



अटल बिहारी वाजपेयी चिकित्सा विश्वविद्यालय, उ० प्र०, लखनऊ
Atal Bihari Vajpayee Medical University, Lucknow U.P.

Ordinance
For
B. Sc. in Operation
Theatre Technology (BOTT)

कुलपति
अटल बिहारी वाजपेयी चिकित्सा विश्वविद्यालय
उत्तर प्रदेश, लखनऊ

12/4/22

Schandola
12/4/22

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Learning Objectives:

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

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

Expectation from the future graduate in the providing patient care -

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

Eligibility for admission

Selection Procedure

1. **Minimum qualification for the admission should be as per latest National Commission for Allied and Healthcare Professionals regulations.**
2. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with minimum aggregate marks of 50% in physics, chemistry and biology provided the candidate has passed in each subject separately.
3. He/she has attained the age of 17 years as on - (current year/session).
4. He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.
5. Admission to B.Sc. Operation Theatre Technology course shall be made on the basis of eligibility and merit list / entrance test to be conducted for the purpose.



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Duration of the course

Duration of the course: 4 years or 8 semesters. (970 hours of Theory & 2270 hours of Practical Classes) and 1440 hours (minimum) of internship.

Total hours - 4680

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

Attendance:

A candidate has to secure minimum -

1. 75% attendance in theoretical classes.
2. 80% attendance in Skills training (practical) for qualifying to appear in the final examination.

Assessment:

Assessment should be completed by the academic staff, on the basis of compilation of the theoretical and clinical performance of student throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated. **Passing marks for every subject should be 50% marks in theory and practical considered separately.**

EVALUATION SCHEDULE FOR BOTT

FIRST SEMESTER –

Sl. No	PAPER CODE	SUBJECTS	THEORY		PRACTICAL		TOTAL
			INTERNAL	EXTERNAL	INTERNAL	EXTERNAL	
1	BOTT-11	Introduction to Healthcare Delivery System in India	20	80	-	-	100
2	BOTT-12	Community orientation and clinical visit	-	-	20	80	100
3	BOTT-13	A- Medical Terminology and Record Keeping. B- Medical Law and Ethics.	20	80	-	-	100
4	BOTT-14	A- Professionalism and values. B- Principles of Management - I.	20	80	-	-	100
5	BOTT-15	A- Research Methodology and Biostatistics. B- Introduction to Quality and Patient safety	20	80	20	80	200

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Total			80	320	40	160	600
6	BOTT-16	Basic computers and information Science	Non- University Exam Subjects (These Subjects must be taught; though there will not be any exam from these through university level.)				
7	BOTT-17	Communication and soft skills					

SECOND SEMESTER –

Sl. No.	PAPER CODE	SUBJECTS	THEORY		PRACTICAL		TOTAL
			INTERNAL	EXTERNAL	INTERNAL	EXTERNAL	
1	BOTT-21	Basic Anatomy and Physiology	20	80	20	80	200
2	BOTT-22	General Biochemistry	20	80	20	80	200
3	BOTT-23	Principle of Management-II	20	80	20	80	200
Total			60	240	60	240	600

THIRD SEMESTER –

Sl. No.	PAPER CODE	SUBJECTS	THEORY		PRACTICAL		TOTAL
			INTERNAL	EXTERNAL	INTERNAL	EXTERNAL	
1	BOTT-31	General Pathology	20	80	20	80	200
2	BOTT-32	Medicine relevant to OT Techniques	20	80	20	80	200
3	BOTT-33	Principles of Anesthesia	20	80	20	80	200
Total			60	240	60	240	600

FOURTH SEMESTER –

Sl. No.	PAPER CODE	SUBJECTS	THEORY		PRACTICAL		TOTAL
			INTERNAL	EXTERNAL	INTERNAL	EXTERNAL	
1	BOTT-41	Clinical Pharmacology	20	80	20	80	200
2	BOTT-42	Clinical Microbiology	20	80	20	80	200
3	BOTT-43	Basic techniques of Anesthesia	20	80	20	80	200
Total			60	240	60	240	600

FIFTH SEMESTER –

Sl. No.	PAPER CODE	SUBJECTS	THEORY		PRACTICAL		TOTAL
			INTERNAL	EXTERNAL	INTERNAL	EXTERNAL	
1	BOTT-51	Basics of Surgical procedures	20	80	20	80	200
2	BOTT-52	CSSD Procedures	20	80	20	80	200
3	BOTT-53	Advance anesthetic techniques	20	80	20	80	200

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4	BOTT-54	Basic Intensive care	20	80	20	80	200
Total			80	320	80	320	800

SIXTH SEMESTER –

Sl. No.	PAPER CODE	SUBJECTS	THEORY		PRACTICAL		TOTAL
			INTERNAL	EXTERNAL	INTERNAL	EXTERNAL	
1	BOTT-61	Specialized surgery and anesthesia	20	80	20	80	200
2	BOTT-62	Electronics and technology in surgery and anesthesia	20	80	20	80	200
Total			40	160	40	160	400

INTERNAL ASSESSMENT-

- Internal assessment (Theory) will be done as follows –
 - (a) Term examinations – 10 marks (maximum)
 - (b) Assignment/ project/ class test/ clinical presentations - 05 marks (maximum)
 - (c) Class Attendance / Discipline - - 05 marks (maximum)**Total = 20 marks (maximum)**
- Internal assessment (practical) will be done as follows –
 - (d) Lab manual – 10 marks (maximum)
 - (e) Day to day performance - 05 marks (maximum)
 - (f) Practical Attendance /Discipline - - 05 marks (maximum)**Total = 20 marks (maximum)**

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Model Curriculum Outline

First Semester– Foundation Course

SINo.	Course Titles	.Hours_____.		
		Theory	Practical	Total
01	Introduction to Healthcare Delivery System in India	60	0	60
02	Basic computers and information Science	10	40	50
03	Communication and soft skills	20	10	30
04	Medical Terminology and Record Keeping (Including anatomical terms)	40	0	40
05	Medical Law and Ethics	40	0	40
06	Introduction to Quality and Patient safety (including Basic emergency care and life support skills, Infection prevention& control, Biomedical Waste Management Disaster management and Antibiotic resistance)	40	60	100
07	Professionalism and values	20	0	20
08	Research Methodology and Biostatistics	40	20	60
09	Principles of Management -I	40	0	40
10	Community orientation and clinical visit (including related practical to course 001)	0	100	100
TOTAL		310	230	540

Teaching resources (tutors) should be made available at every institute for basic subjects such as – Biology and English for students who wish to undertake the extra classes for the same.

