepts of drugs, their mechanism of action on the human body.

Course outcomes-

1. At the end of the course, the students have thorough knowledge of the basic principle of pharmacokinetics and pharmacodynamics as well as the commonly used drugs, mechanism, indications, contraindications, drug dosage and adverse effects.

Topics to be covered under the subject are as follows:

Topics to be covered:

1. **General Pharmacology:**
   - Introduction, Definitions, Classification of drugs, Sources of drugs, Routes of drug administration,
   - Distribution of drugs, Metabolism and Excretion of drugs, Pharmacokinetics, Pharmacodynamics,
   - Factors modifying drug response.
   - Elementry knowledge of drug toxicity, drug allergy, drug resistance, drug potency, efficacy & drug antagonism.
   - Adverse drugs reactions & management
2. **Autonomic Nervous system:**
   - General considerations – The Sympathetic and Parasympathetic Systems, Receptors, Somatic Nervous System
   - Cholinergic and Anti-Cholinergic drugs, Adrenergic and Adrenergic blocking drugs, Peripheral muscle relaxants.
3. **Cardiovascular Pharmacology :**
   - Antihypertensive and drugs useful in Angina.
4. **Neuropharmacology (in brief) :**
   - Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines
   - Antianxiety Drugs: Benzodiazepines, Other Anxiolytics
5. **Inflammatory/Immune Diseases-**
   - Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactions with NSAIDs
   - Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic Use of Glucocorticoids
6. **Digestion and Metabolism (in brief):**
   - Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea
   - Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemics
7. **Pharmacology of different dyes used in OT procedures.**

Bachelor in Operation Theatre Technology Fourth Semester
BASIC TECHNIQUES OF ANESTHESIA
Subject Code: BOT25405
Min. Hrs. : Practical - 60 Hrs.

Course Objectives:

1. To understand the fundamental principles and techniques of anesthesia.
2. To develop skills in administering anesthesia safely and effectively.
3. To recognize the importance of patient assessment and monitoring during anesthesia.
4. To apply basic anesthesia techniques to various surgical procedures.
5. To integrate anesthesia knowledge into operation theatre practice.

Course Outcomes:

1. Define and explain anesthesia concepts, theories, and models.
2. Describe the types and uses of anesthetic equipment and medications.
3. Understand patient assessment and preparation for anesthesia.
4. Identify and describe anesthesia-related complications and emergencies.
5. Explain the principles of anesthesia monitoring and record-keeping**.**

Topics to be covered under the subject are as follows:

1. Anesthesia work station
2. Boyle's anesthesia apparatus and other Advanced Anesthesia machines.
3. Apparatus and technique of the intravenous injections:
    a. Selection of the material used for intravenous injection.
    b. Different types of intravenous needles and cannulas.
    c. Theoretical study for testing of the toxicity of the materials.
4. Resuscitation equipment and Resuscitation techniques:
    a. Endotracheal tubes:
        - Selection of the material used for the endotracheal tube
        - Study of the structure of various types of the endotracheal tubes; Cleaning and sterilization of ETT.
    b. Connectors: Various connectors, size and material used.
    c. Mask: Material, structure and importance of dead space of face mask.
    d. Supraglottic airways.
    e. Spinal and epidural blocks: equipment, types of spinal and epidural needles, their structure. Instruments used for spinal and epidural blocks.
    f. Laryngeal sprays: Types, structure and material used, mechanism, uses and their maintenance.

Bachelor in Operation Theatre Technology Fifth Semester
BASICS OF SURGICAL PROCEDURES
Subject code – BOT25501
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. Understand surgical principles and procedures.
2. Develop surgical skills and techniques.
3. Recognize surgical safety and patient care.
4. Apply basic surgical skills in OT settings.
5. Integrate surgical knowledge into healthcare practice.

