MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

Mahatma Gandhi Institute of Allied Health Sciences

Syllabus

Bachelor of Anaesthesia and Operation Theatre Technology

4 years

(3 Years + 1 Year Internship)

Program Code: BAOTT26

Duration- VIII Semesters (4 Years)

(B.AOTT)

Principal
MG Institute of Allied Health Sciences
Jaipur

Dr. Bushra Fiza
Dean, Faculty of Allied and
Healthcare Professions
MGUMST, Jaipur

2026-2027

Recommended by the BOS in Allied Health Sciences at its meeting held on 8th April, 2026, the Faculty of Allied and Healthcare Professions at its meeting held on 28.7.2026 and approved by Academic Council at its meeting held on 03.08.2026

NOTICE

1. The university reserves the right to make changes in the syllabus /books/ guidelines, fee-structure or any other information at any time without prior notice the decision of the university shall be binding on all.

2. The jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

3. This syllabus is aligned with the NCAHP Curriculum dated 24.04.2025 and Corrigendum dated 27.04.2026. Any subsequent amendments, revisions or corrigenda issued by the NCAHP shall automatically apply to the Rules, Regulations and Syllabus of MGUMST, Jaipur, and implemented accordingly.

References:

https://ncahp.abdm.gov.in/Curriculum/Operation%20&%20Theatre%20Technology.pdf

https://ncahp.abdm.gov.in/Curriculum/CurriculumCorrigendum/Corrigendum%20-1%20for%20AOTT.pdf

List of Abbreviations

Abbreviation	Full Form
AED	Automated External Defibrillator
AHP	Allied Health and Healthcare Professionals
AIDS	Acquired Immunodeficiency Syndrome
BLS	Basic Life Support
BOTT	Bachelor in Operation Theatre Technology
BMW	Biomedical Waste
BVM	Bag-Valve Mask
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 Services Department
DH	District Hospital
DOTT	Diploma in Operation Theatre Technology
DOPS	Direct Observation of Procedural Skills
ECG	Electrocardiogram
ESWL	Extracorporeal Shock Wave Lithotripsy
HIS	Hospital Information System
HOD	Head of Department
HSSC	Healthcare Sector Skill Council
ILO	International Labour Organization
JCI	Joint Commission International
LFT	Liver Function Tests
Mini-CEX	Mini Clinical Evaluation Exercise
NAAC	National Assessment and Accreditation Council
NABH	National Accreditation Board for Hospitals & Healthcare Providers
NCRC	National Curricula Review Committee
NIAHS	National Initiative for Allied and Healthcare Sciences
NSDA	National Skills Development Agency
NSQF	National Skills Qualifications Framework
OBG	Obstetrics and Gynecology
OSCE	Objective Structured Clinical Examination
OSLER	Objective Structured Long Examination Record

OSPE	Objective Structured Practical Examination
OT	Operation Theatre
OTT	Operation Theatre Technology
PPE	Personal Protective Equipment
PHC	Primary Health Centre
RFT	Renal Function Tests
SCA	Sudden Cardiac Arrest
SC	Sub Centre
SDH	Sub District Hospital
SDL	Self-Directed Learning
TFT	Thyroid Function Tests
TURBT	Transurethral Resection of Bladder Tumors
TURP	Transurethral Resection of the Prostate
UGC	University Grants Commission
UHC	Universal Health Coverage

Rules and Regulations of
Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)

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Program Code: BAOTT26

1. **Title of the Program** - Bachelor of Anaesthesia and Operation Theatre Technology

2. **Duration of the Program** – Duration shall be for a period of 4 years (VIII semesters) including one year of internship.

3. **Medium of Instruction** – English

4. **Eligibility for Admissions**

- The candidate must have passed Senior Secondary (10+2) or equivalent with Physics, Chemistry, and Biology/Mathematics subjects.
- Admission on the basis of merit of Senior secondary (10+2).
- He/she has completed 17 years of age at the time of admission or will complete that age on or before 31 December of the year of his/her admission to the first year of the undergraduate Allied and Healthcare Course.
- Lateral Entry to the candidates in second year (3rd semester) who have passes Diploma in Anaesthesia & Operation Theatre Technology (D.AOTT) with 50% marks.
- Medical fitness certificate is mandatory to submit and it is to be endorsed by Government medical officer.
- Foreign students' admission process in under graduate (UG):
    1) Foreign national students intending to study UG program in India, shall have to take equivalence certificate of eligibility certificate from respective State Allied and Healthcare Council.
    2) For Under Graduate admission of foreign national students, merit list will be based on University Entrance Exam.
    3) Verification of Valid Visa and valid visa duration of foreign national students, to be verified by respective institution & University before enrolling students for program.

- The admission criteria shall be updated by the Commission from time to time.
- Admission process shall be conducted by State/Union Territory/ University.

5. **Admission Process** – Selection shall be done by an admission board of the University/Rajasthan State Allied & Healthcare Council strictly on merit/written examination.

6. **Reservation Policy** – Reservation policy for admissions shall be as per the state/ Centre Government norms.

7. Enrolment[@]

1. Every candidate who is admitted to the Bachelor of Anaesthsia and Operation Theatre Technology program in Mahatma Gandhi Institute of Allied Health Sciences shall be required to get himself/herself enrolled with the Mahatma Gandhi University of Medical Sciences & Technology (MGUMST) after paying the prescribed eligibility and enrolment fees.
2. A candidate shall deposit enrolment fee along with tuition fees at the time of his/her admission to the program. Such a candidate who fails to submit, to the college principal, duly filled enrolment form along with original documents including migration certificate required for enrolment within prescribed period then after he/she shall pay late fee applicable at that time. No student will be allowed to appear in the End of Semester Examination without his/her enrolment.

8. Introduction –

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.

a) Objectives/ Aim of the Program

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

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

b) Programme Outcomes

Upon successful completion of the B.AOTT program, students will be able to:

POs	Outcome
PO1	**Basic Medical Knowledge** Apply knowledge of anatomy, physiology, pharmacology, microbiology, and other biomedical sciences in anaesthesia and operation theatre practices.
PO2	**Anaesthesia & Surgical Assistance Skills** Demonstrate competence in assisting anaesthesia administration and surgical procedures following standard protocols**.**
PO3	**Patient Safety & Infection Control** Implement patient safety measures, aseptic techniques, sterilization, and biomedical waste management practices in healthcare settings.
PO4	**Operation Theatre Management** Manage operation theatre environment, instruments, equipment, and resources efficiently**.**
PO5	**Critical Thinking & Emergency Response** Assess clinical situations and respond effectively during emergencies, trauma, and surgical complications.
PO6	**Biomedical Equipment Handling** Operate, maintain, and troubleshoot anaesthesia machines, ventilators, and other OT and ICU equipment.
PO7	**Communication & Teamwork** Communicate effectively and work collaboratively with surgeons, anaesthetists, nurses, and other healthcare professionals.
PO8	**Professionalism, Ethics & Legal Responsibilities** Practice ethical principles, maintain patient confidentiality, and adhere to medico-legal guidelines.
PO9	**Lifelong Learning & Adaptability** Engage in continuous professional development and adapt to advancements in

	anaesthesia and surgical technology.
PO 10	**Research & Evidence-Based Practice** Apply basic research principles and evidence-based practices to improve patient care and clinical outcomes.

c) Graduate Attributes:

1. The Course prepares the operating theatre technologist to work as a competent, reliable member of the health care team under the guidance and supervision of doctors in their delivery of patient care, training also focuses on the knowledge and skills of monitoring infection control policy and procedures in the operating theatre.

2. Employment opportunities can be found in hospitals in both private and public sectors as well as in independent trauma centers.

3. OTT graduate is encouraged to pursue further qualification to attain senior position in the professional field, also to keep abreast with the advance and new technology, the professional should opt for continuous professional education credits offered by national and international institutes.

9. Attendance – A candidate has to secure minimum -

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination. No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

Program Completion Timeline

The maximum period for completion of B.AOTT is 6 years. Failure to do so will result in exit from the program.

10. Minimum Instruction/ Teaching Days – Each academic semester shall consist of minimum 120 working days, including examinations.