Second Semester

Sl. No.	Course Titles	.Hours_____.		
		Theory	Practical	Total
11	Basic Anatomy and Physiology	80	120	200
12	General Biochemistry	40	60	100
13	Principles of Management - II	30	50	80
	<i>OTT Directed Clinical Education – part I (studentship)</i>	-	160	160
TOTAL		150	390	540



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Third Semester

Sl. No.	Course Titles	.Hours		
		Theory	Practical	Total
14	General Pathology	40	80	120
15	Medicine relevant to OT Techniques	40	80	120
16	Principles of Anesthesia	40	100	140
	<i>OTT Directed Clinical Education – part II (studentship)</i>	-	160	160
	TOTAL	120	420	540

Fourth Semester

Sl. No.	Course Titles	.Hours		
		Theory	Practical	Total
17	Clinical Pharmacology	40	60	100
18	Clinical Microbiology	40	60	100
19	Basic techniques of Anesthesia	40	120	160
	<i>OTT Directed Clinical Education – part III (studentship)</i>	-	180	180
	TOTAL	120	420	540

Fifth Semester

Sl. No.	Course Titles	.Hours		
		Theory	Practical	Total
20	Basics of Surgical procedures	30	50	80
21	CSSD Procedures	30	70	100
22	Advance anesthetic techniques	50	70	120
23	Basic Intensive care	30	100	130
	<i>OTT Directed Clinical Education – part IV (studentship)</i>	-	110	110
	TOTAL	140	400	540

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Sixth Semester

Sl. No.	Course Titles	.Hours .		
		Theory	Practical	Total
24	Specialized surgery and anesthesia	80	200	280
25	Electronics and technology in surgery and anesthesia	50	100	150
	<i>OTT Directed Clinical Education – part V (studentship)</i>	-	110	110
	TOTAL	130	410	540

Seventh and Eighth Semester

Sl. No.	Course Titles	.Hours .		
		Theory	Practical	Total
	<i>OTT Internship</i>	-	1440	1440*Internship –

minimum 1440 hours (calculated based on 8 hours per day, if 180 working days in 12 months). This is the minimum requirement, however depending on the working days/hours; the total duration of engagement in internship may be more than 1440 hours.

First Semester- Foundation course

Introduction to National Healthcare System

The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world. Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system
 - a. Healthcare delivery system in India at primary, secondary and tertiary care
 - b. Community participation in healthcare delivery system
 - c. Health system in developed countries.
 - d. Private Sector
 - e. National Health Mission
 - f. National Health Policy
 - g. Issues in Health Care Delivery System in India
2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programmes.
3. Introduction to AYUSH system of medicine
 - a. Introduction to Ayurveda.
 - b. Yoga and Naturopathy



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- c. Unani
 - d. Siddha
 - e. Homeopathy
 - f. Need for integration of various system of medicine
4. Health scenario of India- past, present and future
5. Demography & Vital Statistics
- a. Demography – its concept
 - b. Vital events of life & its impact on demography
 - c. Significance and recording of vital statistics
 - d. Census & its impact on health policy
6. Epidemiology
- a. Principles of Epidemiology
 - b. Natural History of disease
 - c. Methods of Epidemiological studies
 - d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

Medical terminologies and record keeping

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.²⁷ Topics to be covered under the subject are as follows:

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

Basic computers and information science

The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word

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processing, Excel data worksheet and PowerPoint presentation. Topics to be covered under the subject are as follows:

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

Practical on fundamentals of computers–

1. Learning to use MS office: MS word, MS PowerPoint, MS Excel.
2. To install different software.
3. Data entry efficiency

Medical law and ethics

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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 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. Few of the important and relevant topics that need to focus on are as follows:

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
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.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.

Communication and soft skills

Major topics to be covered under Communication course –

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

Introduction to Quality and Patient Safety



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1. Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.
 - a. Concepts of Quality of Care
 - b. Quality Improvement Approaches
 - c. Standards and Norms
 - d. Quality Improvement Tools
 - e. Introduction to NABH guidelines
2. Basics of emergency care and life support skills - Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject are as follows:
 - a. Vital signs and primary assessment
 - b. Basic emergency care – first aid and triage
 - c. Ventilations including use of bag-valve-masks (BVMs)
 - d. Choking, rescue breathing methods
 - e. One- and Two-rescuer CPR
 - f. Using an AED (Automated external defibrillator).
 - g. Managing an emergency including moving a patient

At the end of this topic, focus should be to teach the students to perform the maneuvers in simulation lab and to test their 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.
3. Bio medical waste management and environment safety- The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:
 - a. Definition of Biomedical Waste
 - b. Waste minimization
 - c. BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
 - d. Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
 - e. BMW Management & methods of disinfection
 - f. Modern technology for handling BMW
 - g. Use of Personal protective equipment (PPE)
 - h. Monitoring & controlling of cross infection (Protective devices)
4. Infection prevention and control - The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs

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with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –

- Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
- Prevention & control of common healthcare associated infections,
- Components of an effective infection control program, and
- Guidelines (NABH and JCI) for Hospital Infection Control

5. Antibiotic Resistance

- History of Antibiotics
- How Resistance Happens and Spreads
- Types of resistance- Intrinsic, Acquired, Passive
- Trends in Drug Resistance
- Actions to Fight Resistance
- Bacterial persistence
- Antibiotic sensitivity
- Consequences of antibiotic resistance
- Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals

6. Disaster preparedness and management- The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include-

- Fundamentals of emergency management,
- Psychological impact management,
- Resource management,
- Preparedness and risk reduction,
- Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

Professionalism and Values

The module on professionalism will deliver the concept of what it means to be a professional and how a specialized profession is different from a usual vocation. It also explains how relevant is professionalism in terms of healthcare system and how it affects the overall patient environment.

- Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality
- Personal values- ethical or moral values
- Attitude and behavior- professional behavior, treating people equally
- Code of conduct, professional accountability and responsibility, misconduct
- Differences between professions and importance of team efforts
- Cultural issues in the healthcare environment

Research Methodology and Biostatistics



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

1. Introduction to research methods
2. Identifying research problem
3. Ethical issues in research
4. Research design
5. Basic Concepts of Biostatistics
6. Types of Data
7. Research tools and Data collection methods
8. Sampling methods
9. Developing a research proposal

Principles of Management - I

The course is intended to provide knowledge about the basic principles of Management.

