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For

"Anaesthesia & Operation Theatre Technology"

Master of Anaesthesia & Operation Theatre Technology (M.AOTT)

कुलपति
अटल बिहारी वाजपेयी चिकित्सा विश्वविद्यालय
उत्तर प्रदेश, लखनऊ

Atal Bihari Vajpayee Medical University UP
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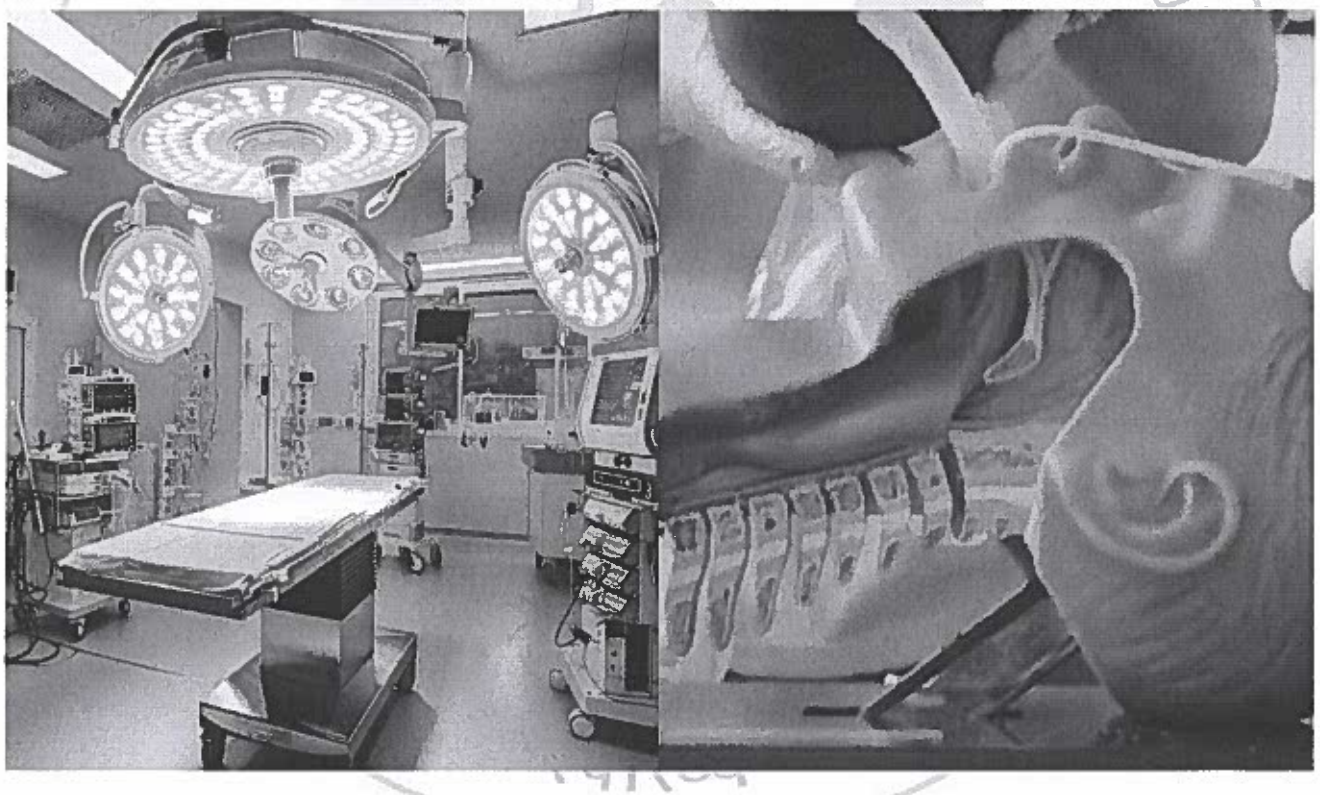
ORDINANCE, REGULATIONS & SYLLABUS FOR M.AOTT COURSE OF ATAL BIHARI VAJPAYEE MEDICAL UNIVERSITY, LUCKNOW (U.P) INDIA ADOPTED AS PER NCAHP COMPETENCY BASED CURRICULUM (NCAHP ACT- 2021)

COMPETENCY BASED CURRICULUM

for

"ANAESTHESIA & OPERATION THEATRE TECHNOLOGY"



As per the NCAHP Act -2021

APPROVED SYLLABUS 2026-27 ONWARDS

Atal Bihari Vajpayee Medical University
Lucknow, UP

Contents

List of Abbreviations

AED	Automated External Defibrillator
AHP	allied and healthcare Professionals
AIDS	Acquired Immuno Deficiency Disease
BLS	Basic life support
BOTT	Bachelor in Operation Theatre Technology
BMW	Bio Medical Waste
BVM	Bag Value Masks
CATS	Credit Accumulation and Transfer System
CBC	Complete Blood Count
CBCS	Choice-Based Credit System
CbD	Case-based discussion
CEX	Case Evaluation Exercise
CHC	Community Health Centre
CMP	Comprehensive Metabolic Panel
CPR	Cardiopulmonary Resuscitation
CPU	Central Processing Unit
CSF	Cerebrospinal fluid
CSSD	Central Sterile Supplies Department
DH	District Hospital
DOTT	Diploma in Operation Theatre Technology
DOPs	Direct observation of procedures
ECG	Electro cardiogram
ESWL	Extracorporeal shock wave therapy
HIS	Hospital Information System
HOD	Head of Department
HSSC	Healthcare Sector Skill Council
ILO	International Labor Organization
JCI	Joint Commission International
LFT	Liver Function Tests
CEX	Mini Case Evaluation Exercise
NAAC	National Assessment and Accreditation Council
NABH	National Accreditation Board for Hospitals & Healthcare
NCRC	National Curricula Review Committee
NIAHS	National Initiative for Allied and Healthcare Sciences
NSDA	National Skills Development Agency
NSQF	National Skills Qualification Framework
OBG	Obstetrics and Gynecology
OSCE	Objective Structured Clinical Examination
OT	Operation Theatre
OTT	Operation Theatre Technology
OSLER	Objective Structured Long Examination Record
OSPE	Objective Structured Practical Examination
PPE	Personal Protective Equipment

PHC	Primary Health Centre
RFT	Renal Function Tests
SDL	Self-directed learning
SCA	Sudden Cardiac Arrest
SC	Sub Centre
SDH	Sub District Hospital
TFT	Thyroid Function Test
TURP	Transurethral Resection of the Prostate
TURBT	Transurethral Resection of Bladder Tumors
UGC	University Grants Commission
UHC	Universal Health Coverage
WWW	World Wide Web

Chapter 1
Introduction to the Handbook

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Chapter 1: Introduction to the Handbook

The report „From Paramedics to Allied Health Professionals: Landscaping the Journey and Way Forward" that was published in 2012, marked the variance in education and training practices for the allied and healthcare courses offered by institutions across the country. This prompted the Ministry of Health and Family Welfare to envisage the creation of national guidelines for education and career pathways of allied and healthcare professionals, with a structured curriculum based on skills and competencies. Thus, this handbook has been designed to familiarize universities, colleges, healthcare providers as well as educators offering allied and healthcare courses with these national standards.

Individually, created for different professional groups of allied and healthcare, this handbook aims to reduce the variation in education by comprising of a standardized curriculum, career pathways, nomenclature and other details for each profession. The change from a purely didactic approach will create better skilled professionals and improve the quality of overall patient care. Approved by National Commission for Allied & Healthcare Professions (NCAHP) i.e. National standard-setting authority, a statutory regulatory body set up by an Act of Parliament in 2021, this handbook will guide thousands of young adults who choose healthcare as a profession – not as doctors or nurses but to play several other critical roles – on the appropriate course of action to enable them to be skilled allied and healthcare professionals of the future.

Who is an Allied and Healthcare Professional?

The Ministry of Health and Family Welfare, accepted in its entirety the definition of an allied and healthcare professional based on the afore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now as follows-

'Allied and healthcare professionals (AHPs) includes individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person('s) physical, mental, social, emotional, environmental health and holistic well-being.'[1]

Since the past few years, many professional groups have been interacting and seeking guidance on all those who would qualify under the purview of "allied and healthcare professionals". In the healthcare system, statutory bodies existed for clinicians, nurses, pharmacists and dental practitioners; but a regulatory structure for around 50 professions was absent in India till 2021 when Government of India established a regulatory body "National Commission for Allied & Healthcare Professions" enacted by an Act of Parliament. The Government has kept these 56 professions (as listed Annex-1) under the ambit of the Allied and Healthcare system and regulated these 56 allied health professionals under 10 different groups by establishing 10 professional councils for each of the group of professions. However, this number is subject to changes and modifications over time, particularly considering how quickly new technologies and new clinical avenues are expanding globally, creating newer cadres of such professionals.

Scope and need for allied and healthcare professionals in the Indian healthcare system

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses.[1] Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that allied and healthcare professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team. For instance in the UK, more than 84,000 AHPs, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care. Australia"s health system is managed not just by their doctors and nurses, but also by the 90,000 university-trained, autonomous AHPs vital to the system.[2,3]

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, though the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being.[2] Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses such as in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and
- With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society.

Learning goals and objectives for allied and healthcare professionals

The handbook has been designed with a focus on performance-based outcomes pertaining to different levels. The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres:

1. Clinical care
2. Communication
3. Membership of a multidisciplinary health team
4. Ethics and accountability at all levels (clinical, professional, personal and social)
5. Commitment to professional excellence
6. Leadership and mentorship
7. Social accountability and responsibility
8. Scientific attitude and scholarship (only at higher levels-Master"s & Ph.D.)
9. Lifelong learning

1. Clinical Care[4]

Using a patient/family-centered approach and best evidence, each student will organize and implement the prescribed preventive, investigative and management plans; and will offer appropriate follow-up services. Program objectives should enable the students to:

- Apply the principles of basic science and evidence-based practice
- Use relevant investigations as needed
- Identify the indications for basic procedures and perform them in an appropriate manner
- Provide care to patients – efficiently and in a cost-effective way – in a range of settings, and maintain foremost the interests of individual patients
- Identify the influence of biological, psychosocial, economic, and spiritual factors on patients" well-being and act in an appropriate manner
- Incorporate strategies for health promotion and disease prevention with their patients

2. Communication[4,5]

The student will learn how to communicate with patients/clients, care-givers, other health professionals and other members of the community effectively and appropriately. Communication is a fundamental requirement in the provision of health care services. Program objectives should enable the students to:

- Provide sufficient information to ensure that the patient/client can participate as actively as possible and respond appropriately to the information

- Clearly discuss the diagnosis and options with the patient, and negotiate appropriate treatment plans in a sensitive manner that is in the patient"s and society"s best interests
- Explain the proposed healthcare service – its nature, purpose, possible positive and adverse consequences, its limitations, and reasonable alternatives wherever they exist
- Use effective communication skills to gather data and share information including attentive listening, open-ended inquiry, empathy and clarification to ensure understanding
- Appropriately communicate with, and provide relevant information to, other stakeholders including members of the healthcare team
- Use communication effectively and flexibly in a manner that is appropriate for the reader or listener
- Explore and consider the influence that the patient"s ideas, beliefs and expectations have during interactions with them, along with varying factors such as age, ethnicity, culture and socioeconomic background
- Develop efficient techniques for all forms of written and verbal communication including accurate and timely record keeping
- Assess their own communication skills, develop self-awareness and be able to improve their relationships with others
- Possess skills to counsel for lifestyle changes and advocate health promotion

3. Membership of a multidisciplinary health team[6]

The student will put a high value on effective communication within the team, including transparency about aims, decisions, uncertainty and mistakes. Team-based health care is the provision of health services to individuals, families, and/or their communities by at least two health providers who work collaboratively to accomplish shared goals within and across settings to achieve coordinated, high quality care. Program objectives will aim at making the students being able to:

- Recognize, clearly articulate, understand and support shared goals in the team that reflect patient and family priorities
- Possess distinct roles within the team; to have clear expectations for each member"s functions, responsibilities, and accountabilities, which in turn optimizes the team"s efficiency and makes it possible for them to use division of labor advantageously, and accomplish more than the sum of its parts
- Develop mutual trust within the team to create strong norms of reciprocity and greater opportunities for shared achievement
- Communicate effectively so that the team prioritizes and continuously refines its communication channels creating an environment of general and specific understanding
- Recognize measurable processes and outcomes, so that the individual and team can agree on and implement reliable and timely feedback on successes and failures in both the team"s functioning and the achievement of their goals. These can then be used to track and improve performance immediately and over time.

4. Ethics and accountability

Students will understand core concepts of clinical ethics and law so that they may apply these to their practice as healthcare service providers. Program objectives should enable the students to:

- Describe and apply the basic concepts of clinical ethics to actual cases and situations
- Recognize the need to make health care resources available to patients fairly, equitably and without bias, discrimination or undue influence
- Demonstrate an understanding and application of basic legal concepts to the practice
- Employ professional accountability for the initiation, maintenance and termination of patient-provider relationships
- Demonstrate respect for each patient's individual rights of autonomy, privacy, and confidentiality

5. Commitment to professional excellence[7]

The student will execute professionalism to reflect in his/her thought and action a range of attributes and characteristics that include technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare. Program objectives will aim at making the students being able to:

- Demonstrate distinctive, meritorious and high quality practice that leads to excellence and that depicts commitment to competence, standards, ethical principles and values, within the legal boundaries of practice
- Demonstrate the quality of being answerable for all actions and omissions to all, including service users, peers, employers, standard-setting/regulatory bodies or oneself
- Demonstrate humanity in the course of everyday practice by virtue of having respect (and dignity), compassion, empathy, honour and integrity
- Ensure that self-interest does not influence actions or omissions, and demonstrate regards for service-users and colleagues

6. Leadership and mentorship[8]

The student must take on a leadership role where needed in order to ensure clinical productivity and patient satisfaction. They must be able to respond in an autonomous and confident manner to planned and uncertain situations, and should be able to manage themselves and others effectively. They must create and maximize opportunities for the improvement of the health seeking experience and delivery of healthcare services. Program objectives should enable the students to:

- Act as agents of change and be leaders in quality improvement and service development, so that they contribute and enhance people"s wellbeing and their healthcare experience
- Systematically evaluate care; ensure the use of these findings to help improve people"s experience and care outcomes, and to shape clinical treatment protocols and services

- Identify priorities and effectively manage time and resources to ensure the maintenance or enhancement of the quality of care
- Recognize and be self-aware of the effect their own values, principles and assumptions may have on their practice. They must take charge of their own personal and professional development and should learn from experience (through supervision, feedback, reflection and evaluation)
- Facilitate themselves and others in the development of their competence, by using a range of professional and personal development skills
- Work independently and in teams. They must be able to take a leadership role to coordinate, delegate and supervise care safely, manage risk and remain accountable for the care given; actively involve and respect others" contributions to integrated person-centered care; yet work in an effective manner across professional and agency boundaries. They must know when and how to communicate with patients and refer them to other professionals and agencies, to respect the choices of service users and others, to promote shared decision-making, to deliver positive outcomes, and to coordinate smooth and effective transition within and between services and agencies.

7. Social Accountability and Responsibility[9]

The students will recognize that allied and healthcare professionals need to be advocates within the health care system, to judiciously manage resources and to acknowledge their social accountability.[10] They have a mandate to serve the community, region and the nation and will hence direct all research and service activities towards addressing their priority health concerns. Program objectives should enable the students to:

- Demonstrate knowledge of the determinants of health at local, regional and national levels and respond to the population needs
- Establish and promote innovative practice patterns by providing evidence-based care and testing new models of practice that will translate the results of research into practice, and thus meet individual and community needs in a more effective manner
- Develop a shared vision of an evolving and sustainable health care system for the future by working in collaboration with and reinforcing partnerships with other stakeholders, including academic health centres, governments, communities and other relevant professional and non-professional organizations
- Advocate for the services and resources needed for optimal patient care

8. Scientific attitude and Scholarship[10]

The student will utilize sound scientific and/or scholarly principles during interactions with patients and peers, educational endeavors, research activities and in all other aspects of their professional lives. Program objectives should enable the students to:

- Engage in ongoing self-assessment and structure their continuing professional education to address the specific needs of the population
- Practice evidence-based by applying principles of scientific methods
- Take responsibility for their educational experiences
- Acquire basic skills such as presentation skills, giving feedback, patient education and the design and dissemination of research knowledge; for their application to teaching encounters

9. Lifelong learning[11]

The student should be committed to continuous improvement in skills and knowledge while harnessing modern tools and technology. Program objectives will aim at making the students being able to:

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

Introduction of new elements in allied and healthcare education

Competency-based curriculum

A significant skill gap has been observed in the professionals offering healthcare services irrespective of the hierarchy and level of responsibility in the healthcare settings. The large variation in the quality of services is due to the diverse methodologies opted for healthcare education and the difference in expectations from a graduate after completion of a course and at work. What one is expected „to perform" at work is assumed to be learned during the course, however, the course design focuses on what one is expected „to know". The competency-based curriculum thus connects the dots between the „know what" and „do how".