Course Outcomes:

1. Define surgical terminology and concepts.
2. Describe surgical instruments and equipment.
3. Understand surgical anatomy and physiology.
4. Explain surgical safety protocols.
5. Identify surgical complications.

Topics to be covered under the subject are as follows:

1. Blood Transfusion
    a. History of discovery of blood groups and genetics of blood groups.
    b. Types of blood groups and Rh factor.
    c. Coombs test.
    d. Collection of blood, its preservation and standardization.
    e. Various types of blood and blood products(Packed cells, PRP, FFP)
    f. Pre-transfusion checks.
    g. Transfusion reactions.
    h. Fluids and electrolytes
    i. Body fluid compartments and the effect of fluid administration on them.
    j. Types of fluids (crystalloids and colloids) and their chemical composition.
    k. Indications of specific fluids and their complications.
2. General surgical procedure and para-surgical equipment
    a. Operating tables: structure, material used, maintenance, control, Hydraulic system and Electrical system.
    b. Different types of diathermy machine. Monopolar, Bipolar, Ligasure, Harmonic Scalpel, CUSA- Principle, hazards, prevention, functioning and maintenance.
    c. Types of operation lights and light sources: Features, Care, cleaning, Sterilization and maintenance.
    d. Operation Theatre sterilization- Different recent advances.
    e. LAR/APR--Positioning of patient, care-Prevention of hazards.
    f. Total thyroidectomy—with emphasis on proper positioning.
    g. Transthoracic esophagectomy—Different approaches.
    h. Venesection and Tracheostomy.
    i. Laparoscopic Cholecystectomy — Pneumoperitonium - Creation and removing, principles.
    j. Nephrectomy.
    k. Breast surgery.
    I. Positioning of patient for different operations: Problems and hazards.

Bachelor in Operation Theatre Technology Fifth Semester
CSSD procedures
Subject code – BOT25502
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. Understand CSSD principles and procedures.
2. Develop skills in sterilization and disinfection.
3. Recognize importance of infection control.
4. Apply CSSD procedures in OT settings.
5. Integrate CSSD knowledge into healthcare practice.

Course Outcomes:

1. Demonstrate proficiency in CSSD procedures.
2. Apply sterilization and disinfection principles.
3. Maintain infection control standards.
4. Manage CSSD operations.
5. Integrate CSSD knowledge into OT practice.

Topics to be covered under the subject are as follows:

1. Principles of sterilization and disinfection.
2. Methods of sterilization
3. Dry Sterilization.
4. Wet sterilization.
5. Gaseous sterilization.
6. Chemical sterilization.
7. Sterilization by radiation (Gamma rays, ultraviolet rays)
8. Techniques of sterilization of rubber articles. (LMA, FOB, ETV, Laryngoscopes, Anesthesia machines and circuits)
9. Technique of sterilization of carbonized articles.
10. Methods of disinfection.
11. Boiling.
12. Chemical disinfection.
13. Hazards of sterilization.
14. Prevention of hazards of sterilization.
15. Precautions to be taken during sterilization.
16. Recent advances in the methods of sterilization.

Bachelor in Operation Theatre Technology Fifth Semester
ADVANCE ANESTHESIA TECHNIQUES
Subject code – BOT25503
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. To understand advanced anesthesia techniques.
2. Develop skills in specialized anesthesia procedures.
3. Recognize complex anesthesia-related complications.
4. Apply advanced anesthesia knowledge in OT settings.
5. Integrate advanced anesthesia skills into healthcare practice.

Programme Outcomes:

1. Demonstrate expertise in advanced anesthesia techniques.
2. Apply specialized anesthesia knowledge in clinical practice.
3. Manage complex anesthesia-related complications.
4. Develop anesthesia protocols for specialized surgeries.
5. Integrate advanced anesthesia skills into comprehensive patient care.