1. Introduction to management
2. Strategic Management
3. Foundations of Planning
4. Planning Tools and Techniques
5. Decision Making, conflict and stress management
6. Managing Change and Innovation
7. Understanding Groups and Teams
8. Leadership
9. Time Management
10. Cost and efficiency

Community orientation and clinical visit

The objective of this particular section of the foundation course is to sensitize potential learners with essential knowledge; this will lay a sound foundation for their learning across the undergraduate program and across their career. Innovative teaching methods should be used to ensure the attention of a student and make them more receptive such as group activities, interactive fora, role plays, and clinical bed-side demonstrations.

1. The community orientation and clinical visit will include visit to the entire chain of healthcare delivery system -Sub centre, PHC, CHC, SDH, DH and Medical College, private hospitals, dispensaries and clinics.
2. The student will also be briefed regarding governance at village level including interaction and group discussion with village panchayat and front line health workers.
3. Clinical visit to their respective professional department within the hospital.

Second Semester-

Basics Anatomy and Physiology of human body

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Anatomy is a key component of all education programmes for OTTs and should have a strong focus on organ position, orientation and relationships. The topics provide the student with an understanding of the structure and relationships of the systems and organs of the body which is essential in patient positioning and accurate delivery of intervention.

Similarly Physiology provides the students with knowledge of the function of systems and organs and their relationships and underpins the understanding of how surgical intervention can modify the function and structure of outcomes. Physiology is important to all programmes with increased depth of content required where OTTs are being required to take a more active role in side effect recognition and management. This may be in departments where OTTs are increasingly taking some responsibility in this area or in resource constrained environments where nursing or medical staff are limited.

1. Structure and function of cell; cell division; tissue: definition and classification (Gross outline)
2. General Anatomical terms and topography of the body-planes regions, positions, movements.
3. Skeleton & joints- Long bones, vertebrae, pelvic and shoulder girdles, hands and feet, skull , face and teeth; parts of classical long bone; outline of different joints and type of movements.
4. Muscles; Classification, structure and function (Gross outline)
5. Brain & spinal cord with its coverings and cavities including cerebrospinal fluids and pituitary gland (Macroscopic anatomy and surface anatomy only)
6. Head & Neck; Oral cavity & lips, Pharynx, Larynx, Nasal Cavity and Para Nasal sinuses, Salivary Glands, Ear; Orbit & its content; Thyroid Gland and Nodal Areas (Macroscopic Anatomy only)
7. Thorax: Structure of Thoracic cage, Oesophagus, Trachea, Lungs & Pleura, The Mediastinum including Thymus, Heart and Great Vessels and Diaphragm (Macroscopic and Surface Anatomy)
8. Abdomen: Structure of Abdomen & Peritoneum, Retro Peritoneal structures (including Kidney), Stomach, Small Intestine, Colon, Liver, Pancreas, Spleen (Macroscopic and Surface Anatomy)
9. Pelvic and Perineum: Structure of Pelvis, Rectum & Anus, Bladder, Prostate, Female Genital Tract, Male Genital Tract and Inguinal Femoral Region (Macroscopic and surface Anatomy)
10. Lymphatic system and Reticulo-endothelial system (Gross outline only)- Position and function of Lymph Nodal regions (Including Neck, Axilla, Mediastinum, para-aortic, Inguinal) Extra nodal Lymphatic Tissues(Waldeyer's Ring, Spleen and Liver, Malt, Bone Marrow, Thymus) and Re System; Lymphatic Drainage.
11. Digestive System- Organs of digestion, histology of the digestive organs (stomach, small intestine, liver, pancreas), process of digestion, absorption and assimilation of food, Vitamins and minerals.

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12. Respiratory System- Organs of respiration and their histology (lungs and trachea), Respiration (Definition and Mechanism), gas exchange in the lungs, regulation of respiration, basal metabolic rate.
13. The skin (Structure and functions)
14. The excretory system- Organs of excretion (kidneys, ureter, bladder), histology of kidney and its functions, formation of urine and its composition, structure of nephron.
15. Circulatory System- Composition and functions of blood, the heart anatomy and physiology, the chambers of heart, various vessels and valves present in heart, Circulation of blood, the cardiac cycle and heart sounds, blood pressure, arteries and veins.
16. Nervous System- Central nervous system (Brain and Spinal cord), Peripheral nervous system (cranial and spinal nerves), The reflex action and reflex arc, The transmission of nerve impulse, sense organs (eye, ear, tongue and nose); structure and functions.
17. Endocrine System- short description of various endocrine glands and their functions
18. Reproductive System- Male and female reproductive system, Histology of Gonads, ovarian cycle and ovulation, Fertilization, Fertility control.

General Biochemistry:

1. Carbohydrates - Glucose and Glycogen Metabolism
2. Proteins-Classification of proteins and functions
3. Lipids- Classification of lipids and functions
4. Enzymes- Definition, Nomenclature, Classification, Factors affecting enzyme activity, Active site. Coenzyme, Enzyme Inhibition, Units of enzymes, Isoenzymes and Enzyme pattern in diseases
5. Vitamins & Minerals- Fat soluble vitamins (A, D, E, K), water soluble vitamins, Bcomplex vitamins, principal elements (Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chlorine and Sulphur), trace elements, calorific value of foods, Basal Metabolic Rate (BMR), Respiratory Quotient (RQ), Specific Dynamic Action (SDA), balanced diet, Marasmus and Kwashiorkor
6. Acids and bases-Definition, pH, Henderson – Hassel Balch equation, Buffers, Indicators, Normality, Molarity, Molality
7. Hormones
8. Applied Chemistry:
 - a. Nomenclature of compounds containing Halogen, Alcohols and Phenols, Ethane, Propane, Ether, Aldehydes, Ketones, Carboxylic acid, Cyanides, Isocyanides, Nitrogen compounds and amines.
 - b. Catalysis.
 - c. Hemoglobin, Blood and respiration.