The efficiency and effectiveness of any educational programme largely depends on the curriculum design that is being followed. With emerging medical and scientific knowledge, educators have realized that learning is no more limited to memorizing specific lists of facts and data; in fact, by the time the professional aims to practice in the healthcare setting, the acquired knowledge may stand outdated. Thus, competency-based education is the answer; a curricular concept designed to provide the skills that professionals need. A competency-based program is a mix of skills and competencies based on individual or population needs (such as clinical knowledge, patient care, or communications approaches), which is then developed to teach relevant content across a range of courses and settings. While the traditional system of education focuses on objectives, content, teacher-centric approach and summative evaluation; competency-based education has a focus on competencies, outcomes, performance and accomplishments. In such a case, teaching activities are learner-centered, and evaluation is continuous and formative in structure. The competency-based credentials depend on the demonstration of a defined set of competencies which enables a professional to achieve targeted goals. Competency frameworks comprise of a clearly articulated statement of a person"s abilities on the completion of the credential, which allows students, employers, and other stakeholders to set their expectations appropriately.[12] [13]

Considering the need of the present and future healthcare delivery system, the curriculum design depicted in this handbook thus will be based on skills and competencies.

Promoting self-directed learning of the professionals

The shift in the focus from traditional to competency-based education has made it pertinent that the learning processes may also be revisited for suitable changes. It is a known fact that learning is no more restricted to the boundaries of a classroom or the lessons taught by a teacher. The new tools and technologies have widened the platform and introduced innovative modes of how students can learn and gain skills and knowledge. One of the innovative approaches is learner-centric and follows the concept of **self-directed learning.**

Self-directed learning, in its broadest meaning, describes a process in which individuals take the initiative with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying resources for learning, choosing and implementing learning strategies and evaluating learning outcomes (Knowles, 1975).[14]

In self-directed learning, learners themselves take the initiative to use resources rather than simply reacting to transmissions from resources, which helps them learn more in a better way.[15] Lifelong, self-directed learning (SDL) has been identified as an important ability for medical graduates (Harvey, 2003)[16] and so is applicable to other health professionals including AHPs. It has been proven through many studies worldwide that the self-directed method is better than the teacher-centric method of learning. Teacher-directed learning makes learners more dependent and the orientation to learning becomes subject-centred. If a teacher provides the learning material, the student is usually satisfied with the available material, whereas if a student is asked to work on the same assignment, he or she invariably has to explore extensive resources on the subject.[15]

Thus the handbook promotes self-directed learning, apart from the usual classroom teaching and opens the platform for students who wish to engage in lifelong learning.

Credit hours vs traditional system

Recently the National Assessment and Accreditation Council (NAAC) and the University Grants Commission (UGC) have highlighted the need for the development of a Choice-Based Credit System (CBCS), at par with global standards and the adoption of an effective grading system to measure a learner"s performance.[17] All the major higher education providers across the globe are operating a system of credits. The European Credit Transfer System (ECTS), the „National Qualifications Framework" in Australia, the Pan-Canadian Protocol on the Transferability of University Credits, the Credit Accumulation and Transfer System (CATS) in the UK as well as the systems operating in the US, Japan, etc. are examples of these. Globally, a need now exists for the use of a fully convertible credit-based system that can be accepted at other universities. It has now become imperative to offer flexible curricular choices and provide learners mobility due to the popularity of initiatives such as „twinning programmes", „joint degrees" and „study abroad" programmes.[18]

In order to ensure global acceptability of the graduates, the current curriculum structure is divided into smaller sections with focus on hours of studying which can be converted into credit hours as per the international norms followed by various other countries.

Integrated structure of the curriculum

Vertical integration, in its truest sense, is the interweaving of teaching clinical skills and knowledge into the basic science years and, reinforcing and continuing to teach the applications of basic science concepts during the clinical years. (Many efforts called „vertical integration" include only the first half of the process).

Horizontal integration is the identification of concepts or skills, especially those that are clinically relevant, that cut across (for example, the basic sciences), and then putting these to use as an integrated focus for presentations, clinical examples, and course materials. e.g. Integration of some of the basic science courses around organ systems, e.g., human anatomy, physiology, pathology; or incorporating ethics, legal issues, finance, political issues, humanities, culture and computer skills into different aspects of a course like the Clinical Continuum.

The aim of an integrated curriculum is to lead students to a level of scientific fluency that is beyond mere fact and concept acquisition, by the use of a common language of medical science, with which they can begin to think creatively about medical problems.[19]

This innovative new curriculum has been structured in a way such that it facilitates horizontal and vertical integration between disciplines; and bridges the gaps between both theory & practice, and between hospital-based practice and community practice. The amount of time devoted to basic and laboratory sciences (integrated with their clinical relevance) would be the maximum in the first year, progressively decreasing in the second and third year of the training, making clinical exposure and learning more dominant.[11] However it may differ from course to course depending on the professional group.

Introduction of foundation course in the curriculum

The foundation course for allied and healthcare professions is an immersive programme designed to impart the required knowledge, skills and confidence for seamless transition to the second semester of a professional allied and healthcare course. Post admission, the foundation course is designed for a period of 6 months to prepare a student to study the respective allied and healthcare course effectively and to understand the basics of healthcare system. This aims to orient the student to national health systems and the basics of public health, medical ethics, medical terminologies, communication skills, basic life support, computer learning, infection prevention and control, environmental issues and disaster management, as well as orientation to the community with focus on issues such as gender sensitivity, disability, human rights, civil rights etc. Though the flexibility to the course designers have been provided in terms of – modifying the required numbers of hours for each foundation subject and appropriate placement of the subject across various semesters.

Learning methodologies

With a focus on self-directed learning, the curriculum will include a foundation course that focuses on communication, basic clinical skills and professionalism; and will incorporate clinical training from the first year itself. It is recommended that the primary care level should have sufficient clinical exposure integrated with the learning of basic and laboratory sciences. There should also be an emphasis on the introduction of case scenarios for classroom discussion/case-based learning.

Healthcare education and training is the backbone of an efficient healthcare system and India's education infrastructure is yet to gain from the ongoing international technological revolution. The report *„From Paramedics to Allied Health: Landscaping the Journey and way ahead'*, indicates that teaching and learning of clinical skills occur at the patient"s bedside or other clinical areas such as laboratories, augmented by didactic teaching in classrooms and lecture theatres. In addition to keeping up with the pace of technological advancement, there has been a paradigm shift to outcome-based education with the adoption of effective assessment patterns.

However, the demand for demonstration of competence in institutions where it is currently limited needs to be promoted. The report also mentions some of the allied and healthcare schools in India that have instituted clinical skill centres, laboratories and high-fidelity simulation laboratories to enhance the practice and training for allied and healthcare students and professionals. The report reiterates the fact that simulation is the replication of part or all of a clinical encounter through the use of mannequins, computer-assisted resources and simulated patients. The use of simulators addresses many issues such as suboptimal use of resources and equipment, by adequately training the manpower on newer technologies, limitations for imparting practical training in real-life scenarios, and ineffective skills assessment methods among others.[1] The table mentioned below lists various modes of teaching and learning opportunities that harness advanced tools and technologies.

Table 1 Clinical learning opportunities imparted through the use of advanced techniques[1,20]

Teaching modality	Learning opportunity examples
Patients	Teach and assess in selected clinical scenarios
	Practice soft skills
	Practice physical examination
	Receive feedback on performance
Mannequins	Perform acquired techniques
	Practice basic procedural skills
	Apply basic science understanding to clinical problem solving
Simulators	Practice teamwork and leadership
	Perform cardiac and pulmonary care skills
	Apply basic science understanding to clinical problem solving
Task under trainers	As specific to Anaesthesia & Operation Theatre Technology

Assessment methods

Traditional assessment of students consists of the yearly system of assessments. In most institutions, assessments consist of internal and external assessments, and a theory examination at the end of the year or semester. This basically assesses knowledge instead of assessing skills or competencies. In competency-based training, the evaluation of the students is based on the performance of the skills as per their competencies. Hence, all the three attributes – knowledge, skills, and attitudes – are assessed as required for the particular competency.

Several new methods and tools are now readily accessible, the use of which requires special training. Some of these are given below:

- Objective Structured Clinical Examination(OSCE), Objective Structured Practical Examination (OSPE), Objective Structured Long Examination Record(OSLER)
- Mini Case Evaluation Exercise(CEX)
- Case-based discussion(CBD)

- Direct observation of procedures(DOPs)
- Portfolio
- Multi-source feedback
- Patient satisfaction questionnaire

An objective structured clinical examination (OSCE) is used these days in a number of allied and healthcare courses, e.g. Optometry, Physiotherapy, and Radiography. It tests the performance and competence in communication, clinical examination, and medical procedures/prescriptions. In physiotherapy, orthotics, and occupational therapy, it tests exercise prescription, joint mobilization/manipulation techniques; and in radiography it tests radiographic positioning, radiographic image evaluation, and interpretation of results. The basic essential elements consist of functional analysis of the occupational roles, translation of these roles ("competencies") into outcomes, and assessment of trainees' progress in these outcomes on the basis of demonstrated performance. Progress is defined solely by the competencies achieved and not the underlying processes or time served in formal educational settings. Most methods use predetermined, agreed assessment criteria (such as observation check-lists or rating scales for scoring) to emphasize on frequent assessment of learning outcomes. Hence, it is imperative for teachers to be aware of these developments and they should suitably adopt them in the allied and healthcare education system.[21]

Chapter 2

Methodology of Curriculum Development

Chapter 2: Methodology of curriculum development

With the release of the report „From Paramedics to Allied Health: Landscaping the journey and the way ahead", the Ministry of Health and Family Welfare prioritized the key recommendations and concerns raised by various allied and healthcare professionals groups and experts as indicated in the report. One of the major recommendations in the report was the need for standardization of curriculum and pedagogic requirements for the major allied and healthcare professional courses.

The MoHFW had identified 12 priority professional streams in the phase-I for the purpose of standardization. The expertise of over 50 leading public and private allied and healthcare educational institutions for 12 different disciplines has been sought as part of this exercise. Additionally, international experts from Canada, Sweden, USA and UK were also being roped in, to arrive at a comprehensive and globally acceptable set of educational standards based on a skills and competencies approach. The opinions were sought from experts for all the courses, though curricula for the following two professions were not redesigned as they fall under the ambit of regulatory body- Rehabilitation Council of India governed by Ministry of Social Justice and Empowerment –

- Audiology and Speech Pathology
- Orthotics and Prosthetics

The National Skills Development Agency has also developed the National Skills Qualification Framework (NSQF). Under the aegis of the NSDA, the Healthcare Sector Skill Council (HSSC) has undertaken a similar process for a few entry level allied and healthcare courses (Certificate and Diploma level). The focus of Ministry of Health and Family Welfare is thus to preempt duplication of efforts and arrive at a comprehensive set of minimum standards for the allied and healthcare professions but for higher level professional qualifications. This would ensure that the key considerations and obligations of both the public and the private sector are adequately addressed.

In view of the above, the Ministry of Health and Family Welfare instituted 12 National Curricula Redesign Taskforce groups comprising of academicians and professionals from the best institutes and colleges across the country. These people served as subject experts and redesigned the curricula based on a standardized framework developed by the NIAHS TSU (National Initiative for Allied Health Sciences-Technical Support Unit), which is the technical arm supporting this project. The final curriculum has been reviewed and approved by the National Curricula Review Committee (NCRC), (constituted by the MoHFW), that consists of experts with versatile and immense experience in their respective streams, to assess the applicability of the curricula drafted in view of the healthcare system as a whole.

Steps undertaken in the curricula review process –

1. Curricula were sought from various States and institutions across the country in response to which the NIAHS TSU reviewed–
    a. 118 curricula of allied and healthcare courses (different levels and different professions) from 10 states across the country;
    b. 133 curricula of various allied and healthcare courses collected during phase-I of the NIAHS project.
2. Literature review – a comprehensive literature review was undertaken resulting in a detailed curriculum of the allied and healthcare courses, which included competency and skills-based models followed nationally as well as internationally, methodologies of curriculum development, assessment protocols, and many such aspects of curriculum development. The literature review helped the TSU to develop a reference document that comprised of a standard framework for a competency-based curriculum to be followed for the curricula review and redesign. A detailed mapping of all the resources was undertaken and shared with the task group experts via email.
3. Constitution of the National Curricula Redesign Taskforces for various professional groups – Specific taskforces were then instituted comprising of technical as well as subject experts who were engaged in the process of redesigning the curriculum.
4. Constitution of the National Curricula Review Committee (NCRC) – The NCRC comprising of experts with versatile and immense experiences of their respective domain, was then constituted for final review and approval on the curriculum drafted by the taskforce and NIAHS TSU.
5. National Curricula Redesign Taskforce Consultations– a series of consultations were conducted with subject experts including both regional and national task group experts to develop a „skill and competency" framework for education and career pathways. The consultations were facilitated by the NIAHS TSU members and were led by the chairperson of the group. Post this, the draft version and recommendations were compiled by the TSU members and sent to the experts for final review and consent.
6. Local consultations – These were also conducted in different hospitals and other healthcare settings to get suggestions, feedbacks and ideas from the subject experts for their respective curricula.
7. Response draft – Comments and suggestions were received on the draft and a response draft curriculum was prepared, which was then re-circulated for final consent and validation by the task group experts.
8. Submission and approval of draft curriculum – The final draft of the curriculum handbook was then submitted by the taskforce chairman to the National Curricula Review Committee for approval and final sign-off.
9. Public opinion – The handbook was uploaded to seek public opinion from national and international experts, students, faculty, and practitioners of the respective professional groups.

10. Final approval by the NCRC- The comments and suggestions by the public were then reviewed and considered for any possible modification by the taskforce group. The final approval and sign off for the overall structure was then sought from NCRC.
11. Dissemination- The final handbook (guidelines) is disseminated by the Ministry of Health and Family Welfare for further adoption and incorporation by institutes/universities as applicable to ensure standardization.

Review of Model Curricula in 2023-24.

National Taskforce was reconstituted by the Interim Commission/National Commission for Allied and Healthcare Professions to review the existing curricula for all major allied health professions. Reconstituted taskforce was provided the draft curricula prepared by the previous taskforce in the year 2015-16 and approved by NCRC to review and to recommend the necessary changes required into this under the guidance and supervision of Committee for Curriculum Standardization and other Standards under National/Interim Commission for Allied and Healthcare Professions, Ministry of Health & Family Welfare, Government of India. Taskforce was provided the guiding principles and parameters while reviewing the curricula.

Taskforce reviewed the draft curricula and find the Bachelor"s degree program curriculum substandard and outdated and decided to prepare a fresh curriculum for the bachelor"s degree program retaining the some course content from the previous curriculum and designing the curriculum afresh keeping in view the technological advancements and progress happened in this rapidly evolving field of allied health sciences. Similarly taskforce designed the Master"s course curriculum as the master"s course curriculum was not prepared by the previous taskforce and it was not part of the draft Curricula Handbook for Operation Theatre Technology.

Following process was followed by the Taskforce in the review of draft curriculum for Anaesthesia & Operation Theatre Technology (AOTT):

1. Curricula were collected from all the major Institutions/Universities conducting the undergraduate and postgraduate courses in Anaesthesia & Operation Theatre Technology with varied nomenclature and course duration. Taskforce studied all the curricula taught in major Government as well private sector Institutions/Universities in order to prepare a competency and skills based curricula which meets the future expectations and prepare the well trained professionals who have in depth knowledge and who can work in the challenging environment of modern healthcare delivery system.
2. Taskforce decided to change the nomenclature of the undergraduate as well as postgraduate program due to following reasons:

    a) Clarity of Focus: The proposed name, "Baccalaureate or Bachelors in Anaesthesia & Operation Theatre Technology (B.AOTT)," clearly communicates the dual specialization of the program, providing prospective students and stakeholders with a more accurate representation of the curriculum.
    b) Alignment with Industry Trends: The healthcare industry is witnessing an increasing demand for professionals with expertise in both Anesthesia and Operation Theatre Technology. Aligning the program's nomenclature with this industry trend will enhance its marketability and relevance.

c) Enhanced Employability: The revised nomenclature may attract a broader spectrum of students who are specifically interested in pursuing a career that involves both Operation Theatre procedures and Anesthesia Technology. The Taskforce has recommended the program nomenclature as "Baccalaureate in Anaesthesia and Operation Theatre Technology" due to its enhanced employability and acceptability at National level..

3. Literature review – a comprehensive literature review was undertaken by the Taskforce resulting in development of a detailed curriculum of "Anaesthesia & Operation Theatre Technology" courses, which included competency and skills-based models followed nationally as well as internationally, methodologies of curriculum development, assessment protocols, and many such aspects of curriculum development.
4. National Curricula Review Taskforce Consultations– a series of consultations were conducted with subject experts including both regional and national task group experts to develop a „skill and competency" framework for education and career pathways. The consultations were facilitated and led by the Chairperson of the Committee for Curriculum Standardization and other Standards and local consultations in taskforce were led by the chairperson of the taskforce group. Post this, the draft version and recommendations were compiled by the Taskforce Team Leader and sent to all the experts for final review and consent.
5. Response draft – Comments and suggestions were received on the draft curricula from all the experts and a response draft curriculum was prepared, which was then re-circulated for final consent and validation by the task group experts.
6. Submission and approval of draft curriculum – The final draft of the curriculum handbook was then submitted by the taskforce lead expert to the Committee for Curriculum Standardization and other Standards for review and approval of the Committee.
7. Public opinion – The draft curricula handbook was uploaded on the Ministry of Health and Family Welfare website to seek public opinion from national and international experts, students, faculty, practitioners and other various stake holders of Anaesthesia & Operation Theatre Technology.
8. Modifications after the public opinion- The comments and suggestions received from stake holders were then reviewed and considered for any possible modification by the taskforce group in a meeting held under the chairmanship of Hon"ble Chairperson of National Commission of Allied and Healthcare Professions. The necessary modifications agreed upon in the meeting were incorporated into the curricula by the Task force.
9. Final Approval and Dissemination: The final draft of Curricula was submitted to the NCAHP through the Chairperson of the Committee for Curriculum Standardization and other Standards constituted under NCAHP. The curricula were finally reviewed by this empowered Committee for Curriculum Standardization and other Standards for final approval and dissemination.