11. Programme Structure (Semester I, II, III, IV_____ *Distribution of courses semester wise)*

B.AOTT FIRST SEMESTER

Course Code	Course Title	Theory Hours	Practical Hours	Total hours	Credit
BAOTT-001	Introduction to Healthcare Delivery System in India	80	-	80	4
BAOTT-002	Medical Terminology & Record Keeping	50		50	3
BAOTT-003	Anatomy	100	40	140	6
BAOTT-004	Physiology	100	40	140	6
BAOTT-005	Health Care Quality & Patient Safety	60	40	100	5
	Total	**390**	**120**	**510**	**24**

B.AOTT SECOND SEMESTER

Course Code	Course Title	Theory Hours	Practical Hours	Total hours	Credit
BAOTT-006	Medical Law and Ethics, Professionalism & Values, Principles of Management	(30+10+30)	-	70	4
BAOTT-007	Basics of Biomedical sciences in surgery and Anesthesia	40	60	100	3
BAOTT-008	Biochemistry & Hematology	40+30	0+30	100	3
BAOTT-009	Pathology & Microbiology	50+50	-	100	4
BAOTT-0010	Basic Concepts in Pharmacology	40	-	40	2
BAOTT-0011	Basic computers and information Science, Communication and soft skills.	40	60	100	4
	Total	**360**	**150**	**510**	**20**

B.AOTT THIRD SEMESTER

Course Code	Course Title	Theory Hours	Practical Hours	Total hours	Credit
BAOTT-012	Basic Techniques of Anesthesia	100	50	150	5
BAOTT-013	Basics of Surgical Procedures	100	50	150	5
BAOTT-014	CSSD & Manifold area	50	100	150	4
BAOTT-015	Industrial Orientation & Industrial Visit	50	0	50	2
	Total	**300**	**200**	**500**	**16**

B.AOTT FOURTH SEMESTER

Course Code	Course Title	Theory Hours	Practical Hours	Total hours	Credit
BAOTT-016	Advanced Anesthesia Techniques	100	50	150	5
BAOTT-017	Advanced Surgical Procedures	100	50	150	5
BAOTT-018	Basic Intensive Care	50	100	150	4
BAOTT-019	Clinical Medicine & Management	50	0	50	2
	Total	**300**	**200**	**500**	**16**

B.AOTT FIFTH SEMESTER

Course Code	Course Title	Theory Hours	Practical Hours	Total hours	Credit
BAOTT-020	Specialized Anesthesia -1	100	50	150	5
BAOTT-021	Specialized Surgery- 1	100	50	150	5
BAOTT-022	Recent Advances in Anesthesia & Surgical Field	100	0	100	5
BAOTT-023	Disaster Management & Environ mental Science	50	0	50	2
	Total	**350**	**100**	**450**	**17**

B.AOTT SIXTH SEMESTER

Course Code	Course Title	Theory Hours	Practical Hours	Total hours	Credit
BAOTT-024	Specialized Anesthesia 2	100	50	150	5
BAOTT-025	Specialized Surgery-2	100	50	150	5
BAOTT-026	Specialized Anesthesia & Surgical-3	100	50	150	5
BAOTT-027	Research Methodology & Biostatics	50	0	50	2
	TOTAL	**350**	**150**	**500**	**17**

B.AOTT SEVENTH & EIGHTH SEMESTER

Course Name	Credit	Contact Hours
INTERNSHIP (clinical posting/research dissertation)	20+20	1440
TOTAL	**40**	**1440**

Total credits **= 110 credits + 40 credits**

Total Contact hours **= 2920+ 1440**

Contact hours of all semesters **= 510+510+500+450+450+500**

Credit Details:

- Lecture / Tutorial: 1 credit = 15 hours
- Practical: 1 credit = 30 hours
- Clinical Lab postings: 1 credit = 45 hours

Credit Includes: L – Lectures, T – Tutorials, P – Practical.

12. Conduct of Continuous Assessment/ Internal Assessment –

- 30% of the total marks is allotted for CIE in each course.
- 50% of CIE shall be based on the average of marks obtained in two notified formative written tests. Absence without prior permission for a formative test shall result in scoring of the test as zero.
- The remaining 50% of CIE will be based on internal assessments in the form of evaluation seminars, journal club presentations, case presentations, completion of assignments etc. which will be specified in the individual course curricula.
- CIE will be conducted for theory and practical for each course wherever applicable.
- A Candidate must secure at least 40% of total marks fixed for CIE in the particular subject in order to be eligible to appear for the End Semester (ESE) for that subject.

13. Dissertation/ Internship/ Project/ Clinical Postings (If any)

7th and 8th Semester: Internship (Clinical posting/ Research dissertation):

A compulsory internship (Clinical posting/ Research dissertation) of one year – equivalent to 12

months, 52 weeks, or 1440 hours – carrying 40 credits, must be complete by each student to be eligible for the award of the **Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT).** If a student opts for Research dissertation, it must be of a minimum duration of 6 months.

During the internship period, students are required to adhere to the rules and regulations of the host organization. Upon successful completion, students will receive an Internship Certificate that includes:

Details of clinical or relevant departmental postings with corresponding hours.

Information on any research project completed during research dissertation
The certificate must be authenticated by the Dean/ Head of Department (HoD)/Coordinator and the Head of the Institution (HoI).

Note: The Bachelor's Degree will be awarded only upon successful completion of the Internship requirements.

14. Scheme of Examination – The end of semester examination for the program shall be conducted semester wise at the end of every semester.

MARKS DISTRIBUTION

B.AOTT FIRST SEMESTER

Course/Paper Code	Course/Paper Name	Credits Theory/ Practical	Theory SEE	Theory IA	Practical SEE	Practical IA	Total
BAOTT-001	Introduction to Healthcare Delivery System in India	**4**	**40**	**10**	**-**	**-**	**50**
BAOTT-002	Medical Terminology & Record Keeping	**3**	**40**	**10**	**-**	**-**	**50**
BAOTT-003	Anatomy	**6**	**80**	**20**	**40**	**10**	**150**
BAOTT-004	Physiology	**6**	**80**	**20**	**40**	**10**	**150**
BAOTT-005	Healthcare Quality & Patient Safety	**5**	**40**	**10**	**30**	**20**	**100**
TOTAL	**5**	**24**	**280**	**70**	**110**	**40**	**500**

B.AOTT SECOND SEMESTER

Course/Paper Code	Course/Paper Name	Credits Theory/ Practical	Theory SEE	Theory IA	Practical SEE	Practical IA	Total
BAOTT-006	Medical Law & Ethics, Principles of Management	**4**	**40**	**10**	**-**	**-**	**50**
BAOTT-007	Basics of Biomedical Sciences in Surgery & Anesthesia	**3**	**40**	**10**	**-**	**-**	**50**
BAOTT-008	Biochemistry & Hematology	**3**	**80**	**20**	**30**	**20**	**150**
BAOTT-009	Pathology & Microbiology	**4**	**80**	**20**	**-**	**-**	**100**
BAOTT-0010	Basic Concept in Pharmacology	**2**	**40**	**10**	**-**	**-**	**50**
BAOTT-0011	Basic Computer & Information Sciences, Communication & Soft Skills	**4**	**40**	**10**	**30**	**20**	**100**
TOTAL	**6**	**20**	**320**	**80**	**60**	**40**	**500**

B.AOTT THIRD SEMESTER

Course/Paper Code	Course/Paper Name	Credits Theory/ Practical	Theory SEE	Theory IA	Practical SEE	Practical IA	Total
BAOTT-012	Basic Techniques of Anesthesia	**5**	**80**	**20**	**40**	**10**	**150**
BAOTT-013	Basics of Surgical Procedures	**5**	**80**	**20**	**40**	**10**	**150**
BAOTT-014	CSSD & Manifold Area	**4**	**40**	**10**	**-**	**-**	**50**
BAOTT-015	Industrial Orientation & Industrial Visit	**2**	**40**	**10**	**-**	**-**	**50**
TOTAL	**4**	**16**	**240**	**60**	**80**	**20**	**400**

B.AOTT FOURTH SEMESTER

Course/Paper Code	Course/Paper Name	Credits Theory/ Practical	Theory SEE	Theory IA	Practical ESE	Practical CA	Total
BAOTT-016	Advanced Anesthesia Techniques	**5**	**80**	**20**	**40**	**10**	**150**
BAOTT-017	Advanced Surgical Procedures	**5**	**80**	**20**	**40**	**10**	**150**
BAOTT-018	Basic Intensive Care	**4**	**40**	**10**	**30**	**20**	**100**
BAOTT-019	Clinical Medicine & Management	**2**	**40**	**10**	**-**	**-**	**50**
TOTAL	**4**	**16**	**240**	**60**	**110**	**40**	**450**

B.AOTT FIFTH SEMESTER

Course/Paper Code	Course/Paper Name	Credits Theory/ Practical	Theory SEE	Theory IA	Practical ESE	Practical CA	Total
BAOTT-020	Specialized Anesthesia-1	**5**	**80**	**20**	**40**	**10**	**150**
BAOTT-021	Specialized Surgery-1	**5**	**80**	**20**	**40**	**10**	**150**
BAOTT-022	Recent Advancements in Anesthesia & Surgical Fields	**5**	**80**	**20**	**-**	**-**	**100**
BAOTT-023	Disaster Management & Environmental Science	**2**	**40**	**10**	**-**	**-**	**50**
TOTAL	**4**	**17**	**280**	**70**	**80**	**20**	**450**

B.AOTT SIXTH SEMESTER

Course/Paper Code	Course/Paper Name	Credits Theory/ Practical	Theory SEE	Theory IA	Practical ESE	Practical CA	Total
BAOTT-024	Specialized Anesthesia – 2	**5**	**80**	**20**	**40**	**10**	**150**
BAOTT-025	Specialized Surgery – 2	**5**	**80**	**20**	**40**	**10**	**150**
BAOTT-026	Specialized Anesthesia & Surgery– 3	**5**	**80**	**20**	**40**	**10**	**150**
BAOTT-027	Research Methodology & Biostatistics	**2**	**40**	**10**	**-**	**-**	**50**
TOTAL	**4**	**17**	**280**	**70**	**120**	**30**	**500**

B.AOTT SEVENTH & EIGHTH SEMESTER

S. No	COURSE Titles	Continuous Assessment	End Semester Examination	Total
B.AOTT-028	AOTT Internship (should contain six months of Anaesthesia, six months of surgery, and at least one month of each specialty)	90	210	300

Note: ESE* will be conducted immediate after end of the 8th semester at the institutional level.