Syllabus for practical

1. Benedict's test
2. Heat coagulation tests

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Principles of management - II

1. Principles of management:


- Development of Management: Definitions of Management – Contributions of F.W. Taylor, Henry Fayol and others.
- Functions of Management: Planning – Organizing – Directing – Controlling
Planning: Types of planning – Short-term and long plans – Corporate or Strategic Planning – Planning premises – Policies – Characteristics and sources – principles of policy making – Strategies as different from policies – Procedures and methods– Limitations of planning.
- Organizing: Importance of organization – Hierarchy – Scalar chain – Organization relationship – Line relationship – Staff relationship - Line staff relationship – Functional relationship - Committee organization – Management committees – Departmentation.
- Motivation: Motivation theories – McGregor's theory X and theory Y – Maslow's and Herzberg's theory – Porter and Lawler model of complex view of motivation– Other theories – Diagnostic signs of motivational problems – Motivational Techniques.
- Communication: Types of communication – Barriers of effective communication– Techniques for improved communication.
- Directing: Principles relating to Direction process – Principles and theories of leadership – Leadership Styles – Delegation of authority.
- Controlling: Span of control – Factors limiting effective span of control – Super management, General managers, Middle managers and supervisors – Planning and controlling relationships – Management control process – Corrective measures– Strategic control points – Budgetary control – Types of budgets.
- Co-ordination: Co-ordination and co-operation – Principles of co-ordination – Techniques of co-ordination charts and records – Standard procedure instructions.

2. Personnel management:

Objective of Personnel Management – Role of Personnel Manager in an organization – Staffing and work distribution techniques – Job analysis and description – Recruitment and selection processes – Orientation and training – Coaching and counselling – disciplining – Complaints and grievances – Termination of employees – Performance appraisal – Health and safety of employees - Consumer Protection Act as applicable to health care services.

3. Financial management:

Definition of financial Management – Profit maximization – Return maximization– wealth maximization – Short term Financing – Intermediate Financing – Long term Financing – leasing as a source of Finance – cash and Security Management – Inventory Management – Dividend policies – Valuations of Shares – Financial Management in a hospital – Third party payments on behalf of patients. Insurance – health schemes and policies.


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OTT Directed Clinical Education – part I (studentship)

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

Third Semester-

General Pathology:

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.

Medicine relevant to OT Techniques:

1. Common symptoms of diseases –
 - a. Pain: pathophysiology, clinical types, assessment and management
 - b. Fever: clinical assessment and management
 - c. Cough, chest pain, dyspnoea, hemoptysis
 - d. Edema, anasarca, ascites
 - e. Pallor, jaundice
 - f. Bleeding
 - g. Anorexia, nausea and vomiting
 - h. Constipation and diarrhea
 - i. Hematemesis, malena and hematochezia
 - j. Common urinary symptoms- dysuria, pyuria, anuria, oliguria, polyuria, nocturia, enuresis
 - k. Body pains and joint pains



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- l. Headache, seizures, fainting, syncope, dizziness, vertigo
- m. Disturbances of consciousness and coma
- n. Weight loss and weight gain

2. Immune Response and Infections

- a. Approach to infectious diseases – diagnostic and therapeutic principles
- b. Immune defense mechanisms
- c. Laboratory diagnosis of infections
- d. Principles of immunization and vaccine use
- e. Immunodeficiency disorders - acquired
- f. Immunodeficiency disorders – congenital

3. Systems

- a. Cardiovascular system- Clinical examination of the cardiovascular system, major manifestations of cardiovascular disease
- b. Respiratory system - Clinical examination of the respiratory system, major manifestations of respiratory disease
- c. Renal and genito-urinary system- Major manifestations of renal and urinary tract disease
- d. Liver and biliary tract disease - Viral hepatitis, alcoholism.
- e. Endocrinology and metabolism - Diabetes mellitus, Hyper - and hypothyroidism.
- f. Disorders of the Immune System, Connective Tissue and Joints
- g. Disorder of haemopoiesis - Anemia - iron deficiencies anemia.

Principles of anaesthesia

1. Medical gas supply

- a. Compressed gas cylinders
- b. Color coding
- c. Cylinder valves; pin index.
- d. Gas piping system
- e. Recommendations for piping system
- f. Alarms & safety devices.
- g. Scavenging of waste anesthetic gases

2. Anaesthesia machine

- a. Hanger and yoke system
- b. Cylinder pressure gauge
- c. Pressure regulator
- d. Flow meter assembly
- e. Vaporizers - types, hazards, maintenance, filling and draining, etc.

3. Breathing system

- a. General considerations: humidity & heat
- b. Common components - connectors, adaptors, reservoir bags.
- c. Capnography



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- d. Pulse oximetry
 - e. Methods of humidification.
 - f. Classification of breathing system
 - g. Mapleson system - a b c d e f
 - h. Jackson Rees system, Bain circuit
 - i. Non rebreathing valves - AMBU valves
 - j. The circle system
4. Face masks & Airway laryngoscopes
- a. Types, sizes
 - b. Endotracheal tubes - Types, sizes.
 - c. Cuff system
 - d. Fixing, removing and inflating cuff, checking tube position, complications.
5. Anesthesia ventilator and working principles.
6. Monitoring
- a. Electrocardiography (ECG)
 - b. Pulse oximetry (SpO₂)
 - c. Temperature- central and peripheral
 - d. End tidal carbon dioxide (EtCO₂)
 - e. Anesthesia gas monitoring
 - f. Non-invasive blood pressure (NIPB) and Invasive blood pressure (IBP)
 - g. Central venous pressure (CVP)
 - h. PA Pressure, LA Pressure & cardiac output
 - i. Anesthesia depth monitor
 - j. Neuromuscular transmission monitor

Practical

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



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

OTT Directed Clinical Education – part II (studentship)

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

Fourth Semester-

Clinical pharmacology

1. Antisialagogues: Atropine, Glycopyrrolate.
2. Sedatives I Anxiolytics: Diazepam, Midazolam, Phenergan, Lorazepam, Chlorpromazine, and Triclofos.
3. Narcotics: Morphine, Pethidine, Fentanyl, Pentazocine, tramadol.
4. Antiemetic's: Metoclopramide, Ondansetron, Dexamethasone
5. Induction Agent: Thiopentone, Diazepam, Midazolam, Ketamine, Propofol, Etomidate.
6. Muscle Relaxants: Depolarizing - Suxamethonium, Non depolarizing - Vecuronium, Atracurium, Rocuronium
7. Inhalational Gases: Gases-O₂, N₂O, Air, Agents-Ether, Halothane, Isoflurane, Sevoflurane, Desflurane
8. Reversal Agents: Neostigmine, Glycopyrrolate, Atropine, Naloxone, Flumazenil (Diazepam).
9. Local Anesthetics: Xylocaine, Bupivacaine - Topical, Prilocaine-jelly, Emla - Ointment, Etidocaine, Ropivacaine.
10. Emergency Drugs: Mode or administration, dilution, dosage and effects
 - a. Adrenaline, Atropine
 - b. Ephedrine, Mephentermine
 - c. Bicarbonate, calcium, potassium.
 - d. Inotropes: dopamine, dobutamine, amidarone
 - e. Aminophylline, hydrocortisone, antihistaminic,
 - f. Antihypertensive –Beta-blockers, Ca-channel blockers.
 - g. Antiarrhythmic- xylocard
 - h. Vasodilators- nitroglycerin & sodium nitroprusside
 - i. Respiratory system- Bronchodilators



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j. Renal system- Diuretics, frusemide, mannitol

Clinical Microbiology

1. Morphology

a. Classification of microorganisms, size, shape and structure of bacteria; Use of microscope in the study of bacteria.

