IK Gujral Punjab Technical University
B.Sc (Operation Theatre Technology) Batch 2019 Onwards

First Semester

Course Code	Course type	Course title	Load allocation			Marks distribution		Total Marks	Credits
			L	T	P	Int.	Ext.		
BSOT101-19	Core Theory	Human Anatomy and Physiology – 1	3	1	0	40	60	100	4
BSOT102-19	Core Theory	Applied Biochemistry	3	1	0	40	60	100	4
BTHU103-18	Core Theory	Communication Skills	3	1	0	40	60	100	4
BSOT103-19	Core Practical	Human Anatomy and Physiology – 1 (Practical)	0	0	4	40	60	100	2
BSOT104-19	Core Practical	Applied Biochemistry (Practical)	0	0	4	40	60	100	2
BTHU104-18	Core Practical	Communication Skills (Practical)	0	0	4	40	60	100	2
BSOT105-19	AECC	Medical Law and Ethics	2	0	0	40	60	100	2
BSOT106-19	AECC	Medical Terminology, Record keeping and Orientation to Operation theatre Technology and Management	2	0	0	40	60	100	2
HVPE101-18	AECC	Human Values, De-addiction and Traffic Rules	3	0	0	40	60	100	3
HVPE102-18	AECC	Human Values, De-addiction and Traffic Rules (Lab/ Seminar)	0	0	1	25	--**	25	1
BMPD102-18		Mentoring and Professional Development	0	0	2	25	--**	25	1
		Total	15	03	14	420	480	900	25

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

IK Gujral Punjab Technical University
B.Sc (Operation Theatre Technology) Batch 2019 Onwards

Second Semester

Course Code	Course type	Course title	Load allocation			Marks distribution		Total Marks	Credits
			L	T	P	Int.	Ext.		
BSOT201-19	Core Theory	Human Anatomy and Physiology – 2	3	1	0	40	60	100	4
BSOT202-19	Core Theory	Applied Microbiology	3	1	0	40	60	100	4
BSOT203-19	Core Theory	Quality Management, Patient safety and Disaster management	3	1	0	40	60	100	4
BSOT204-19	Core Practical	Human Anatomy and Physiology – 2 (Practical)	0	0	4	40	60	100	2
BSOT205-19	Core Practical	Applied Microbiology (Practical)	0	0	4	40	60	100	2
BSOT206-19	Core Practical	Quality Management, Patient safety and Disaster management (Practical)	0	0	4	40	60	100	2
EVS102-18	AECC	Environmental Sciences	2	0	0	40	60	100	1
BSOT207-19	AECC	Nursing procedures	2	0	0	40	60	100	2
BSOT208-19	AECC	Applied Physics	1	1	0	25	50	75	2
BMPD202-18		Mentoring and Professional Development	0	0	2	25	--	25	1
Total			14	04	14	370	530	900	24

IK Gujral Punjab Technical University
B.Sc (Operation Theatre Technology) Batch 2019 Onwards

3rd Semester

Course Code	Course type	Course title	Load allocation			Marks distribution		Total Marks	Credits
			L	T	P	Int.	Ext.		
BSOT301-19	Core Theory	Equipment in OTs – Care & Maintenance	3	1	0	40	60	100	4
BSOT302-19	Core Theory	Principles of Anaesthesia	3	1	0	40	60	100	4
BSOT303-19	Core Theory	Sterilization, disinfection and CSSD procedures	3	1	0	40	60	100	4
BSOT304-19	Core Practical	Equipment in OTs and ICUs – Care & Maintenance	0	0	4	40	60	100	2
BSOT305-19	Core Practical	Principles of Anaesthesia (Practical)	0	0	4	40	60	100	2
BSOT306-19	Core Practical	Sterilization and disinfection in OTs (Practical)	0	0	4	40	60	100	2
BSOT307-19	AECC	Antibiotic resistance and antibiotic Policy	2	0	0	40	60	100	1
BSOT308-19	AECC	Medicine Outline	2	0	0	40	60	100	2
BSOT309-19	AECC	Clinical Pharmacology	1	1	0	25	50	75	2
BMPD202-18		Mentoring and Professional Development	0	0	2	25	--	25	1
Total			14	04	14	370	530	900	24

IK Gujral Punjab Technical University
B.Sc (Operation Theatre Technology) Batch 2019 Onwards

4th Semester

Course Code	Course type	Course title	Load allocation			Marks distribution		Total Marks	Credits
			L	T	P	Int.	Ext.		
BSOT401-19	Core Theory	Basic Surgical procedures	3	1	0	40	60	100	4
BSOT402-19	Core Theory	Transfusion Medicine	3	1	0	40	60	100	4
BSOT403-19	Core Theory	Basic Anaesthesia Procedures	3	1	0	40	60	100	4
BSOT404-19	Core Practical	Basics Surgical procedures (Practical)	0	0	4	40	60	100	2
BSOT405-19	Core Practical	Transfusion Medicine (Practical)	0	0	4	40	60	100	2
BSOT406-19	Core Practical	Basic Anaesthesia procedures (Practical)	0	0	4	40	60	100	2
BSOT407-19	AECC	Clinical Hematology	2	0	0	40	60	100	1
BSOT408-19	AECC	Clinical Pathology	2	0	0	40	60	100	2
BSOT409-19	AECC	Biomedical Waste Management	1	1	0	25	50	75	2
BMPD202-18		Mentoring and Professional Development	0	0	2	25	--	25	1
Total			14	04	14	370	530	900	24

Human Anatomy and Physiology– I (Theory)

Code : BSOT101-19

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

Topics:

Module-1

1. Introduction to human Anatomy and Physiology
2. Cell and cell organelles
   - 2.1 Structure and classification
   - 2.2 Function
   - 2.3 Cell division (Mitosis and Meiosis)
3. Tissues
   - 3.1 Definition
   - 3.2 Classification with structure and Functions
     - 3.2.1 Epithelial tissues
     - 3.2.2 Connective tissues
     - 3.2.3 Muscular tissues
     - 3.2.4 Nervous tissue

Module-2

4. Blood
   - 4.1 Composition
   - 4.2 Function of blood
5. Muscular skeletal system
   - 5.1 Introduction
   - 5.2 Classification
   - 5.3 Structure and function of skeletal system, muscles and joints
   - 5.4 Various movements of body

Module-3

6. Respiratory system
   - 6.1 Introduction
   - 6.2 Structure
   - 6.3 Function
   - 6.4 Mechanism of breathing and respiration
   - 6.5 Various terms involved in respiratory System
     - 6.5.1 Vital capacity
     - 6.5.2 Total Volume
     - 6.5.3 Reserve volume
     - 6.5.4 Total lung capacity

Module-4

7. Cardiovascular system
   - 7.1 Anatomy and physiology of heart
   - 7.2 Blood circulation
   - 7.3 Arteries and veins
   - 7.4 Conductive system of heart
   - 7.5 Cardiac cycle
   - 7.6 Introduction to ECG
8. Lymphatic system
   - 8.1 Introduction
   - 8.2 Structure and function
     - 8.2.1 Lymph nodes
     - 8.2.2 Spleen
     - 8.2.3 Thymus gland, Tonsils

Suggested readings:

1. Anatomy & Physiology- Ross and Wilson
2. Anatomy and Physiology: Understanding the Human Body by Clark
3. Anatomy and Physiology for nurses by Evelyn Pearce
4. Anatomy and Physiology for nurses by Sears
5. Anatomy and Physiology for nurses by Pearson
6. Anatomy and Physiology by N Murgesh

Applied Biochemistry

Subject Code: BSOT102-19

Rationale: Students will be able to learn the terminology of the subject and basic knowledge of basic chemistry and biochemistry involved in physiology of human body. Theywill be able to understand the reports generated by laboratory and shall be able to convey the surgeon about any critical alert.

Topics:

Module-1

1. Nomenclature of compounds containing halogen, alcohols and phenols. Ethane, Propane, Ether, aldehydes, Ketones, Carboxylic acid, Cyanides Isocyanides, Nitrogen compounds and amines.
2. Nature of radiation and radioactive substances
3. Catalysis
4. Amino-acids, peptides, proteins and enzymes

Module-2

5. Haemoglobin, blood and respiration
6. Vitamins and hormones
7. Carbohydrate metabolism
8. Brief knowledge about “Disturbances of carbohydrate metabolism, glucose tolerance test, diabetic ketosis, insulin tolerance, abnormal sugar in urine”.

Module-3

9. Protein metabolism
10. Disturbances of protein and nitrogen metabolism
11. Fat metabolism, its disorders, ketosis and high plasma cortisol
12. Disorders of liver and bilirubin metabolism, plasma bilirubin
13. Liver function test

Module-4

14. Calcium, phosphorous, sodium and potassium in the body, their significance and general precautions
15. Renal function tests
16. Disturbance in water and sodium metabolism
17. Acid-base equilibrium
18. Blood gases

Communication Skills

Subject Code: BTHU103-18

Rationale: The students will be able to appreciate communication skills as these are important to everyone - those are how we give and receive information and convey our ideas and opinions with those around us. The topic shall also include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient) which is an important part of their individual contribution to the success of an organization. These skills can include social graces, communication abilities, language skills, personal habits, cognitive or emotional empathy, and leadership traits. The organisations with trained soft skill staff are more successful. Hence in addition to standard qualification the students trained with this course will be able to deal with patients, their fellows and seniors, face to face, in a better way.

Topics:

Module-1

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills with focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.