Topics to be covered under the subject are as follows:

1. Heart as a pump.
2. Cardiac cycle.
3. Cardiac contractility and stroke volume.
4. Cardiac output and its measurement.
5. Various ECG Leads, their placement and Normal ECG.
6. Cardiac Arrhythmias (atrial fibrillation, ventricular tachycardia, extra systoles)
7. Circulatory shock and its physiology.
8. Cardiac failure.
9. Physics of blood flow and pressure.
10. Measurement of blood flow.
11. Electromagnetic flow meter, ultrasonic flow meter, plethysmography.
12. Regulation of arterial pressure and hypertension (Drugs used for treatment of hypertension)
13. Arterial circulation including cardiopulmonary bypass.
14. Artificial ventilation and related equipment:
    a. Physiology of IPPV (Intermittent positive pressure ventilation)
    b. Principles of mechanical ventilation.
    c. Various modes of IPPV.
    d. Automatic pressure and time cycled ventilators.
    e. Operating room ventilators.
    f. Other types of ventilators (HFJV, NIV)
    g. Complications in patients on ventilator
    h. General care of a patient on ventilator.
    i. Disinfection and sterilization of ventilators.
    j. Humidification
    k. Principles of oxygen administration and methods used to deliver oxygen.
    l. Acid base balance.
    m. Electrolyte imbalance and its relevance to anesthesia.

Bachelor in Operation Theatre Technology Fifth Semester
BASICS OF SURGICAL PROCEDURES
Subject code – BOT25504
Min. Hrs. - Practical: 60 Hrs.

Course Objectives:

1. Understand surgical principles and procedures.
2. Develop surgical skills and techniques.
3. Recognize surgical safety and patient care.
4. Apply basic surgical skills in OT settings.
5. Integrate surgical knowledge into healthcare practice.

Course Outcomes:

1. Describe surgical instruments and equipment.
2. Understand surgical anatomy and physiology.
3. Explain surgical safety protocols.
4. Identify surgical complications.

Topics to be covered under the subject are as follows:

1. **Blood Transfusion**
   1. Demonstrate blood grouping and Rh typing.
   2. Perform Coombs test.
   3. Identify and label different blood components (packed cells, PRP, FFP).
   4. Practice pre-transfusion checks.
   5. Simulate transfusion reactions and manage accordingly.

2. **Fluid and Electrolyte Management**
   1. Calculate fluid requirements for patients.
   2. Identify types of fluids (crystalloids and colloids) and their indications.
   3. Demonstrate fluid administration techniques.
   4. Monitor and manage fluid and electrolyte imbalances.
   5. Practice fluid therapy calculations.

3. **General Surgical Procedures**
   1. Assist in surgical procedures (e.g., venesection, tracheostomy).
   2. Demonstrate patient positioning for various surgeries.
   3. Practice surgical scrubbing, gloving, and gowning.
   4. Assist in laparoscopic cholecystectomy and nephrectomy.
   5. Observe and assist in breast surgery.

4. **Para-Surgical Equipment**
   1. Operate and maintain operating tables.
   2. Demonstrate diathermy machine usage (monopolar, bipolar).
   3. Use and maintain operation lights.
   4. Practice sterilization techniques.
   5. Demonstrate laparoscopic equipment usage.

Bachelor in Operation Theatre Technology Fifth Semester
CSSD procedures
(Central Sterile Supply Department Procedures)
Subject code – BOT25505
Min. Hrs. - Practical: 60 Hrs.

Course Objectives:

1. Understand CSSD principles and procedures.
2. Develop skills in sterilization and disinfection.
3. Recognize importance of infection control.
4. Apply CSSD procedures in OT settings.
5. Integrate CSSD knowledge into healthcare practice.

Course Outcomes:

1. Demonstrate proficiency in CSSD procedures.
2. Apply sterilization and disinfection principles.
3. Maintain infection control standards.
4. Manage CSSD operations.
5. Integrate CSSD knowledge into OT practice.