15. Conduct of University Examination/ End of Semester Examination@ –

a) **Appointment of Examiners and Paper Setters (Qualification of paper Setters and Examiners):**

- All the examiners, paper setters, theory examination answer book evaluators, external and internal examiners for practical examinations shall be appointed by the respective university.
- Professor/Assoc. Professor/ Assistant Professor/Lecturer /Allied health Professional having PG Qualification and 3 years professional /teaching experience after PG in respective fields or UG Qualification and 5 years professional industry/teaching experience after UG is eligible to act as an internal or external examiner of theory/practical examination.
- For the 1st semester to 4th semester examination- respective theory question papers shall be set by the internal examiners covering their respective areas of syllabus. For each theory question paper, there shall be a separate internal examiner. The answer books shall be evaluated by the concerned internal examiners (paper setters).
- In the Vth and VIth semester examination, 25% of the theory question papers shall be set and evaluated by external examiners. The external examiner (paper setter) shall evaluate answer books of his/her theory paper.

b) **Eligibility to appear for the Examination**:

- A student is required to have minimum 75% attendance in theory and 80% practical's separately of each semester to make him/her eligible to appear in the university semester examination.

c) Theory Examinations:

- There shall be Theory papers in each semester of study.
- Each Theory paper examination shall be of 3 hours / 1.5 hours duration and a maximum of 80 marks/ 40 marks.
- Internal assessment (IA) shall be 20 marks/ 10 marks for each Theory paper.

- The Paper Setter shall set the questions within the prescribed course of study of the concerned paper. There will be a set pattern of question papers duly approved by the Academic Council.

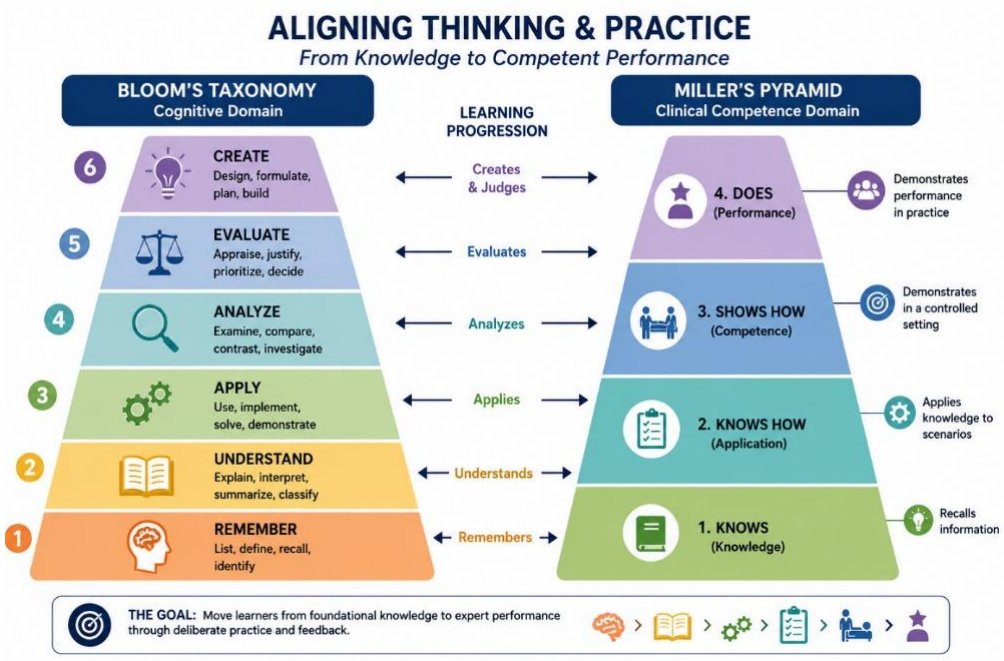
Proposed Pattern of question papers –

MAXIMUM MARKS = 80		
TYPE OF QUESTION	NUMBER OF QUESTION	MARKS FOR EACH QUESTION
ESSAY TYPE	3 (to answer 2)	15
SHORT ESSAY TYPE	9 (to answer 7)	5
SHORT ANSWER TYPE	7 (to answer 5)	3

Proposed Pattern of question papers –

MAXIMUM MARKS = 40		
TYPE OF QUESTION	NUMBER OF QUESTION	MARKS FOR EACH QUESTION
ESSAY TYPE	2 (to answer 1)	15
SHORT ANSWER TYPE	7 (to answer 5)	5

- **Bloom's Level:** A blended approach—combining didactic methods, experiential laboratory training, problem-solving, clinical immersion, and research exposure—is essential in Anaesthesia & Operation Theatre Technology. When guided by educational frameworks such as Bloom's Level, these methodologies ensure that learners progress from acquiring foundational knowledge to demonstrating competence and ultimately practicing independently as professionals.
- By weaving Bloom's Level (cognitive depth) the curriculum ensures that graduates not only master theoretical knowledge but also translate it into safe, accurate, and independent Clinical practice.



d) **Practical Examinations and Viva Voce**

- At the end of each semester there shall be the practical and viva-voce examination. It shall be conducted after the Theory examination is over. A candidate will have to obtain at least 50% marks in the practical and viva-voce examination.
- The university shall appoint the panel of examiners in such a manner that the complete syllabus of semester is taken care of by the internal/external practical examiner(s).

e) Criteria for pass(Results):

A Candidate must score 50%separately in theory and practical wherever applicable to be declared as pass. In case of fail, subsequently a candidate has to appear for both theory and practical examination of the university in that particular course.

f) Supplementary examination :

- 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.

Passing Marks: A candidate will have to obtain at least 50% marks in each Theory paper including internal assessment to pass.

Grace Marks: The award of grace marks shall be as per the policy governed by the rules of Mahatma Gandhi University of Medical Sciences & Technology (MGUMST)

g) Re-totaling/ Re- Evaluation: (As per MGUMST Rules)

Re-totaling/ Re- Evaluation of marks is permitted only for theory papers. The University/board, on application within the stipulated time and remittance of a prescribed fee, shall permit a re-totalling/ Re- evaluation of marks for the course/s applied. The marks obtained after re-totaling/ re- evaluation shall be the final marks awarded.

h) Carry over benefit (Promotion to next year) :

- 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 not more than 2 subjects in I semester is allowed to move to II semester. The candidate with back log subjects shall take both I semester backlog subjects as well as II semester subjects. The candidate with a backlog of not more than 2 subjects in II semester is allowed to go to the III semester till he/she clears all I semester subjects.
- The candidate with a backlog of not more than 2 subjects in III semester is allowed to go to the IV semester till he/she clears all II semester subjects.

- The candidate with a backlog of not more than 2 subjects in IV semester is allowed to go to the V semester till he/she clears all III semester subjects.
- The candidate with a backlog of not more than 2 subjects in V semester is allowed to go to the VI semester till he/she clears all IV semester subjects.
- Results of candidates will be declared at the end of VI semester only when the all backlog subjects are cleared by the candidates.

Maximum attempt: No more than three attempts shall be allowed for the candidate to pass the any subjects. If he/she fails to clear the any subjects within three attempts will be considered as withdrawal of the course.

Letter Grades and Grade Points

Letter Grade	A+	A	B	C	D	E	F/I/DT
Credit value	10	9	8	7	6	5	0

F- Fail, DT - Detained/Attendance shortage, I – Incomplete

Internals Weightage (%)	**End semester Exam Weightage (%)**
20/10	80 / 40

Calculation of GPA & CGPA: An example is provided

Course code	**Course**	**Credits (a)**	**Grade obtained by the student**	**Credit value (b)**	**Grade Points (a x b)**
BAOTT 1	Course - 1	4	D	6	24
BAOTT 2	Course - 2	4	B	8	32
BAOTT 3	Course - 3	3	A+	10	30
BAOTT 4	Course - 4	4	C	7	28
BAOTT 5	Course - 5	5	A	9	45
TOTAL		**20**	**-**	**-**	**159**

1st Semester GPA = Total grade points / total credits

159/20 = **7.95**

Suppose in **the 2nd semester, GPA** = **8.35** with respective course credit 20

$$Then, 1^{st}YearCGPA = \frac{\sum 7.95x20 \sum + \sum 8.35x20 \sum}{20 + 20} = 8.15$$

Credit Weightage Distribution

Item	Weightage (%)
Formative	
Sessional exams	20% / 10%
Summative	
End-of-Semester University exam	80% / 40%
Total	100 %

Internals Weightage (%)	End semester Exam Weightage (%)
20/ 10	80/40

16. Award of Degree@: The degree shall be awarded by the university only after receipt of course completion certificate and No Dues from the principal of the college.

17. Authority to issue transcript: The Controller of Examination of the University shall be the authority for issuing transcript after receiving the described fee from the candidate.

18. Logbooks and Clinical Records:

- **Guidelines for Logbook Entry Outcome:**
- Outcome: Morbidly/ Mortality/Any major complication should be indicated with measures taken for timely management.