Module-2

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

Module-3

5. Special characteristics of health communication
6. Types & process of communication
7. Barriers of communication & how to overcome

Module-4

8. Soft Skills - with important sub-elements:
    a. Communication Styles
    b. Team work
    c. Leadership Skills
    d. Effective & Excellent Customer Service
    e. Decision Making & Problem Solving
    f. Managing Time and Pressures
    g. Self-Management & Attitude

Suggested readings:

1. Effective Communication and Soft Skills by Nitin Bhatnagar Pearson Education India, 2011
2. Communication N Soft Skills Paperback – 2014 by Niraj Kumar, Chetan Srivastava

Human Anatomy and Physiology – I (Practical)

Code : BSOT103-19

Human Anatomy & Physiology – Practical

1. Demonstration of various parts of body
2. Demonstration of cell and tissues of body
3. Demonstration of parts of respiratory system
4. Demonstration of various parts of circulatory system
5. Examination of blood film for various blood cells from stained slides
6. Blood pressure estimation
7. Demonstration of structural differences between skeletal, smooth and cardiac muscles
8. Demonstration of various bones and joints
9. To study circulatory system from charts and transverse section (TS) of artery and vein

Note: Demonstrations can be done with the help of models, charts and histological slides

Applied Biochemistry (Practical)

Subject Code: BSOT104-19

1. To practice Blood sample collection as per sample draw pattern
2. To visit Clinical biochemistry laboratory observe and learn about:
    a. What tests are being performed in clinical biochemistry laboratory?
    b. Basics of various routine laboratory tests performed e.g.
        i. determination of blood sugar levels
        ii. Liver function tests
        iii. Renal function tests
        iv. Urine sugar and protein level
3. To understand briefly the interpretation of various tests report
4. To know about critical alerts
5. To visit Blood Gas Analysis laboratory and learn to analyse blood gases

Communication skills (Practical)

Subject Code: BTHU104-18

Rationale: To develop communication skills of a graduate technician by emphasizing on writing, speaking & listening skills.

1. Précis writing and simple passage from a prescribed text books. Atleast100 words should be chosen and few questions from the passage may be said to answer.
2. Speaking skill testing: Giving as small topic and to speak for at least two minutes on it.
3. Group discussion on profession related topics
4. To practice all forms communication i.e.
    a. drafting report,
    b. agenda notes,
    c. précis writing,
    d. E. mail drafting,
    e. circular,
    f. representations,
    g. press release,
    h. telephonic communication,
    i. practice of writing resume and
    j. Writing application of employment.
5. Organising a mock interview
6. Locate a specified book in the library Find out some words in the dictionary Pronunciation, stress and intonation Give abbreviations of particular words and vice-versa Give meaning of some words Spell some words Practice of handling some communication system like telephone and noting down and conveying message

Medical Law and Ethics

Subject Code : BSOT105-19

Rationale: Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice. Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors and Allied Healthcare professionals are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.

Topics

Module-1

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics – Confidentiality

Module-2

4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia

Module-3

7. Organ transplantation
8. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.

Module-4

9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.

Medical Terminology, Record keeping and Orientation to Operation theatre Technology and Management

Subject Code: BSOT106-19

Rationale: This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests.

Topics:

Module-1

1. Derivation of medical terms.
2. Define word roots, prefixes, and suffixes.

Module-2

3. Conventions for combined morphemes and the formation of plurals.
4. Basic medical terms.

Module-3

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.

Module-4

9. Orientation to Operation theatre Technology and Management
10. Data entry and management on electronic health record system/Hospital information system (HIS).

HVPE101-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules

Course Objective

This introductory course input is intended

a. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
b. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a naturalway.
c. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

Thus, this course is intended to provide a much needed orientational input in Value Education to the young enquiring minds.

Course Methodology

- The methodology of this course is universally adaptable, involving a systematic and rational study of the human being vis-à-vis the rest of existence.
- It is free from any dogma or value prescriptions.
- It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as proposal and the students are facilitated to verify it in their own right based on their Natural Acceptance and Experiential Validation.
- This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and within the student himself/herself finally.
- This self-exploration also enables them to evaluate their pre-conditionings and present beliefs.

HVPE101-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules

Total no. of Lectures: 28 [L-T-P: 3-0-0]

Content for Lectures:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

[6]

1. Understanding the need, basic guidelines, content and process for Value Education
2. Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

[6]

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
8. Understanding the needs of Self ('I') and 'Body' - *Sukh* and *Suvidha*
9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in 'I'
11. Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensure *Sanyam* and *Swasthya*
    - Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

[6]

13. Understanding harmony in the Family- the basic unit of human interaction
14. Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*;
    Trust (*Vishwas)* and Respect (*Samman)* as the foundational values of relationship

15. Understanding the meaning of *Vishwas*; Difference between intention and competence
16. Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship
17. Understanding the harmony in the society (society being an extension of family): *Samadhan, Samridhi, Abhay, Sah-astitva* as comprehensive Human Goals
18. Visualizing a universal harmonious order in society- Undivided Society (*Akhand Samaj),* Universal Order (*Sarvabhaum Vyawastha)*- from family to world family!

- Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

[4]

19. Understanding the harmony in the Nature
20. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
21. Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space
22. Holistic perception of harmony at all levels of existence

- Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

[6]

23. Natural acceptance of human values
24. Definitiveness of Ethical Human Conduct
25. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
26. Competence in professional ethics:

a) Ability to utilize the professional competence for augmenting universal human order,

b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,

c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

27. Case studies of typical holistic technologies, management models and production systems
28. Strategy for transition from the present state to Universal Human Order:

a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers

b) At the level of society: as mutually enriching institutions and organizations

Text Book

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

Reference Books

1. Ivan Illich, 1974, *Energy & Equity,* The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
3. A Nagraj, 1998, *Jeevan Vidya ek Parichay,* Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, *How the Other Half Dies,* Penguin Press. Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Purblishers.
6. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.
7. Subhas Palekar, 2000, *How to practice Natural Farming,* Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limits to Growth – Club of Rome's report*, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, *Fundamentals of Ethics for Scientists & Engineers ,* Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, *Engineering Ethics (including Human Values)*, Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, *Foundations of Ethics and Management,* Excel Books.
12. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, *http://uhv.ac.in*

2. Story of Stuff, *http://www.storyofstuff.com*

3. Al Gore, *An Inconvenient Truth*, Paramount Classics, USA

4. Charlie Chaplin, *Modern Times*, United Artists, USA

5. IIT Delhi, *Modern Technology – the Untold Story*

HVPE102-18	**Ability Enhancement Compulsory Course (AECC)**	**Human Values, De-addiction and Traffic Rules (Lab/ Seminar)**

One each seminar will be orgnizied on Drug De-addiction and Traffic Rules. Eminent scholar and experts of the subject will be called for the Seminar atleast once during the semester. It will be binding for all the students to attend the seminar.

Mentoring and Professional Development

The objective of mentoring will be development of:

1. Overall Personality
2. Aptitude (Technical and General)
3. General Awareness (Current Affairs and GK)
4. Communication Skills
5. Presentation Skills
6. The course shall be split in two sections i.e. outdoor activities and class room activities. For achieving the above, suggestive list of activities to be conducted are:

Part – A (Class Activities)

1. Drug De-addiction
    a. Drugs and their misuse
    b. Addictive Drugs
    c. Their harmful effects on human body and society
    d. Motivational talks of Psychologists and/or Drug De-addiction counsellor.
    e. Awareness regarding de-addiction
2. Traffic rules
    a. To learn various traffic rules in India
    b. Importance of patience while driving
    c. How traffic rules are beneficial
    d. To arrange a lecture from traffic police expert on accidents
3. Expert and video lectures
4. Aptitude Test
5. Group Discussion
6. Quiz (General/Technical)
7. Presentations by the students
8. Team building Exercises
9. Basic exercises on Computers are also added as per Annexure-I

Part – B (Outdoor Activities)

1. Sports/NSS/NCC
2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.

Evaluation shall be based on rubrics for Part – A & B. Mentors/Faculty incharges shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.

Human Anatomy and Physiology– II (Theory)

Code : BSOT201-19

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

Module-1

1. Structure and function of sense organ
   1.1 Eye
   1.2 Ear
   1.3 Nose
   1.4 Tongue
2. Body fluids and their significance: Important terms, types of body fluid, total body water, avenues by which water leaves and enters body, general principles for fluid balance, cardinal principle, How body fluids maintain Homeostasis, Electrolytes & ions Function of electrolytes, How electrolyte imbalance leads to fluid imbalance

Module-2

3. Digestive system: Organization; accessory organs; structure & function (Mouth, Tongue, Teeth, Oesophagus, Pharynx, Stomach, Intestine, Rectum, Anus); Digestive glands; physiology of digestion of carbohydrates, lipids & proteins
4. Liver: structure and function

Module-3

5. Urinary system: Main parts, Structure & function of kidney, structure of nephron, physiology of excretion & urine formation, urine, additional excretory organs
6. Genital system: Structure of male and female reproductive system, Gametogenesis in male & female, menstrual cycle. Placenta and extra embryonic membranes.

Module-4

7. Nervous system: Parts, function & structure; brain, spinal cord, spinal & cranial nerves; all & none principle, role of neurotransmitters in transmission of nerve impulse
8. Endocrine system: Endocrine & exocrine glands, their location, structure & functions

Suggested readings:

1. Anatomy & Physiology- Ross and Wilson
2. Anatomy and Physiology: Understanding the Human Body by Clark
3. Anatomy and Physiology for nurses by Evelyn Pearce
4. Anatomy and Physiology for nurses by Sears
5. Anatomy and Physiology for nurses by Pearson
6. Anatomy and Physiology by N Murgesh

Applied Microbiology

Subject code : BSOT202-19

Module-1

1. Morphology and Classification of microorganisms, size, shape and structure of bacteria. Vegetative and spore forms of microbes,
2. Sterilization and Disinfection :
    a. Definitions and differences
    b. Principles and use of various sterilizers namely hot air oven, different types of autoclaves and their working principles, Ethylene tetra oxide (ETO) sterilization and Radiation sterilisation.
3. Efficacy testing to sterilizers
4. Types of Disinfectants used and Disinfection procedures performed in operation theatre
5. Efficacy testing of disinfectants – Brief knowledge

Module-2

6. To visit clinical microbiology laboratory with at least one week posting and to observe/understand:
    a. Use of microscope in the study of bacteria.
    b. Culture media and its use in diagnostic bacteriology.
    c. Antimicrobial sensitivity testing with special reference to understanding the AST report and critical alerts associated with it.
    d. Immunity, vaccines, types of vaccines and immunization schedule, principles and interpretation of common serological tests namely Widal, VDRL, ASLO, CRP, and Rheumatoid Factor. Rapid tests for HIV, HCV and HBsAg (excluding technical details).
    e. Systematic Bacteriology : Morphology, diseases caused, sample collectionand transportation for laboratory diagnosis of microbiological investigations.
    f. To understand briefly about Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, E. coli, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas & Spirochetes.

Module-2

7. Hospital acquired infections:
    a. Definition, types, routes of infections.
    b. Air and water bacteriology
    c. Hand washing and scrubbing : Importance and methods
    d. Role of Operation theatre Technologist in reducing hospital acquired infections.

Module-3

8. Parasitology a. Morphology, life cycle, and sample collection for laboratory diagnosis of following parasites:
    a. E. histolytica,

b. Plasmodium,
c. tape worms, and
d. Intestinal nematodes.