Topics to be covered under the subject are as follows:

1. **Sterilization Techniques**
   1. Autoclaving: Demonstrate proper use and maintenance.
   2. Dry Heat Sterilization: Practice sterilization of heat-resistant materials.
   3. Ethylene Oxide Sterilization: Demonstrate safety protocols and usage.
   4. Gamma Radiation Sterilization: Understand principles and safety measures.
   5. Chemical Sterilization: Practice sterilization using chemical agents.
2. **Disinfection Methods**
   1. Boiling: Demonstrate disinfection of heat-sensitive materials.
   2. Chemical Disinfection: Practice disinfection using chemical agents.
   3. UV Disinfection: Understand principles and safety measures.
3. **Sterilization of Specific Equipment**
   1. Sterilization of Rubber Articles (LMA, FOB, ETV, Laryngoscopes).
   2. Sterilization of Anesthesia Machines and Circuits.
   3. Sterilization of Carbonized Articles.
4. **CSSD Operations**
   1. Manage CSSD operations: receiving, processing, and distributing sterilized materials.
   2. Maintain infection control standards: cleaning, disinfection, and sterilization.

Bachelor in Operation Theatre Technology Fifth Semester
ADVANCE ANESTHESIA TECHNIQUES
Subject code – BOT25506
Min. Hrs. - Practical: 60 Hrs.

Course Objectives:

1. To understand advanced anesthesia techniques.
2. Develop skills in specialized anesthesia procedures.
3. Recognize complex anesthesia-related complications.
4. Apply advanced anesthesia knowledge in OT settings.
5. Integrate advanced anesthesia skills into healthcare practice.

Programme Outcomes:

1. Demonstrate expertise in advanced anesthesia techniques.
2. Apply specialized anesthesia knowledge in clinical practice.
3. Manage complex anesthesia-related complications.
4. Develop anesthesia protocols for specialized surgeries.
5. Integrate advanced anesthesia skills into comprehensive patient care.

Topics to be covered under the subject are as follows:

1. Cardiovascular Monitoring (15 Hrs.)
- ECG interpretation
- Blood pressure measurement
- Cardiac output measurement

2. Ventilation Management (20 Hrs.)
- Mechanical ventilation setup
- Oxygen therapy
- Humidification

3. Advanced Anesthesia Techniques (15 Hrs.)
- Total Intravenous Anesthesia (TIVA)
- Regional anesthesia
- Anesthesia machine checkout

4. Simulation-Based Training (10 Hrs.)
- Anesthesia-related emergencies
- Crisis resource management

Bachelor in Operation Theatre Technology Fifth Semester
BOTT Directed Clinical Education-I
Subject code – BOT25507
Min. Hrs. - Practical: 240 Hrs.

Students shall be deputed to various labs of OT department wherein they shall undergo practical training of handling patients, collection and processing of investigation of surgical procedures and equipments used.
Identification of patient's particulars based on the available medical records.
Each student is required to maintain a logbook of the various posting. Student's performance shall be evaluated on continuous basis by the faculty concerned.

Bachelor in Operation Theatre Technology Sixth Semester
SPECIALIZED ANESTHESIA AND SURGERY
Subject code – BOT25601
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. Understand specialized anesthesia techniques and surgical procedures.
2. Develop skills in managing complex anesthesia cases.
3. Recognize and manage anesthesia-related complications.
4. Apply knowledge of specialized surgery in OT settings.
5. Integrate advanced anesthesia and surgical skills into healthcare practice.

Course Outcomes:

1. Describe advanced anesthesia techniques.
2. Explain specialized surgical procedures.
3. Understand anesthesia management for complex cases.
4. Identify anesthesia-related complications.
5. Explain post-operative care for specialized surgeries.