- The candidate should make the entries in the logbook daily, countersigned by the Assistant Professor /Associate Professor / Professor / Head of the Department.
- The Associate Professor / Professor must review & sign the logbook every week for short duration postings & every month for long duration postings
- In emergency OT posting the logbook will be countersigned by Senior Resident on duty.
- The logbook is to be submitted through the Professor /Associate Professor at the time of the final examination.
- Please use clear handwriting for filling the Logbook.
- NOTE- Duration 12 months (Anesthesia- 6 months & Surgical Disciplines 6 months)

19. Any specific point/ rule/ regulation related to college/ institute-NA

20. Course wise syllabus with recommended text books-

21. Model Papers:- Attached

QUESTION PAPER TEMPLATE FOR B.AOTT SEMESTER I–IV

INSTRUCTIONS FOR PAPER SETTERS FOR B.AOTT SEMESTER I–IV

1. All questions must be framed in alignment with the NCAHP framework. Map each question to the relevant Course Outcome (CO) and Bloom's taxonomy.
2. Every question must carry two mandatory annotations:(a) Course Outcome (CO): e.g., CO2, CO5;(b) Highest Bloom's Level Attained: e.g., L3 – Application. These must be written in brackets after the question text.
3. The Bloom's Taxonomy ceiling for BAOTT Semester I–IV is Level 3 – Application. No question in this paper shall exceed this level. The paper setter must self-audit using the Bloom's reference table provided in this template.
4. Question distribution across Bloom's levels [L1 – Knowledge; L2 – Comprehension; and L3 – Application] must be documented on the master copy. Recommended distribution for Semester I–IV:
   L1–L2: ~70–80%;
   L3: ~20–30%;
   L4–L6: ~0% (not applicable).
5. Avoid repetition of topics across questions. Q1, Q2 and Q3 should collectively cover a minimum of 6–8 different topics/competencies to ensure adequate syllabus sampling.
6. All Long Answer Questions must carry sufficient internal scope. A 10-mark Long Answer Question should have 4–5 expected response components. These expected answers must be included in the model answer key submitted alongside the paper.
7. The paper setter must submit:
   (i) Question Paper with CO + Bloom's Level annotations;
   (ii) Model Answer Key with marking scheme.
   All documents are confidential and must be submitted in a sealed envelope to the Examination Cell.

BAOTT Semester I–IV: Question-Level Mapping Table (80 Marks)

Q. No.	Question Type	Bloom's Range
Q1	Long Answer (Attempt any 2 out of 3)	L1 – L3
Q2	Short Essay (Attempt any 8)	L1 – L3
Q3	Short Answer (Attempt any 5)	L1 – L2 only

B.AOTT Semester I–IV: Question-Level Mapping Table (40 Marks)

Q. No.	Question Type	Bloom's Range
Q1	Long Answer (Attempt any 1 out of 2)	L1 – L3
Q2	Short Essay (Attempt any 4)	L1 – L3
Q3	Short Answer (Attempt any 2)	L1 – L2 only

Question Paper Structure:

Subject Code **Subject Abb.**

Bachelor of Anaesthesia and Operation Theatre Technology (BAOTT)
Semester
Subject Name
Time: 3 Hours
Maximum Marks: 80

Q.1. Long Answer Questions (Attempt any 2) (2 × 10 = 20 Marks)

a). ..... (CO____, L-___)

b). ..... (CO____, L-____)

c). ..... (CO____, L-___)

Q.2. Short Essay Questions (Attempt any 8) (8 × 5 = 40 Marks)

a) ..... (CO____, L-___)

b) ..... (CO____, L-___)

c) ..... (CO____, L-___)

d) ..... (CO____, L-___)

e) ..... (CO____, L-___)

f) ..... (CO____, L-___)

g) ..... (CO____, L-___)

h) ..... (CO____, L-___)

i) ..... (CO____, L-___)

j) ..... (CO____, L-___)

Q.3. Short Answer Questions (Attempt any 5) (5 × 4 = 20 Marks)

a) ..... (CO____, L-___)

b) ..... (CO____, L-___)

c) ..... (CO____, L-___)

d) ..... (CO____, L-___)

e) ..... (CO____, L-___)

f) ..... (CO____, L-___)

g) ..... (CO____, L-___)

Question Paper Structure:

Subject Code **Subject Abb.**

Bachelor of Anaesthesia and Operation Theatre Technology (BAOTT)

Semester
Subject Name

Time: 1.5 Hours
Maximum Marks: 40

Q.1. Long Answer Questions (Attempt any 1) (1 × 10 = 10 Marks)

a). ..... (CO____, L-___)

b). ..... (CO____, L-___)

Q.2. Short Essay Questions (Attempt any 4) (4 × 5 = 20 Marks)

a) ..... (CO____, L-___)

b) ..... (CO____, L-___)

c) ..... (CO____, L-___)

d) ..... (CO____, L-___)

e) ..... (CO____, L-___)

f) ..... (CO____, L-___)

Q.3. Short Answer Questions (Attempt any 2) (2 × 5 = 10 Marks)

a) ..... (CO____, L-___)

b) ..... (CO____, L-___)

c) ..... (CO____, L-___)

d) ..... (CO____, L-___)

QUESTION PAPER TEMPLATE FOR BAOTT SEMESTER V–VI

INSTRUCTIONS FOR PAPER SETTERS FOR BAOTT SEMESTER V–VI

1. All questions must be framed in alignment with the NCAHP framework. Map each question to the relevant Course Outcome (CO) and NCAHP and Bloom's Taxonomy.
2. Every question must carry two mandatory annotations:(a) Course Outcome (CO): e.g., CO2, CO5;(b) Highest Bloom's Level Attained: e.g., L5.These must be written in brackets after the question text.
3. The Bloom's Taxonomy ceiling for BAOTT Semester V–VI is Level 5 – Evaluation. No question in this paper shall exceed this level. The paper setter must self-audit using the Bloom's reference table provided in this template.
4. Question distribution across Bloom's levels [L2 – Comprehension; L3 – Application; L4 – Analysis; and L5 – Evaluation] must be documented on the master copy.
   Recommended distribution:
   L2-L3: ~70–80%;
   L4: ~10–15%;
   L5: 5-10%
5. Avoid repetition of topics across questions. Q1, Q2 and Q3 should collectively cover a minimum of 6–8 different topics/competencies to ensure adequate syllabus sampling.
6. All Long Answer Questions must carry sufficient internal scope. A 10-mark Long Answer Question should have 4–5 expected response components. Clinical scenarios or case-based questions should be included wherever appropriate. These expected answers must be included in the model answer key submitted alongside the paper.
7. The paper setter must submit:
   (i) Question Paper with CO + Bloom's Level annotations;
   (ii) Model Answer Key with marking scheme.
   All documents are confidential and must be submitted in a sealed envelope to the Examination Cell.

BAOTT Semester V–VI: Question-Level Mapping Table (80 Marks)

Q. No.	Question Type	Bloom's Range
Q1	Long Answer (Attempt any 2 out of 3)	L2 – L4
Q2	Short Essay (Attempt any 8)	L2 – L4
Q3	Short Answer (Attempt any 5)	L1 – L3 only

BAOTT Semester V–VI: Question-Level Mapping Table (40 Marks)

Q. No.	Question Type	Bloom's Range
Q1	Long Answer (Attempt any 1 out of 2)	L2 – L4
Q2	Short Essay (Attempt any 4)	L2 – L4
Q3	Short Answer (Attempt any 2)	L1 – L3 only

Question Paper Structure:

Subject Code **Subject Abb.**

Bachelor of Anaesthesia and Operation Theatre Technology (BAOTT)
Semester
Subject Name
Time: 3 Hours
Maximum Marks: 80

Q.1. Long Answer Questions (Attempt any 2) (2 × 10 = 20 Marks)

a). ..... (CO____, L-___)

b). ..... (CO____, L-____)

c). ..... (CO____, L-___)

Q.2. Short Essay Questions (Attempt any 8) (8 × 5 = 40 Marks)

a) ..... (CO____, L-___)

b) ..... (CO____, L-___)

c) ..... (CO____, L-___)

d) ..... (CO____, L-___)

e) ..... (CO____, L-___)

f) ..... (CO____, L-___)

g) ..... (CO____, L-___)

h) ..... (CO____, L-___)

i) ..... (CO____, L-___)

j) ..... (CO____, L-___)

Q.3. Short Answer Questions (Attempt any 5) (5 × 4 = 20 Marks)

a) ..... (CO____, L-___)

b) ..... (CO____, L-___)

c) ..... (CO____, L-___)

d) ..... (CO____, L-___)

e) ..... (CO____, L-___)

f) ..... (CO____, L-___)

g) ..... (CO____, L-___)

Question Paper Structure:

Subject Code **Subject Abb.**

Bachelor of Anaesthesia and Operation Theatre Technology (BAOTT)
Semester
Subject Name
Time: 1.5 Hours
Maximum Marks: 40

Q.1. Long Answer Questions (Attempt any 1) (1 × 10 = 10 Marks)

a). ..... (CO____, L-___)

b). ..... (CO____, L-___)

Q.2. Short Essay Questions (Attempt any 4) (4 × 5 = 20 Marks)

a) ..... (CO____, L-___)

b) ..... (CO____, L-___)

c) ..... (CO____, L-___)

d) ..... (CO____, L-___)

e) ..... (CO____, L-___)

f) ..... (CO____, L-___)

Q.3. Short Answer Questions (Attempt any 2) (2 × 5 = 10 Marks)

a) ..... (CO____, L-___)

b) ..... (CO____, L-___)

c) ..... (CO____, L-___)

d) ..... (CO____, L-

Subject: Remedial English

Particular	Details
Theory Hours	30 Hours
Practical / Demonstration Hours	As per curriculum / Practical sessions
Lecture Schedule	01 Hour per Week
Practical / Demonstration	Practical / Demonstration Sessions
Method of Assessment	Written Examination

Course Description

The course is designed for the students from non-English Boards by introducing and improving their spoken English knowledge and speaking skills apropos their professional work.