Module-4

9. Mycology : Morphology, diseases caused and sample collection for lab diagnosis of following fungi:
    a. Candida,
    b. Cryptococcus,
    c. Dermatophytes, and
    d. opportunistic fungi

Module-5

10. Virology
    a. General properties of viruses, diseases caused.
    b. and sample collection for lab diagnosis and prevention of following viruses:
        i. Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.

Quality Management, Patient safety and Disaster management

Subject code: BSOT203-19

Rationale: The course will help students to understand the basic concepts of quality health Care and develop skills to implement sustainable quality assurance, Quality control and Quality improvement program in the healthcare system particularly in Operation theatre services. They shall be prepared to work in healthcare system primarily taking care of patient safety. By learning Biomedical Waste management they will help prevent harm to workers, property, the environment and the general public from hazardous and infectious waste. While living on this earth humans and all other living creatures may face many types of natural and manmade disasters. Some contents of this subject are focussed on preparing the students to deal with healthcare requirement during these disasters and help the life.

Topics:

Module-1

1. Quality management system (QMS) :
    a. Understanding Quality and components of QMS i.e. Quality assurance, Quality control and Quality improvement.
    b. The basic concepts of quality in health Care
    c. Standards and Norms
    d. Quality Improvement Tools
    e. Introduction to NABH guidelines
    f. Implementation of QMS in Operation theatres

Module-2

2. Basics of emergency care and life support skills:
    a. Vital signs and primary assessment
    b. Basic emergency care – first aid and triage
    c. Basic life support (BLS) following cardiac arrest.
    d. Fundamental aspects of BLS including immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system,
    e. Initial recognition and response to heart attack and stroke.
    f. Ventilations including use of bag-valve-masks (BVMs) d. Choking, rescue breathing methods e. One- and Two-rescuer CPR
    g. Early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED).
    h. Managing an emergency including moving a patient
    i. Testing student's skills with focus on airways management and chest compressions.

At the end of the foundation course, each student should be able to perform and execute/operate on the above mentioned modalities.

Module-3

3. Bio medical waste management (BWM) and environment safety:
    a. Definition of Biomedical Waste
    b. Waste minimization
    c. Types of waste generated in an operation theatre and in general in a hospital i.e. Liquid waste, Solid waste, Sharpe waste, Infectious waste, Anatomical waste, Hazardous waste like Radioactive waste, Metals, Chemicals and Drug waste etc.
    d. BMW Management as per central pollution control board rules and regulations effective from time to time
    e. Advances in BWM.
    f. Disinfection and common disinfectants used in an operation theatre including hand disinfectants.
    g. Use of Personal protective equipment (PPE)
    h. Monitoring & controlling of cross infection (Protective devices)
    i. Segregation at source (including color coding), collection, transportation, treatment and disposal of BMW.

Module-4

4. Infection prevention and control:
    a. Evidence-based infection control principles and practices such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE),
    b. Prevention & control of common healthcare associated infections
    c. Components of an effective infection control program, and
    d. Guidelines of NABH and in-house committees like Hospital Infection Control committee and Infection control team – Understanding and implementation of their decisions.

5. Antibiotic Resistance:
    a. Introduction to antibiotics
    b. Basic knowledge of:
        i. Antibiotic resistance
        ii. How Resistance Happens and Spreads
        iii. Types of resistance- Intrinsic, Acquired, Passive
        iv. Trends in Drug Resistance
        v. Actions to Fight Resistance
        vi. Bacterial persistence
        vii. Consequences of antibiotic resistance
    c. Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals

Module-5

6. Disaster preparedness and management
        a. Natural and manmade disasters

b. Impacts of disasters
c. Fundamentals of emergency management,
d. Psychological impact management,
e. Resource management,
f. Preparedness and risk reduction,
g. Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

7. Role of Operation theatre Technologist in Disaster preparedness and management
8. Fire safety in healthcare setup

Human Anatomy and Physiology – II (Practical)

Code : BSOT204-19

Human Anatomy & Physiology – Practical

1. Human Anatomy & Physiology-II (Practical)

1. Demonstration of parts of digestive system
1. Demonstration of parts of skin
2. Demonstration of parts of excretory system
3. Demonstration of various parts of nervous system (brain and spinal cord)
4. Structure of eye and ear
5. Demonstration of reflex action
6. Demonstration of various parts of human reproductive system
7. To study digestive system from charts and TS of liver, spleen and pancreas from permanent slides.
8. Study of Urinary system
9. Study of Genital system (male & female) from charts and TS of testis and ovaries
10. To study nervous system
11. To study various body fluids.

Note: Demonstrations can be done with the help of models, charts and histological slides

Applied Microbiology (Practical)

Subject Code: BSOT205-19

1. To visit clinical microbiology laboratory with at least one week regular posting and to observe/understand:
    a. Use of microscope in the study of bacteria.
    b. Culture media and its use in diagnostic bacteriology.
    c. Antimicrobial sensitivity testing (AST) with special reference to understanding the AST report and critical alerts associated with it.
2. To prepare different material for sterilization in autoclave
3. To operate autoclave and hot air ovens
4. To prepare different material for sterilization in hot air oven
5. To perform disinfection procedures for hard surfaces and aerial decontamination
6. Visit to OT with a bacteriologist to understand role of microbiological testing of air, water and surfaces during routine and outbreak surveillance.

Quality Management, Patient safety and Disaster management (Practical)

Subject code: BSOT206-19

1. To discuss and demonstrate various Medical terminologies to assess whether the student understand them.
2. To discuss and demonstrate various diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.

h. To visit different operation theatres and demonstrate:
   i. Design of various OTs
   ii. Different marks on floor and their meanings
   iii. Demonstrate various equipment used in OTs
   iv. Personnel Protective equipment
   v. Do's and Don'ts in OTs
   vi. Responsibilities of OT technologists
   vii. Differences between their and nursing professionals responsibilities
   viii. Their specific roles in assisting the surgeries
   ix. Measures to reduce hospital acquired infections and microbiological requirements related to reduction of HAIs.

3. To demonstrate documentation as per requirement of NABH especially:
   a. Quality manual, Procedures, other manuals, SOPs and formats
   b. Calibration and validation of equipment
   c. Health and hygiene requirements like vaccination
   d. Exposure to requirements related to internal and external audits by NABH assessors
   e. Preservation and transportation of various clinical samples to respective laboratories
4. Data entry and management on electronic health record system/Hospital information system (HIS) regarding"
   i. Reception of patient in OT
   ii. Pre-surgical procedures
   iii. Procedures to be performed
   iv. Post-surgical procedures

Environment Studies

Subject code: EVS102-18

Course Outcomes:

1. Students will enable to understand environmental problems at local and national level through literature and general awareness.
2. The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various environmental Issues.
3. The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore the possibilities to mitigate these problems.
4. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world

UNIT-1: Introduction to Environmental Studies

Multidisciplinary nature of Environmental Studies: Scope & Importance

Need for Public Awareness

UNIT-2: Ecosystems

Concept of an Ecosystem: Structure & functions of an ecosystem (Producers, Consumers & Decomposers)

Energy Flow in an ecosystem: Food Chain, Food web and Ecological Pyramids

Characteristic features, structure & functions of following Ecosystems:

- Forest Ecosystem
- Aquatic Ecosystem (Ponds, Lakes, River & Ocean)

UNIT-3: Natural Resources

Renewable & Non-renewable resources

Forest Resources: Their uses, functions & values (Biodiversity conservation, role in climate change, medicines) & threats (Overexploitation, Deforestation, Timber extraction, Agriculture Pressure), Forest Conservation Act

Water Resources: Their uses (Agriculture, Domestic & Industrial), functions & values, Overexploitation and Pollution of Ground & Surface water resources (Case study of Punjab), Water Conservation, Rainwater Harvesting,

Land Resources: Land as a resource; Land degradation, soil erosion and desertification

Energy Resources: Renewable & non-renewable energy resources, use of alternate energy resources (Solar, Wind, Biomass, Thermal), Urban problems related to Energy

UNIT-4: Biodiversity & its conservation

Types of Biodiversity: Species, Genetic & Ecosystem

India as a mega biodiversity nation, Biodiversity hot spots and biogeographic regions of India

Examples of Endangered & Endemic species of India, Red data book

UNIT-5: Environmental Pollution & Social Issues

Types, Causes, Effects & Control of Air, Water, Soil & Noise Pollution

Nuclear hazards and accidents & Health risks

Global Climate Change: Global warming, Ozone depletion, Acid rain, Melting of Glaciers & Ice caps, Rising sea levels

Environmental disasters: Earthquakes, Floods, Cyclones, Landslides

UNIT-6: Field Work

Visit to a National Park, Biosphere Reserve, Wildlife Sanctuary

Documentation & preparation of a Biodiversity (flora & fauna) register of campus/river/forest

Visit to a local polluted site : Urban/Rural/Industrial/Agricultural

Identification & Photography of resident or migratory birds, insects (butterflies)

Public hearing on environmental issues in a village

Suggested Readings:

1. Bharucha, E. Text Book for Environmental Studies. University Grants Commission, New Delhi.
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down to Earth, Centre for Science and Environment (R)
9. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
10. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
11. Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
12. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
13. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
14. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
15. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
16. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
17. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
18. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
19. Survey of the Environment, The Hindu (M)
20. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
21. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
22. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

Nursing Procedures

Subject code : BSOT207-19

Rationale: The students will learn the procedures which are commonly handled by nursing staff, so that in case of any emergency they can be helpful in the working of operation theatre.

Topics:

Module-1

1. Pre-operative preparation of patient and Pre-anaesthetic Check up
2. Transportation techniques of patient in conscious, semi-conscious and unconscious state, to and from operation Theatre
3. Management of pre-operative and post-operative rooms

Module-2

4. Resuscitation techniques along with the management of equipment and drugs.
5. Sterilization in operation theatre
6. Handling sterilized articles in the operation theatre

Module-3

7. Scrubbing techniques
8. Preparation of patients; Aseptic techniques and draping of patient.
9. Injection techniques: Intra muscular and intra venous and insertion of I.V. cannulas.

Module-4

10. Handling of sterilized syringes and needles.
11. Types of suturing material, techniques of stitching and removal of stitches.
12. Positioning of patients for different operations.
13. Handling ventilators and ambo-bags etc

Applied Physics:

Subject code: BSOT208-19

Rationale: The subject will make them capable of understanding the physics involved in working of various instruments used in operation theatres.