Chapter 3
Background of the profession

Chapter 3: Background of the profession

Statement of Philosophy– Why this profession holds so much importance

A latest study by the Harvard School of Public Health has found that while the South-East Asia region has just 2.6 OTs per 1 lakh population, the number is as low as 1.3 OT per 1 lakh population in India and Pakistan. Whereas, developed regions like Eastern Europe have the highest number of OTs per 1 lakh population - 25.1, followed by Asia Pacific (high income countries) 24.3, Central Europe 15.7, Western Europe 14.7, North America and Australasia 14.3, Central Asia 11.7 and the Caribbean 10.4 OTs). So we may interpret that there is an enormous scope and need for the profession not only in India as well as in other developing countries but at the same time along with skilled manpower we need adequate manpower.

Moreover, a variety of electrical and electronic equipment are in use in modern operation theatres for monitoring anesthesia & surgical procedures, the success of the procedures and safety of patients depend largely on the reliability, smooth and trouble free performance of these equipment"s and ability of skilled manpower to operate the same. Thus, there is increased need for qualified and trained professionals in the system. This course is aimed at satisfying this need.

About Anaesthesia & Operation Theatre Technology

An Anaesthesia & operation theatre (OT) technologist forms an intrinsic part of any hospital. To become a trained professional one must undertake Anaesthesia & operation theatre technology course. An AOT professional is the one, who facilitates the surgical procedures, planned and emergency both, by preparing in advance the equipment that are necessary for any surgical procedures. He/she also looks after all the work and management of the operation theatre which includes managing the patients in & out of operation theatre, looking after all the surgical equipment, arrangement of operation theatre table, dressing table, anesthesia table as well as management of the staff. As the surgical branch has various specialties including General Surgery, OBG, Cardiac, Ortho and genito-urinary, the OT technologist needs to know about these various specialties.

Scope of practice

a. Setup, check, and maintain anesthesia machine, monitors life support equipment like airway equipment, ventilator, emergency equipment, defibrillator, anesthetic and resuscitation drugs.
b. Orders, Maintains and keep records of all anesthesia equipment and drug.
c. Assist Anesthetist in patient procedures like setting up of invasive lines, airway management, setting up of monitors and administer anesthesia to patient
d. Assists during emergency situations by assisting in basic and advanced life support, critical events
e. Prepares and maintains operation table, light, electric cautery, tourniquets etc.
f. Management of central sterile services department. Packing of equipment and linen. Sterilization procedures like autoclaving, plasma sterilization and disinfection procedures as per guidelines, checking, storage and dispatch.
g. Management in Intensive Care unit and emergency department of equipment like ventilators, monitors, infusion pumps, defibrillators etc.

h. Assist disaster team in disaster situations and national emergencies on field and safe transport in ambulance.
i. Assist anesthesia and surgical team in all kinds of surgical disciplines.
j. Assist anesthetist during anesthesia procedures outside operation theatres like CT and MRI suits, Cardiac catheterization laboratory, pain relief procedures etc.

Recognition of Title and qualification

Within the multidisciplinary team, the professional responsible for the facilitation and preparation of the surgical procedures is the Anaesthesia & Operation theatre technologist.

The recommended title thus stands as the Anaesthesia & Operation Theatre Technologist with the acronym - AOTT for this group of professionals.

It is a known fact that with the career advancement, the nomenclature will also vary and will also depend on the sector and profile of the professional. Considering the 10 NSQF levels designed by the NSDA, the following level progression table has been proposed by the taskforce to map the nomenclature, career pathways and progression in different sectors of professional practice for Anaesthesia & Operation Theatre Technologist. **The proposed progression is for further discussion and deliberation, the implementation time of the same may vary depending on the current system and regulations in place**.

The table 2 below indicates the various channels of career progression in three distinct sectors such as clinical setting, academic and industry (management/sales or technical) route. It is envisaged that the AOTT will have two entry pathways – students with diploma or baccalaureate. The level of responsibility will increase as the career progresses and will starts with NSQF level four (4) for diploma holders and NSQF level five (5) for baccalaureate degree holders. The table also indicates the corresponding level of qualification with experience required by the professional to fulfill the requirements of each level. Considering the degree of patient dealing in anaesthesia & operation theatre technology and such other professions, government aims to phase out the Diploma and PG Diploma level courses and promote Bachelors" and Masters" degree courses. In the academic front, as per UGC guidelines, to work at the position of a Lecturer/Assistant Professor the candidate must attain master degree. At present there are limited master degree seats in Anaesthesia & Operation Theatre Technology in India, and thus it has been decided that Universities will be promoted to start master degree courses. The table also indicates that career progression is up to the level 10 of NSQF, however it needs to be stated that the ultimate signatory authority on patient documentation stands with the surgeon on role, the chief technical officer of the OT unit (clinical route) will be the ultimate authority for the management responsibilities, the final authority for the clinical decisions will be with the doctor.

Table 2: Nomenclature based on career progression for Anaesthesia & Operation Theatre Technologist (Proposed)

Nomenclature in various sectors			Qualification and experience
Clinical	**Academic**	**Industry**	
Junior Anaesthesia & Operation Theatre Technologist		Technical associate	• Diploma AOTT with 0 - 5 years post Diploma AOTT experience
Anaesthesia & Operation Theatre Technologist	Demonstrator	Anaesthesia & Operation Theatre Technologist	• B. AOTT • Diploma AOTT with 6-10 years post AOTT)
Senior Anaesthesia & Operation Theatre Technologist	Tutor/ Lecturer (Post Graduate)	Senior Anaesthesia & Operation Theatre Technologist	• B. AOTT with 4 years" experience at Level-5. • M. AOTT (for academic role) • Diploma AOTT 11-15 years" experience. (only for Industry pathway)
Technical Officer (AOTT)	Assistant Professor	Chief Anaesthesia & OT Technologist	• B. AOTT with 4 years" experience at Level -6 • M. AOTT with 4 years post M.AOTT experience. for academic role • Ph.D. AOTT for Academic role.
Senior Technical Officer (AOTT)	Associate Professor	Deputy Manager for Anaesthesia & OT Technology	• B. AOTT with 4 years" experience at Level-7 • M. AOTT with 8 years post M.AOTT experience. • Ph.D. AOTT with 4 years post PhD experience for Academic pathway
Chief Technical Officer (AOTT)	Additional Professor	Additional Director for Anaesthesia & OT Technology	• B. AOTT with M.AOTT with 4 years" experience at Level-8 • M. AOTT with 12 years post M.AOTT experience. • Ph.D. AOTT with 8 years post PhD experience for Academic pathway
Chief Manager (AOTT)/ AOTT Head/	Professor/ Principal	Director for Anaesthesia & OT Technology	• B. AOTT with M.AOTT with 4 years (only clinical/industry role) experience at Level-9 • Master"s in AOTT with 15 years post M.AOTT experience. • Ph.D. AOTT with 12 years post PhD experience.

Career progression

Abbreviations

* B. AOTT – Baccalaureate in Anaesthesia & Operation Theatre Technology.

* M. AOTT – Master"s in Anaesthesia & Operation Theatre Technology.

*AOTT – Anaesthesia & Operation Theatre Technology.

IMPORTANT NOTES:

1. **Diploma AOTT, Bachelor in AOTT and Master's AOTT completed before implementation of this scheme shall be considered at par with the current scheme of Diploma AOTT, Bachelors in AOTT and Masters in AOTT respectively, irrespective of their course duration for concerned level.**
2. **Existing in-service Anaesthesia & Operation Theatre Technologists should be considered at par in the present scheme at their respective levels.**
3. ***Diploma should be phased out in next 5 years and the minimum required qualification should be Bachelor in AOTT with 4 years duration course (3 years + 1 year internship).**

Definition of Anaesthesia & Operation Theatre Technologist

Anaesthesia & Operation theatre Technologist is a member of a multidisciplinary team in operation theatres who prepare and maintain an operating theatre. Assists anaesthetist and surgical team during peri-operative period and provides support to patients in the recovery room.

Education of the Anaesthesia & operation theatre technologist

When developing any education programme it is necessary that programme planning should be outcome-based, meeting local and national manpower requirements, personal satisfaction and career potential for the professionals with supporting pathway in the development of the profession. One of the major changes is the shift from a focus based on traditional theoretical knowledge and skills to competency based education and training. Optimal education/training requires that the student is able to integrate knowledge, skills and attitude in order to be able to perform a professional act adequately in a given situation.

Thus, the following curriculum aims to focus on skills and competencies based approach for learning and is designed accordingly. The curriculum is prescriptive and is designed with an aim to standardize the content across the nation.

Entry requirements

It is recommended that the students entering the AOTT programme should have completed the recognized secondary school studies as the qualification, stipulated for AOTT course (diploma/degree) is **10+2 or equivalent examination with science subjects (Physics, Chemistry and Biology)** from a recognized university or board which would provide the foundation for and prepare them for higher education studies with minimum 50% aggregate marks at HSC for open category and minimum 45% aggregate marks for reserve category.

Course Duration

It is recommended that any programme developed from this curriculum should have a minimum of the following duration to qualify as an entry level professional in AOTT -

- Diploma in Anaesthesia & Operation Theatre Technology (D. AOTT)- 2.5 year programme (including 6 months of clinical training/internship)- Diploma level
- Baccalaureate in Anaesthesia & Operation Theatre Technology (B. AOTT)- 4 year programme (including 1 year of clinical training /internship)- Bachelor"s degree level
- Masters in Anesthesia & Operation Theatre Technology (M. AOTT)- 2-year programme – Master"s degree programme.
- Ph.D. in Anaesthesia & Operation Theatre Technology.

IMPORTANT NOTE:

1. Diploma AOTT, Bachelor in AOTT and Master"s AOTT completed before implementation of this scheme shall be considered at par with this scheme of Diploma AOTT, Bachelors in AOTT and Masters in AOTT respectively, irrespective of their course nomenclature, duration etc. for admission to higher program.
2. *Diploma should be phased out in the future (preferably in next 5 years) and the minimum required qualification should be Bachelor in AOTT with 4 years duration course (3 years + 1 year internship).

The emphasis initially should be on the academic content establishing a strong scientific basis and in the latter year on the application of theory to clinical/reflective practice. In Bachelor degree programme minimum one year should be devoted to clinical practice and this should be on a continuum of rotation from theory to practice over the programme. The aim of the 4 year degree programme is to enable the development of the AOTT as a key member of the multidisciplinary team and to enable him/her to execute his/her role with ensuring quality.

With the change in the disease dynamics and multifold increase in the, it is imperative that a well-structured programme of postgraduate education is also encouraged so as to enhance research capacity within the country to widen the scope of clinical practice for the profession. Thus, **a master's degree programme is recommended with minimum of two years of education in specialized field**. The post graduate students can contribute significantly in research and academics. Presently, there are limited master degree courses in the country and institutes and universities should be encouraged to start master and doctorate courses.

Teaching Faculty and Infrastructure

The importance of providing an adequate learning environment for the students cannot be over emphasized. Both the physical infrastructure and the teaching staff must be adequate.

Teaching areas should facilitate different teaching methods. Where students share didactic lectures with other disciplines (e.g. nurses) large lecture theatres may be appropriate, but smaller teaching areas should also be provided for tutorial and problem/case-based learning approaches. In all venues where students are placed the health and safety standards must be adhered to.

The recommended teachers to student ratio in the UG level should be -1:25.

Job availability

As per ILO documentation, employers worldwide are looking for job applicants who not only have technical skills that can be applied in the workplace, but who also can communicate effectively, including with customers; can work in teams, with good interpersonal skills; can solve problems; have good ICT skills; are willing and able to learn; and are flexible in their approach to work.[22] After completion of the courses mentioned in following chapters, the individual will find a challenging career in a hospital, nursing homes, trauma / emergency centers, Intensive Care units, CSSD etc. Graduates are eligible for employment overseas where their qualifications, training and experience are highly regarded. With further experience, graduates may be employed by medical equipment manufacturers and development specialists.

Graduates have good employment prospects, and will enter a field in which the demand for professionals has increased in recent years and will keep on increasing due to changing environment and conditions.

Chapter 4

Model Curriculum of Anaesthesia & Operation Theatre Technology (AOTT) Courses

Chapter 4: Model Curriculum

Background

The need for accuracy in preparation and delivery is a critical component of modern technology driven healthcare and requires knowledge and understanding of the basic sciences as well as the interaction between the technology used in operation theatres and the site within the body that needs the surgical intervention. In an era of greater complexity of technology and techniques, the role of the Anaesthesia & operation theatre technologist (AOTT) and his/her level of responsibility is continually evolving and expanding. Education programmes should provide the AOTT with the scientific theoretical foundation of the profession and enable them, as practitioners, to be able to synthesize, evaluate and apply their knowledge in a clinical setting.

The aims of the recommended curriculum are to produce AOTTs who are

- Technically and clinically competent;
- Aware of safety issues and the importance of quality assurance;
- Understand the theoretical basis for evidence based practice;
- Effective members of the multidisciplinary team;
- Prepared to participate in or initiate research into practice;
- Can work according to registration requirements on the respective continents.

All aspects of anaesthesia & operation theatre technology have been considered in the development of this curriculum together with the identification of the roles expected for different levels based on their qualification and experience. The need for connecting the dots between the education and employment practices has been the road map for devising this curriculum.

The National Curriculum Taskforce on Anaesthesia & Operation theatre technology has successfully designed the career and qualification map indicating the growth opportunities for a professional in the career pathway based on the level as indicated in the National Skills Qualification Framework (NSQF). The career pathway indicates **NSQF level 4 corresponding Pay level - 7 as per 7th CPC as the entry level** after the completion of a minimum 2.5 years of diploma level programme in Anaesthesia & operation theatre technology (Diploma in Anaesthesia & Operation Theatre Technology) as well as **NSQF level 5 (Pay level - 8 as per 7th CPC) as the entry level** after completion of a minimum 4 years of Baccalaureate level programme on Anaesthesia & operation theatre technology (Bachelor in Anaesthesia & Operation Theatre Technology). The component of the programmes starting from diploma and above has been detailed out in the coming chapters.

Foundation course has also been designed to bring all the students at the same level of understanding with respect to basic healthcare related norms before the start of a career in a healthcare professional course. The foundation course is mandatory for all the allied and healthcare professional courses and for both entry level courses – diploma as well as degree. If a diploma holder has completed the foundation course and is willing to pursue the degree course, the candidate will directly get entry for next semester, however a pre- qualifier skill test will have to be satisfactorily completed, if not, then the candidate will have to undergo the first semester of foundation course again.

4. Master"s in Anaesthesia & Operation Theatre Technology (M. A&OTT)

MASTER'S IN ANAESTHESIA & OPERATION THEATRE TECHNOLOGY (M.AOTT)

ABOUT THIS PROGRAM

An Anaesthesia and Operation Theatre (A&OT) Technologist forms an intrinsic part of any hospital. To become a trained professional one must undertake Anaesthesia and Operation Theatre Technology (A&OTT) program. This program aims at providing advanced knowledge in the field of Anaesthesia & Operation Theatre Technology. It aims to provide graduates who are well versed in planning, setting up, maintaining and managing the anaesthesia and surgical procedures. This program provides training on working and handling of anaesthesia and surgical equipment in and outside the Operating Room(OR). This program will bring out post graduates who are qualified and eligible to work as clinical supervisors in the Operation Theatre (OT), teach and train the students in the same specialty.

SCOPE OF PRACTICE

a. The Anaesthesia & Operation Theatre Technologists mainly assists the Anaesthesiologist and Surgeons in preparing and managing the patient for surgery during pre-operative, intra-operative and post-operative periods
b. Responsible for maintaining anaesthesia records
c. Understand the anxiety of patient in preoperative state and appropriately assist to shift, induce anaesthesia and position patient for surgical procedure
d. Assist anesthesiologists and surgeons with Non-Operating Room Anaesthesia(NORA) and surgery, like in CT and MRI suits, dental clinic, Labor theatre, IVF centres, burn centres, endoscopy room, and Cardiac catheterization laboratory, pain relief procedures etc.
e. Assist anesthesiologists during management of patient in the emergency departments and intensive care units
f. Assist consultant in transportation of the patients
g. Responsible for managing an OR as clinical supervisor
h. Postgraduates are qualified to teach at the university level and responsible for developing curriculum and delivering the course content, grading assignments, assessing the students and providing feedback and support the students
i. Postgraduates can also be involved in research related to their field of study, in addition to teaching and other academic responsibilities
j. There is a scope to get a fellowship or Ph. D after post-graduation
k. Assist disaster team in disaster situations and national emergencies on field and safe transport in ambulance.