Objectives

After completing this course the students will be able to:

- Read and write correct English.
- Communicate effectively in English language.
- Demonstrate skill in writing and speaking English language.

COURSE OUTCOMES

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

CO1: Analyze and restate the meaning of a text in English.

CO2: Demonstrate the skill to write in English without grammatical error.

CO3: Practice listening effectively to communication in English.

CO4: Develop the ability to speak English language with the right way of pronunciation.

CO5: Express the viewpoints with confidence in English.

CO6: Express values and skills gained through effective communication to other disciplines.

CO7: Compose articles and compositions in English.

CO8: Discuss and socialize effectively in English.

Unit I – Language Basic *(05 Hours)*

Content:

- Review of grammar
- Remedial study of grammar
- Building vocabulary
- Introduction

- Parts of speech
- Exercise on use of grammar
- Tense
- Number
- Gender

Assessment Methods:

- Objective type
- Fill in the blanks

Unit II *(03 Hours)*

- Read and comprehend prescribed course books.
- Reading.
- Summarizing.
- Comprehension.

Assessment Methods:

- Fill in the blanks.
- One-mark questions.

Unit III – Various Forms of Composition *(06 Hours)*

- Letter writing
- Note taking
- Precis writing
- Diary writing
- Reports on health problems etc.
- Official correspondence
- Outgoing correspondence
- Replying to incoming correspondence
- Writing circulars
- Notices
- Charge memos
- Note taking
- Writing summaries
- Observation reports

Teaching Learning Activities:

- Exercise on writing
- Letter writing
- Resume/CV writing
- Essay writing

Assessment Methods:

- Applications
- Short reports to be written

Unit IV *(10 Hours)*

Objective:
Develop skill in spoken English.

Content:

- English spoken mode
- Debates
- Telephonic conversation
- Formal & informal conversation
- Agreeing
- Emphasizing
- Interrupting politely
- Opinions
- Interviews
- Visual presentation

Teaching Learning Activities:

- Participating in seminars
- Telephonic conversation
- Conversation in different situations
- Practice in public speaking

AssessmentMethods:
Assessment of the skills.

Unit V *(06 Hours)*

Content:

- Listening to comprehension media
- Audio

- Video
- Speeches
- Definition of listening
- Types of listening
- Purposes of listening
- Obstacles for listening
- Contexts of listening
- To be a good listener
- Listening to a lecture etc.

Teaching Learning Activities:

- Listening to audio/video tapes
- Identifying the key points

Assessment Methods:

- Practical test of listening
- Filling in the blanks

There shall be examination for **100 marks** at the end of the academic year, which will be conducted by the college.

Reference Books

1. Tom Koorkkakala, *Communicative English for General Nursing Students*, K.J. Publications, 2008.
2. *King's English*, Addone Publishing Group, Thiruvananthapuram.
3. John Ellison Kahn & Others, *How to Write and Speak Better*.

First Semester:

Course Code	Course Title	Teaching Hour				Theory			Practical			Grand Total (Marks)
		L hrs.)	P/D	CLP	CR	SEE	IA	T	SEE	IA	T	
BAOTT-001	Introduction to Health Care Delivery System in India	80	…..	…..	4	40	10	50	…..	…..	…..	50
BAOTT-002	Medical Terminologygy & Record Keeping	50	…..	…..	3	40	10	50	…..	…..	…..	50
BAOTT-003	Anatomy	100	40	…..	6	80	20	100	40	10	…..	150
BAOTT-004	Physiology	100	40	…..	6	80	20	100	40	10	…..	150
BAOTT-005	Healthcare Quality & Patient Safety	60	40	…..	5	40	10	50	30	20	50	100
Total		**390**	**120**	**…..**	**24**	**…..**	**….**	**350**	**…..**	**…..**	**50**	**500**
Grand Total		**510**			**……**							

SEMESTER-I

Foundation course

Introduction to Health Care Delivery System in India

(80 Hours)

Learning Objectives

Understanding the key features of the Indian healthcare delivery system, comparing it to other countries, evaluating community participation in healthcare, understanding the role of the private sector in healthcare, familiarizing oneself with the National Health Mission and National Health Policy, identifying issues and challenges, and exploring the background, objectives, and operations of national health programmes are the learning objectives of this course. The course also covers the AYUSH medical system, India's past, present, and future health scenarios, demography, vital statistics, epidemiological concepts, disease transmission, and disease monitoring in infectious and non-communicable diseases.

Course Outcomes

CO No.	Course Outcome Statement	Bloom's Level
CO1	Describe healthcare delivery systems in India at different levels of care.	L1
CO2	Explain the role of community participation, NHM, NHP, and private sector in healthcare.	L2
CO3	Compare healthcare systems and evaluate healthcare challenges.	L2
CO4	Discuss National Health Programmes and AYUSH systems.	L2
CO5	Apply epidemiological and demographic concepts in public health situations.	L3

Introduction to healthcare delivery system

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

Introduction to healthcare delivery system- 15 Hours

a) Healthcare delivery system in India at primary, secondary and tertiary care

b) Community participation in healthcare delivery system

c) Health system in developed countries.

d) Private Sector

e) National Health Mission

f) National Health Policy

g) Issues in Health Care Delivery System in India

National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.- 10 Hours

Introduction to AYUSH system of medicine. 15 Hours

a) Introduction to Ayurveda.

b) Yoga and Naturopathy

c) Unani

d) Siddha

e) Homeopathy

f) Need for integration of various system of medicine

Health scenario of India- past, present, and future. -5 Hours

Demography & Vital Statistics- -10 Hours

a) Demography – its concept

b) Vital events of life & its impact on demography

c) Significance and recording of vital statistics

d) Census & its impact on health policy

Epidemiology -25 Hours

a) Principles of Epidemiology

b) Natural History of disease

c) Methods of Epidemiological studies

d) Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

Reference Books:

l. "Indian Healthcare: Inside Out" by B.S. Ajaikumar

This book provides insights into the challenges and opportunities in the Indian healthcare system, covering topics such as healthcare delivery models, healthcare financing, technology advancements, and policy considerations.

2."Healthcare Delivery in India: Critical Perspectives" edited by K.R. Nayar and R. Raman

This book offers a multidisciplinary perspective on the Indian healthcare system, covering topics such as healthcare policy, healthcare delivery models, healthcare workforce, healthcare technology, and healthcare financing

Medical Terminology and Record keeping (including anatomical terms)

(50 Hours)

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

Course Outcomes

CO No.	Course Outcome Statement	Bloom's Level
CO1	Recall and define medical terms, abbreviations, symbols, prefixes, suffixes, and roots.	L1
CO2	Interpret and explain formation of medical terms and plurals.	L2
CO3	Apply medical terminology to different body systems and clinical situations.	L3
CO4	Interpret medical orders and reports accurately.	L3
CO5	Demonstrate electronic health record documentation and data management.	L3

Course content

Topics to be covered under the subject are as follows:

1. Derivation of medical terms.

2. Define word roots, prefixes, and suffixes.

3. Conventions for combined morphemes and the formation of plurals.

4. Basic medical terms.

5. Form medical terms utilizing roots, suffixes, prefixes, and combining roots.

6. Interpret basic medical abbreviations/symbols.

7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.

8. Interpret medical orders/reports.

9. Data entry and management on electronic health record system.

Reference Books:

1. Davies, Juanita. Essentials of Medical Terminology. 3rd edition. New York. Delmar.2008.
2. Mogli. JD. Medical Records: Organization & Management 2ndedition New Delhi: Jaypee Brothers.
3. The body by Bilbirson Agreed for Occupance

Anatomy

(100 Hours)

Learning Objectives

The course aims to teach basic anatomical terminology, identify bones and features of the limbs, thorax, lungs, and heart, comprehend the muscular system, investigate excretory, digestive, and nervous systems, comprehend the gastrointestinal tract, and comprehend the structure and function of the central nervous system. Students will also learn surface anatomy and radiological interpretation abilities. Understanding the relationship between the muscular system and specific actions, describing the excretory and digestive systems, explaining the structure and function of the central nervous system, and applying surface anatomy and radiology interpretation techniques are among the course outcomes.