Topics:

Module-1

1. Energy: Potential energy and Kinetic energy, Mechanical efficiency, Energy and mass.
2. Density of Gases: Molecular weight, Gram molecular weight. Avogadro number, Molecular agitation, Density.

Module-2

3. Heat: Thermometry, Thermistor, Thermocouple. Heat capacity of gases. Newton's Law of cooling, Convection, Conduction, Thermal Conductivity and Specific heat capacity.

Module-3

4. Pressure: Dalton's Law of partial pressure, Pressure gauges vapour pressure and ambient pressure.
5. Compressed gases, Gas laws and their applications, filling of compressed gases and filling ration.

Module-4

Flow of fluids: Viscosity, Law and laminar flow rate. Turbulent flow pressure loss due to abrupt change in bore of tube. Bernoulli's principle and clinical application of Bernoulli theorem, Diffusion, Osmosis, Law of diffusion, Isotonic solution.

6. Oxidation, combustion, flames, deflagrations. Prevention of explosions.

Mentoring and Professional Development

The objective of mentoring will be development of:

1. Overall Personality
2. Aptitude (Technical and General)
3. General Awareness (Current Affairs and GK)
4. Communication Skills
5. Presentation Skills
6. The course shall be split in two sections i.e. outdoor activities and class roomactivities. For achieving the above, suggestive list of activities to be conducted are:

Part – A (Class Activities)

1. Drug De-addiction
    a. Drugs and their misuse
    b. Addictive Drugs
    c. Their harmful effects on human body and society
    d. Motivational talks of Psychologists and/or Drug De-addiction counsellor.
    e. Awareness regarding de-addiction
2. Traffic rules
    a. To learn various traffic rules in India
    b. Importance of patience while driving
    c. How traffic rules are beneficial
    d. To arrange a lecture from traffic police expert on accidents
3. Expert and video lectures
4. Aptitude Test
5. Group Discussion
6. Quiz (General/Technical)
7. Presentations by the students
8. Team building Exercises
9. Basic exercises on Computers are also added as per

Annexure-IPart – B (Outdoor Activities)

3. Sports/NSS/NCC
4. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club,etc.

Equipment in OTs – Care & Maintenance

Subject code: BSOT301-19

Rationale: The subject will make them capable of understanding the physics involved in working of various instruments used in operation theatres.

Topics: Operation Theatre and Anaesthesia equipment: Theoretical and practical training

Module-1

1. Medical gas supply
    1. Compressed gas cylinders: types, their testing and evaluation
    2. Color coding
    3. Cylinder valves; pin index.
    4. Gas piping system
    5. Recommendations for piping system
    6. Alarms & safety devices.
    7. Scavenging of waste anesthetic gases
    8. Types of compressors, structure and mechanism of various type of gauges.
    9. Liquid oxygen storage and supply system

2. Anesthesia machine
    1. Hanger and yoke system
    2. Cylinder pressure gauge
    3. Pressure regulator: structure of pressure reducing valves. Mechanism of pressure reducing valves, their maintenance and safety checks
    4. Flow meter assembly, maintenance and safety checks
    5. Vaporizers - types, hazards, maintenance, filling and draining, etc.

Module-2

1. Volatile anesthetic agents: Selection of material to be used for containers of the volatile anesthetic agents. Structure of different types of vaporizers. Principles of various vaporizers, their maintenance and safety precautions.
2. Types of circuits: i. Open, semi closed and closed circuits ii. Non-rebreathing valves iii. T-piece circuit and its modifications iv. To and fro-system and circle absorber v. Types of valves used in different circuits. Structure and working of heidbrink's valve, Rubin valve nu-main valve etc.
3. Boyle's Anaesthesia apparatus and other Advanced Anaesthesia machines

Module-3

4. Apparatus and technique of the intravenous injections: Selection of the material used for intravenous injection. Different types of intravenous needles and cannulas. Theoretical study for testing of the toxicity of the materials.

5. 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 endotracheal tubes.
    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, instrument used for spinal and epidural blocks.
    f) Laryngeal sprays: Types, structure and material used, mechanism, uses and their maintenance.

Module-4

A. Armamentarium for Laparoscopic and endoscopic surgery - Care and maintenance of the following:
    a. Camera unit (Sterilizable head and cable, video control unit)
    b. Connector cables from camera to monitor
    c. Video monitor
    d. Light source and Light transmission fiberoptic cable
    e. Insufflators
    f. Carbon dioxide cylinder & pressure regulator valve
    g. Tubing and Luer-lock adapter for carbon dioxide to patient
    h. Suction irrigation apparatus
    i. Cautery machine with cables and foot control
    j. Extension cord
    k. Telescope
    l. Trocars and cannulas
    m. Veress needle
    n. Atraumatic and toothed graspers
    o. Curved dissector
    p. Clip applicator with suitable clips
    q. Dissection hook
    r. Laparoscopic scissors
    s. Suction irrigation cannula
    t. Laparoscopic needle holder
    u. Robotic assisted laparoscopic surgery

B. Latest addition to minimal invasive surgery is Robotic surgery
    a. Robotic systems most commonly used are Da Vinci Si and Da Vinci Xi
    b. Telescopes (0° and 30°), light guide cables, specific 8 mm robotic instrument compatible trocars, robotic working instruments

Principles of Anaesthesia

Subject code: BSOT302-19

Module-1

3. Breathing system (Basic life support (Airway, breathing, circulation) and the equipment used)
    1. General considerations: humidity & heat
    2. Common components - connectors, adaptors, reservoir bags.
    3. Capnography
    4. Pulse oximetry
    5. Methods of humidification.
    6. Classification of breathing system
    7. Mapleson system - a b c d e f
    8. Jackson Rees system, Bain circuit
    9. Non rebreathing valves - Ambo valves
    10. The circle system

Module-2

4. Resuscitation techniques:
    1. Drugs used in CPR
    2. Defibrillators
    3. Advanced life support
5. Face masks & Airway laryngoscopes
    1. Types, sizes
    2. Endotracheal tubes - Types, sizes.
    3. Cuff system MODEL CURRICULUM HANDBOOK OF OPERATION THEATRE TECHNOLOGY (Intellectual property of Ministry of Health and Family Welfare) Page 76 of 95
    4. Fixing, removing and inflating cuff, checking tube position, complications.

Module-3

6. **Principles of Anaesthesia:**
    1. Principles of Anaesthesia
    2. Basics of general Anaesthesia depth, mechanism and intubation
    3. Techniques of general Anaesthesia
    4. Various intravenous and inhalational agents
    5. Regional Anaesthesia, spinal and epidural, posture and drugs.
    6. Local anesthetic agents
    7. Neuro muscular blocking agents
7. Oxygen Administration and Post-operative care of patient:
    1. Principles of oxygen administration along with the apparatus
    2. Care of patient in the recovery room
    3. Post-operative pain: evaluation and management
    4. Types of fluid and therapy
    5. Blood transfusion

Module-4

8. Monitoring
    1. Electrocardiography (ECG)
    2. Pulse oximetry (Sp02)
    3. Temperature- central and peripheral
    4. End tidal carbon dioxide (EtCO2)
    5. Anesthesia gas monitoring
    6. Non-invasive blood pressure (NIPB) and Invasive blood pressure (IBP)
    7. Central venous pressure (CVP)
    8. PA Pressure, LA Pressure & cardiac output
    9. Anesthesia depth monitor
    10. Neuromuscular transmission monitor
9. Preparation of Anaesthesia machine and patient
    1. Preparation of Anaesthesia machine, intubation kit, suction machine, Anaesthesia drugs.
    2. Patient identification, marking, shifting to OT before surgery and out of OT to recovery room after surgery, complete take over and hand over of the patient with vital signs recording before and after surgical procedure to the nursing staff. 15.Electrolyte imbalance and acid base balance.

Sterilization, disinfection & CSSD Procedures

Subject code: BSOT301-19

Module-1

1. Sterilization
    a. Definition and Principles of sterilization
    b. Types of sterilization:
        i. Heat Sterilization
            1. Dry sterilization
            2. Wet sterilization
                a. Below 100^0C

b. At 100^0C
c. Above 100^0C

ii. Gaseous sterilization, gases used and their applied chemistry
iii. Sterilization by filtration
iv. Sterilization by radiation (Hot & cold Radiation)

Module-2

2. Disinfection
    a. Definition of disinfection and disinfectants,
    b. Types disinfectants, their modes of action and applications
    c. Principles/General rules of disinfectant use
    d. Hazards associated to disinfection
    e. Disinfection of soft rubber articles and carbonized articles (LMA, FOB, ETT, Laryngoscopes, Anaesthesia machines and circuits.
    f. Disinfection of ventilators i.e., chemical vapours and chemical lotions
    g. Hand scrubbing and Disinfection

Module-3

3. Quality Evaluation of Sterilizers and sterilization process
4. Recent advances in sterilization
5. Preparation of reusable materials for sterilization

Module-4

6. CSSD preparations of surgical kits
7. Functioning of Central Sterile Supply Department
8. Care during transportation or shifting, process of appropriate cleaning and sterilization of laparoscopic, endoscopic and robotic instruments
9. General steps of sterilization and processing of surgical instruments like Pre-cleaning, Disassembly, Cleaning, Packaging, Loading, Sterilization process, re-assembly, storage and Monitoring their sterilization process.

Equipment in OTs – Care & Maintenance Practical

Subject Code : BSOT304-19

To understand and practice with use of the following practically:

1. Compressed gas cylinders: types, their testing and evaluation
2. Color coding
3. Cylinder valves
4. Gas piping system

5. Alarms & safety devices.
6. Scavenging of waste anesthetic gases
7. Types of compressors, structure and mechanism of various type of gauges.
8. Liquid oxygen storage and supply system
9. Anesthesia machine
3. Hanger and yoke system
4. Cylinder pressure gauge
5. Pressure regulator: their maintenance and safety checks
6. Flow meter assembly, maintenance and safety checks
7. Vaporizers - types, hazards, maintenance, filling and draining, etc.
8. Volatile anesthetic agents: Selection of material to be used for containers of the volatile anesthetic agents. Structure of different types of vaporizers. Principles of various vaporizers, their maintenance and safety precautions.
9. Types of circuits:
    i. i. Open, semi closed and closed circuits
    ii. ii. Non-rebreathing valves
    iii. iii. T-piece circuit and its modifications
    iv. iv. To and fro-system and circle absorber
    v. v. Types of valves used in different circuits.
    vi. Structure and working of heidbrink's valve, Rubin valve nu-main valve etc.
10. Boyle's Anaesthesia apparatus and other Advanced Anaesthesia machines
11. Apparatus and technique of the intravenous injections: Different types of intravenous needles and cannulas.
12. Resuscitation equipment and resuscitation techniques:
    a) Endotracheal tubes: Their cleaning and disinfection
    b) Use of various Connectors
    c) Masks
    d) Supraglottic airways
    e) Equipment, types of spinal and epidural needles, their structure, instrument used for spinal and epidural blocks.
    f) Laryngeal sprays: Types, uses and their maintenance.