Topics to be covered under the subject are as follows:

1. Cardiovascular and Respiratory System- Techniques, equipment, procedures and instruments
    a. Diseases of cardiovascular and respiratory systems.
    b. Types of perfusion machines.
    c. Techniques of Perfusion and operational capabilities.
    d. Intra-aortic Balloon pump.
    e. Cell saver techniques.
    f. Care, maintenance and working of Heart lung Machine.
    g. Patient's record keeping preoperatively, during anesthesia and post-operatively.
    h. Principles and techniques of temperature monitoring. i. Positioning during cardiothoracic surgical procedures.
    j. Positioning and techniques for:
        a) Radial artery cannulation
        b) Central venous cannulation/pulmonary artery catheter
        c) Femoral artery/venous cannulation
2. Monitoring Techniques and Equipment:
    a. Cardiac monitors, blood pressure and ECG monitoring
    b. Respiratory monitors, respiratory rate, Spirometers, Sp02, and EtC02.
    c. Temperature monitors.
    d. TEE and echocardiography machine
    e. Non- invasive cardiac output machine
3. Positioning
    a. During various neurosurgical procedures including sitting, prone, lateral and position for trans-sphenoidal hypo-physectomy.
    b. Fixation of head during various neurosurgical procedures.
    c. Prone and Knee chest position for spine surgery.
4. Requirements during intubation in a case of cervical spine fracture including fiber- optic laryngoscopy, awake intubation, LMA family especially ILMA.
5. Anaesthetic and surgical requirements during aneurysm surgery.

6. Surgical and Anaesthetic requirements during micro neurosurgery including types of microscopes, principle, structural features, microscopic photography and cameras used.
8. Anaesthetic and surgical requirements during abdominal surgery including Laproscopic surgery, genitourinary surgery including percutaneous nephrolithotomy, Endoscopic surgery, TURP, TURBT, Lithotripsy, ESWL (Extracorporeal shock wave therapy)
9. Anaesthetic and surgical requirement during renal transplant donor and recipient surgery including care and precautions during operative procedures of hepatitis B & hepatitis C positive patients.
10. Anaesthetic and surgical requirement during pediatric and Neonatal surgical procedures including emergency procedures like tracheo-esophageal fistula. Sub diaphragmatic hernia, major abdominal and thoracic procedures;Foreign body bronchus and esophagus.
11. Apparatus and techniques for measuring blood pressure and temperature.
12. Principle and working of direct/Indirect blood pressure monitoring apparatus.
13. Intraoperative and postoperative problems and complications of general surgery.
14. Management of emergency caesarean section.
15. Management of massive obstetrical hemorrhage.
16. Surgical management in major burns and craniofacial surgery.
17. Surgical management of joint replacement and arthroscopy.
18. Surgical management of endoscopies, laryngectomy with RND and cochlear implant.
19. Management of PPV and perforating eye injury.
20. Care and maintenance of Para-surgical equipment (Cautery, OT Lights, OT Table etc.)

Bachelor in Operation Theatre Technology Sixth Semester
ELECTRONICS AND TECHNOLOGY IN SURGERY AND ANESTHESIA
Subject code – BOT25602
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. Understand electronic principles in surgical and anesthesia equipment.
2. Develop skills in operating and troubleshooting medical devices.
3. Recognize safety protocols for electronic equipment.
4. Apply knowledge of technology in surgical and anesthesia settings.
5. Integrate electronic and technological skills into healthcare practice.

Course Outcomes:

1. Describe electronic principles (e.g., circuit analysis, microprocessors).
2. Explain medical device technology (e.g., anesthesia machines, ventilators).
3. Understand safety standards for electronic equipment.
4. Identify medical device classification and regulations.
5. Explain telemedicine and robotic surgery concepts.

Topics to be covered under the subject are as follows:

1. Electronics and electro mechanical techniques
   a. Electrical safety precautions in operation theatre. OT tables, OT lights, suction machines, electrodes, pressure transducers, electrical safety, application, handling operation.
   b. Basic electronics, basic principle, care and maintenance and uses of surgical diathermy machine, defibrillator, Boyle's apparatus, anesthesia machine, monitors, pace-makers and stimulators etc.
   c. Engineering aspects of operation theatre equipment, power supplies, CVT, servostabilizers, and ups etc.