JOB RESPONSIBILITIES FOR MASTER'S IN ANAESTHESIA & OPERATION THEATRE TECHNOLOGY:

- **As a Clinical Supervisor/ OT Manager:**

a. Providing supervision to clinical staff in the OT
b. Monitoring progress and ensuring that clinical staff adhering to ethical and legal standards
c. Maintaining the records, inventory and human resource in the OT

- **As an Anaesthesia/Surgical assistant:**

a. Assisting Anaesthesiologist and surgeons during surgeries and anaesthetic procedures for general surgeries and super specialties like Cardio Thoracic surgeries, Neuro surgeries, Pediatric surgeries, Renal surgeries, Plastic and reconstructive surgeries, Onco-surgeries, Ophthalmic surgeries, Otorhinolaryngology (ENT) surgeries, Orthopedic surgeries and OBG procedures
b. Preparation and maintenance of advanced anesthetic equipment including fiberoptic bronchoscopes, ultrasound used in anaesthesia, advanced airway gadgets, invasive monitoring devices and infusion pumps
c. Maintaining the stock and records of anaesthetic drugs including narcotics
d. Preparation and maintenance of advanced surgical equipment including laparoscopes, endoscopes, microscopes, electrosurgical units, laser and robotic surgical instruments

- **As Teaching faculty**

a. Designing course curriculum, developing and implementing new teaching strategies and methods
b. Student assessment
c. Mentoring the students
d. Organizing and participating in departmental meetings, workshops, conferences, faculty development programmes and other academic activities
e. Conducting research related to their field of study
f. Collaborating with researchers and industry experts
g. Serving on academic committees and participating in other service activities

Entry requirements

A candidate seeking admission to Master"s in Anaesthesia & Operation Theatre Technology program must have passed Bachelor"s degree of minimum of 3 years duration in Anaesthesia & Operation Theatre Technology/Anaesthesia Technology/ Operation Theatre Technology from a recognized university, with minimum 50% aggregate marks at HSC for open category and minimum 45% aggregate marks for reserve category.

Course Duration

The duration of Master"s in Anaesthesia & Operation Theatre Technology shall be two academic years (4 semesters)

Medium of instruction:

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

Teaching Faculty and Infrastructure

The importance of providing an adequate learning environment for the students cannot be over emphasized. Both the physical infrastructure and the teaching staff must be adequate.

Teaching areas should facilitate different teaching methods. Large lecture theatres may be appropriate, but smaller teaching areas should also be provided for tutorial and problem/case-based learning approaches. In all venues where students are placed the health and safety standards must be adhered to.

The recommended teachers to student ratio in the PG level should be - 1:20.

Attendance:

A candidate has to secure minimum-

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

Assessment:

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

Examination:

There shall be a University examination at the end of each semester. Evaluation is based on formative evaluation (Internal Assessment) and summative evaluation (University examination).

Internal assessment (IA):

The internal assessment for theory and practical"s shall be 20 marks each.
Internal assessment for theory shall be calculated as average of two sessional examinations, seminars, assignments etc. The internal assessment for practicals shall be calculated on the basis of the records of the practicals maintained and examinations.
A Candidate must secure at least 40% of total marks fixed for internal assessment in a particular course in order to be eligible to appear in the university examination of that course. If candidate is having inadequate internal assessment marks shall appear for internal assessment in the next semester.

University examination:

A candidate who satisfies the requirements of attendance, progress and conduct shall be eligible to appear for the university examinations. There shall be a university examination at the end of each semester.
To be eligible to appear for University examination a candidate should fulfil all the following conditions:

- 80% attendance separately in theory and practical/Clinical postings, in each course.
- Secure at least 40% of total marks fixed for internal assessment in a particular course in theory and practical separately.
- Submit dissertation in the prescribed format, as per the stipulated schedule in IV semester.

Dissertation:

A candidate is required to carry out research study in a select area of his subject, under the supervision of a faculty guide. The results of such a study shall be submitted to the University in the form a dissertation as per the prescribed format and within the date stipulated by the University.

Guide:

A guide shall be MD/DNB/PG Diploma/M. Sc. or equivalent qualification as recognized by the University in relevant subject with two years" experience in respective Allied Health Science Course. In case of postgraduate diploma, he/she should have two publications in indexed journals. However, a Co-guide can be opted wherever required with prior permission of the Institute and University. The Co-guide shall also be a postgraduate teacher recognized by the University as a guide.

Candidate shall submit synopsis to the University through the Guide and Head of the Institute, on or before the completion of one month of second semester, or within the date notified by the University, whichever is earlier.

Once the synopsis is approved and registered by the University, no change in the topic or Guide shall be made without the prior approval of the University.

In the event of registered Guide leaving the Institute or in the event of the death of the guide, a change of Guide shall be permitted by the University, on the specific recommendation of the Institute.

Ethical clearance:

Ethical clearance should be obtained for a study involving any procedure on human subjects. The candidate should apply for the certificate to the Ethics Committee of the respective Institute/University, through the Guide and present the study before the Committee for clearance. A copy of the certificate should be attached along with the synopsis forwarded at the time of submission of synopsis. All such clearance should be sought within one month of commencement of II semester.

Submission of Synopsis:

Synopsis should be verified by guide, HOD and departmental curriculum development cell and approved by the institutional ethics committee before submission to the university. The synopsis should be submitted as per the format, on or before one month of second semester, or within the date notified by the University, whichever is earlier. Once the synopsis is approved and registered by the university no change in the topic or Guide shall be made without the prior approval of the University.

Final submission of the dissertation

The dissertation complete in all respects and duly certified by the Guide/Co-guide, Course Co-ordinator/ HOD/ Director should be submitted it to the Controller of Examinations as per the date specified by the respective University, generally three months before commencement of University examination.

Semester & credit system regulations

Definitions of Key Words:

Credit: A unit by which the course work is interpreted. It functions the number of hours of instructions required per week.

Credit Distribution

Each semester would get a complete 15 weeks for academics, excluding sessional exams, study leave, university exams, semester break, declared holidays and non-academic events.

Lectures (L)/Theory (T)	: 1 hour /week = 1 credit
Practical (P)/ Demonstration (D)	: 2 hours/week = 1 credit
Clinical Posting (CLP)	: 3 hours/week = 1 credit

Credit distribution table format:

(L - Lectures, T - Theory, P/D –Practicals/Demonstration, CLP – Clinical Posting, CR - Credits. IA - Internal Assessment, SEE – Semester End Examination)

Semester Grade Point Average (SGPA): The overall performance of a student in each semester

Grade Point: It is a numerical marking allotted to each letter grade on a 10-point scale.

Grade Point Average (GPA):

The total performance of a candidate will be indicated by GPA.

Grade points will be awarded for each course after the assessment of Semester End Examination (SEE) as per the letter grading system

Grade point and letter grade received for respective mark range is tabulated below:

Marks Range(%)	Grade Point	Letter Grade	Descriptor	Classification	CGPA
90 & above	10	O	Outstanding	First Class with distinction	7.00 and Above
80 -89	9	S	Excellent		
70-79	8	A+	Very Good		
60-69	7	A	Good	First Class	6.00-6.99
55-59	6	B+	Above Average	Second Class	5.50-5.99
50-54	5	B	Average		5.00-5.49
40-49	4	C	Pass	Pass Class	4.0-4.99
Below 40	0	F	Fails	Fail	Less than 4.0
Absent	0	I	Absent		

Semester Grade Point Average (SGPA): The overall performance of a student in each semester

Semester Grade Point Average (SGPA) is computed as follows:

$$SGPA = \frac{\sum [(\text{course credit}) \times (\text{Grade point})] \text{ for all courses in that semester; with Letter grades, including F}}{\sum [(\text{course credits})] \text{ for all courses in the semester with Letter grades, including F}}$$

Cumulative Grade Point Average (CGPA):

It is a measure of the overall performance of the student for the entire program

Cumulative Grade Point Average (CGPA) is computed as follows:

$$CGPA = \frac{\sum [(\text{course credit}) \times (\text{Grade point})] \text{ for all courses for all semesters with, Letter grades excluding F}}{\sum [(\text{course credits})] \text{ for all courses for all semesters with Letter grades, excluding F}}$$

Conversion of Grades into Percentage:

Formula for conversion of GPA into percentage: **CGPA earned X10 = Percentage of marks scored**

Illustration: (CGPA Earned 8.18 X 10) = 81.80 %

23/03/26

Award of Class:

The candidate, who has passed all the courses prescribed, shall be declared to have passed the program. Class will be awarded only to those who pass the entire examination in the first attempt and on the basis of the aggregate of marks scored in individual semester.

A candidate shall be considered to have completed a course successfully and earned the credits assigned, if he secures an acceptable letter grade in the range O-C. Letter grade „F" in any course implies failure in that course and no credit is earned.

A candidate having satisfactory attendance at classes and meeting the passing standard at CIE in a course, but remained absent from SEE shall be awarded „I" grade in that course.

- A candidate who secures GPA ≥ 7.00 and above in first attempt shall be declared to have passed in „First Class with Distinction".
- A candidate who secures GPA ≥ 6.00 or more but less than 7.00 in the first attempt shall be declared to have passed in „First Class".
- A candidate who secures GPA ≥ 5.00 or more but less than 6.00 in the first attempt shall be declared to have passed in „Second Class".
- A candidate who secures GPA ≥ 4.00 or more but less than 5.00 in the first attempt shall be declared to have passed in „Pass Class".
- Candidates who pass the examinations in more than one attempt shall be declared as passed in „Pass" class irrespective of the percentage of marks secured.
- An attempt means the appearance of a candidate for one or more courses either in part or full in a particular examination. If a candidate submits application for appearing for the examination but does not appear for any of the courses either in full or part in the university examination, he can appear for supplementary examination provided other conditions such as attendance requirement, internal assessment marks, etc are fulfilled and his appearing in the supplementary examination shall be considered as the first attempt.
- Candidates who pass the subjects in the supplementary examinations are not eligible for the award of Gold Medal or Merit Certificate

Carry Over Benefit:

A candidate shall appear for all the subjects of that particular semester in the University examinations but failed in that semester can avail this benefit provided:

- A candidate who fails in I semester is allowed to move to II semester. The candidates with back log subjects shall take both I semester backlog papers as well as II semester papers. Candidate with a backlog of not more than 2 papers in I & II semester put together is allowed to go to the III semester.
- Candidates who have failed in not more than 2 subjects of II semester and III semester (put together) and not having backlog of I semester papers are only permitted to go to IV semester.

- The candidate is permitted to appear for the IV semester examination along with the backlog subjects of II and III semesters and should pass all the subjects, including the backlog subjects to be declared as having completed the course.
- However, a candidate should pass all the lower semester papers before the announcement of final semester results.

Supplementary Examinations:

Supplementary examination shall be conducted by the university for the benefit of unsuccessful candidates. Lower semester examinations shall be conducted by the University along with current semester examinations for the benefit of unsuccessful candidates.

- A Candidate detained for lack of attendance will be barred from appearing in any one or all course/s for the supplementary examination.
- A candidate permitted to appear for the supplementary examination can improve his internal assessment marks before he takes the supplementary examination by subjecting himself to internal assessment.

MODEL CURRICULUM

MASTER'S IN ANAESTHESIA AND OPERATION THEATRE TECHNOLOGY

PROGRAM OUTCOMES

At the completion of this program, the student should be -

- Able to help the anesthesiologist in administering anesthesia, assist in various procedures and also help in continuous monitoring of patients during surgery.
- Able to train and develop an individual to independently handle the latest technology and high end biomedical equipment in Operation Theatre
- Able to assist anesthesiologists in developing patient care plans, including pre-operative, surgical theater, recovery room, and post-operative intensive care procedures.
- Able to do- patient data collection, catheter insertion, airway management, assisting the administration and monitoring of regional and peripheral nerve blockades, support therapy, adjusting anesthetic levels during surgery, inter-operative monitoring, postoperative procedures, pain clinics and patient education, and administrative tasks.
- Able to assist surgeons during perioperative period
- Able to manage medical gases and pipeline system
- Able to assist in Intensive care unit
- Able to manage Central sterile supply department
- Able to apply principles of management in health care setting
- Able to apply statistical methods for research and analysis

FIRST SEMESTER												
Course Code	Course Title	Credit(s) distribution				Marks Distribution						
		L/T	P/D	CLP	CR	Theory			Practical			Total
						IA	SEE	Total	IA	SEE	Total	
MAOT1.1	Review of Applied sciences	3	--	--	3	20	80	100	---	--	--	100
MAOT1.2	Anaesthetic equipment and procedures	3	1	2	6	20	80	100	20	80	100	200
MAOT1.3	Anaesthetics and emergency drugs	3	1	2	6	20	80	100	20	80	100	200
MAOT1.4	Applied surgical technology	3	--	2	5	20	80	100	--	--	--	100
GRAND TOTAL					20							600

L - Lectures, T - Theory, P/D –Practicals/Demonstration, CLP – Clinical Posting, CR - Credits. IA - Internal Assessment, SEE – Semester End Examination

SECOND SEMESTER

Course Code	Course Title	Credit(s) distribution				Marks Distribution						
		L/T	P/D	CLP	CR	Theory			Practical			Total
						IA	SEE	Total	IA	SEE	Total	
MAOT 2.1	Advanced anaesthesia techniques	3	1	2	6	20	80	100	20	80	100	200
MAOT 2.2	Speciality Anaesthesia-I	3	1	1	5	20	80	100	20	80	100	200
MAOT 2.3	Clinical surgery-I	3	1	2	6	20	80	100	20	80	100	200
MAOT 2.4	Research methodology & biostatistics (should include one unit related to teaching methodology)	4	--	--	4	20	80	100	---	---	--	100
GRAND TOTAL					21							700

L - Lectures, T - Theory, P/D –Practicals/Demonstration, CLP – Clinical Posting, CR - Credits. IA - Internal Assessment, SEE – Semester End Examination

THIRD SEMESTER

Course Code	Course Title	Credit(s) distribution				Marks Distribution						
		L/T	P/D	CLP	CR	Theory			Practical			Total
						IA	SEE	Total	IA	SEE	Total	
MAOT 3.1	Speciality Anaesthesia-II	3	1	4	8	20	80	100	20	80	100	200
MAOT 3.2	Clinical surgery-II	3	1	3	7	20	80	100	20	80	100	200
MAOT 3.3	Health care management (includes principles of management)	3	--	--	3	20	80	100	---	---	--	100
GRAND TOTAL					18							500

L - Lectures, T - Theory, P/D –Practicals/Demonstration, CLP – Clinical Posting, CR - Credits. IA - Internal Assessment, SEE – Semester End Examination

FOURTH SEMESTER												
Course Code	Course Title	Credit(s) distribution				Marks Distribution						
		L/T	P/D	CLP	CR	Theory			Practical			Total
						IA	SEE	Total	IA	SEE	Total	
MAOT4.1	Clinical Medicine & critical care management	5	1	1	7	20	80	100	20	80	100	200
MAOT4.2	Dissertation evaluation	--	--	8	8	--	---	--	-	100	100	100
GRAND TOTAL					15							300

L - Lectures, T - Theory, P/D –Practicals/Demonstration, CLP – Clinical Posting, CR - Credits. IA - Internal Assessment, SEE – Semester End Examination

COURSES OF STUDY & TEACHING HOUR DISTRIBUTION

FIRST SEMESTER					
Course code	Course Title	Total hours of instruction			
		Theory	Practical		Total
			Demonstration	Clinical Posting	
MAOT1.1	Review of applied sciences	45	--	--	45
MAOT1.2	Anaesthetic equipment and procedures	45	30	90	165
MAOT1.3	Anaesthetics and emergency drugs	45	30	90	165
MAOT1.4	Applied surgical technology	45	--	90	135
TOTAL		180	60	270	510

SECOND SEMESTER					
Course code	Course Title	Total hours of instruction			
		Theory	Practical		Total
			Demonstration	Clinical Posting	
MAOT2.1	Advanced anaesthesia techniques	45	30	90	165
MAOT2.2	Speciality Anaesthesia-I	45	30	45	120
MAOT2.3	Clinical surgery-I	45	30	90	165
MAOT2.4	Research methodology & biostatistics (should include one unit related to teaching methodology)	60	--	--	60
TOTAL		195	90	225	510

THIRD SEMESTER					
Course code	Course Title	Total hours of instruction			
		Theory	Practical		Total
			Demonstration	Clinical Posting	
MAOT3.1	Speciality Anaesthesia-II	45	30	180	255
MAOT3.2	Clinical surgery-II	45	30	135	210
MAOT3.3	Health care management(includes principles of management)	45	--	--	45
TOTAL		135	60	315	510

FOURTH SEMESTER					
Course code	Course Title	Total hours of instruction			
		Theory	Practical		Total
			Demonstration	Clinical Posting	
MAOT4.1	Clinical Medicine & critical care management	75	30	45	150
MAOT4.2	Dissertation- Project work	--	--	360	360

FIRST SEMESTER

REVIEW OF APPLIED SCIENCES

Theory: 45 hours

OBJECTIVES:

At the end of this semester students should be able to

1. Describe the parts of brain
2. Mention the coverings of spinal cord & CSF
3. Illustrate the anatomical structure of the bronchi and their subdivisions.