Principles of Anaesthesia – Practical

Subject Code : BSOT305-19

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.
1. Structure of reducing valves
    a. Mechanism of pressure reducing valves.
    b. Their maintenance and safety checks
2. Structure and mechanism of flow meters, maintenance and safety checks
3. Volatile anesthetic agents.
    a. Selection of material to be used for containers of the volatile anesthetic agents.
    b. Structure of different types of vaporizers.
    c. Principles of various vaporizers, their maintenance and safety precautions.
4. 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.
5. Types of valves used in the different circuits. Structure and working of Heidbrink's valve, Rubin
6. valve nu-man valve etc

Sterilization and disinfection in OTs - Practical

Subject code: BSOT306-19

1. Safe practice for collection of used equipment or other materials to be sterilized or disinfected and re-cycled
2. Biomedical waste management: Importance of segregation at source
3. Preparation of material like surgical kits to be treated in CSSD department
4. To understand practically: the suitable methods of sterilization for different materials
5. Working of various sterilizers
    a. Hot air ovens
    b. Steam sterilizers
    c. Various types of autoclaves
    d. Plasma sterilizers
    e. ETO sterilizer
    f. Radiation sterilization
6. Efficacy testing of various sterilizers
7. Safe handling and use of disinfectants belonging to different groups:
    a. Alcohols and alcohol-based hand disinfectants
        i. Liquids and gel based
    b. Aldehydes: Formaldehyde, Glutaraldehyde. Orthophathalaldehyde
    c. Oxidizing agents
        i. Chlorine generating, Hydrogen peroxide based, peracetic acid etc.
    d. Quaternary Ammonium Compounds
8. Fogging / Fumigation of OT environment
9. Understanding and Monitoring OT environment i.e.
    a. Operation theatre design
    b. Positive pressure ventilation
    c. Air Changes
    d. Temperature

e. Humidity

f. Microbial load evaluation in collaboration to Microbiologist

Antibiotic Resistance and Antibiotic Policy

Subject code : BSOT307-19

Module-1

1. History and Introduction to antimicrobial resistance
2. Difference between antimicrobial resistance and antibacterial resistance
3. Why antimicrobial resistance is a concern

Module-2

4. Mechanisms of antibacterial resistance
    a. Intrinsic
    b. Acquired – Genetic methods (Brief knowledge)
5. Mechanisms of antibiotic resistance inactivation
6. Factors involved in antibiotic resistance
    a. Environment related factors
    b. Drug related factors
    c. Patient related factors
    d. Prescriber related factors

Module-3

7. Indian scenario of antibiotic resistance
8. Strategy to contain antibiotic resistance
9. Judicious use of antibiotics

Module-4

10. Hospital acquired drug resistance
11. Hospital antibiotic policy.

Medicine – Outline

Subject Code: BSOT308-19

Introduction to some Common diseases

1. Disorder of hemopoiesis Anemias Iron deficiency anemia,
2. Infectious diseases
    a. Sepsis and septic stock,
    b. fever of unknown origin,
    c. Infective endocarditis,
    d. Infections of skin, muscle, soft tissue,
    e. Tuberculosis
    f. Hospital Infections,
    g. Other common infections caused by bacteria, viruses, fungi, protozoa and helminths
    h. Common secondary infection in HIV.
3. Diseases of CVS congenital RHD Rheumatic fever, CAD, Peripheral vascular diseases.
4. Respiratory system asthma pneumonia
5. Kidney & Urinary tract acute renal failure, Glomerulonephritis, Hemodialysis, Transplant, Urinary tract infection
6. Liver and biliary tract disease Viral hepatitis, alcoholism
7. Endocrinology and metabolism Diabetes mellitus, Hyper and hypothyroidism
8. Pain Medicine

Clinical Pharmacology

Subject Code: BSOT309-19

Scope

The subject is designed to strengthen the basic knowledge in the field of clinical Pharmacology and to impart knowledge about drugs which are being used in operation theatre. This subject will also help the students to understand pharmacokinetic, mechanism of action, adverse drug reactions and contraindication of drugs used in operation theatre.

Objectives

Upon completion of the course the student shall be able to

1. Understand the Pharmacokinetic parameters of drugs which are being used in OT
2. Understand mechanism of drugs at cellular and molecular level which are being used in OT
3. Understand the adverse effects, contraindications and clinical uses of drugs in OT

Theory

Module -1

Pharmacokinetic: Dynamics of drug absorption, distribution, excretion and elimination. Pharmacokinetic of drugs used in OT department such as antisialagogues, sedative, anaesthetics, adrenergic drugs, etc.

Module-2

Pre- and post-operative drugs

a. Mechanism of actions, ADRs, contraindications and uses of following classes of drugs
b. Antisialagogues: Atropine, Glycophyrrolate,
c. Sedatives and anxiolytics: Diazepam, Midazolam, Phenergan, Lorazepam, Chloropromazine, Trichlopho, Nacrotics: Morphine, Pethidine, Fentanyl, Pentazozine
d. Antiemetics: 5-HT3 blockers: Metaoclopramide, Ondanseteron, Granisetron,
e. Antacids: Na citrate, Gelusil, Mucaine gel
f. H2 blockers: Cimetidine, Ranitidine, Famotidine

Module-3

Muscle relaxants, Local and general anesthetic agents

a. Muscle relaxants: Depolarising agents Suxamethonium, Non depolarizing agents: Pancuronium, Vecuronium, Atracurium, rocuranium

b. General anaesthetics: Inhalational agents: gases (nitrous oxide, Entonox, xenon) and liquids (Halothane, Ether, Isofllurane, Saevoflurane, Desflurane)
c. Inducing agents: Thiopentone, Diazepam, Midazolam, Ketamine, Propofol, Etomidate.
d. Local anaesthetics: Amide and Ester class: Xylocaine, Preparation, Local – Bupivacaine - Topical, Prilocaine jelly, Emla ¬ Ointment, Etidocaine. Ropivacaine
e. Reversal agents: Neostigmine, Glysopyrrolate, Atropine, Nalorphine, Naloxone, Flumazenil (Diazepam)

Module-4 :

Emergency drugs: Mode of administration, dilution, dosage, Effects

a. Adrenaline, Isoprenaline
b. Atropine, bicarbonate, calcium, ephedrine, xylocard,
c. Ionotropes : dopamine, dobutamine, amidaron
d. Aminophylline, hydrocortisone, antihistamlnics, potassium.
e. CVS drugs: beta blockers, calcium channel blockers
f. Vasodilators: nitroglycerin & sodium nitroprusside
g. Respiratory system : Bronchodilators, respiratory stimulants Broncholytic agents
h. Renal system: Diuretics, furosemide, mannitol
i. Obstetrics: oxoytocin, methergin
j. Miscellaneous: steroids, antibiotics, NSAIDS, anticoagulants and Insulin

Basic Surgical procedures

Subject Code: BSOT401-19

Module-1

1. Operating tables: structure, material used, maintenance, control, Hydraulic system and Electrical system.
2. Different types of diathermy machine. Monopole, Bipolar, Ligasure, Harmonic Scalpel, CUSA- Principle, hazards, prevention, functioning and maintenance.
3. Types of operation lights and light sources: Features, Care, cleaning, sterilization and maintenance.

Module-2

4. Operation Theatre sterilization- Different recent advances.
5. LAR/APR--Positioning of patient, care-Prevention of hazards.

6. Total thyroidectomy—with emphasis on proper positioning.

Module-3

7. Transthoracic esophagectomy—Different approaches.
8. Venesection and Tracheostomy.
9. Laproscopic Cholecystectomy – Pneumoperitonium - Creation and removing, principles.

Module-4

10. Nephrectomy.
11. Breast surgery.
12. Positioning of patient for different operations: Problems and hazards. m. Hypothermia and hyperthermia.

Transfusion Medicine

Subject Code: BSOT402-19

Module-1

1. Introduction and importance of Blood transfusion
2. History of discovery of blood groups and genetics of blood groups.
3. Types of blood groups and Rh factor.
4. Coombs test / AHG Test, its relevance of direct and indirect test

Module-2

5. Collection of blood, its preservation and standardization.
6. Various types of blood and blood products (Packed cells, PRP, FFP)
7. Proper storage of blood ,packed cells other components and platelets ,for example platelets are stored at room temp and they should be kept shaking
8. Shelf life of various components
9. Requisition of Blood & Blood Products

Module-3

10. Proper request form as per the NACO guidelines
11. Pre-transfusion checks.
12. Transfusion reactions :
    a. Blood reaction sign and symptoms during transfusion
    b. Detection and management procedures.
13. To understand critical call alerts from Blood bank
14. Fluids and electrolytes – requirement calculation as per body weight

Module-4

15. Body fluid compartments and the effect of fluid administration on them.
16. Types of fluids (crystalloids and colloids) and their chemical composition.
17. Indications of specific fluids and their complications.

Check list on bag before transfusion ,testing cross matching etc
Transfusion transmitted diseases
sign of overload of fluid/pulmonary oedema etc.
Ration blood transfusion

Basic Anaesthesia Procedures

Subject Code: BSOT403-19

Module-1

1. **Resuscitation techniques:**
    a. Basic life support (Airway, breathing, circulation) and the equipment used for it.
    b. Drugs used in CPR. c. AED and Defibrillators.

Module-2

2. **Anesthesia drugs and techniques-I**
    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.

Module-3

1. **Anesthesia drugs and techniques-II**
    a. Local Anesthetic agents.

b. Neuro muscular blocking agents.
c. Principles of oxygen administration along with the apparatus.
d. Care of patient in the recovery room.
e. Post-operative pain: evaluation and management.