2. Book keeping and Stock maintenance.
   a. Moral aspects and duties of OT technologist.
   b. Indenting, Book keeping and storage procedures of different articles.
   c. Co-ordination with all working personal in operation Theatre.
   d. Psychological aspects of patient, staff and relatives of the patient.
   e. Management of operation theatre in routine and emergency.

3. Computer data processing, software information and Data management
   a. Logging on and off, Security concepts, Sending and receiving Emails.
   b. Hospital information system.

Bachelor in Operation Theatre Technology Sixth Semester
BASIC INTENSIVE CARE
Subject code – BOT25603
Min. Hrs. - Theory: 60 Hrs.

Course Objectives:

1. Understand ICU patient management principles.
2. Develop skills in vital sign monitoring and interpretation.
3. Recognize and manage critical care emergencies.
4. Integrate ICU skills into comprehensive patient care.

Course Outcomes:

1. Explain vital sign monitoring (e.g., ECG, BP, SpO2).
2. Understand mechanical ventilation principles.
3. Identify critical care emergencies (e.g., cardiac arrest, sepsis).
4. Explain sedation and analgesia management.

Topics to be covered under the subject are as follows:

1. Care and maintenance of ventilators, suction machine, monitoring devices.
2. Sterilization and disinfection of ventilators.
3. Care, maintenance and operational capabilities of beds, lights and other apparatus.
4. Air conditioning and control of pollution in ICU.
5. Attachment and intraoperative utility of ventilators and monitoring devices.
6, Care of unconscious adult and pediatric patients.
7. Physiotherapy techniques, feeding, Ryle's tube insertion and hyper alimentation.
8. Suctioning and posturing of semiconscious and unconscious patients.
9. Oxygen therapy, maintenance of clear Airway.
10. Ventilation of patient in crisis:
11. Mouth to mouth.
12. Mouth to ET Tube.
13. Resuscitator/ bag valve mask assembly
14. Different types of Airways.
15. Short term ventilation/ Transport ventilators.
16. ICU Laboratory; Detection of blood gases of the patient, Principles of ABG machines
17. Management of asepsis.
18. Management of tetanus patient.
19. Psychological aspects of the patient, relative and staff.
20. Hemofiltration and hemodialysis.
21. Ventilators: Principles of working of different ventilators:
    a. Volume cycled/Time cycled/Pressure cycled ventilators.
    b. High frequency ventilators and other types.
    c. Methods of measuring the expired gases from the patient; Types of spirometers, Principles of working of spirometers; Clinical application of above apparatus
    d. Apparatus and techniques of measuring of blood pressure and temperature; Principle and working of direct/indirect blood pressure monitoring apparatus; structure, principle and working of the oscillotonometer. Principles and working of aneroid manometer type B.P. instrument.
    e. Laryngeal sprays; Types, material, principle and mechanism.
    f. Monitoring techniques and equipment; Cardiac monitors, Respiratory monitors, Spirometers, Temperature monitors.

Bachelor in Operation Theatre Technology Sixth Semester
SPECIALIZED SURGERY AND ANESTHESIA
Subject code – BOT25604
Min. Hrs. - Practical: 60 Hrs.

Course Objectives:

1. Understand specialized anesthesia techniques and surgical procedures.
2. Develop skills in managing complex anesthesia cases.
3. Recognize and manage anesthesia-related complications.
4. Apply knowledge of specialized surgery in OT settings.
5. Integrate advanced anesthesia and surgical skills into healthcare practice.

Course Outcomes:

1. Describe advanced anesthesia techniques.
2. Explain specialized surgical procedures.
3. Understand anesthesia management for complex cases.
4. Identify anesthesia-related complications.
5. Explain post-operative care for specialized surgeries.