4. Explain how the blood transports oxygen and carbon dioxide.
5. Describe gas exchange in the pulmonary and systemic circuits.
6. Understand the clinical physiology of ANS and α and β receptors
    a. Uses and side effects of major drugs in each category.
    b. Clinical circumstances where these agents may be beneficial.
7. Ability to identify, address and treat the associated risk factors according to evidence based guidelines.
8. Understand the pharmacology of diuretics, antihypertensives, antiarrhythmics, corticosteroids, drugs used for coagulation disorders and other hormonal preparations
9. Understand hypersensitivity and antibiotic sensitivity
10. Understand and manage nosocomial infections

COURSE OUTCOMES:

At the end of the course, students will be able to...

CO1: Discuss the anatomy of Brain & spinal cord

CO2: Discuss the anatomical & physiological aspects of respiratory and cardiovascular system.

CO3: Record and interpret the lung function tests.

CO4: Explain the homeostasis and hemostasis

CO5: Describe the pharmacology of Adrenergic and Cholinergic drugs and their blockers.

CO6: Explain the pharmacology of Diuretics, antiarrhythmics, antihypertensives and corticosteroids.

CO7: Describe the pharmacology of drugs used in coagulation disorders and other drugs

CO8: Understand immunology & nosocomial infections.

Unit-I: Applied Anatomy **12 hours**

A. Brain & Spinal Cord
    - Parts of brain
        - Covering of spinal cord
        - Tracts of spinal cord
        - CSF
B. Broncho pulmonary segments and alveoli
C. Systemic and pulmonary circulation
D. Coronary circulation

E. Hepatobiliary system
   - Liver
   - Biliary apparatus

F. Urinary system

Unit-II: Applied Physiology **13 hours**

A. Respiratory physiology
   - Spirometry
   - Lung function tests
   - Oxygen transport & CO2 transport

B. Conducting system of the heart
C. Neuro muscular junction
D. Coagulation and its disorders
E. Acid base physiology
F. Hepatobiliary physiology

Unit-III: Applied Pharmacology **13 hours**

A. Adverse drug reactions & Drug interactions
B. Drugs acting on autonomic nervous system
   - Adrenergic drugs & blockers
   - Cholinergic drugs & blockers

C. Diuretics
D. Antiarrhythmics
E. Antihypertensive drugs
F. Corticosteroids
G. Drugs used in disorders of coagulation
H. Others
   - Insulin
   - Oxytocin
   - Methylergometrine
   - Prostodine
   - Antacids

Unit-IV: Microbiology **07 hours**

A. Immunology
   - Immunity
   - Antigen
   - Antibody
   - Hypersentivity
   - Antibiotic resistance

B. Nosocomial infection – Introduction, prophylactic immunization & management
   - Meningitis
   - Hepatitis
   - HIV infection & AIDS
   - UTI
   - Pneumonia
   - MRSA infection

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Review of applied sciences** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20 marks

There shall be no practical examination

Reference books:

1. Essentials of medical pharmacology (Latest edition) – KD Tripathi
2. Textbook of Pharmacology for Dental and Allied Health Sciences (Latest edition)- Padmaja Udaykumar
3. Text book of Medical Physiology – Indu Khurana
4. Manipal manual of Anatomy for Allied Health Sciences Courses- Sampath Madhyastha
5. BD Chaurasia"s Human Anatomy – volume1
6. Text book of microbiology- C P Baveja

FIRST SEMESTER

ANAESTHETIC EQUIPMENT AND PROCEDURES

Theory: 45 hours

Practical/Demonstration: 30 hours

OBJECTIVES:

At the end of the first semester students should be able to

1. Check adequacy of gas supplies, indent for required supplies, and ensure safe storage and commissioning of gas supplies.
2. Perform routine and periodic checks of
    a. Anaesthesia workstation
    b. Gases supply system
    c. Scavenging system
3. Trouble shoot problems in gas supply, anaesthesia workstation and scavenging system.
4. Ensure availability of standard monitors and their proper functioning.
5. Able to trouble shoot minor complications. Periodic check and suitability of monitoring. Competency in basic interpretation of monitored values.
6. Understand simulation in anaesthesia

COURSE OUTCOMES

At the end of the course, students will be able to...
CO1: Understand & demonstrate anaesthesia workstation, its components & safety
CO2: Practice safety check of anaesthesia workstation.
CO3: Discuss and operate monitoring devices
CO4: Understand and operate airway devices
CO5: Prepare difficult airway cart.
CO6: Set up for hemodynamic monitoring.
CO7: Understand types of simulators and simulation in anaesthesia

Unit-1 **07 hours**

A. Medical Gases and Distribution System
    - Medical gas supply, storage and safety

B. The modern integrated Anaesthesia workstation
    - Anaesthesia machine & its components
    - Fail safe system
    - Safety check of anaesthesia machine
    - Scavenger system

Unit-2 **16 hours**

C. Monitoring Equipment

- Respiratory gas monitoring and minimum alveolar concentration
- Equipments to measure depth of anaesthesia
  - Bi-spectral index
  - Entropy
- Neuromuscular block monitoring equipment
- Cardiac output monitors
- Equipment for central neuraxial and regional blocks
  - Needles
  - Catheters
  - Nerve locators
  - Ultrasound device
- Anesthesia equipment for magnetic resonance imaging
- Equipment for anaesthesia in remote locations

Unit-3 **12 hours**

D. Airway gadgets and their accessories

- Surgical airway equipments
- Percutaneous airway equipments
- Optical laryngoscopes
- Fiberoptic bronchoscopes
- Airway introducers
- Alternative to intubation
- Gadgets for difficult airway

Unit-4 **10 hours**

E. Hemodynamic monitoring
- Pressure transducers: resonance
- Damping
- Invasive & non-invasive blood pressure measurement
- Oscillometer

F. Defibrillator

G. Updates in anaesthesia devices
- Advanced Supraglottic Airway Devices
- Ventrain device
- Optical Stylets
- Smart pumps

H. Simulation in anaesthesia

Practical/Demonstration: **30 hours**

- Perform routine and periodic checks and troubleshooting of anaesthesia workstation, Gas Supply and Scavenging system 04 hours
- Analyze the proper working of monitoring systems 03 hours
- Assembly of gadgets for difficult airway management 02 hours
- Preparation of invasive blood pressure monitoring systems 02 hours
- Arrangement of trolley for surgical airway 02 hours
- Simulation in anaesthesia – Mask ventilation, laryngoscopy and endotracheal intubation 03 hours
- Training of use of anaesthesia equipment in MRI field 02 hours
- Pre-use check of anaesthesia equipment 02 hours
- Sterilization and maintenance of anaesthesia equipment 02 hours
- Anaesthesia in remote locations- Exposure to patients in
  - Emergency department 02 hours
  - Endoscopy room, 02 hours
  - IVF center, 02 hours
  - Labour theatre 02 hours

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Anaesthetic Equipment & Procedures** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory internal assessment-20marks

Practical examination-100marks

Marks pattern for practical examination:-

Practical exercises		Viva- Voce	Internal assessment
Skill	**Response**		
30	30	20	20
Grand Total- 100			

Reference books:

1. A practical approach to anaesthesia equipment- Jerry A Dorsch & Susan E Dorsch
2. Anaesthesia equipment simplified- Gregory Rose & J Thomas Mclarney
3. Understanding anaesthetic equipments and procedures A practical approach- Dwarakadas K Baheti & Vandana V Laheri

ANAESTHETICS AND EMERGENCY DRUGS

Theory: 45 hours

Practical/Demonstration: 30 hours

OBJECTIVES:

At the end of the semester students should be aware

1. Preparation, strength, dose, dilution and storage of commonly used drugs during anaesthesia and resuscitation.
2. Common indications and main pharmacological effects of drugs, fluid and blood used in anaesthesia.
3. Common side effects of the drugs.
4. Identification and immediate treatment of common side effects.

COURSE OUTCOMES

At the end of the course, students will be able to...

CO1: Describe the pharmacology of emergency drugs

CO2: Group and demonstrate preparation of emergency drugs.

CO3: Discuss and use antiemetic drugs

CO4: Demonstrate and dilute electrolytes

CO5: Demonstrate fluid infusion including blood

CO6: Discuss transfusion hazards

Unit-1 **11 hours**

- Core drugs in anaesthetic practice
  - General anaesthetic agents
    - IV inducing agents
    - Opioid analgesics & antagonists
    - Volatile anaesthetic agents
    - Sedative hypnotics
  - Local anaesthetics
  - Muscle relaxants and anticholinesterases
  - NSAIDS

Unit-2 **12 hours**

- Emergency drugs
  - Oxygen
  - Inotropes
    - Adrenaline
    - Noradrenaline
    - Dopamine
    - Dobutamine
    - Isoprenaline
    - Vasopressine
    - Digoxin
  - Sympathomimetics
    - Mephentermine
    - Phenylephrine
    - Ephedrine
  - Vasodilators
    - Sodium Nitroprusside
    - Nitroglycerin
    - Nifedipine
  - Anticholinergics
    - Atropine
    - Glycopyrrolate
  - Bronchodilators
    - Deriphylline
    - Aminophylline
    - Salbutamol

Unit-3 **10 hours**

- Other important drugs
  - Antiemetics and related drugs
  - Antimicrobials
  - Antihistamines
  - Electrolytes
    a. Sodium Bicarbonate
    b. Calcium Gluconate
    c. Calcium Chloride
    d. Magnesium Sulphate
    e. Potassium Chloride

Unit-4 **12 hours**

- Fluid therapy and transfusion
- Distribution of body fluids
- Crystalloids
- Colloids
- Fluid infusion and effect on body fluid compartments
- Blood components
- Blood transfusion
- Transfusion hazards

Practical/Demonstration: **30hours**

- Preparation, strength, dosage, dilution and labelling of
  - General anaesthetic agents
    - IV inducing agents
    - Opioid analgesics & antagonists
    - Volatile anaesthetic agents
    - Sedative hypnotics
  - Local anaesthetics
  - Muscle relaxants and anticholinesterases
  - NSAIDS
  - Oxygen
  - Inotropes
  - Sympathomimetics
  - Vasodilators
  - Anticholinergics
  - Bronchodilators
  - Antiemetics
  - Electrolytes
- I. V fluid infusion for adults and paediatric patients
- Blood transfusion demonstration
- Identification and immediate treatment of common side effects of drugs

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Anaesthetics and Emergency drugs** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20 marks

Practical examination- 100marks
Marks pattern for practical examination: -

Practical exercises		Viva- Voce	Internal assessment
Skill	**Response**		
30	30	20	20
Grand Total- 100			

Reference books:

1. Comparative Pharmacology for Anaesthetist: Armeen Ahmed, Vipin Dhama, Nitin Garg
2. A Primer of Anesthesia- Rajeshwari Subramaniam
3. Drugs in anaesthesia & intensive care- Edward Scarth & Susan Smith

FIRST SEMESTER

APPLIED SURGICAL TECHNOLOGY

Theory: 45 hours

OBJECTIVES:

At the end of the second semester student is expected to understand

1. Common procedures performed in anaesthesia, intensive care unit, and emergency department.
2. Physics and technology involved in the functioning of special equipment used to aid the procedures.
3. Safely transportation of the patient

COURSE OUTCOMES

At the end of the course, students will be able to...

CO1: Understand developing a surgical diagnosis

CO2: Demonstrate and apply aseptic technique.

CO3: Understand and demonstrate suturing techniques

CO4: Classify and identify surgical instruments

CO5: Maintenance and troubleshoot specialized surgical devices

Unit-1 **08 hours**

- Developing a surgical diagnosis
  - Complete and thorough history
  - Physical examination
    - Radiographic findings
    - Laboratory investigations
    - Record keeping
    - Differential diagnosis

Unit-2 **12 hours**

- Basic necessities for surgery
- Aseptic technique
  - Medical asepsis
  - Surgical asepsis
- Pre surgical preparation of the patient
- Surgical Infection
  - Factors for wound infection
  - Management of abscess
  - Antibiotic prophylaxis
- Infection prevention and universal precautions
- Surgical Incisions
- Hemostasis
  - Means of promoting wound Hemostasis
  - Dead space management

Unit-3 **11 hours**

- Decontamination and debridement
- Edema control
- Patient general health and nutrition
- Wound management
  - Prevention of wound infections
- Suture techniques
- Anastomoses
- Abdominal drainage
- Basic surgical and perioperative considerations
  - Antibiotic prophylaxis
  - Prevention of infection in postoperative period

Unit-4 **14 hours**

- Patient Safety
  - Admission Procedure
  - Procedure for Safely Transferring the Patient to the Operating Table
  - Positioning
- Surgical Instrumentation
  - Functioning
  - Uses
  - Maintenance
  - Risks and precautions
  - Electrocautery
  - Harmonica
  - Lasers
  - Surgical bio-microscopes
  - X-ray
  - Endoscopes

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Applied surgical technology** shall be as given under.

Type of questions	**No. of questions**	**Marks**	**Total**
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20marks

There shall be no Practical examination

Reference books:

1. Basic surgical skills and techniques- Sudhir Kumar Jain, David L Stoker & Raman Tanwar
2. Berry & Kohn"s Operating Room Technique (Latest edition)
1. Pocket guide to the Operating Room- Jaypee Latest edition

ADVANCED ANAESTHESIA TECHNIQUES

Theory: 45 hours

Practical/Demonstration: 30 hours

OBJECTIVES:

At the end of the second semester student is expected to understand

1. Common procedures performed in anaesthesia, intensive care unit, and emergency department.
2. Physics and technology involved in the functioning of special equipment used to aid the procedures.
3. Understand and manage anaesthetic emergencies in the intraoperative period

COURSE OUTCOMES

At the end of the course, students will be able to...

CO1: Understand and practice peripheral venous cannulation
CO2: Demonstrate and prepare vascular cannulation
CO3: Explain and demonstrate the applications of ultrasound in ICU
CO4: Understand modern technology in anaesthesia
CO5: Understand and apply emergency anaesthesia guidelines

Unit- I **11 hours**

- Vascular cannulation
- Central neuraxial blockade
  - Potential benefits of central neuraxial block
  - Mechanism of action, spread, uptake & elimination
  - Ultrasound for central neuraxial blockade
- Peripheral nerve blocks
- Post anaesthesia care
- Ultrasound in ICU
  - FAST
  - Volume assessment
  - Thoracic ultrasound

Unit- II **10 hours**

- Review of modern technology in anaesthesia
  - Ultrasound
  - Fiberoptic
  - X-ray
- Smart Pumps and Computer-Controlled Drug Infusion Delivery
- Anaesthesia information management systems
- Clinical information systems in critical care
- Decision support system

Unit- III **12 hours**

- General anaesthesia
  - Types and techniques
  - Awareness during anaesthesia
  - Complications
  - The long term effects of general anaesthesia
  - Management of general anaesthesia
  - Anesthesia and children

Unit- IV **12 hours**

- Emergency anaesthesia guidelines
  - Incidence and risk factor
- Anaesthetic emergencies
  - Airway emergencies
  - Anaphylaxis
  - Local anaesthetic toxicity
  - Malignant hyperthermia
- The principles and conduct of anaesthesia for emergency surgery
  - Choice of anaesthetic technique
  - Management and protection of the airway including pulmonary aspiration
  - The rapid sequence induction: evolution over time
  - Management of ventilation
  - Maintenance of anaesthesia

Practical/Demonstration **30 hours**

- Assembly of cart for and knowledge of technique of
  - Vascular cannulation 02 hours
  - Central neuraxial blockade 04 hours
  - General Anaesthesia 04 hours
- Assembly of cart for Peripheral nerve blocks 02 hours

- Use of special equipment and trouble shoot
  - Ultrasound used in anaesthesia 03 hours
  - Fiberoptic 03 hours
  - Smart pumps and computer controlled drug infusions 03 hours
- Identification and management of airway emergencies 03 hours
- Preparation of anaesthesia cart for emergency surgeries 03 hours
- Intraoperative maintenance of patient in terms of monitoring and ventilation. 03 hours

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Advanced Anaesthesia Techniques** shall be as given under.

Type of questions	**No. of questions**	**Marks**	**Total**
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20marks
Practical examination-100marks

Marks pattern for practical examination:-

Practical Exercises	**Viva- Voce**	**Internal assessment**
60	20	20
Grand Total- 100		

Reference books:

1. Step by step practical aspects of emergency anesthesia- Arun Kumar Paul
2. Anesthesiology updates for postgraduates- Sampa Dutta Gupta
3. Morgan and Mikhail's Clinical Anesthesiology

SECOND SEMESTER

SPECIALITY ANAESTHESIA-I

Theory: 45 hours

Practical/Demonstration: 30 hours

OBJECTIVES:

Upon completion of this semester, students will achieve knowledge and level of expertise & proficiency in:

1. Anaesthetic and surgical requirement for different subspeciality procedures in terms of equipment and monitoring.
2. Functioning and procedures of pain clinic.

COURSE OUTCOMES

At the end of the course, students will be able to...

CO1: Understand, prepare and demonstrate the anaesthesia for Laparoscopic and Robotic surgeries

CO2: Understand, prepare and demonstrate the anaesthesia for Obstetrics and Gynecological procedures

CO3: Understand, prepare and demonstrate the anesthesia for Orthopedic surgeries.

CO4: Understand, prepare and demonstrate the anesthesia for Ophthalmic surgeries.