Module-4

1. **Anesthesia drugs and techniques-III**
   f. Types of fluid and therapy.
   g. Preparation of anesthesia machine, intubation kit, suction machine, anesthesia drugs.
   h. 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.

Basic Surgical Procedures Practical

Subject Code: BSOT404-19

To learn the functioning of the following:

1. Operating tables: Structure, material used, maintenance, control, hydraulic system and electrical system
2. Different types of diathermy machine, monopolar, biopolar, ligasure, harmonic scalpel, CUS-principle, hazards, prevention, functioning and maintenance.
3. Types of operation lights and light sources: Features, care, cleaning, sterilization and maintenance.
4. Operation theatre sterilization – Different recent advances. 5. LAR/APR – Positioning of patient, care prevention of hazards

To observe and learn the various steps of the following with respect to positioning and function of required equipment:

1. Total thyroidectomy – With emphasis on proper positioning
2. Transthoracic esophagectomy – Different approaches
3. Venesection and tracheostomy
4. Laproscopic cholecystecomy – Pneumoperitonium – Creation and removing,

principles
5. Nephrectomy
6. Breast surgery
7. Positioning of patient for different operations: Problems and hazards
8. Hypothermia and hyperthermia

Blood Transfusion

Practical

Subject Code: BSOT405-19

1. **To visit the Blood Bank for minimum of 15 days and observe the following:**
    a. Types of blood groups and Rh factor.
    b. How Blood grouping is done
    c. Coombs test.
    d. Collection of blood, its preservation and standardization.
    e. Various types of blood and blood products (Packed cells, PRP, FFP)

2. **To observe while working in Operation Theater**
    a. Pre-transfusion checks.
    b. Transfusion reactions, if any.
    c. Body fluid compartments and the effect of fluid administration to the patients.

Basic Anaesthesia Procedures

Practical

Subject Code: BSOT406-19

Module-1

1. To handle Anesthesia work station
2. Boyle's anesthesia apparatus and other Advanced Anesthesia machines.

Module-2

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.

Module-3

4. Resuscitation equipment and Resuscitation techniques:
    a. Endotracheal tubes :
        i. Selection of the material used for the endotracheal tube
        ii. 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.

Module-4

    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.

Clinical Haematology

Subject Code: BSOT407-19

1. Introduction to Hematology :
    (a) Definition
    (b) Importance
2. Introduction to blood, its composition, function and normal cellular components.
3. Collection and preservation of blood sample for various haematological investigations.

4. Definition, Normal values, Clinical significance, understanding errors involved for the following"
    (a) Haemoglobinometry
    (b) Total leucocytes count (TLC)
    (c) Differential leucocytes count (DLC)
    (d) Erythrocyte Sedimentation Rate (ESR)
    (e) Packed cell volume/ Haematocrit value.
    (f) Red cell Indices (RCI)
    (g) Absolute Eosinophil count
    (h) Reticulocyte count
    (i) Platelet Count.
5. CBC reading and interpretation
6. Trauma & Bleeding Disorders including DIC
7. To understand importance coagulation studies and commonly used parameters like bleeding time, prothrombin time etc.
8. Shock : Hemorrhagic & Hypovolemic
9. Brief Knowledge about various anaemias
10. Haemolytic reaction
11. Various shock
    a. hypovolemic ,
    b. cardiac
    c. endotoxic shock
12. Neutropenia , neutrophilia low platelets and its relevance in surgery

Clinical Pathology

Subject Code: BSOT408-19

1. Cellular adaptation and cell death
2. Inflammation and repair, infection, circulatory disorders, immune defense
3. Genetics of disease
4. Neoplasia
5. Cell injury and adaptation
6. Atrophy, hypertrophy, metaphase, hyperplasia
7. Classification of tumors, premalignant lesion
8. Types of inflammation & system manifestations of inflammation
9. Disorders of vascular flow & shock (brief introduction)

10. Oedema, hyperemia or congestion, thrombosis, embolism, infarction shock, ischemia, over hydration, dehydration
11. The response to infection
12. Categories of infectious agents, host barriers to infection
13. How disease is caused
14. Inflammatory response to infectious agents
15. Hematopoietic and lymphoid System
16. Hemorrhage, various types of anemia, leucopenia, leukocytosis, bleeding disorders coagulation mechanism.

Biomedical Waste Management

Subject Code: BSOT409-19

Module-1

1. Biomedical Waste: Introduction
2. Types of Waste generated in:
    a. Healthcare establishments especially in operation theatres
    b. Allied establishment
3. Waste Associated risks in:
    a. Healthcare establishments
    b. Occupational and public healthcare

Module-2

4. Risks to environment
5. Waste Characterization
6. Improper waste management – Reasons thereof
7. Legislation and guidelines especially in India

Module-3

8. Collection and Segregation of waste
9. Handling of waste
10. Labelling
11. Storage

12. Transportation
    a. Onsite and
    b. offsite

Module-4

13. Waste treatment
    a. Methods and choice
    b. Incineration
        i. Advantages, disadvantages and contraindications
        ii. Autoclaving
        iii. Microwave system
        iv. Thermal hydroclaves
        v. Chemical processes
        vi. Other methods
14. Waste disposal – Various methods
15. Waste minimizing and re-cycling

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5th Semester

Course Code	Course type	Course title	Load allocation			Marks distribution		Total Marks	Credits
			L	T	P	Int.	Ext.		
BSOT501-19	Core Theory	Basic Intensive care	3	1	0	40	60	100	4
BSOT502-19	Core Theory	Advanced Anaesthesia procedures	3	1	0	40	60	100	4
BSOT503-19	Core Theory	Electronics and technology in surgery and anesthesia	3	1	0	40	60	100	4
BSOT504-19	Core Practical	Basic Intensive care (Practical)	0	0	4	40	60	100	2
BSOT505-19	Core Practical	Advanced Anaesthesia procedures (Practical)	0	0	4	40	60	100	2
BSOT506-19	Core Practical	Electronics and technology in surgery and anesthesia (Practical)	0	0	4	40	60	100	2
BSOT507-19	AECC	OT & ICU associated Nosocomial Infections	2	0	0	40	60	100	1
BSOT508-19	AECC	Emergency Medicine	2	0	0	40	60	100	2
BSOT509-19	AECC	Research Methodology	1	1	0	25	50	75	2
BMPD202-18		Mentoring and Professional Development	0	0	2	25	--	25	1
Total			13	04	14	370	530	900	24

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6th Semester

Course Code	Course type	Course title	Load allocation			Marks distribution		Total Marks	Credits
			L	T	P	Int.	Ext.		
BSOT601-19	Core Theory	ICU Management	3	1	0	40	60	100	4
BSOT602-19	Core Theory	Specialized Surgery and Anesthesia	3	1	0	40	60	100	4
BSOT603-19	Core Theory	Fundamentals of Blood Transfusion	3	1	0	40	60	100	4
BSOT604-19	Core Practical	Basic Intensive care (Practical)	0	0	4	40	60	100	2
BSOT605-19	Core Practical	Specialized Surgery and Anesthesia (Practical)	0	0	4	40	60	100	2
BSOT606-19	Core Practical	Fundamentals of Blood Transfusion (Practical)	0	0	4	40	60	100	2
BSOT607-19	AECC	Basic Immunology	2	0	0	40	60	100	1
BSOT608-19	AECC	Anaphylactic reactions and Autoimmunity Outlines	2	0	0	40	60	100	2
BSOT609-19	AECC	Basic Biostatistics	1	1	0	25	50	75	2
BMPD202-18		Mentoring and Professional Development	0	0	2	25	--	25	1
		Total	13	04	14	370	530	900	24

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BASIC INTENSIVE CARE (THEORY)

Subject Code BSOT501-19

Rationale: Students will learn about the types of ICUs, their design and functioning. Also they will learn about the equipment in ICU.

Topics

Module 1

a. Introduction of ICU
b. Types of I.C.U. Difference between closed and open ICUs. Advantages and disadvantages. Also the different types according to patients e.g. medical, surgical, neuro, stroke, etc.
c. Design of I.C.U
d. ICU recommendations by WHO

Module 2

e. ICU protocols for various types of procedures.
f. ICU nurses and technicians with their role and responsibilities
g. Type of patients in ICU esp. in relation to type of disease of patient.

Equipment's used in ICU

Module 3

a. Defibrillator
b. Portable X-Ray
c. Ultrasound
d. Ventilator
e. Infusion Pumps

Module 4

f. Multi-Model Monitor
g. Special ICU Beds
h. ABG Machine
i. ECG Machine
j. Nebulizers
k. DVT Pump

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ADVANCED ANAESTHESIA PROCEDURES (THEORY)

Subject Code: BSOT502-19

Rationale: Students will learn about anaesthesia for different types of surgeries. They should be familiar for what is needed in the various types of surgeries. In short, they must be taught about the problems associated with the type of surgery and associated risks and complications.

Module 1

a. Anaesthesia For Obese Patients
b. Anaesthesia For Neuro-Surgery
c. Anaesthesia In Laparoscopic Surgery

Module 2

d. Anaesthesia For Obstetric Procedure
e. Anaesthesia In Paediatric Patient
f. Anaesthesia In Orthopaedic Surgery

Module 3

g. Anaesthesia In Geriatric Surgery
h. Anaesthesia For Ophthalmic Surgery
i. Anaesthesia In Day Care Surgery

Module 4

j. Anaesthesia For ENT Surgery
k. Anaesthesia For Management Of Burn Patients.
l. Anaesthesia In Pain Management

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ELECTRONICS & TECHNOLOGY IN ANAESTHESIA & SURGERY (THEORY)

Subject Code: BSOT503-19

Students will be made aware of the various electronic devices used in anaesthesia and surgery. Hence they should know the theory about the basic design, function and application of these devices.