2. Growth and nutrition

a. Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic bacteriology.

3. Culture media

a. Use of culture media in diagnostic bacteriology, antimicrobial sensitivity test.

4. Sterilization and Disinfection

a. Principles and use of equipment of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptic and disinfectants.

5. Immunology

a. Immunity, vaccines, types of vaccine and immunization schedule, principles and interpretation of common serological tests namely Widal, VDRL, ASLO, CRP, RF& ELISA.
b. Rapid tests for HIV and HBsAg (excluding technical details).

6. Systematic Bacteriology

a. Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria (excluding classification, antigenic structure and pathogenicity),
b. Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, E. coli, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas & Spirochetes.

7. Parasitology

a. Morphology, life cycle, laboratory diagnosis of following parasites: E. histolytica, Plasmodium, tape worms, Intestinal nematodes.
8. Mycology a. Morphology, diseases caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi
9. Virology a. General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.

Basic techniques of anaesthesia

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.

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2. Anesthesia drugs and techniques:

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

Practical

1. Anesthesia work station

2. Boyle's anesthesia apparatus and other Advanced Anesthesia machines.

3. Apparatus and technique of the intravenous injections:

- a. Selection of the material used for intravenous injection.
- b. Different types of intravenous needles and cannulas.
- c. Theoretical study for testing of the toxicity of the materials.

4. Resuscitation equipment and Resuscitation techniques:

- a. Endotracheal tubes:
 - Selection of the material used for the endotracheal tube
 - Study of the structure of various types of the endotracheal tubes; Cleaning and sterilization of ETT.
- b. Connectors: Various connectors, size and material used.
- c. Mask: Material, structure and importance of dead space of face mask.
- d. Supraglottic airways.
- e. Spinal and epidural blocks: equipment, types of spinal and epidural needles, their structure. Instruments used for spinal and epidural blocks.
- f. Laryngeal sprays: Types, structure and material used, mechanism, uses and their maintenance.


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OTT Directed Clinical Education – part III (studentship)

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

Fifth Semester-

Basics of surgical procedures

1. Blood Transfusion

- History of discovery of blood groups and genetics of blood groups.
- Types of blood groups and Rh factor.
- Coombs test.
- Collection of blood, its preservation and standardization.
- Various types of blood and blood products (Packed cells, PRP, FFP)
- Pre-transfusion checks.
- Transfusion reactions.
- Fluids and electrolytes
- Body fluid compartments and the effect of fluid administration on them.
- Types of fluids (crystalloids and colloids) and their chemical composition.
- Indications of specific fluids and their complications.

2. General surgical procedure and para-surgical equipment

- Operating tables: structure, material used, maintenance, control, Hydraulic system and Electrical system.
- Different types of diathermy machine. Monopolar, Bipolar, Ligasure, Harmonic Scalpel, CUSA- Principle, hazards, prevention, functioning and maintenance.
- Types of operation lights and light sources: Features, Care, cleaning, sterilization and maintenance.
- Operation Theatre sterilization- Different recent advances.
- LAR/APR--Positioning of patient, care-Prevention of hazards.
- Total thyroidectomy—with emphasis on proper positioning.
- Transthoracic esophagectomy—Different approaches.
- Venesection and Tracheostomy.
- Laparoscopic Cholecystectomy – Pneumoperitonium - Creation and removing, principles.
- Nephrectomy.
- Breast surgery.
- Positioning of patient for different operations: Problems and hazards.
- Hypothermia and hyperthermia.

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CSSD procedures

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

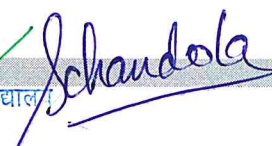
Advance anesthesia techniques

1. Heart as a pump.
2. Cardiac cycle.
3. Cardiac contractility and stroke volume.
4. Cardiac output and its measurement.
5. Various ECG Leads, their placement and Normal ECG.
6. Cardiac Arrhythmias (atrial fibrillation, ventricular tachycardia, extra systoles)
7. Circulatory shock and its physiology.
8. Cardiac failure.
9. Physics of blood flow and pressure.
10. Measurement of blood flow.
11. Electromagnetic flow meter, ultrasonic flow meter, plethysmography.
12. Regulation of arterial pressure and hypertension (Drugs used for treatment of hypertension)
13. Arterial circulation including cardiopulmonary bypass.
14. Artificial ventilation and related equipment:
 - a. Physiology of IPPV (Intermittent positive pressure ventilation)
 - b. Principles of mechanical ventilation.
 - c. Various modes of IPPV.
 - d. Automatic pressure and time cycled ventilators.
 - e. Operating room ventilators.
 - f. Other types of ventilators (HFJV, NIV)
 - g. Complications in patients on ventilators.



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- h. General care of a patient on ventilator.
- i. Disinfection and sterilization of ventilators.
- j. Humidification
- k. Principles of oxygen administration and methods used to deliver oxygen.
- l. Acid base balance.
- m. Electrolyte imbalance and its relevance to anesthesia.

Basic Intensive care

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



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

Sixth Semester-

Specialized anesthesia and surgery

1. Cardiovascular and Respiratory System- Techniques, equipment, procedures and instruments
 - a. Diseases of cardiovascular and respiratory systems.
 - b. Types of perfusion machines.
 - c. Techniques of Perfusion and operational capabilities.
 - d. Intra-aortic Balloon pump.
 - e. Cell saver techniques.
 - f. Care, maintenance and working of Heart lung Machine.
 - g. Patient's record keeping preoperatively, during anesthesia and post-operatively.
 - h. Principles and techniques of temperature monitoring.
 - i. Positioning during cardiothoracic surgical procedures.
 - j. Positioning and techniques for:
 - Radial artery cannulation
 - Central venous cannulation/pulmonary artery catheter
 - Femoral artery/venous cannulation
2. Monitoring Techniques and Equipment:
 - a. Cardiac monitors, blood pressure and ECG monitoring
 - b. Respiratory monitors, respiratory rate, Spirometers, SpO₂, and EtCO₂.
 - c. Temperature monitors.
 - d. TEE and echocardiography machine
 - e. Non- invasive cardiac output machine
3. Positioning
 - a. During various neurosurgical procedures including sitting, prone, lateral and position for trans-sphenoidal hypo-physectomy.
 - b. Fixation of head during various neurosurgical procedures.
 - c. Prone and Knee chest position for spine surgery.
4. Requirements during intubation in a case of cervical spine fracture including fiber- optic laryngoscopy, awake intubation, LMA family especially ILMA.
5. Anaesthetic and surgical requirements during aneurysm surgery.
6. Surgical and Anaesthetic requirements during micro neurosurgery including types of microscopes, principle, structural features, microscopic photography and cameras used.
7. Anaesthetic and surgical requirements during thyroid surgery, adrenal surgery.