Course Outcomes:

CO No.	Course Outcome (Theory)	Bloom's Level
CO1	Describe basic anatomical terminology and identify major bones of the upper limb, lower limb, vertebral column, and thoracic cage.	L1
CO2	Explain the anatomy of thorax, lungs, heart, digestive system, excretory system, and nervous system.	L2
CO3	Illustrate the structure and functions of skeletal muscles, gastrointestinal tract, and urinary system.	L2
CO4	Discuss the organization and functional significance of the central and peripheral nervous systems.	L2
CO5	Apply anatomical knowledge for understanding organ systems and their clinical relevance in healthcare practice.	L3

Course content

Basic anatomy

1. Introduction to Anatomy: Basic Anatomical terminology

a) Osteology-- 20 Hours

- Upper limb – clavicle, scapula, humerus, radius, ulna,
- Lower limb - femur, hipbone, sacrum, tibia, fibula &Vertebral column

b) Thorax – Intercostal space, pleura, bony thoracic cage, ribs sternum &thoracic vertebrae- 8 Hours

c) Lungs – Trachea, bronchial tree.- 6 Hours

2. Heart – Surface anatomy of heart, chambers of the heart, valves of the heart, and major blood vessels of heart, pericardium, and coronary arteries- 10 Hours

3. Skeleton-muscular system – Muscles of thorax, muscles of upper limb(arm & fore arm) Flexor and extensor group of muscles (origin, insertion, action) - 10 Hours

4. Excretory system – Kidneys, ureters, bladder.- 6 Hours

5. Digestive System: 20 Hours

- Structure and function of the digestive system
- Oral cavity and digestive enzymes
- Anatomy and function of the gastrointestinal tract
- Absorption and digestion of nutrients
- Common digestive disorders

6. Nervous System: -20 Hours

- Structure and function of neurons
- Organization of the central nervous system (brain and spinal cord)
- Peripheral nervous system and its divisions
- Cranial nerves and spinal nerves
- Basic principles of neurophysiology

Practical in Anatomy **(40 Hours)**

CO No.	Practical Course Outcome	Bloom's Level
CO1	Identify and differentiate major bones of the human skeleton and their anatomical features.	L1
CO2	Demonstrate surface anatomy of major organs and body regions using models and mannequins.	L2
CO3	Identify anatomical structures in radiological images and X-ray investigations.	L3
CO4	Apply anatomical knowledge for interpretation of organ anatomy and clinical correlations.	L3

Mannequins to be provided for Teaching Osteology – Bones identification (right and left side) and prominent features and muscle attachment of the bone, clavicle, scapula, radius, ulna, humerus, femur, hip bone, sacrum, tibia, fibula. Surface Anatomy, Organ Anatomy (Heart, Lungs, Stomach, Liver, Spleen, Kidney, Urinary tract, Testis, Female reproductive organs), Radiology, and X-ray Chest PA view

Reference Books:-

a. Human Anatomy (Vol-I,II,III) B D Chaurasia,
b. Ross and Wilson Anatomy and Physiology,
c. Human Anatomy for Students, B.D Ghosh.
d. Textbook of Anatomy (Vol-1,2,3) Samar Mitra

Physiology

(100 Hours)

Learning Objectives

Learn about cellular physiological processes, blood composition and functions, cardiovascular, respiratory, excretory, reproductive, central nervous, endocrine, gastrointestinal tract, vital signs, electrocardiogram interpretation, and respiratory examinations. Learn how to take vital signs, interpret electrocardiograms, and do respiratory tests. Learn about the activities of the central nervous system and the endocrine system, as well as the physiological architecture of the gastrointestinal tract.

Course Outcomes

CO No.	Course Outcome (Theory)	Bloom's Level
CO1	Describe the physiological functions of cells, blood, and body fluid regulation mechanisms.	L1
CO2	Explain the physiology of cardiovascular, respiratory, excretory, reproductive, and endocrine systems.	L2
CO3	Discuss physiological mechanisms involved in digestion, absorption, circulation, and homeostasis.	L2
CO4	Explain the functions of the central nervous system and special sensory organs.	L2
CO5	Apply physiological principles for understanding normal body functions and interpretation of physiological parameters.	L3

Course Content:

Physiology

The Cell:- 8 Hours

a) Acid base balance and disturbances of acid base balances (Alkalosis, Acidosis)

The Blood:- 10 Hours

a) Composition of Blood, functions of the blood and plasma proteins, classification and protein, Blood Cascade, Bleeding and Clotting time.

b) Pathological and Physiological variation of the RBC.

c) Function of Hemoglobin.

d) Erythrocyte Sedimentation Rate.

e) Detailed description about WBC-Total count (TC), Differential count (DC) and functions.

f) Platelets – formation and normal level and functions.

g) Blood groups and Rh factor.

Cardio-Vascular System: - 15 Hours

a) Physiology of the heart.

b) Heart sounds.

c) Cardiac cycle, Cardiac output.

d) Auscultation

e) Arterial pressures, blood pressure.

f) Hypertension.

g) Electro cardiogram (ECG.)

Respiratory system: - 10 Hours

a) Respiratory ventilation

b) Oxygenation

c) Definitions and Normal values of Lung volumes and Lung capacities.

Excretory system:

a) Renal System: 10 Hours

b) Urine volume and specific gravity measurements

c) Renal function tests, including assessment of glomerular filtration rate (GFR)

d) Analysis of renal tubular function

e) Study of renal handling of electrolytes and water

f) Assessment of acid-base balance and renal regulation of pH.- 10 Hours

Reproductive system: 8 Hours

a) Formation of semen and spermatogenesis.

b) Brief account of menstrual cycle.

Central Nervous system: - 9 Hours

a) Functions of CSF.

Endocrine system: -10 Hours

a) Functions of the pituitary, thyroid, parathyroid, adrenal and pancreatic Hormones.

Digestive system: - 10 Hours

a) Physiological Anatomy of the GIT.

b) Food Digestion in the mouth, stomach, intestine

c) Absorption of foods

d) Role of bile in the digestion.

Special Senses: 10 Hours

- Vision testing and assessment of visual acuity
- Auditory tests and assessment of hearing function
- Study of taste and olfaction perception
- Analysis of vestibular system and balance control
- Assessment of proprioception and kinesthetic sense-

Practical in Physiology **(40 Hours)**

CO No.	Practical Course Outcome	Bloom's Level
CO1	Perform determination of blood groups and interpret the findings.	L3
CO2	Measure and record vital signs including blood pressure, pulse rate, respiratory rate, and body temperature.	L3
CO3	Perform and interpret basic electrocardiography (ECG) and spirometry procedures.	L3
CO4	Demonstrate examination of the respiratory system and assess respiratory parameters accurately.	L3

a) Determination of Blood Groups.

b) Vital signs measurement: Students can learn how to measure and interpret vital signs, including blood pressure, heart rate, respiratory rate, and body temperature. This may involve using instruments such as sphygmomanometers, stethoscopes, and thermometers.

c) Electrocardiography (ECG): Students can practice performing and interpreting electrocardiograms to study the electrical activity of the heart. This may involve placing electrodes on the body to record the ECG waveform and analyzing abnormalities.

d) Spirometry: Students can learn how to perform spirometry tests to measure lung function. This involves using a spirometer to assess parameters such as tidal volume, vital capacity, forced expiratory volume, and peak expiratory flow rate.

e) Examination of Respiratory system to count respiratory rate and measure inspiration and respiration.

Reference Books:-

a. Essentials of Medical Physiology, K Sembulingam,
b. Comprehensive Textbook of Medical Physiology, G K Pal.
c. Ross and Wilson Anatomy and Physiology,
d. Practical Physiology G K Pal & Pravati Pal
e. Ganong‟s Review of Physiology by Barrett,Barman,Brooks and Yuan

Health Care Quality & Patient Safety

(60 Hours)

Learning Objectives

Learn essential life support and emergency care procedures, such as vital sign and primary assessment, infection prevention and control principles, and recognizing prevalent healthcare- associated infections. Identify and implement infection prevention and control methods, as well as enhance environmental safety through biomedical waste management. Proficiency in BLS procedures, accurate vital sign assessment, infection prevention and control, and environmental safety through biomedical waste management practices are among the course outcomes.

Quality assurance and management, antibiotic resistance, disaster readiness, and disaster preparedness are among the learning objectives. Understanding the core concepts of care quality, approaches to improvement, standards, and instruments for improving healthcare procedures are all part of quality assurance. Antibiotic resistance is an increasing concern in healthcare settings, with a variety of forms, trends, and tactics required to effectively combat it. Principles and strategies for antimicrobial stewardship are also discussed. Understanding psychological effect management, resource management, readiness and risk reduction concepts, critical response functions, institutional procedures, and the importance of information management in coordinating and communicating during catastrophes are all part of disaster preparedness and management.

The course covers four key areas of healthcare management: quality assurance and management, antibiotic resistance, disaster preparedness and management. Students will learn to apply quality of care concepts, implement quality improvement approaches, adhere to standards, and use tools to identify areas for improvement. They will also understand the significance of NABH guidelines and their role in promoting quality and patient safety in healthcare organizations.

Antibiotic resistance is addressed by understanding the historical context, factors contributing to its spread, different types of resistance, monitoring trends, advocating for actions and policies, and implementing antimicrobial stewardship practices. Disaster preparedness and management involves applying emergency management principles, managing the psychological impact, managing resources efficiently, developing preparedness plans, coordinating key response functions, contributing to recovery, rehabilitation, and reconstruction efforts, and utilizing information management systems for effective communication and coordination during disasters.