BASICS OF

Module 1

a. Operation Theatre Lights
b. Electro-Surgical Diathermy

Module 2

c. Suction
d. Laparoscopy Instruments

Module 3

e. C-Arm and radiation safety
f. Multi-channel Cardiac monitors
g. Gas Analysers

Module 4

h. Electronic Infusion Pumps
i. Advanced Intubating Devices
j. Portable Ultrasound

BASIC INTENSIVE CARE (PRACTICAL)

Subject Code: BSOT504-19

Students will receive practical experience of seeing patients in ICUs and their management under supervision of ICU staff

a. Monitoring in ICU
b. Principles and mechanism of the defibrillator
c. ECG (electrocardiography)
d. Sterilization and disinfectant of ventilators, beds, lights, and other apparatus
e. Cardiopulmonary resuscitation (CPR)
f. Intubation
g. Tracheotomy
h. CVP (central venous pressure)
i. Urine Catheterization, Insertion of Ryle's tube

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ADVANCED ANAESTHESIA PROCEDURES (PRACTICAL)

Subject Code: BSOT505-19

Students will learn under supervision the setting up of various types of lines for patients undergoing anaesthesia and surgery

a. Intravenous Cannula: Setting up an IV Line, colour coding of different IV cannula, Flow through IV cannula, places where IV cannula can be inserted, Technique of inserting IV cannula in adults and children.
b. Intra-arterial Line: Uses and techniques, position, places where IA cannula can be put. Central Venous Cannulation: Uses and technique, Measurement of CVP, precautions during insertion, indications and contraindications.
c. Brief idea about Cardiac catheterization and Pulmonary Catheterization

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ELECTRONICS & TECHNOLOGY IN ANAESTHESIA & SURGERY (PRACTICAL)

Subject Code: BSOT506-19

Students will be thought how to check the working of all anaesthesia and surgical instruments and equipment. Hence, they should be able to trouble shoot any non-functioning equipment used during anaesthesia and surgery.

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OT & ICU ASSSOCIATED NOSOCOMIAL INFECTIONS (AECC)

Subject Code: BSOT507-19

Rationale: Students will learn about nosocomial infections, their mode of transmission, complications caused and prevention strategies.

Module 1

a. Definition-what are nosocomial infections
b. Incidence
c. Types endogenous / exogenous

Module 2

d. Type by Sites – VAP, SSI, CAUTI,Blood Stream
e. Predisposing factors – Types of prone patients
f. Factors which increase the risk of nosocomial infections

Module 3

g. Sources
h. Agents – Bacteria, Fungi, Virus
i. Common Agents – MRSA (Methicillin resistant S.aureus), CONS (cogulase negative staphylococci, Vancomycin resistant enterococci, pseudomonas aeruginosa

Module 4

j. Mode of transmission
k. Consequences
l. Preventive Strategies

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EMERGENCY MEDICINE (THEORY)

Subject Code: BSOT508-19

Module 1 - Introduction & Overview

a. Emergency Medicine Department – Organization of EMD, Organization of Emergency MS, Disaster management
b. Legal Aspects of Emergency Medicine – Introduction

Module 2 - Trauma &Management of patients

a. Airway Management – Introduction. Indications and methods of intubation and ventilation
b. Trauma Emergencies – General Approach to a Trauma Patient, Traumatic Shock, Hypovolemic Shock, Thoracic Shock
c. Principles of wound management, Methods of wound closure under Local or Regional Anaesthesia

Module 3 - Medical Emergencies

a. Approach to patients with
b. Cardiac Emergencies: Chest Pain, Cardiogenic Shock, Congestive Cardiac Failure or Acute heart failure, Acute Coronary Syndrome, Syncope and Cardiac Arrhythmias
c. Respiratory Emergencies: Acute Respiratory Failure, Asthma and Bronchial Asthma Chronic Obstructive Pulmonary Disease (COPD), Haemoptysis, Pneumonia, Non-Cardiogenic Pulmonary Edema, Pleural Effusions and Pneumothorax, Mycobacterial Emergencies
d. Endocrine Emergencies: Hypoglycaemia, Diabetic Ketoacidosis, NKH Coma (Nonketotic Hyperosmolar Coma), Alcoholic Ketoacidosis, Lactic Acidosis, Thyroid Storm and Myxoedema Coma, Adrenal Crisis
e. Neurological disorders: Altered Mental Status and Coma, CNS Infections, Stroke Emergencies, Anorexia Nervosa and Bulimia Nervosa, Panic Disorder, Depression and Suicide, Septic Shock
f. Renal Emergencies: Acid Base Balance and Interpretation of Blood Gas Results, Electrolyte Disorders, Acute Renal Failure, Chronic Renal Failure, Acute kidney injury, Urinary Tract Infections, Urinary Retention
g. Gastrological and Hepatic Emergencies: Inflammatory Bowel Disease, Diverticulitis, Hepatitis, Management of Acute Bleeding Oesophageal Varices, Liver Cirrhosis
h. Anaphylaxis

Module 4 - Surgical Emergencies and Transfusion Emergencies

a. Surgical Emergencies: Abdominal Trauma, Acute Appendicitis, Acute Cholecystitis, Acute Pancreatitis, Anorectal Disorders- Haemorrhoids and Anal fissure, GI Foreign Bodies, Oropharyngeal Foreign Bodies, Rectal Foreign Bodies, Abdominal Aortic

Aneurysm [AAA], Acute Mesenteric Ischemia [AMI], Intestinal Obstruction, Surgical Emergencies of Bowel, Genital Lesions

b. Burns – Chemical Burns, Electrical Burns, Lightning Burns, Thermal Burns
c. Snake Bite

Books Recommended:

1. Meharban Singh. (2000). Medical Emergencies in Children. Sagar Publications 3rd edition
2. Karyis & Warner. (1983). Emergency Medicine. AN ASPEN Publications 1st edition
3. Parveen Aggarwal. (2005). Principles & Practice of Emergency Medicine. B.I Publications Pvt. Ltd. 1st edition
4. Jaffereon, Caterino. (2003). Emergency Medicine. Blackwell Publishing 1st edition
5. Parvesh Saini, Pooja Saluja. (2004). First Aid & Emergency Management. Lotus Publisher 1st edition
6. Swapna Wasker. (2011). First AID & Emergency Carl. Kumar Publishing House 2st edition
7. C.Manivannan. (2011). Text Book of First AID and Emergency NSG. EMMESS Medical Publisher 1st edition
8. P.K.Dave. (2001). Emergency Medical Services & Disaster Management. Jetinder P. Vij Delhi 1st edition
9. P.K.Dave. (2008). Emergency Medical Services & Disaster Management. Jaypee Brothers 1st edition
10. The Washington Manual of Emergency Medicine SAE Paperback – 1 December 2021 by Praveen Aggarwal

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RESEARCH METHODOLOGY (AECC)

Subject Code: BSOT509-19

Rationale: Objective is to help students to understand the basic principles of research and methods applied to draw inferences from the research findings.

Module 1

a. Introduction to research methods
b. Identifying research problem

Module 2

c. Ethical issues in research
d. Research design

Module 3

e. Basic Concepts of Biostatistics
f. Types of Data

Module 4

g. Research tools and Data collection methods, sampling methods, Developing a research proposal

Reference Books

S. No.	Title Of Book	Author	Edition	ISNB	Publisher
1	Manual Of Anaesthesia For Operation Theatre Technicians	Ahanantha Pillai	1st	978-8180617607	Jaypee
2	Basics Of Anesthesia	Miller	7th		Elsevier
3	Pocket Guide ToOperating Room	Maxine Gold	4th	13: 978-0-8036-6839-3	F A Davis Company
4	Synopsis Of Medical Instruments & Procedure	Ajay Yadav &Arora	3RD	9788171792900	Jaypee
5	Short Text Book Of Anaesthesia	Ajay Yadav	6th	9789352704644	JP Brothers

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6TH SEAMESTER

ICU MANAGEMENT (THEORY)

Subject Code: BSOT601-19

Rationale: Students will learn about different types of monitoring used in ICU. This will include the indications of monitoring, the setup for the procedure, and connection to the relevant monitors.

Monitoring of ICU patient

Module 1

a. CVP
b. NIBP & IBP
c. ICP and IOP
d. ECG
e. EMG and EEG

Module 2

f. BSI
g. Capnography
h. Temperature Monitoring
i. Pulmonary Capillary Wedge Pressure
j. Auscultation Of Bowel Sounds

Module 3

Students will also learn about different respiratory diseases encountered in ICUs. This will include the signs and symptoms, the investigations and their interpretation. They will also be taught as to how to handle respiratory emergencies.

a. Asthma
b. COPD
c. ARDS

Module 4

d. Pneumonia
e. Respiratory Failure
f. Atelectasis

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SPECIALIZED SURGICAL & ANAESTHESIA PROCEDURES (THEORY)

Subject Code: BSOT602-19

Rationale: In this module students will learn about the different surgical procedures being done and their anaesthetic management.

This will include the definition, organ involved, problems faced by the patient. Also the students will learn about the corrective surgery to be done, its complications and difficulties.

General Surgical procedures

Module 1

- Hiatus Hernia
- Gastrectomy
- Partial Hepatectomy
- Cholecystectomy
- Whipple's Procedure

Module 2

- Colectomy, Colostomy
- Gastrostomy
- Umbilical Hernia
- Inguinal Hernia
- Appendectomy
- Haemorrhoidectomy

Module 3

- Lap. Cholecystectomy,
- Lap. Appendectomy,
- Lap. Inguinal Hernia
- Repair Techniques (TAPP AND TEP),
- Lap. Partial Gastrectomy

Module 4

- ✓ Anaesthetic management of all above surgical procedures. The students must know about the associated problems and complications of each procedure and how to prevent them so that the patient remains safe.

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FUNDAMENTALS OF BLOOD TRANSFUSION (THEORY)

Subject Code: BSOT603-19

Rationale: Students will learn all about blood grouping, blood collection and blood transfusions

Module 1

a. Blood Group System & Their Techniques
b. Methods For ABO Grouping - Slide & Tube Method
c. Difficulties In ABO Grouping,
d. Antiserum Used In ABO Test Procedures - Anti –A, Anti-B, Anti- AB
e. Inheritance Of The Blood Groups
f. Blood Collection & Their Preservatives

Module 2

g. Blood Grouping Techniques
h. Methods Of Blood Collection
i. Anticoagulant – Definition,
j. Types Of Anticoagulants (EDTA, Citrate, Oxalate, Heparin, Sodium Fluoride)
k. Mechanism Of Coagulation,

Module 3

l. Haemolysis Of Blood.
m. Separation Of Serum & Plasma,
n. Criteria For Blood Specimen Rejection / Changes In Blood,
o. Maintenance Of Specimen Identification,
p. Transportation Of The Blood
q. Storage Of Blood In Blood Bank,
r. Universal Precautions

Module 4

s. Blood Transfusions
t. Indications Of Blood Transfusion,
u. Reactions Of Blood Transfusion
v. Precaution Of Blood Transfusion.
w. Blood Transfusion Reactions

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ICU MANAGEMENT (PRACTICAL)

Subject Code: BSOT604-19

Rationale: Students are expected to practically see what procedures are done on patients in the ICU.