CO5: Understand, prepare and demonstrate the anesthesia for Otorhinolaryngoscopic surgeries

CO6: Understand, prepare and demonstrate the anesthesia for Onco surgeries

Unit- I **15hours**

- Anaesthesia for Laparoscopic and Robotic Surgeries
  - Patient preparation
  - Anaesthetic Management
  - Special Considerations
  - Post- operative care
- Anaesthesia for Obstetrics & Gynecological procedures
  - Patient preparation
  - Anaesthetic Management
  - Special Considerations
  - Post-operative care

Unit- II **15 hours**

- Anaesthesia for Orthopedic surgeries
  - Patient preparation, Anaesthetic Management, Positioning, Post-operative care for
    - Upper limb procedures
    - Hip and knee
    - Foot & ankle
    - Pediatric orthopedics
    - orthopedic emergency/trauma

- Anaesthesia for Ophthalmic surgeries
  - Patient preparation
  - Anaesthetic Management
  - Special Considerations
  - Post-operative care

Unit- III **15hours**

- Anesthesia for Otorhinolaryngologic Surgeries
  - Preoperative considerations
  - Intraoperative Management
  - Special Considerations
  - Post-operative care

- Anesthesia for Onco surgeries
  - Preoperative considerations
  - Intraoperative Management
  - Special Considerations
  - Post-operative care

Practical/Demonstration: **30 hours**

- Setting up of monitor, equipment and preparation of the patient for
  - Anaesthesia for Laparoscopic Surgery
  - Anaesthesia for Robotic Surgery
  - Anaesthesia for obstetrics and gynaecological procedures
  - Anaesthesia for ophthalmic procedures
  - Anaesthesia for orthopaedic surgeries
  - Anesthesia for Otorhinolaryngologic Surgeries
  - Anesthesia for Onco surgeries

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Specialty Anesthesia-I** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20marks

Practical examination-100marks

Marks pattern for practical examination:-

Practical Exercises	Viva- Voce	Internal assessment
60	20	20
Grand Total- 100		

Reference books:

1. Anaesthesiology updates for postgraduates- Sampa Dutta Gupta
2. Textbook of Anaesthesia- Alan R Aitkenhead, David J Rowbotham, Graham Smith
3. A basic textbook is essential - Fundamentals of Anaesthesia- Tim Smith, Colin Pinnock, Ted Lin, and Robert Jones
4. Morgan and Mikhail's Clinical Anesthesiology

SECOND SEMESTER

CLINICAL SURGERY-I

Theory: 45 hours

Practical/Demonstration: 30 hours

OBJECTIVES:

At the end of this semester students should understand

1. Various sub speciality surgical procedures
2. Different requirement for each of these procedures
3. Preparation of patient, equipment, operation theatre for these surgical procedures

COURSE OUTCOMES

At the end of the course, students will be able to...

CO1: Understand & prepare for Laparoscopic & Robotic surgeries

CO2: Understand spinal cord injuries and management of spinal trauma

CO3: Describe types of fractures and its management

CO4: Understand & prepare for ophthalmic surgeries

CO5: Understand & prepare for ENT surgeries

CO6: Understand & prepare for Obstetrics & gynecological procedures

Unit- I **11 hours**

- **Laparoscopic Surgery**
  - Principles of laparoscopic surgery
  - Advantages and disadvantages
  - Safety issues and indications
  - Postoperative care
  - Laparoscopic Cholecystectomy
  - Laparoscopic Appendicectomy
  - Advanced Laparoscopic Surgeries
  - Diagnostic Laparoscopy
- **Robotic surgery**
  - Principles of robotic surgery
  - Advantages and disadvantages
  - Safety issues and indications
  - Postoperative care

Unit- II **17 hours**

- **Neck and spine**
  - The accurate assessment of spinal cord injuries
  - The basic management of spinal trauma and major pitfalls
- **Trauma to the face and mouth**
  - Classification of facial fractures
  - Diagnosis and management of fractures
- **Elective orthopedics**

  Pathology, assessment and management of
  - Upper limb
  - Hip and knee
  - Foot and ankle
  - Pediatric orthopedics

Unit- III **17 hours**

- **Ophthalmic surgeries**
  - Cataract extraction
  - Corneal transplant/ keratoplasty
  - Correction of strabismus
- **ENT surgeries**
  - Tympanoplasty
  - Mastoidectomy
  - FESS
  - Rhinoplasty
  - Tonsillectomy & Adenoidectomy
  - Tracheostomy
  - Laryngectomy
  - Radical Neck Dissection
- **Obstetrics & Gynaecological Procedures**
  - D&C
  - Hysterectomy
  - Salphingooophorectomy
  - Tubal Sterilization
  - LSCS
  - Ectopic pregnancy

Practical/Demonstration: **30 hours**

- Setting up of Equipments and preparation of patient for
  - Laparoscopic surgery
  - Robotic surgery
  - Neck and spine surgery
  - Trauma to the face and mouth
  - Elective orthopedic surgery
  - Ophthalmic surgery
  - ENT surgeries
  - Obstetrics and gynaecological procedures

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Clinical Surgery-I** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20marks

Practical examination-100marks
Marks pattern for practical examination:-

Practical Exercises	Viva- Voce	Internal assessment
60	20	20
Grand Total- 100		

Reference books:

1. Bailey & Loves Short Textbook of Surgery
2. Text book of surgery – S. Das
3. Manipal manual of surgery-K. Rajgopal Shenoy & Anitha Shenoy
4. Short text book of surgery – Himasu Roy

SECOND SEMESTER

RESEARCH METHODOLOGY & BIOSTATISTICS

Theory: 60 hours

At the end of the semester students should be able to

1. Understand and apply statistical methods for the design of biomedical research and analysis of biomedical research data;
2. Learn to participate in a research team in study design, data coordination and management, and statistical analysis and reporting of study results

COURSE OUTCOMES

At the end of the course, students will be able to...

CO1: Understand & apply scales of measurements, incidence, prevalence and central tendency
CO2: Understand sampling methods
CO3: Describe skewness and kurtosis
CO4: Explain tests of significance
CO5: Understand correlation & regression
CO6: Understand & estimate sample size determination
CO7: Describe study designs & scientific documentation

Unit 1: **08 hours**

Introduction

Introduction to biostatistics &research methodology, types of variables & scales of measurements, measure of central tendency & dispersion, rate, ratio, proportion, incidence & prevalence

Unit 2: **06 hours**

Sampling

Random and non-random sampling, Different sampling techniques – simple random, stratified, systematic, cluster& multi-stage. Sampling and non-sampling errors and methods of minimizing these errors

Unit 3:

08 hours

Sampling distribution. Statistics and parameter. Standard error. Basic probability distributions-Normal, Poisson and Binomial distributions with their application in biological sciences. Skewness & Kurtosis.

Unit 4:

10 hours

Tests of significance

Basics of testing of hypothesis – Null & Alternative hypothesis, type 1 and type II errors, level of significance & power of the tests, p value. Different Parametric Tests – T test (paired & unpaired), & Test for proportion, One-way analysis of variance. Repeated measures analysis of variance. Non-Parametric Tests of significance Chi square test– Mann – Whitney U Test, Wilcoxon Test, Kruskal – Wallis Analysis of variance by ranks, Friedman's test.

Unit 5:

08 hours

Correlation and regression

Linear correlation by Karl Pearson and Rank order correlation due to Spearman. Testing the significance of correlation. Linear and Multiple regression.

Unit 6: **02hours**

Sample size determination

General concept. Sample size for estimating means and proportion, testing of difference in means and proportions of two groups.

Unit 7: **06 hours**

Study designs

Descriptive epidemiological methods – case series analysis and prevalence studies. Analytical epidemiological methods – case control and cohort studies. Clinical trials / intervention studies, odds ratio and relative risk, stratified analysis

Unit 8: **04 hours**

Multivariate analysis

Concept of multivariate analysis, introduction to logistic regression and survival analysis

Unit 9: **02 hours**

Reliability and validity of diagnostic tests

Unit 10: **06 hours**

Scientific documentations

Structure of research protocols, structure of thesis/research report, formats of reporting in scientific journals. Systematic review and meta-analysis.

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Research methodology and Biostatistics** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20marks

There shall be no practical examination

Reference books:

1. ABC of research methodology and applied biostatistics by MN Parick & Nithya Gogtay.
2. Introduction to biostatistics and research methods by P.S.S. Sundar Rao & J. Richard
3. Research methodology & Biostatistics- A comprehensive guide for health care professionals-Suresh K. Sharma
4. Guide to research methodology and Biostatistics-KMK Masthan

THIRD SEMESTER

SPECIALITY ANAESTHESIA- II

Theory: 45 hours

Practical/Demonstration: 30 hours.

OBJECTIVES:

Upon completion of this semester, students will achieve knowledge and level of expertise & proficiency in:

1. Anaesthetic and surgical requirement for different sub speciality procedures in terms of equipment and monitoring.
2. Functioning and procedures of pain clinic.
3. Basic legal ethical issues in organ transplant

COURSE OUTCOMES

At the end of the course, students will be able to...

CO1: Understand, prepare and demonstrate the anaesthesia for Neurosurgeries
CO2: Understand, prepare and demonstrate the anaesthesia for Pediatric surgeries
CO3: Understand, prepare, and demonstrate the anesthesia for Cardiovascular surgeries.
CO4: Understand, prepare, and demonstrate the anesthesia for Genitourinary surgeries.
CO5: Understand, prepare, and demonstrate the anaesthesia for Plastic & reconstructive surgeries.
CO6: Understand, prepare and demonstrate the anaesthesia for organ transplantation

Unit- I **15 hours**

- Anaesthesia for Neurosurgeries
  - ICP & ICT
  - Patient preparation
  - Anaesthetic Management
  - Special Considerations
  - Post- operative care

- Anaesthesia for Paediatric surgeries
  - Patient preparation
  - Anaesthetic Management
  - Special Considerations
  - Post-operative care

Unit- II **15 hours**

- Anaesthesia for Cardiovascular surgeries
  - Patient preparation
  - Anaesthetic Management
  - Positioning
  - Post-operative care
  - Cardiopulmonary bypass

- Anaesthesia for genitourinary surgeries
  - Patient preparation
  - Anaesthetic Management
  - Special Considerations
  - Post-operative care

Unit- III **15hours**

- Anaesthesia for plastic & reconstructive Surgeries
  - Preoperative considerations
  - Intraoperative Management
  - Special Considerations
  - Post-operative care

- Anaesthesia for organ transplantation
  - What is organ transplantation
  - The transplant process
  - Cadaveric organ donation
  - Living organ donation
  - Anaesthetic management

Practical/Demonstration: **30 hours**

- Setting up of monitor, equipment and preparation of the patient for
  - Anaesthesia for Neurosurgeries
  - Anaesthesia for Paediatric surgeries
  - Anaesthesia for Cardiovascular surgeries
  - Anaesthesia for genitourinary surgeries
  - Anaesthesia for plastic & reconstructive Surgeries
  - Anaesthesia for organ transplantation

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Specialty Anesthesia- II** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20marks

Practical examination-100marks

Marks pattern for practical exams:-

Practical Exercises	Viva- Voce	Internal assessment
60	20	20
Grand Total- 100		

Reference books:

1. Anaesthesiology updates for postgraduates- Sampa Dutta Gupta
2. Textbook of Anaesthesia- Alan R Aitkenhead, David J Rowbotham, Graham Smith
3. A basic textbook is essential - Fundamentals of Anaesthesia- Tim Smith, Colin Pinnock,Ted Lin, and Robert Jones
4. Morgan and Mikhail's Clinical Anesthesiology

THIRD SEMESTER

CLINICAL SURGERY-II

Theory: 45 hours

Practical/Demonstration: 30 hours

OBJECTIVES:

At the end of this semester students should understand

- Various sub speciality surgical procedures
- Different requirement for each of these procedures
- Preparation of patient, equipment, operation theatre for these surgical procedures

COURSE OUTCOMES

At the end of the course, students will be able to...

CO1: Understand & prepare for Cardiac, thorax and vascular surgeries
CO2: Understand organ transplantation procedures
CO3: Describe Elective neurosurgeries
CO4: Understand & prepare for plastic & reconstructive surgeries

Unit- I **15 hours**

- Elective neurosurgery
  - Head injury
  - Investigation and treatment for intracranial infection
  - Treatment for hydrocephalus
  - Management of intracranial hemorrhage
  - Management of epilepsy
  - Understanding the principles involved in brain death

- Plastic and reconstructive surgery
  - The spectrum of plastic surgical techniques
  - The various skin grafts
  - The principles and use of flaps
  - Plastic surgery to manage difficult and complex tissue loss

Unit- II **20 hours**

- The thorax
  - Investigation of chest pathology
  - Surgical oncology as applied to chest surgery

- Vascular surgery
  - Investigation for vascular surgery
  - Management technique of vascular surgery
    - Direct repair by stunting
    - Endarterectomy
    - Bypass

- Cardiac surgery
  - The role of investigation in planning of surgery
  - The management of coronary heart disease
  - The role of surgery in valvular heart disease
  - Special role of surgery in congenital heart disease
  - The management of aortic vascular and pericardial disease"

Unit- III **10 hours**

- Organ Transplantation
  - What is organ transplantation
  - The transplant process
  - Timeline of medical and legal advances in organ transplantation
  - Cadaveric organ donation
  - Living organ donation
  - Alternative organs
  - The impact of transplantation

Practical/Demonstration: **30 hours**

- Setting up of Equipments and preparation of patient for
  - Elective neurosurgery
  - Plastic and reconstructive surgery
  - The thoracic surgery
  - Vascular surgery
  - Cardiac surgery
  - Organ Transplantation

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Clinical Surgery-II** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20marks
Practical examination-100 marks
Marks pattern for practical examination: -

Practical Exercises	Viva- Voce	Internal assessment
60	20	20
Grand Total- 100		

Reference books:

1. Bailey & Loves Short Textbook of Surgery
2. Text book of surgery – S. Das
3. Manipal manual of surgery-K. Rajgopal Shenoy & Anitha Shenoy
4. Short text book of surgery – Himasu Roy

HEALTH CARE MANAGEMENT

Theory: 45 hours

OBJECTIVES:

At the end of the third semester students should be able to

1. Discuss the role of the manager in healthcare and how organizations and people work within the healthcare system.
2. Effectively manage people, finances and organizational resources.
3. Complete an organizational development project, reflect on the learning gained and evaluate the project from a leadership and healthcare management perspective.

COURSE OUTCOMES

At the end of the course, students will be able to...

CO1: Understand & apply management concepts & theories
CO2: Mention management functions & process
CO3: Describe basics of HRM & sourcing
CO4: Understand staff training & development
CO5: Understand materials management
CO6: Describe Inventory control, value analysis & biomedical waste management

Unit-I **13 hours**

- **Management concepts and theories**
  - Management and organizations
  - Management role
  - Levels of managers and management skills
  - Classical school
  - Behavior school
  - Management science school

- **Management functions and process**
  - Planning
  - Organizing
  - Staffing
  - Directing
  - Controlling

Unit- II **10 hours**

- **Basics of HRM and sourcing**
  - Introduction and relationship between HRM and HRD
  - Objectives of HRM
  - HR planning: short term and long term
  - Productivity analysis in healthcare
  - HR policy and procedure
  - Recruitment
  - Selection
  - Placement
  - Induction / Orientation
- **Training and development**
  - Staff training and development
  - Career growth and development
  - Management development

Unit- III **12 hours**

- **Materials management**
  - Introduction
  - Definition and function
  - Goals and objectives of materials management
  - Problems and issues in hospitals
- **Equipment purchase and maintenance**
  - Planning and selection of equipment
  - Import of equipment
  - Equipment utilization and operation
  - Equipment repair and maintenance
  - Equipment audit

Unit- IV **10 hours**

- **Scientific inventory management**
  - Codification and standardization
  - Value analysis
  - Inventory control
  - Lead time, safety stock and reorder level
  - Economic order quantity (EOQ)
  - Selective controls
  - Case studies on inventory control
  - The biomedical waste (management and handling) rules

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Health care management** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20marks

There shall be no practical examination

Reference books:

1. Introduction to health care management by Sharoon B & Nancy H
2. Foundations of health care management – Bernard J Healy & Marc C Marchese
3. Dunn & Haimann"s Health Care Management

FOURTH SEMESTER

CLINICAL MEDICINE & CRITICAL CARE MANAGEMENT

Theory: 75 hours

Practical/Demonstration: 30 hours

OBJECTIVES:

- At the end of the fourth semester students should be able to
- Overall idea of ICU care, emergency care, and transport of patients.
- Knowledge of techniques, procedures and monitoring of ICU patients.
- General care, nutrition and respiratory care of ICU patients.
- Basic Life Support and some knowledge of ACLS.
- Understand the emergency/ disaster management cycle
- Develop a basic knowledge of prevention, mitigation, preparedness, response and recovery in disaster
- Have a basic understanding emergency management.
- Resuscitation and triage skills

COURSE OUTCOMES

At the end of the course students should be able to…

CO1: Understand universal precautions
CO2: Report patient vital signs with different monitoring systems
CO3: Know the techniques, procedures and treatment of intensive care unit patients
CO4: Understand general care, nutrition and respiratory care of intensive care unit patients
CO5: Learn to manage the hospital acquired infections
CO6: Participate in disaster and triage management and trauma management
CO7: Perform basic life support (BLS) and advanced cardiac life support (ACLS)
CO8: Learn to monitor the patient during inter hospital and intra hospital transport