Course Outcomes

CO No.	Course Outcome (Theory)	Bloom's Level
CO1	Describe the principles of basic life support, emergency care, infection prevention, and biomedical waste management.	L1

CO2	Explain the procedures of first aid, CPR, AED usage, infection control practices, and environmental safety measures.	L2
CO3	Discuss quality assurance concepts, quality improvement tools, standards, and NABH guidelines in healthcare.	L2
CO4	Explain biomedical waste segregation, disposal methods, and strategies for prevention of healthcare-associated infections.	L2
CO5	Apply patient safety principles, infection control measures, and quality improvement practices in healthcare settings.	L3

Course Content:

Basics of emergency care and life support skills. (25 Hours)

Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject
are as follows:

a) Vital signs and primary assessment

b) Basic emergency care – first aid and triage

c) Ventilations including use of bag-valve-masks (BVMs)

d) Choking, rescue breathing methods

e) One- and Two-rescuer CPR

f) Using an AED (Automated external defibrillator).

g) Managing an emergency including moving a patient

At the end of this topic, focus should be to teach the students to perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions. At the end of the foundation course, each student should be able to perform and execute/operate on the above-mentioned modalities.

Infection prevention and control. (15 Hours)

The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include

a) Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],

b) Prevention & control of common healthcare associated infections,

c) Components of an effective infection control program, and

d) Guidelines (NABH and JCI) for Hospital Infection Control

Bio medical waste management and environmental safety. (8 Hours)

The aim of this section will be to help prevent harm to workers, property, the environment, and the public. Topics to be covered under the subject are as follows:

a) Definition of Biomedical Waste

b) Waste minimization

c) BMW – Segregation, collection, transportation, treatment and disposal (including color coding)

d) Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste

e) BMW Management & methods of disinfection

f) Modern technology for handling BMW

g) Use of Personal protective equipment (PPE)

h) Monitoring & controlling of cross infection (Protective devices)

Quality assurance and management. (12 Hours)

The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.

a) Concepts of Quality of Care

b) Quality Improvement Approaches

c) Standards and Norms

d) Quality Improvement Tools

e) Introduction to NABH guideline

Second Semester:

Course Code	Course Title	Teaching Hour				Theory			Practical			Grand Total (Marks)
		L (hrs.)	P/D	CLP	CR	SEE	IA	T	SEE	IA	T	
BAOTT-006	Medical Law & Ethics,Professionalism & Values, Principles of Management	70	…..	…..	4	40	10	50	…..	….	…..	50
BAOTT-007	Basics of Biomedical Sciences in Surgery & Anesthesia	40	60	…..	3	40	10	50	…..	….	…..	50
BAOTT-008	Biochemistry & Hematology	40 + 30	0 + 30	…..	3	40 + 40	10 + 10	100	30	20	50	150
BAOTT-009	Pathology & Microbiology	50 + 50	…….	…..	4	40 + 40	10 + 10	100	…..	….	…..	150
BAOTT-0010	Basic Concept in Pharmacology	40	…….	…..	2	40	10	50	…..	….	…..	100
BAOTT-0011	Basic Computer & Information Sciences, communication & Soft Skills	40	60	0	4	40	10	50	30	20	50	100
Total		**350**	**150**	**…..**	**20**	**…..**	**….**	**400**	**…..**	**….**	**100**	**500**

SEMESTER-II

Medical Law and Ethics, Professionalism & Values, Principles of Management

(70 Hours)

Learning Objectives

This course delves into the legal and ethical issues that arise in medical practice. Medical ethics, confidentiality, informed consent, euthanasia, organ transplantation, medico-legal implications of medical data, and professional indemnity insurance are among the topics covered. The professionalism module emphasizes the significance of professionalism in the healthcare system and its impact on the patient environment. It addresses professional values like integrity, objectivity, competence, confidentiality, ethical or moral values, attitude and behavior, code of conduct, professional accountability, responsibility, misconduct, differences between professions, team efforts, and cultural issues in the healthcare setting. The programme emphasizes the value of collaboration and adhering to ethical norms in the healthcare system. organizations. This course focuses on management principles and functions in a variety of situations, including healthcare Planning, organizing, directing, motivation, communication, leadership, coordination, human management, financial management, and healthcare technology management are among the themes covered.

Course Outcomes

CO No.	Course Outcome (CO)	Bloom's Taxonomy Level
CO1	Define and explain the concepts of medical law, medical ethics, professionalism, and management principles in healthcare practice.	L1
CO2	Describe patient rights, confidentiality, informed consent, professional values, code of conduct, and healthcare-related legal provisions.	L2
CO3	Explain medico-legal issues, malpractice, negligence, professional accountability, leadership, communication, and motivation theories in healthcare organizations.	L2
CO4	Apply ethical principles, management functions, personnel management, and legal regulations in solving healthcare-related professional and organizational problems.	L3
CO5	Demonstrate the ability to develop informed consent procedures, maintain medico-legal records, implement professional standards, and	L3

	apply financial and administrative management practices in healthcare settings.	

Course Content:

Medical law and ethics (30 Hours)

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society‟s legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, behavior, and attempting to resolve the ethical problems that arise in practice" Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

a) Medical ethics – Definition – Goal – Scope

b) Introduction to Code of conduct

c) Basic principles of medical ethics – Confidentiality

d) Malpractice and negligence – Rational and irrational drug therapy

e) Autonomy and informed consent – Right of patients

f) Care of the terminally ill- Euthanasia

g) Organ transplantation

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

i) Professional Indemnity insurance policy

j) Development of standardized protocol to avoid near miss or sentinel events.

k) Obtaining an informed consent.

Professionalism and values **(10 hours)**

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

Professional ethics act (2002)

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

Principles of management: **(30 Hours)**

Principles of management: 20 Hours

a) Development of Management: Definitions of Management – Contributions of F.W. Taylor, Henry Fayol, and others.

b) Functions of Management: Planning – Organizing – Directing – Controlling Planning: Types of planning – Short–term and long plans – Corporate or Strategic Planning – Planning premises – Polices – Characteristics and sources – principles of policy making – Strategies as different from policies – Procedures and methods– Limitations of planning.

c) Organizing: Importance of organization – Hierarchy – Scalar chain – Organization relationship – Line relationship – Staff relationship – Line staff relationship – Functional relationship – Committee organization – Management committees – Depart mentation.

d) Motivation: Motivation theories – McGregor‟s theory X and theory Y – Maslow‟s and Herzberg‟s theory – Porter and Lawler model of complex view of motivation– Other theories – Diagnostic signs of motivational problems – Motivational Techniques.

e) Communication: Types of communication – Barriers of effective communication– Techniques for improved communication.

f) Directing: Principles relating to Direction process – Principles and theories of leadership – Leadership Styles Delegation of authority. Controlling: Span of control – Factors limiting effective span of control – Supper management, General managers, Middles managers and supervisors – Planning and controlling relationships – Management control process – Corrective measures– Strategic control points – Budgetary control – Types of budgets.

g) Co-ordination: Co-ordination and co-operation – Principles of co-ordination – Techniques of co-ordination charts and records – Standard procedure instructions.

h) Acts: CPA Act (1986 & 2019), BMW Act (1998,2016), Drugs Act(1940), IMC Act(1956),Patient Privacy – IT Rules, 2011

i) Medical Malpractice sections: - 304A, 337 and IPC 1860.

Personnel management:- **5Hours**

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

Financial management:- **5 Hours**

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

Reference books:

l. Law relating to medical negligence and compensation- Dr.K.P.D.A. Prabakar & Dr.J.Paulraj Joseph – 2023
2. A textbook of medical jurisprudence and toxicology Justice K Kannan -2+ edition — I st edition 2016
3. Law the doctor must know- Hitesh J Bhatt & Geetebdra Sharma — 2017
4. "Professionalism in Health Care: A Primer for Career Success" by Sherry Makely
5. "Principles of Management for Quality Projects: Smart Strategies" by George Ecke

Basics of Biomedical sciences in surgery and Anaesthesia

(40 Hours)

Learning Objectives

This course introduces biomedical engineering principles and technology in the realms of surgery and anaesthesia. It discusses surgical and anaesthesia devices, biomedical imaging, surgical navigation and guidance systems, anaesthesia delivery and monitoring, healthcare technology management, and ethical and legal issues in biomedical engineering.