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

Electronics and technology in surgery and anesthesia

1. Electronics and electro mechanical techniques

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

2. Book keeping and Stock maintenance.

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

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- e. Management of operation theatre in routine and emergency.
3. Computer data processing, software information and Data management
 - a. Logging on and off, Security concepts, Sending and receiving Emails.
 - b. Hospital information system.

OTT Directed Clinical Education – part V (studentship)

This course is the final in a series of five directed clinical courses. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction.

Seventh and Eighth Semester

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in simulation and treatment delivery. Students will demonstrate competence in beginning, intermediate, and advanced procedures in both areas. Students will participate in advanced and specialized treatment procedures. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The students are expected to work for minimum 8 hours per day and this may be more depending on the need and the healthcare setting.

Skills based outcomes and monitorable indicators for Operation Theatre Technologist

Competency statements

1. Demonstrate ability to prepare and maintain Operation Theater
2. Demonstrate ability to maintain equipment support in an acute care environment
3. Identify and move to maintain a sterile field
4. Follow infection control policies and procedures
5. Manage and maintain theater equipment
6. Demonstrate ability to prepare the patient for operative procedures
7. Provide intra-operative equipment and technical support
8. Demonstrate skills and knowledge to assist anesthetist in handling emergencies outside of OT Room
9. Manage hazardous waste and follow biomedical waste disposal protocols
10. Ensure availability of medical and diagnostic supplies
11. Monitor and assure quality
12. Act within the limits of one's competence and authority
13. Work effectively with others
14. Manage work to meet requirements
15. Maintain a safe, healthy, and secure working

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S. no.	Learning outcomes	Knowledge/comprehension	Applications / synthesis / evaluation	Hours
1	Prepare and maintain Operation	Be familiar with the OT and all the equipments	Prepare the OT for the operation along with all the necessary equipments	300
		Know the protocols used in Operation Theatre	Interpret and understand all planning techniques to keep an OT functional.	
2	Maintain equipment support in an acute care environment	Use basic knowledge of surgical procedures to assist and identify the needs of equipment of Operating teams.	Clean and store equipment safely	300
			Position equipment in accordance with set up procedures	
3	Assist anaesthetist in handling emergencies outside of OT Room.	Knowledge of assisting anaesthetist outside OT Room.	Prepare emergency kit to handle areas outside OT Room	300
			Ensure any signs or symptoms of a clinical emergency is identified correctly and reported to the appropriate clinician.	
4	Follow infection control policies and procedures	Knowledge of effective infection control strategy that ensures the safety of the patient.	Perform the standard precautions to prevent the spread of infection in accordance with organization requirements.	220
5	Ensure availability of medical and diagnostic supplies	Anticipating demand and ensuring availability of adequate medical and diagnostic supplies.	Maintain adequate supplies of medical and diagnostic supplies. Arrive at actual demand as accurately as possible	100
6	Prepare patient for operative procedures	Knowledge of preparing patients as required before the operation.	Safely position patient to meet the requirements of the anaesthetist and Surgeon.	200
7	Provide intra-operative equipment and technical support	Knowledge to assist the anaesthetist and provide technical support during surgical procedure.	Monitoring the performance of equipment used and adjusting surgical equipment.	200
8	Work effectively with others	Working with other people to meet requirements	Identify any problems with team members and other people and take the initiative to solve these problems.	100
		Communicating with other team members and people internal	Communicate with other people clearly and effectively	

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		or external to the organisation		
9	Be able to demonstrate professional behavior	Explain the legal and ethical guidelines related to the profession Be aware of your own competency levels	Promote collaborative practice	100
10	Be able to complete accurate treatment documentation	Recognize the importance of accurate documentation	Complete the treatment documentation accurately	50
11	Manage hazardous waste	Knowledge of Handle, collect and dispose of the hazardous waste.	Coordinate the hazardous waste management program. Properly identify, segregate, handle, label, and store waste.	100
12	Maintain a safe, healthy and secure working environment.	Complying the health, safety and security requirements and procedures for Workplace.	Identify individual responsibilities in relation to maintaining workplace health safety and security requirements. Follow the organization's emergency procedures promptly, calmly, and Efficiently.	100
13	Monitor and assure quality	Monitor treatment process/outcomes Identify problems in treatment Solve treatment process/outcome problems	Evaluate potential faults in treatment procedures. Identify breaches in health, safety and security procedures. Follow the organization's emergency procedures promptly, calmly and efficiently.	200
Total-		2270		

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Books suggested for the course –