Procedures in ICU

a. Central venous catheterization,
b. Haemodialysis,
c. Invasive Arterial Blood Pressure Monitoring,
d. Portable X-Ray,
e. Urinary Catheterization,
f. Chest Drainage Tubing's,
g. Extra Corporeal Membrane Oxygenator,
h. Intubation,
i. Oxygen Therapy
j. Feeding,
k. Care Of Unconscious Patient,
l. Nutritional Therapy,
m. Transport Of Critically Ill Patient (Inter and Intra Hospital Transport)

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SPECIALIZED SURGERY AND ANAESTHESIA (PRACTICAL)

Subject Code BSOT605-19

Rationale: Students will be exposed to the surgical and anaesthesia procedures they have studied in the theory classes. They will see practically the application of methods of these procedures. Hence they must be made aware as to what precautions are to be taken to prevent complications.

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FUNDAMENTALS OF BLOOD TRANSFUSION (PRACTICAL)

Subject Code: BSOT606-19

Rationale: Students will observe all about blood transfusion in the blood bank.

a. Blood Banking Techniques
b. Blood Donation:
c. Blood Donor Requirements
d. Criteria For Selection & Rejection,
e. Medical History & Personal Details
f. Health Checks Before Donating Blood,
g. Blood Collection Packs
h. Anticoagulants
i. Instructions Given To The Donor After Blood Donation
j. Adverse Donor Reaction
k. Testing Donor Blood
l. Blood Donor Records
m. Storage Of Blood
n. Changes In Blood After Storage
o. Blood Transfusion Reactions

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BASIC IMMUNIOLOGY (AECC)

Subject Code: BSOT607-19

Module 1

a. Types of immunity-innate and adaptive; Features of immune response-memory; Specificity and recognition of self and non-self; Terminology used in the study of immune system.
b. Lymphoid cells, heterogeneity of lymphoid cells; T-cells, B-cells, Null cells; Monocytes, Polymorphs, primary and secondary lymphoid organs-thymus, Bursa of Fabricius, spleen, lymph nodes, lymphatic system, Mucosa Associated Lymphoid Tissue (MALT), Lymphocyte traffic.

Module 2

a. Antigen, Epitope (B cell & T Cell epitope), Immunogen, Structure T & B Cells, Factors influencing immunogenicity, Immunoglobulins, classes and structure; affinity and avidity; Complement fixing antibodies and complement cascade.
b. Structure of T-cell antigen receptors and recognition of antigens by T-cells.

Module 3

c. T-cell subsets and surface markers, T-dependent and T-independent antigens, Monoclonal antibodies: its production and uses.
d. MHC class I and class II molecules, and function of class I and class II MHC molecules.
e. Various types of immuno-diffusion and immuno-electrophoretic procedures. ELISA, RIA, Agglutination of pathogenic bacteria, Haemagglutination and haemagglutination inhibition.
f. Immunity to viruses, intracellular and extracellular bacteria

Module 4

g. Active and passive immunization, Adjuvants, whole organism vaccine, purified macromolecules as vaccine, recombinant antigen vaccine, recombinant vector vaccine, synthetic peptide vaccine, multivalent subunit vaccine, DNA Vaccine

Books Recommended:

1. Austyn, J.M. and Wood K.J. (1993), Princi[les of Cellular and molecular Immunology, Oxford University Press Inc. New York
2. Paul, W./E. (1995), Fundamental Immunology, 3rd Ed., Raven Press, New York
3. Britch, J.R. and Lennox, E.S. (1995), Monoclonal Antibodies Principles and Application, Wiley Liss.
4. Roitt, I.M. Brostoff, J. and Male, D.K. 91996), Immunology, 4th Edition, Grower Medical Publishing , New York
5. Strites D.P., Terr. A.I. &Parslow T.G. (1997), Medical Immunology, 9th Ed., PHI, Cambridge. 6. Kanfmann, S.H.E., Sher A., Ahmed, R. (2002). Immunology of Infections Diseases, ASM Press, Washington 7. Kuby, J. (2004), Immunology, 5th Edition. W.H. Freeman and Company, New York
6. Abbas, A.K. Litchman, A.H. and Pober, J.S. (200). Immunology, 4th ed., Philadelphia, Pennsylvania: W.B. Saunders Company Publishers.

7. Benjamni, E., Coico, R. and sunshine, G. (2000). Immunology: A short course, 4th ed., New York, Wiley-Liss.
8. Roit, I.M., Delves, P. (2000). Essential Immunology, 10th ed., Oxford: Blackwell Scientific Publications.
9. Roitt, I., Brostoff, J. and Male, D. (2001). Immunology, 6th ed., Mosby.
10. Kanfmann S.H.E., Sher, A., Ahmed, R. (2002). Immunology of infections Diseases, ASM Press, Washington.
11. Butler, M. (2004). Animal Cell Technology, 2nd ed., BIOS Scientific Publishers, U.K.
12. Goldsby, R.A., Kindt, T.J., Osborne, B.A. (2006). Kuby Immunology, 4th ed., W.H. Freeman and Company, New York

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ANAPHYLACTIC REACTIONS & AUTOIMMUNITY OUTLINES (AECC)

Subject Code: BSOT608-19

Rationale: Students will learn about anaphylactic reaction, their identification and management. They will also learn about autoimmunity.

ANAPHYLACTIC REACTIONS

Module 1

a. Definition
b. Type Of Anaphylactic Reactions
c. Signs & Symptoms

Module 2

d. Drugs Used
e. Management

AUTOIMMUNITY OUTLINES

Module 3

a. Definition
b. Mechanism
c. Causes
d. Signs and symptoms

Module 4

e. Diseases of autoimmunity
f. Management

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BASIC BIOSTATISTICS (ACCE)

Subject Code: BSOT608-19

Rationale: The students will be made aware of the need of biostatistics and understanding of data and sampling methods

Study about Biostatics & understanding of data in Biostatics: -

a. Need of biostatistics
b. What is biostatistics: beyond definition
c. Understanding of data in biostatistics
d. How & where to get relevant data

Study the relation between data and variables & types of Variables: -

a. Relation between data &variables
b. Type of variables: defining dataset
c. Collection of relevant data: sampling methods

Study type, Sample size and Population

a. Construction of study: population, sample, normality and its beyond (not design of study, perhaps), Summarizing data on the pretext of underlined study
b. Statistical Data Analysis

Module 1

Elementary Statistics: The mean, median, mode, standard deviation, variance, covariance of data.

Representation of data- discrete data, continuous data, histogram, polygons, frequency curves. Mean, Median, Quartiles, Percentile, Skewness, Standard deviation, Variance, Box and whisker diagrams (box plots), Scatter diagrams, Introduction to statistical sampling from a population, Random Sampling.

Module 2

Probability: Basic concepts, sample space and events, use of counting method in probability, addition law, Bayes theorem.

Probability: Experimental Probability, Probability when outcomes are equally likely, Subjective Probabilities, Probability laws Probability rules for Combined events, Conditional Probability and Independent Events, Probability trees.

Module 3

Introduction to Correlation & Regression: Scatter diagram, Linear correlation, linear regression lines.

Random Variables and Probability Discrete random variables, their Probability Mass function, Probability Density Function Mean and variance. Binomial and Poisson Distributions Continuous Random variables, their Probability Mass function, Probability Density Function Mean and variance, Normal Distribution Cumulative distribution function

Module 4

Hypothesis Testing: Concept of Null and Alternate Hypothesis, Chi-square test (Goodness of fit and association of attributes). Fischer test, Student t-test, One way ANOVA

Recommended Books:

1. Elhance D.N. (1984). Fundamentals of Statistics. Kitab Mahal, Allahabad.
2. Mendenhall W. and Sincich T. (1995). Statistics for engineering and sciences (IVth edition). Prentice Hall. And sciences (IVth edition). Prentice Hall.
3. B.A./B.Sc Part-I (12+3 System of Education) 225 Gupta S.P. (2000). Statistical methods. Sultan Chand and Company, New Delhi.
4. Kapoor V.K. and Gupta S.C. (2000) Fundamentals of Mathematical Statistics. Sultan Chand and Company, New Delhi 5. J. Crawshaw and J Chamber (2002) Advanced level Statistics, 4th Edition, MelsonThornes.
5. Brian S., Ripley D. and Venables W. N. (2002). Modern Applied Statistics. Springer Verlag.
6. J. Crawshaw and J Chamber (2002), Advanced Level Statistics, 4 th Edition, MelsonThornes.
7. Kapoor V.K. and Gupta S.C. (2000) Fundamentals of Mathematical Statistics. Sultan Chand and Company, New Delhi
8. Gupta S.P. (2000). Statistical Methods. Sultan Chand and Company, New Delhi.
9. Mendenhall W. and Sincich T. (1995). Statistics for Engineering and Sciences (IV th edition). Prentice Hall. 6 Elhance D.N. (1984). Fundamentals of Statistics. Kitab Mahal, Allahabad

Reference books

S. No.	TITLE OF BOOK	AUTHOR	EDITION	ISNB	PUBLISHER
1	Statistical Methods	S.P. GUPTA	1ST	978-8180549892	Sultan Chand & Sons
2	Methods In Biostatistics: For Medical Students And Research Workers	B.K. MAHAJAN	7th	978-8184487138	JPB
3	Biostatistics Buster (Rxpg Series)	**HIMANSHU TYAGI**	1st	978-8180610592	JPB

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S. No.	TITLE OF BOOK	AUTHOR	EDITION	ISBN	PUBLISHER
1	Haematology For Students Practices	RamnikSood	6th	978-8184489354	JAYPEE
2	Clinical Haematology	Christopher A. Ludlam	1st	978-0443038341	Churchill Living Stone
3	Synopsis Of Medical Instruments & Procedure.	Ajay Yadav & Arora	6th	9789352704644	Jaypee
4	Synopsis Of Medical Instruments & Procedure.	Ajay Yadav & Arora	6th	9789352704644	Jaypee
5	Short Text Book Of Anaesthesia	Ajay Yadav	6th	9789352704644	JP Brothers
6	Textbook-Anaesthesia	Pramod Kumar	2nd	9781728684802, 9781728684802	Elsevior
7	Manual Of Anaesthesia For Operation Theatre Technicians	S Ahanantha Pillai	1st	978-8180617607	JAYPEE