Topics to be covered under the subject are as follows:

1. Anesthesia Techniques
- - TIVA
- - Regional Anesthesia
- - Pediatric/Geriatric Anesthesia

2.Surgical Procedures

- - Neurosurgery
- - Cardiothoracic Surgery
- - Orthopedic/Vascular Surgery
- - Laparoscopic Surgery

3. Complication Management

4. Case Presentations
5. Clinical Rotations

Bachelor in Operation Theatre Technology Sixth Semester
ELECTRONICS AND TECHNOLOGY IN SURGERY AND ANESTHESIA
Subject code – BOT25605
Min. Hrs. - Practical: 60 Hrs.

Course Objectives:

1. Understand electronic principles in surgical and anesthesia equipment.
2. Develop skills in operating and troubleshooting medical devices.
3. Recognize safety protocols for electronic equipment.
4. Apply knowledge of technology in surgical and anesthesia settings.
5. Integrate electronic and technological skills into healthcare practice.

Course Outcomes:

1. Describe electronic principles (e.g., circuit analysis, microprocessors).
2. Explain medical device technology (e.g., anesthesia machines, ventilators).
3. Understand safety standards for electronic equipment.
4. Identify medical device classification and regulations.
5. Explain telemedicine and robotic surgery concepts.

Topics to be covered under the subject are as follows:

1. OT Equipment Handling
   - OT tables, lights, suction machines
   - Anesthesia machines, ventilators
2. Electrical Safety & Troubleshooting
   - Electrical safety protocols
   - Equipment maintenance
3. Book Keeping & Stock Maintenance
   - Indenting, storage, inventory management
4. Computer Data Processing
   - Basic computer operations
   - Hospital Information System (HIS)
5. Project Presentation

Bachelor in Operation Theatre Technology Sixth Semester
BASIC INTENSIVE CARE
Subject code – BOT25606
Min. Hrs. - Practical: 60 Hrs.

Course Objectives:

1. Understand ICU patient management principles.
2. Develop skills in vital sign monitoring and interpretation.
3. Recognize and manage critical care emergencies.
4. Apply knowledge of life-support systems.
5. Integrate ICU skills into comprehensive patient care.

Course Outcomes:

1. Describe ICU patient assessment and management.
2. Explain vital sign monitoring (e.g., ECG, BP, SpO2).
3. Understand mechanical ventilation principles.
4. Identify critical care emergencies (e.g., cardiac arrest, sepsis).
5. Explain sedation and analgesia management.

1. ICU Equipment Handling
   - Ventilators
   - Monitoring devices
   - Suction machines
2. Life-Support Systems
   - Mechanical ventilation
   - Oxygen therapy
   - Defibrillator operation
3. Patient Care
   - Vital sign monitoring
   - Sedation/analgesia management
   - Airway management
4. Respiratory Therapy
   - Oxygen therapy
   - Ventilator setup
5. Cardiovascular Management
   - ECG interpretation
   - Blood pressure monitoring
6. Specialized Procedures
   - Hemofiltration/hemodialysis
   - Tetanus patient management
   - CPR/bag-valve-mask

Bachelor in Operation Theatre Technology Sixth Semester
BOTT Directed Clinical Education-II
Subject code – BOT25607
Min. Hrs. - Practical: 240 Hrs.

- Patient handling (pre-operative, transfer, positioning, post-operative care)
- Surgical procedures (observation, assistance, instrument handling, sterilization)
- Equipment handling (anesthesia machines, ventilators, monitoring devices)
- Investigation collection and processing (blood, urine, tissue sampling)
- Monitor patients (vital signs, ECG interpretation, blood gas analysis)
- Perform critical care procedures (oxygen therapy, ventilator management, medication administration)
- Patient particulars
- Surgical procedures
- Equipment usage and maintenance
- Reflections on learning experiences