Book's Name with author-

- Ajmani - Embalming: Principles and Legal Aspects,
- Gandotra - Gross Anatomy workbook
- Jain - General Anatomy for Students
- Kapur - Ess. Of Surface & Radiological anatomy
- Singh - Essentila of Anatomy, (all in four colour)
- Ross & Wilson - Anatomy & Physiology
- P R Ashalatha - Text Book of Anatomy & Physiology for Nurses
- Feneis - Pocket Atlas of Human Anatomy
- Panda - Concise Pocket Medical Dictionary,
- Panda - Jaypee's Nurses' Dictionary,
- Rikh - Pocket Medical English Hindi Dictionary, Ind.
- Dorland - Dorland's Pocket Medical Dictionary,
- Bijlani - Understanding Medical Physiology,
- Ratan - Handbook of Human Physiology,
- Despopoulos - Color Atlas of Physiology,
- Harsh Mohan - Text Book of Pathology
- Mahajan - Methods in Biostatistics,
- Prabhakaran - Biostatistics ,
- Rao - Biostatistics: The Manual of Statistical Methods for use in Health & Nutrition,
- Singh - Elementary Statistics for Medical Workers,
- Dave - Emergency Medical Services & Disaster Management,
- Dogra - aids to Clinical Medicine
- Gupta - Manual of Medical Emergency
- Krishna Das - TB of Medicine ,Vol.1,11,
- Mohaptra - Occupation, Health Hazards and Remedies
- Mogli - Medical Records Organization and Management
- Prasad - TB of Medicine (Hindi)
- Suratt - Manual of Medical Procedures, Ind.
- Nambi - Psychiatry for Nurses
- Ray - Yogic Exercises : Physiologic and Psychic Processes
- Rattnlalchhpujani, Rajesh Bhatia - Microbiology for Nurses
- Patricia, A Potter, RN, MSN, FAAN, Anne Griffin Perry, RN, EdD, - Fundamentals Of Nursing
- Sr. Nancy - Principles & Practice of Nursing
- Suzanne C. Smelzer, Brenda G. Bare, Janice L. Hinkle, Kerry H. Cheever - TB of MSN(Volume-1 & 2)
- AST (Paul Price, Kelvin B. Frey, Tracey Ross)- Surgical Technology for Surgical Technologists
- Kanojia - Plaster Application Made Easy
- Jain - Basic Surgical Skills And Techniques
- Gomez - Manual of Operating Room Techniques
- Johararpurkar - Instruments In Surgery ,Orthopedics And ENT
- Sweta - Manual of Surgical equipment
- Thresyamma - Operating Room Technique & Anaesthesia for General Nursing Coarse
- Chaube - Consumer Protection and The Medical Profession
- Francis - Medical Ethics
- Gupta - Manual of First Aid Hindi



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- Gupta - Manual of First Aid: Manag. General Injuries, Sports Injuries Common ailments
- Prasad - Step by Step 1st Aid for all with special emphasis on NBC
- Jaiswal - Consumer Protection act and The Medical Practitioners
- Meador - A Little Book of Doctors' Rules ind.
- Mogli - Medical Records Organization and Management
- Moss - Ind Health Manual A Self Help Guide 1/e Ind
- Nayyar - Tell Me about Me: The Living Machine-Basic human Anat.
- Panda - Handbook for Medical Representatives
- Singhals - Medical Ethics
- Urs - Networking Organisation of Health Science Laboratories
- Bijlani - Nutrition: A Practical Approach
- Chandra - Poshan & Swastha, (Hindi)
- Ghosh - Nutrition and Child care: A Practical Guide (Hindi)
- Gupta - Food & Nutrition: Facts and Figures
- Indrani - Ess. of Nutrition and Therapeutic Diet (2 Vols)
- Mazumdar - Essentials of Human Nutrition
- Salins - Nutrition Guide
- Virk - Lecture notes in Nutrition
- Boyle - Personal Nutrition
- Mahan - Krauses Food, Nutrition and Diet Therapy
- Way - Nutrition Secrets Ind
- WHO - Guidelines for training Community Health Workers in Nutri
- WHO - Nutrition Learning Packages Ind
- Williams - Basic Nutrition and Diet Therapy
- Lippincott Williams & Wilkins - Pharmacology
- Annamma Jacob, Rekha R, Jadhav Sonali Tarachand - Pharmacology for Nurses
- Katherine Snyder, Chriskeegan - Pharmacology For Surgical technologists
- K Raja Gopal Shenoy & Anitha Nileshwar - Manipal Manual of surgery
- Mohan - Step by Step Minor Surgical Procedures
- Dutta - Laproscopy Made Easy
- Divekar - Anae, and Resus, for Medical Students and Practitioners
- Dutta - Fundamentals of Operation theatre Service
- Kaushik - Anaesthesia: Concepts and Management
- Panda - PAIN: Clinical Aspects and Management
- Moyel - Ward's Anaesthesia Equipment
- Stoelting - Pharmacology & Physiology in Anesthetic Practice
- Vickers - Drugs in Anaest. & Intensive Care Pract.
- WHO - Anaesthesia at the District Hospital, Ind.
- Agarwal - Essentials of Surgery
- Gallagher - Anesthesia Unplugged A Step-Step Guide To Techniques & Procedure
- Pillai - Anesthesia For Nurses
- Pillai - Mechanical Ventilation Made Easy
- Paul - Step by Step Practical Aspects of Emergency Anesthesia
- Paul - Step By Step Regional Anesthesia And Analgesia
- Kaushik - Operative Procedures in Surgical Gastroenterology
- Kochar - Common Surgical Emergencies
- Kumar - Aids to Operative Surgery

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- Dombai - Surgical Decision Making
- Dudely - Guide for House Surgeon & Interns in the Surgical Unit Kurzweg - The Surgeons Handbook
- Norton - Surgery Basics Science and Clinical Evidence
- K. Park - Preventive & Social Medicine

List of suggested instruments / equipments and articles for demonstration in BOTT

S No	Name of Item
1.	B P Handle
2.	Kidney Tray
3.	Towel Clip
4.	Yaunkar's suction Nozzle
5.	Sponge Holding forceps
6.	Dissecting forceps plain
7.	Toothed Dissecting Forceps
8.	Curve On Flat Scissor (Mayo Type)
9.	Metzenbaum's Scissor
10.	Needle Holder
11.	Mosquito (Curve) Artery forceps
12.	intestinal clamp
13.	Desjardin's choledocolithotomy forceps
14.	Randall Renal calculus forceps
15.	Straight artery forceps
16.	Medium curved artery forceps
17.	Scalp artery forceps(Curved on Angle)
18.	Kocher's Hemostatic forceps
19.	Alli's Tissue forceps
20.	Babcock's tissue forceps
21.	Lengenbeck's Retractor
22.	Dever's Retractor
23.	Doyen's Retractor
24.	Gigli's Wire Saw
25.	Gigli's Wire Handle
26.	Amputation Saw
27.	Valkmann's Scoop
28.	Ribs Repertory
29.	Bone cutter
30.	Instrument Trolley
31.	Stellate
32.	SS Bowl
33.	D&C Instrument Set
34.	Czerny Retractor
35.	Mayo's trolley
36.	Knee Hammer
37.	Magill forceps
38.	Bone Nibbler
39.	Mackintosh Rubber Sheet
40.	Cut Sheet