Unit-I **20 hours**

- First aid for unconsciousness
  - Aims, principles & rules of first aid
  - First aid box
- Advance Trauma Life Support
- Cardio pulmonary resuscitation
- Basic life support
  - Algorithm
  - Mouth to mouth ventilation
  - External cardiac compression
- ACLS
  - Defibrillation
  - Vascular access
  - Definitive airway
  - Foreign body obstruction
  - Drugs
- CPR in infants and children
- Complications of BLS

Unit- II **20 hours**

- Monitoring techniques in ICU practice
  - Invasive blood pressure (BP) monitoring
  - Transoesophageal Doppler (TED)
  - Measurement of central venous pressure (CVP)
  - Pulmonary artery catheterization
  - Arterial blood gas (ABG) analysis

- Ventilator Life Support in ICU
  - Working principles of ventilator in ICU
  - Types of ventilators
  - Mechanical ventilation modes and settings
  - Ventilator management
  - Ventilation induced lung injury
  - Ventilation monitoring
  - Non-conventional ventilation
  - Weaning from the ventilator
  - Spontaneous Awakening Trial (SAT) & Spontaneous Breathing Trial (SBT)

Unit- III **12 hours**

- Intubation and tracheostomy
- Spirometry - Data analysis
- Fluid control and therapy
- Supportive care
  - Control of infection
  - Transport of critically ill
  - Investigations
- Patient Safety Bundle
  - Ventilator Care Bundle
  - Central-line Bundle
  - Severe Sepsis Bundle

Unit- IV **10 hours**

- Hospital disaster preparedness and response
  - Coordination and management
  - Planning, training
  - Information, communication and documentation
  - Medico legal concerns
  - Safety and security
  - Human resources
  - Triage
  - Post disaster recovery
  - Patient handling

Unit- V **13 hours**

- Neurologic evaluation or monitoring
  - Sedation score
  - Glasgow coma scale

- Shock and Multisystem failure
  - Sepsis
  - Septic shock
  - Hemorrhagic shock
  - Neurogenic shock
  - Anaphylactic shock
  - Acute Lung Injury (ALI) and Acute Respiratory Distress syndrome (ARDS)
  - Multi-organ dysfunction syndrome

Practical/Demonstration: **30 hours**

- Principles and setting up of
  - Invasive blood pressure monitoring 02 hours
  - Transesophageal Doppler 01 hours
  - Measurement of Central Venous pressure 02 hours
  - Pulmonary artery catheterization 01 hours
  - Arterial blood gas analysis 01 hours
  - Intracranial pressure measurement 01 hours
  - Intra-abdominal pressure measurement 01 hours
- Working principle and setting up of ventilator 03 hours
- Hand washing and universal precautions 02 hours
- Transport of critically ill patient 02 hours
- Training on- First aid, BLS, ACLS, ATLS and defibrillation 10 hours
- Mock drill on disaster preparation 04 hours

Scheme of Theory Examination:

There shall be one theory paper of **three** hours duration carrying **80** marks. Distribution of type of questions and marks for **Clinical Medicine & Critical care management** shall be as given under.

Type of questions	No. of questions	Marks	Total
Long Essay(LE)	02	15	30
Short Essay(SE)	10	05	50
Grand Total			**80**

Theory Internal Assessment-20marks

Practical examination-100marks

Marks pattern for practical examination: -

Practical Exercises	Viva- Voce	Internal assessment
60	20	20
Grand Total- 100		

Reference books:

1. Civetta, Taylor & Kirbey"s Critical care
2. Critical care- Paul Marino
3. The ICU book-Schumacher

FOURTH SEMESTER
DISSERTATION /PROJECT WORK

COURSE OUTCOMES:

At the end of the course students will be able to...

CO1: Develop the ability to apply the methods while working on a research project work
CO2: Describe the appropriate statistical methods required for a particular research design
CO3: Choose the appropriate research design and develop appropriate research hypothesis for a research project
CO4: Develop an appropriate framework for research studies

The dissertation work is aimed at training a postgraduate candidate in research methodology and techniques. It includes identification of the problem, formulation of a hypothesis, review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, and comparison of results and drawing conclusions.

Preparation of dissertation

The written text of dissertation shall be prepared as per the respective university guidelines.

Scheme of evaluation

Dissertation shall be evaluated at the time of university examination of 4th semester by the panel of examiners (internal & external) appointed by the university. He should obtain a score of 50% aggregate to be declared pass in IV semester examination.

Evaluation format for dissertation

Sl. No	University Evaluation	Marks			
		Max Marks	Internal Examiner	External Examiner	Marks obtained
1.	Objectives, Research Question, Literature Review	25			
2.	Results and Discussion	25			
3.	Dissertation Defence	25			
4.	Viva voce by Internal and External Examiner	25			
	Total	**100**			

LOG BOOK PROFORMA FOR MAOTT PROGRAM:

Institute Name & Logo
Logbook for MAOTT Program.

Student Name .....
Year & Month .....
Regd. No. .....

BIODATA OF THE STUDENT

Name	
D.O. B	
Parents Name	
Regd. No	
Year of Passing BAOTT Program	
Date of Joining the MAOTT Program	
Permanent Address	
Postal Address	
Mobile No. of Student	
Mobile No. of Parents	
Email	
Other Achievements	

Outcome - Morbidly / Mortality / Any major complication should be indicated with measures taken for timely management.

1. The candidate should make the entries in the log book daily, countersigned by the Assistant Professor / Associate Professor / Professor / Head of the Department.
2. The Associate Professor / Professor must review & sign the log book every week for short-duration postings & every month for long-duration postings
3. In emergency OT posting the log book will be countersigned by Senior Resident on duty.
4. Any classes taken for BAOTT students or time spent on a thesis should be explicitly noted along with the nature of work in the log book.
5. The logbook is to be submitted through the Professor / Associate Professor at the time of the final examination.
6. Please use clear handwriting to fill the Logbook.

Logbook Proforma: MAOTT

Area of Posting……. Period……to……

Date						
Patient ID						
Age/Sex						
Diagnosis						
Operative Procedure						
Anesthetic Technique						
Special Procedure						
In time						
Out time						

Observation/Work done/Newly learned things						
Any Classes Taken for BAOTT students						
Time, Nature of work regarding thesis work.						
Signature of Faculty/Senior Resident						

Course Coordinator Signature: .....

Competencies Statement

Master in Anaesthesia & Operation Theatre Technology

Learning Objectives:

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

1. Provide advanced nursing care to manage the complex clinical needs of patients in an intensive care unit and operating room
2. Managing patient care procedures during anaesthesia
3. Various anaesthesia techniques- theory and skills, anaesthetic drugs, specialty anaesthesia with complications and management under supervision of the Anaesthesiologist.
4. Understanding monitoring needs, preventing, detecting complications using technologically advanced monitors & instruments and treating the condition respecting the limitation of his own competence
5. Capable to order and interpret full spectrum of diagnostic tests and special procedures related to care of critically ill, under the supervision of a critical care specialist and evaluate the outcomes of intervention.
6. The application of relevant theories, research, and evidence-based guidelines, and meet psychological needs of patients in critical care situation
7. Managerial skills, effective communication with patients ,,relatives, medical staff in high stress conditions, working within norms and regulation as well as ethics and following deontological principles.

Expectation from the future post graduates in the providing patient care

1. Student will be able to demonstrate comprehensive knowledge covering the main areas of Anaesthetic management of the all critical care medicine.
2. Student will be able to apply clinical reasoning and integrate knowledge with practice in a wide, and often unpredictable, variety of clinical conditions.
3. You will be able to demonstrate criticality and problem-solving in the areas of academic and clinical critical care.
4. Student will be able to manage patient care procedures during anaesthesia and critical care
5. Student will have ability to work independently and take responsibility for his own work, collaborating in activities of clinical research and training.

23/03/26

Performance Criteria	Indicators		
	Knowledge	Skill	Behavior
• **Quality care and patient safety**	• Should have in depth knowledge about various general health conditions while examination • Should have essential knowledge about providing care to each individual who visits to your hospital • Should be aware of different types of disabilities and information on patients with additional need. • Should have essential knowledge about rights and dignity of the patients.	• Proficiency in assisting surgeons/anaesthetis t with equipment"s, machines instruments, and suturing. • Competence in aiding anesthetists with anesthesia induction, airway management, and vital sign monitoring.	• Proactive attitude in preparing for procedures and anticipating the needs of the surgical team/Anesthesia team. • Attention to detail, ensuring proper organization of instruments and supplies. • Effective time management and collaboration with the surgical team. • Adaptability to handle unexpected situations and adjustments during surgery. • Professionalism, including confidentiality, ethical conduct, and respect for boundaries.
• **Quality care and patient safety**	• Thorough understanding of the principles of aseptic technique and sterile field maintenance.	• Proficiency in performing hand hygiene using appropriate handwashing or hand sanitization methods.	• Maintaining appropriate hand hygiene procedures both inside and outside the operating room.

	• Knowledge of infection control guidelines, including hand hygiene, proper gowning and gloving techniques, and disinfection protocols. • Familiarity with different types of sterilization methods, such as steam sterilization, ethylene oxide sterilization, and sterile packaging	• Competence in donning sterile gowns and gloves without contaminating them and in maintaining sterility while working within the sterile field. • Skill in handling sterile instruments, supplies, and drapes to prevent contamination and maintain a sterile environment. • Ability to assist surgeons and anesthetists in maintaining sterility during procedures, such as passing instruments or opening sterile packages.	• Diligently adhering to the recommended gowning and gloving procedures to protect oneself and the patient. • Pay close attention to protecting the sterile field's integrity by limiting air circulation, preventing needless movements, and contaminating it with non-sterile things. • Strict adherence to sterile procedure during instrument handling, making sure that instruments stay in the sterile field and maintaining the proper sterile instrument passes. • Addressing any breaches of sterile technique or potential contamination as soon as possible, taking corrective action, and, as necessary, informing the surgical team. • Maintaining sterility during the procedure with constant attention and awareness while aggressively looking out for any potential breaks or compromises.

• **System based practice**	• Understanding of surgical instruments and their uses. • Familiarity with medical equipment, such as anesthesia machines and monitors and Troubleshooting • Knowledge of equipment setup and placement.	• Proficiency in handling surgical instruments and ensuring their sterility. • Ability to set up and place medical equipment accurately. • Skill in operating equipment and adjusting settings. • Troubleshooting abilities for equipment malfunctions.	• Continuously update knowledge of instruments and equipment. • Ensure instruments are clean and organized. • Double-check equipment setup for patient safety. • Communicate effectively with surgeons and anesthetists. • Promptly address equipment issues during procedures. • Collaborate with appropriate personnel for complex troubleshooting.
• System based practice	• Understanding of surgical procedures, including laparoscopic, arthroscopic, and robotic techniques. • Knowledge of different surgical instruments, sutures, and their uses. • Familiarity with sterile techniques and maintaining a sterile field.	• Proficiency in directly supporting the surgeon during procedures. • Ability to anticipate the surgeon's needs and provide timely assistance. • Skill in passing sutures, instruments, and other necessary items accurately.	• Adhere to the surgeon's directions promptly and accurately. • Anticipate the surgeon's demands and prepare instruments or sutures in advance. • Maintain clear and open communication with the surgeon throughout the procedure.

		• Competence in scrubbing for more technical procedures like laparoscopic, arthroscopic, and robotic surgeries.	• Collaborate with the surgical team to ensure effective teamwork. • Demonstrate attentiveness and responsiveness during the surgery. • Continuously enhance knowledge of surgical procedures and instruments. • Adhere to sterile techniques and maintain a sterile environment.
• System based practice (Anesthesia Support)	• Understanding of anesthesia administration and management. • Familiarity with the different stages of anesthesia induction and maintenance. • Awareness of monitoring vital signs, oxygen saturation, and end-tidal carbon dioxide levels taking ABG sample, BIS, NMT, Arterial line/CVP line insertion.	• Proficiency in assisting with the administration and supervision of anaesthesia. • Ability to assist in securing and positioning patients during anesthesia induction. • Ability to monitor and assess vital signs, oxygen saturation, and end-tidal carbon dioxide levels.	• Collaborate closely with the anaesthetist, following their instructions and assisting with anaesthesia administration. • Help secure and position patients during anaesthesia induction and throughout the procedure. • Pay close attention to any changes or irregularities in patient conditions. • Promptly communicate any significant changes to the anaesthetist and surgical team.

• Communication and Teamwork.	• Understanding of emergency procedures and protocols. • Knowledge of the locations and functions of emergency equipment/crash carts. • Familiarity with potential postoperative complications and their management.	• Proficiency in identifying and accessing emergency equipment quickly. • Ability to remain calm and composed in high-stress situations. • Competence in following established emergency protocols. • Skill in assisting the surgical team during crises or postoperative difficulties.	• Proactively learn about emergency procedures and equipment locations. • Follow established protocols and guidelines for emergency situations. • Assist the surgical team promptly and effectively during crises. • Continuously update knowledge of emergency procedures and best practices.
• Informatics and technology	• Should have adequate knowledge of data protection and how this will impact security, access and confidentiality of the patient"s records • Should have essential knowledge to ensure the patient environment will remain safe and user-friendly, in terms of access and facilities	• Conversant in using various digital devices, access cloud storage platforms and saves electronic medical records on system-based software programs and keeps them safe • Demonstrates how to store and retrieve manual medical records	• Seeks consent of the patient before providing information to external stake holders • Restricts self from discussing patient information and condition in any open forum/external communication

• Professionalism and Leadership	• Should have essential knowledge of how to maintain practice in accordance with other professional health care standards	• Explains the condition that are treatable/correct able beyond your practice standards	• Honesty and understanding of own limitations
• Professionalism and Leadership	• Should have in depth knowledge of ethical practice and standard operating procedures followed in the clinical examination	• Explains the uses of various diagnostic instruments and their importance in the process of examination	Can demonstrate and teach of bachelor courses students
• Evidence Based practice	• Should have vital knowledge of the law, codes and guidelines set by the regulatory body of profession and is fully aware of the consequences if not followed.	• Follows the code of conduct set down by the council/ appropriate authorities	Can demonstrate and teach of bachelor courses students

Chapter 5
Job Descriptions

Chapter 5: Job Description for all levels

Duties and Responsibilities of Anaesthesia and OT Technologist:

Definition: Anaesthesia & Operation theatre Technologist is a member of a multidisciplinary team in operation theatres who prepare and maintain an operating theatre. Assists Anaesthesiologist and surgical team during peri-operative period and provides support to patients in the recovery room.

1. **Junior Anaesthesia & Operation Theatre Technologist:**

1. JOB TITLE	:	**Junior Anaesthesia & Operation Theatre Technologist**
2. JOB PURPOSE:		• Assisting team in pre-operative arrangements. • Assisting during intra-operative with surgeons & Anaesthesiologist. • Assisting team post-operative. • Maintenance of machines.
3. ACCOUNTABLE TO:		HOD- Anaesthesia Department / Senior AOT Technologist.
4. QUALIFICATION:		Diploma in Anaesthesia & Operation Theatre Technology (2.5 years)

RESPONSIBILITIES:

- Responsible for the transportation of patients to and from the theatre and PACU
- Assist staff with the mobilization of the patient within the Operation Theatre
- Assist with patient procedures as required
- Maintain procedure room/operating theatre equipment so as to ensure a clean, safe and efficient environment for patients and staff
- Assist in the preparation of patient prior to surgery, e.g. pre-operative, patient positioning.
- Ensure that the patient is positioned securely and safely on the operating table prior to surgery and on the patient trolley at the completion of surgery
- Provide assistance to Anaesthesiologist
- Promote patient safety at all the times
- Assist in other areas within the theatre complex as workload permits
- Maintain good communications with other staff in the theatre complex
- Maintain patient integrity at all the times
- Be familiar with the correct operation of all equipment
- Collect and return all necessary equipment for the procedure and patient safety
- Report malfunctioning equipment to person as per protocol
- Follow the hospital"s Health and Safety policies and procedures
- Be aware of the OH&S guidelines for the safe transport of beds and patients throughout the hospital

2. Anaesthesia & Operation Theatre Technologist:

JOB TITLE : Anesthesia & Operation Theatre Technologist

JOB PURPOSE: Assisting team in pre-operative arrangements.

- Assisting during intra-operative with surgeons & anesthesiologist.
- Assisting team post-operative.
- Maintenance of machines

ACCOUNTABLE TO : Head- Anaesthesia/ Senior AOT Technologist.

QUALIFICATION : Baccalaureate in Anaesthesia & Operation Theatre Technology

(4 Years degree program)

RESPONSIBILITIES:

Supporting the multidisciplinary team in providing a safe, high quality environment for the carrying out of surgical procedures by:

- Anticipating the needs of the Anesthesia/surgical team and responding effectively
- Implementing of Surgical safety checklist and handover form/checklist
- Implementing OT functionality and equipment checklist
- Implementing crash cart checklist
- Maintaining effectiveness of sterilizing process in the OT
- Managing anesthesia drugs in the OT
- Be well versed with Narcotic policy and appropriately maintain records
- Maintaining biomedical equipment and troubleshooting as and when required
- Handling blood products, coordination with blood bank and alignment with related blood policy
- Assisting Anesthesiologist in peripheral procedures – endoscopy, MRI, CT scan etc.
- Assisting in patient positioning and transfer
- Assisting in skin preparation and draping of the surgical field.
- Supporting and observing the patient throughout the operation.
- Assisting in the measurement and recording of fluid input/output.
- Working as part of the multidisciplinary team for the benefit of the patient, appreciating each member of the team"s needs and role.
- Safely handling and recording anesthesia and surgical instruments in line with policy.
- Disposing of clinical and biomedical waste including drugs safely and appropriately in line with policy.
- Capturing and maintaining patient data/documentation and any information required for auditing/quality issues. Documentation will be countersigned by the Registered Practitioner.
- Utilizing communication skills, preparing the environment and equipment and acting as a link between the surgical team and other parts of the theatre and hospital.