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41.	Surgeon's Gown
42.	Drape Sheet - long
43.	Cheatele's forceps
44.	Drape Sheet- small
45.	Bain's breathing circuit
46.	IV stand
47.	Sphygmomanometer
48.	Stethoscope
49.	Thermometer
50.	Anesthetic oxygen mask
51.	Gauge cutting scissor
52.	AMBU Bag
53.	Laryngoscope with all blades(Macintosh)
54.	Weighing machine
55.	Guedel's Oral airway
56.	Urethral dilatator (lister's type)
57.	Proctoscope
58.	Mastoid self-retaining retractor
59.	Double hock retractor
60.	Surgical blade
61.	Surgical needle Straight(round body, cutting)
62.	Surgical needle Curved(round body ,Reverse cutting)
63.	Hospital Bed
64.	Torch
65.	Tourniquet
66.	Cervical collar (hard & Soft)
67.	Curtain
68.	Blanket cover
69.	Pillow
70.	Pillow cover
71.	Bed Mattress
72.	Bed sheet
73.	Formalin chamber
74.	Fowler's cot
75.	Ortho Fracture Table
76.	Dressing Trolley (SS)
77.	ICCU Cots
78.	Bed Side Screen
79.	Medicine Trolley(SS)
80.	Case Sheet Holders with clip(S.S.)
81.	Instrument Trolley Mayo's (SS)
82.	Surgical Bin Assorted
83.	Wheel Chair (SS)
84.	Stretcher / Patience Trolley (SS)



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85.	Instrument Tray (SS) Assorted
86.	Basin Assorted (SS)
87.	Basin Stand Assorted (SS)
88.	Delivery Table (SS Full)
89.	Cylinder Trolley(SS)
90.	Urinal Male and Female
91.	Arm Board
92.	AMBU bags
93.	O2 Cylinder with spanner ward type
94.	Needle destroyer
95.	Thermometer - clinical
96.	Emergency Resuscitation Kit-Adult
97.	O T Table
98.	Surgical diathermy
99.	Anesthesia machine\workstation
100.	Fumigator
101.	O T portable stand light
102.	Suction machine
103.	Syringe pump
104.	Multi-paramonitor
105.	C PR Dummy

List of consumable items for demonstration in BOTT course -

S No	Name of Item
1.	Barber thread
2.	Silk suture
3.	Chromic Catgut suture
4.	Vicryl suture
5.	Nylon suture
6.	Prolene suture
7.	SS wire thread
8.	Prolene mesh
9.	Colostomy kit
10.	Ryle's tube
11.	Feeding tube
12.	Uro-bag
13.	Foley's
14.	Dynaplast
15.	Micropore
16.	Leucoplast
17.	Tracheostomy Tube

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18.	ET tube cuffed
19.	ET tube Uncuffed
20.	ICD kit
21.	Roma vac suction drain kit
22.	ECG Electrode
23.	Xylocaine jelly
24.	Plane catheter
25.	Spinal needle
26.	I V cannula
27.	Hypodermic needle
28.	Syringes
29.	I V set (macro)
30.	I V set (micro)
31.	I V set (paedia)
32.	Surgical gloves
33.	Cap disposable
34.	Face mask disposable
35.	Abgel
36.	Corrugated drain
37.	Cotton Bundle
38.	Gauge Than
39.	Crape bandage
40.	Triangular bandage
41.	Roller bandage

Faculty, Staff & Area Layout

Department-wise and year-wise requirement -

(i) Teaching staff (full time) -It is recommended that a **faculty and student ratio of 1:10** for UG to be followed.

Required teaching staff year wise Bachelor Courses for 60 intake

Bachelor course year wise	Principle/Dean	I & II Year	III & IV Year	Total
Professor	Associate Professor	01	--	04
Assistant Professor		01	03	07
		03	04	12
		06	06	

(ii) Technical staff

Technical Staff for Bachelor courses

Technical staff	Number
Technician	01
Technical Assistant	01



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(iii) Administrative staff

Administrative Staff	Number
Administrative officer	01
Office superintendent	01
PA to Principal	01
Accountants/Cashier	01

(iv) Ancillary staff

Ancillary Staff	Number
Academic clerk	02
Record clerk	03
Librarian	01
Library attendant	02
Steno typist	02
Lab attendant	02
Classroom attendant	04
Office attendant	02
Peon	02
Security Guard	02
Driver	01
Sweeper	05

(v) Planning and layout - master plan, layouts and elevation and floor wise area calculation

Space allotment	Upto 50 intake	51 to 100 intake	No of units	Total area required in sq.ft
Administrative office	500	1000	1	500/1000
Director/dean/principal/H.O.D.'s office	400	400	1	400
Professor's office	150 per unit	150 per unit	3/4/6	450/600/900
Associate Professor's Office	100 per unit	100 per unit	1/4/6/11	100/400/600/1100
Assistant Professor's Office	75 per unit	75 per unit	3/8/9/13/22	225/600/675/975/1650

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Conference room	300	500	1	300/500
Mini auditorium	1500	2500	1	1500/2500
Class Rooms	750	1200	4	3000/4800
Student Common room (Girls)	1000	1500	1	1000/1500
Student common room (Boys)	250	300	1	250/300
Library with reading room	1200	2000	1	1200/2000
Discussion/ Interaction room	200	300	1	200/300
Hostels for Girls	Mandatory	Mandatory	Separate or shared with Medical college	
Hostels for Boys	Mandatory	Mandatory	Separate or shared with Medical college	
Core laboratories	1200	1500	2	2400/3000
Clinical skill/demonstration OT lab	1200	1500	1	1200/1500
Sterile Supply demonstration Lab	1200	1500	1	1200/1500
Human Anatomy Lab	1200	1500	1	1200/1500
Human Physiology Lab	1200	1500	1	1200/1500
Indoor department	1200	1200	1	1200
Outdoor department as per work load	5000	7000	1	5000/7000
Recreational Area	1000	1200	1	1000/1200

(VI) Details of the hospital –For Bachelor Courses, own hospital/ attached hospital with 150 beds and related department is mandatory. Student: Patient Ratio in hospital and OPD should be 1:5. In case of an attached hospital there should be a maximum distance of 5 km from the academic block of the College. The college must have its own/ tie-up with at least 2 PHCs/NGOs/Special Schools for Community training.

REFERENCES -

- Model Curriculum Handbook of Operation Theatre Technology (Intellectual Property of Ministry of Health and Family Welfare) Allied Health Section 2015-16.
- Section 68 of National Commission for Allied and Healthcare Profession Act, 2021 (14 of 2021) for State Government.
- CPE21 Information Brochure of AtalBihari Vajpayee Medical University UP for session 2021-22.
- Brochure of UP State Medical Faculty for BOTT Rules 23 Jan 2008.
- Ordinance and Syllabus of BPT in AtalBihari Vajpayee Medical University UP for session 2021-22.