- Assisting the Registered Practitioner in the handover of the patient to the recovery staff, providing appropriate information and documentation.
- Responds and notifies appropriate physicians when immediate clinical response is necessary based on emergency in Operation Theater.
- Involvement in research and development.

Brief description of work which a professional will perform after successful completion of Baccalaureate in Anaesthesia & Operation Theatre Technology (B. A&OTT) are as follows:-

1. Carry out administration of oxygen and nebulization in OT as instructed by Anesthesiologist.
2. Ensure sterilization, day to day maintenance and proper storage as required of Anesthesia work stations with all their attachments, OT Tables, Electro-cautery, OT Lights, sterilizers, Harmonic Cautery, ENT and Ophthalmic Microscopes, Suction Machines, Monitors, defibrillators, ventilators, airways, tubes, circuits, lines, anesthetic instruments, all components and accessories of endoscopes and laparoscopes, Infusion Pumps, Ultrasound Machines, Phaco Machines, DVT pumps, tourniquets, multi Para monitors etc.
3. Fixing and removing BIPAP/CPAP masks as required, and operation of machines.
4. Assisting surgeons in all kind of endoscopic and laparoscopic procedures up to technological aspects permits.
5. Assisting Anesthetist in Laryngoscopy, intubation, I-gel/LMA insertion, Fiber optic intubation, CVP line insertion, Arterial Line Insertion, percutaneous tracheostomy, general anesthesia, USG guided regional anesthesia blocks (e.g. Spinal Anaesthesia, Epidural Anaesthesia, Brachial block, Axillary Block etc.)
6. Assisting Anesthetists in pain clinics during all kind of procedures except operating the C-Arm machine..
7. Assisting Surgeons in all type of surgeries (e.g. Obstetrics & Gynecology, Orthopedics, General Surgery, Plastic-cosmetics and maxillofacial surgeries, ENT, Ophthalmic Surgeries, Neurosurgery, Cardiac Surgery, Onco Surgeries, Urology, and Pediatric Surgeries etc.) by providing technical support during the surgeries.
8. Assisting Surgeons in Robotic surgeries up to required technological aspects.
9. IV Cannulation and securing them.
10. Help Anesthesiologist in ABG sampling and send it for testing with proper ice packing and labeling.
11. Taking Vitals (e.g. Pulse, Blood Pressure, temperature, SPO2 etc.) and document it wherever required.
12. Working in Central Sterile Supply Department (CSSD), Operate Autoclave Machines, ETO Sterilizers and Plasma Sterilizers, flash sterilizers and do its record keeping.
13. Work in all type of intensive care units (ICU"s) to manage its equipments (e.g. Multi Para Monitors, Ventilators, Defibrillators, Nebulizers, DVT Pumps, ABG Machines, Syringe Pumps etc.)

14. Looking after the AMC/CMC of all the equipment of OTs and ICUs.
15. Maintain a sterile field during surgical procedures.
16. Reprocessing and maintenance of fragile equipments used by Technologists.
17. Assist to Anesthesiologist in obtaining an accurate pre-anaesthetic health history, perform a thorough physical examination, and maintain organized records.
18. Establish and monitor non-invasive and invasive monitoring modalities, as delegated by the supervising Anesthesiologist.
19. Administer induction agents, adjust Anaesthesia levels, provide adjunctive treatment, and ensure continuity of anaesthetic care through the postoperative recovery period under the supervision of Anesthesiologist.
20. Apply and interpret advanced monitoring techniques, including pulmonary artery catheterization, electroencephalographic spectral analysis, echocardiography, and evoked potentials.
21. Utilize advanced life-support techniques such as high-frequency ventilation and intra-arterial cardiovascular assist devices under the supervision of Anaesthesiologist.
22. Conduct post-anaesthesia patient rounds, record progress notes, compile case summaries, and transcribe orders under supervision of Anaesthesiologist.

3. Senior Anaesthesia & Operation Theatre Technologist:

1. JOB TITLE: **Senior Anaesthesia & Operation Theatre Technologist**
2. JOB PURPOSE:
    - Supervision of working of Junior and AOT Technologist.
    - Indenting, stock management and documentation of drugs and other consumables.
    - Looking after the AMC/CMC of all the machines in OTs and ICUs and maintenance of all the machines.
    - Helping Technical Officers in maintenance of duty roster of all the technologists working under his/her control.
3. ACCOUNTABLE TO: Head Anaesthesia Department / Technical Officer (AOTT)

RESPONSIBILITIES:

Supporting the multidisciplinary team in providing a safe, high quality environment for the carrying out of surgical procedures by supervision of Junior Anaesthesia & Operation Theatre Technologists and Anaesthesia & Operation Theatre Technologists in carrying their duties efficiently by:

- Indenting, storage and managing all drugs including narcotics, anesthetic agents, inhalational agents, anesthesia and surgical consumables etc.
- Looking after the AMC/CMC of all the equipment of OTs and ICUs.
- Anticipating the needs of the Anesthesia/surgical team and responding effectively.
- Implementing of Surgical safety checklist and handover form/checklist
- Implementing OT functionality and equipment checklist with the help of Junior Technologists and Technologists.

- Implementing crash cart checklist.
- Maintaining effectiveness of sterilizing process in the OT and continuous supervision of application of sterilization methods.
- Be well versed with Narcotic policy and appropriately maintain records.
- Maintaining biomedical equipment and troubleshooting as and when required and helping Junior Technologists and Technologists working under him/her.
- Handling blood products, coordination with blood bank and alignment with related blood policy.
- Supporting and observing the patient throughout the operation.
- Assisting in the measurement and recording of fluid input/output.
- Working as part of the multidisciplinary team for the benefit of the patient, appreciating each member of the team"s needs and role.
- Safely handling and recording anesthesia and surgical instruments in line with policy.
- Capturing and maintaining patient data/documentation and any information required for auditing/quality issues. Documentation will be countersigned by the Registered Practitioner.
- Utilizing communication skills, preparing the environment and equipment and acting as a link between the surgical team and other parts of the theatre and hospital.
- Assisting the Registered Practitioner in the handover of the patient to the recovery staff, providing appropriate information and documentation.
- Responds and notifies appropriate physicians when immediate clinical response is necessary based on emergency in Operation Theater.
- Involvement in research and development of human and healthcare resources.

4. Technical officer (Anaesthesia & Operation Theatre Technology)

1. JOB TITLE: **Technical officer (A &OTT)**
2. JOB PURPOSE:
    - Should have a thorough understanding of all hospital procedures and policies
    - He/she serves as a liaison between administration, faculty/doctors, and all technical employees in developing and implementing standard operating procedures, communicating with doctors/faculty on various operational and administrative issues, budgeting, and stock maintenance.
    - He/she anticipates the department's future requirements. He employs his/her organizational and leadership skills to supervise staff and assure adherence to policies and regulations, resulting in the most efficient use of labor and other resources.
    - He/she will be in charge of ensuring that hospital's technical operations work smoothly.

3. ACCOUNTABLE TO: Head Anaesthesia Department/Senior Technical Office (AOTT)

RESPONSIBILITIES:

- Roster planning of all Anaesthesia & Operation Theatre Technologists.
- Material and store management of consumable and non-consumable items and their proper record keeping. Calls for special equipment service, evaluates service contracts and maintains equipment inventories.
- Installation and demonstrations of equipment and machinery being used in their respective departments.
- Maintains equipment by completing preventive maintenance schedules, conducting tests and troubleshooting and repairing malfunctions.
- Maintains supplies inventory by checking stock, anticipating needs, placing and expediting orders, and verifying receipts.
- Control inventory levels and ensure availability of material during emergencies.
- Keep detailed records on procurement activity, materials quantity, specifications etc.
- Assist in forecasting to plan future orders.
- Maintains a safe and healthy working environment by conducting safety tests, recommending and complying with procedures, training and guiding medical and healthcare personnel and complying with hospital policies and protocols.
- Ensures that standard operating procedures are followed in his respective departments which he ensures by conducting classes, training the technical staff and taking rounds prior to and during the various ongoing procedures in the department.
- Reporting to the Senior/ Chief Technical Officer- In charge for any procurement-related issues like approvals of new machines/ consumables/accessories.
- Reporting of issues related to manpower management if any shortage arises.

5. **Senior Technical officer (Anaesthesia & Operation Theatre Technology):**

1. JOB TITLE : **Senior Technical officer (A & OTT)**
2. JOB PURPOSE
   - He/she should have a thorough understanding of all hospital procedures and policies.
   - He/she serves as a liaison between administration, faculty/doctors/Chief Technical Officer and all technical employees in developing and implementing standard operating procedures, communicating with doctors/faculty on various operational and administrative issues, budgeting, and stock maintenance.
   - He anticipates the department's future requirements. He/she employs his/her organizational and leadership skills to supervise staff and assure adherence to policies and regulations, resulting in the most efficient use of human and other healthcare resources.
   - He/she will be in charge of ensuring that hospital's technical operations work smoothly.

3. ACCOUNTABLE TO: Head Anaesthesia Department/Chief Technical Officer (AOTT)

RESPONSIBILITIES:

- Supervise and monitor daily operations in concerned departments and the involvement of the technical staff under him/her.
- Act as a spokesperson/ representative for all the technical staff.
- Arranges/attends all the monthly/weekly meetings with faculty/Head of the Department/Administration held for technical staff and their involvement with concerned authorities.
- Signing and forwarding authority for sanctioning various leaves and other official letters to underlying technical staff.
- Monitor expenses and suggest cost-effective alternatives.
- Develop and implement effective policies for all operational procedures.
- Prepare/amend work schedules/standard operating procedures. (Creates and adheres to standard operating procedures) under the guidance of his/her respective HOD/Authority.
- Maintain Leave records of all technical staff in the department.
- Monitoring technical staff's performance also has a significant role in the Annual Performance Appraisal Report (APAR) of all the technical staff of the concerned department and he/she is Reporting Authority for technical staff up to the level of Technical Officers.
- Ensure the training of all technical staff by allocating proper arrangements.
- Ensure prompt ordering and stocking of medical and hospital supplies.
- Involve in training of BSc/MSc Anesthesia/ AOT technology courses.
- Maintain attendance/ roster of all BSc/MSc Anesthesia/ OT technology courses students.
- Help in organize Demo class, academic classes, practical classes of B. AOTT/M.AOTT/ OT technology course students with respective course coordinator.
- Provide technical support in PG practical exams in department with guidance of HOD/ faculty.
- Provide technical support in conference/CME/Workshop organized by Dept. with the coordination of HOD/Faculty
- Any other supervisory official work assigned by HOD.

6. Chief Technical officer (Anaesthesia & Operation Theatre Technology):

1. JOB TITLE: **Chief Technical officer (A & OTT)**
2. JOB PURPOSE
    - He/she should have a thorough understanding of all hospital procedures and policies.
    - He/she serves as a liaison between Administration/Head of Department and all technical employees through Senior Technical Officers in developing and implementing standard operating procedures, communicating with doctors/faculty on various operational and administrative issues, budgeting, and stock maintenance.
    - He anticipates the department's future requirements. He/she employs his/her organizational and leadership skills to supervise staff and assure adherence to policies and regulations, resulting in the most efficient use of human and other healthcare resources.
    - He/she will be in charge of ensuring that hospital's technical operations work smoothly.
3. ACCOUNTABLE TO: Head Anaesthesia Department or Higher authorities of the Hospital/Institution.

RESPONSIBILITIES:

- Act as a spokesperson/ representative for all the technical staff with Hospital Administration/ Head of Department.
- Arranges/attends all the monthly/weekly meetings with faculty/Head of the Department/Administration held for technical staff and their involvement with concerned authorities.
- Signing and forwarding authority for sanctioning various leaves and other official letters to underlying technical staff.
- Monitor expenses and suggest cost-effective alternatives.
- Roster management and deployment of all Senior Technical Officers and Technical Officers in his/her concerned department.
- Develop and implement effective policies for all operational procedures.
- Prepare/amend work schedules/standard operating procedures. (Creates and adheres to standard operating procedures) under the guidance of his/her respective HOD/Authority.
- Maintain Leave records of all technical staff in the department.
- Monitoring technical staff"s performance also has a significant role in the Annual Performance Appraisal Report (APAR) of all the technical staff of the concerned department and he/she is Reporting Authority for Senior Technical Officers and Reviewing Authority for technical staff up to the level of Technical Officers (AOTT).
- Ensure the training of all technical staff by allocating proper resources.

- Ensure prompt ordering and stocking of medical and hospital supplies.
- Involve in training of BSc/MSc Anesthesia/ AOT technology courses.
- Organizing Demo class, academic classes, and practical classes of B. AOTT/M.AOTT/ OT technology course students with respective course coordinator.
- Provide technical support in conference/CME/Workshop organized by Dept. with the coordination of HOD/Faculty.
- Any other supervisory official work assigned by HOD.

Allied and Healthcare Professions

Allied and healthcare professionals includes individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person('s) physical, mental, social, emotional, environmental health and holistic well-being.

The wide variation in the understanding of the concept of allied and healthcare professional, better known as „paramedic", the nomenclature, and functions has led to the poor image of allied and healthcare sciences in India. The use of the word paramedic itself limits the activities of AHPs in the system. Hence, it is imperative to adequately compensate these professionals based on their qualifications and specialties. Despite a huge demand for services from this sector, allied and healthcare sciences is highly fragmented. As per the report „From Paramedics to Allied Health Sciences", in total 138 courses of varied levels were identified during the process. Although it is estimated that there may be many more courses which are yet to be identified.

Considering the lack of regulatory mechanism following 15 core professional groups (accounting for around 44 professions) has been enlisted below (The list is illustrative of the allied and healthcare professions. In future there may be addition or removal of certain professions based on the state of their regulation and standardization). It also needs a mention that most of these professions are not restricted to the professional groups under which they have been categorized, their role may extend to other professional services too. Similarly, the categorization is an indicative categorization, however this may evolve over time based on deeper understanding of the roles and responsibilities of each professional group:

1. **Healthcare Professions**
    1. Optometry
    2. Physiotherapy
    3. Occupational Therapy
    4. Nutrition Sciences
    5. Physician Associate and Assistants

2. **Allied Health Professions**
    6. Cardiology, Vascular and Pulmonary Technology
    7. Medical Laboratory Sciences
    8. Medical Radiology and Imaging Technology
    9. Neurosciences Technology
    10. Non- direct and Administrative services
    11. Primary Care and Community services
    12. Radiation Therapy
    13. Renal Technology
    14. Surgical and Anesthesia related Technology
    15. Trauma Care Services

The above mentioned groups account for over 44 job profiles in the allied and healthcare space, which are as follows-

A. Healthcare Professions

1. Optometry
    a. Optometrist
2. Physiotherapy
    a. Physiotherapist
3. Occupational Therapy
    a. Occupational Therapist
4. Nutrition Sciences
    a. Nutritionist
    b. Dietitian
5. Physician Associate and Assistants
    a. Physician Associates and Assistants

B. Allied Health Professions

1. Surgical and anesthesia related technology
    a. Anesthesia Assistants and Technologist
    b. OT Technologist
    c. Endoscopy Technologist
2. Medical Laboratory Sciences
    a. Cyto-Technologist
    b. Dermatology/STD /Leprosy Lab Technologist
    c. Forensic Technologist
    d. Haemato-Technologist
    e. Histopathology-Technologist
    f. Phlebotomist
    g. Medical and Clinical Lab Technologist
3. Medical Radiology and Imaging Technology
    a. Radiographer
    b. Radiologic /Imaging Technologist
    c. Diagnostic Medical Sonographer
4. Renal Technology
    a. Urology Technologist
    b. Dialysis Therapy Technologist
5. Radiation Therapy
    a. Radiotherapy Technologist
    b. Medical Dosimetrist
    c. Nuclear Medicine Technologist
6. Trauma Care Services
    a. Emergency Medical Technologist (paramedic)
    b. Critical Care/ICU Technologist

7. Neurosciences Technology
    a. EEG/END Technologist
    b. EMG Technologist
    c. Neuro Lab Technologist
    d. Sleep Lab Technologist
8. Cardiology, Vascular and Pulmonary Technology
    a. Cardiovascular Technologist
    b. ECG Technologist
    c. ECHO Technologist
    d. Perfusionist
    e. Pulmonary Function (PFT) Technologist
    f. Respiratory Therapist
9. Non- direct and Administrative Services
    a. Biomedical Engineers and Technologist
    b. Medical Assistant
    c. Medical Secretaries
    d. Medical Transcriptionist
    e. Health Information Management Technologist
10. Primary Care and community services
    a. Blood Bank Technologist
    b. Counselor- Integrated Behavioral Health Counselors, Palliative counselors etc.
    c. Sanitary Health Inspectors

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