Course Outcomes

At the end of the course, students should be able to:

CO No.	Course Outcome	Bloom's Level
CO1	Describe the basics of biomedical engineering in surgery and anaesthesia.	L1
CO2	Explain the principles and functions of surgical and anaesthesia equipment.	L2
CO3	Explain biomedical imaging and surgical navigation systems.	L2
CO4	Apply monitoring and anaesthesia delivery techniques in clinical practice.	L3
CO5	Demonstrate the use and interpretation of biomedical devices and monitoring parameters.	L3

Course Content: This course contains following modules:

- Introduction to Biomedical Engineering in Surgery and Anaesthesia.- (4 Hours)
- Surgical and Anesthesia Devices (OT Table, OT light, Infusion Pumps, TCA pumps, Video Laryngoscopes, Bronchoscopes, Diathermy, Drills, Coagulation devices like E.S. U‟s, LASER, Ultrasonic devices, RF Devices and Harmonic Scalpels, 12 Lead ECG), and Physical laws behind Transducer, EtCO2 monitor, Pulse oximeter, Blood pressure monitor**.-** (15 Hours)
- Surgical Microscope.- (2 Hours)

- Laparoscopic cart (including various scopes), Veress needle, Trocars, and various instruments.- (2 Hours)
- Biomedical Imaging in Surgery and Anaesthesia.- (6 Hours)
    - Principles and technologies of medical imaging (e.g., X-ray, computed tomography, magnetic resonance imaging) Image-guided surgical procedures and interventions
    - Image processing and analysis techniques for surgical planning and intraoperative guidance
    - Advances in real-time imaging and its integration into surgical and Anesthesia workflows
- Surgical Navigation and Guidance Systems.- (2 Hours)
    - Principles of surgical navigation systems and their applications
    - Use of imaging, tracking, and registration techniques in surgical navigation.
- Anesthesia Delivery and Monitoring.- (9 Hours)
    - Anaesthesia machines and delivery systems
    - Design and development of Anesthesia monitoring devices.
    - Physiological monitoring parameters and their interpretation during Anesthesia
    - Advances in Anesthesia technology, such as closed-loop Anaesthesia delivery systems

Reference Books:-

a. Fundamentals of Biomedical Instrumentation by Dr. O.N. Pandey (Author)
b. Handbook of medical instrumentation by R S Kanpur.
c. The Anesthesia Technologist‟s Manual by Emily S Guimaraes, Matthew Davis, Jeffrey R Kirsch, Glenn Woodworth.
d. Surgical Technology for the surgical technologist by association of surgical technologists

Biochemistry & Haematology

(40 + 30 Hours)

Course Outcomes

CO No.	Course Outcome	Bloom's Level
CO1	Describe the functions of vitamins, minerals, and nutritional requirements of the human body.+	L1
CO2	Explain acid-base balance, pH, buffers, and biochemical calculations.	L2
CO3	Explain blood components, hemoglobin, blood cell counts, and coagulation parameters.	L2
CO4	Apply knowledge of hematological disorders and blood transfusion practices in patient care.	L3
CO5	Interpret hematological investigations and coagulation profiles for clinical decision-making.	L3

Course Content:

Bio-chemistry **(40 Hours)**

- Vitamins & Minerals: Fat soluble vitamins (A, D, E, K) – Water soluble vitamins – B-complex vitamins- principal elements (Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chlorine, and sulfur)- Trace elements – Calorific value of foods – Basal metabolic rate (BMR) – respiratory quotient (RQ). (30 Hours)
- Acids and bases: Definition, pH, Henderson – Hassel Balch equation, Buffers, Indicators, Normality, Molarity, Molality. (10 Hours)

Hematology **(30 Hours)**

- Haemoglobin, blood cell counts, differential count (5 Hours)
- Anaemia, polycythaemia (5 Hours)
- Thrombocytopenia (5 Hours)
- Coagulation parameters- BT, CT, PT, INR, APTT (5 Hours)

- Coagulation disorders. (5 Hours)
- Blood transfusion-hazards and complications (5 Hours)

Practical (Hematology) (40 Hours)

CO No.	Practical Course Outcome	Bloom's Level
CO1	Perform phlebotomy following standard safety procedures.	**L3**
CO2	Demonstrate complete blood count (CBC) testing procedures.	**L3**
CO3	Perform ABO/Rh blood grouping and typing.	**L3**
CO4	Demonstrate blood cross-matching techniques for transfusion compatibility.	**L3**

- Phlebotomy
- CBC
- RBO Typing
- Cross Matching of blood

Reference Books:-

a. Biochemistry, U Satyanarayan,
b. Biochemistry, DM. Vasudevan,
c. An Introduction to Hematology, Nandini Mukherjee.

Pathology & Microbiology

(50 +50 Hours)

Learning Objectives

This course introduces students to the fundamentals of pathology, and microbiology. injury, inflammation, immunity disorders, infectious diseases, neoplasia, environmental and nutritional disorders, morphology and growth of microorganisms, culture media, sterilization and disinfection, immunology, systematic bacteriology, parasitology, mycology, and virology are among the topics covered.

Course Outcomes

CO No.	Course Outcome	Bloom's Level
CO1	Describe the basic concepts of pathology, cell injury, inflammation, and immunity disorders.	L1
CO2	Explain infectious diseases, neoplasia, and environmental and nutritional disorders.	L2
CO3	Explain the morphology, growth, culture, sterilization, and immunological aspects of microorganisms.	L2
CO4	Apply microbiological principles for identification and diagnosis of bacterial, fungal, parasitic, and viral infections.	L3
CO5	Interpret pathological and microbiological findings for disease diagnosis and patient management.	L3

Course Content

Pathology

a) Cellular adaptation, Cell injury & cell death.- 17 Hours

- Introduction to pathology.
- Overview: Cellular response to stress and noxious stimuli. Cellular adaptations of growth and differentiation.
- Overview of cell injury and cell death.
- Causes of cell injury. Mechanisms of cell injury.

- Reversible and irreversible cell injury.
- Examples of cell injury and necrosis.

b) Inflammation. -8 Hours

- General features of inflammation Historical highlights
- Acute inflammation
- Chemical mediators of inflammation Outcomes of acute inflammation Morphologic patterns of acute inflammation Summary of acute inflammation
- Chronic inflammation

c) Immunity disorders. -6 Hours

- General features of the immune system Disorders of the immune system

d) Infectious diseases. -6 Hours

- General principles of microbial pathogenesis viral infections.
- Bacterial infections-Rheumatic heart disease.
- Fungal infections.
- Parasitic infections.

e) Neoplasia. - 5 Hours

- Definitions Nomenclature.
- Biology of tumor growth benign and malignant neoplasms Epidemiology.
- Carcinogenic agents and their cellular interactions Clinical features of tumors.

f) Environmental and nutritional disorders. 8 Hours

- Environmental and disease.
- Common environmental and occupational exposures Nutrition and disease.
- Coronary artery disease.

Clinical Microbiology- (50 Hours)

a) Morphology - 6 Hours

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

b) Growth and nutrition - 4 Hours

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

c) Culture media. - 4 Hours

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

d) Sterilization and Disinfection. - 2 Hours

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

e) Immunology. - 6 Hours

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

f) Systematic Bacteriology. - 10 Hours

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

g) Parasitology.- 6 Hours

- Morphology, life cycle, laboratory diagnosis of following parasites: E. histolytica, Plasmodium, tape worms, Intestinal nematodes.

h) Mycology. 6 Hours

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

i) Virology. -6 Hours

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

Reference Books:-

a. Microbiology, Ananthanarayan and Paniker's,
b. CP. Baveja. Textbook of Microbiology for nurses.
c. A textbook of Microbiology-Chakraborty.
d. Pathology, Harsh Mohan e. Basic Pathology by Robbins

Basic Concepts in Pharmacology

(40Hours)

Learning Objective

This course provides an overview to pharmacology. It discusses several medication classes, their modes of action, indications, contraindications, adverse effects, and interactions.

Course Outcomes

CO No.	Course Outcome	Bloom's Level
CO1	Describe the basic concepts of pharmacology, pharmacokinetics, and pharmacodynamics.	L1
CO2	Explain the actions and uses of commonly used drugs in anaesthesia practice.	L2
CO3	Explain the indications, contraindications, and adverse effects of anaesthetic and emergency drugs.	L2
CO4	Apply knowledge of drug dosage, administration routes, and dilution in clinical situations.	L3
CO5	Demonstrate safe and effective use of pharmacological agents during perioperative care.	L3

Course content

Clinical pharmacology

a. Introduction to Pharmacology. - 1 Hours
b. Pharmacokinetic & Pharmacodynamics & routes of drugs administration- 2 Hours
c. NSAIDs Drugs. 2 Hours
d. Ant sialagogues: Atropine, Glycopyrrolate. 3 Hours
e. Sedatives I Anxiolytics: Diazepam, Midazolam, Phenergan, Lorazepam, Chlorpromazine, and Tricolors.- 4 Hours
f. Narcotics: Morphine, Pethidine, Fentanyl, Pentazocine, tramadol.- 2 Hours
g. Antiemetic"s: Metoclopramide, Ondansetron, Dexamethasone- 2 Hours

h. Induction Agent: Thiopentone, Diazepam, Midazolam, Ketamine, Propofol, Etomidate. 4 Hours

i. Muscle Relaxants: Depolarizing - Suxamethonium, Non depolarizing Vecuronium, Atracurium, rocuronium. 4 Hours

j. Inhalational Gases: Gases-02, N20, Air, Agents-Ether ,Halothane, Isoflurane,Sevoflurane, Desflurane 2 Hours

k. Reversal Agents: Neostigmine, Glycopyrrolate, Atropine, Flumazenil (Diazepam). Naloxone 2 Hours

l. Local Anesthetics: Xylocaine, Bupivacaine - Topical, Prilocaine-jelly, Emla -Ointment, Etidocaine. Ropivacaine. 2 Hours

m. Emergency Drugs : Mode or administration, dilution, dosage and effects- 10 Hours

- Adrenaline, Atropine
- Ephedrine, Mephentermine
- Bicarbonate, calcium, potassium.
- Inotropes: dopamine, dobutamine, amiodarone
- Aminophylline, hydrocortisone, antihistaminic,
- Antihypertensive –Beta-blockers, Ca-channel blockers.
- Antiarrhythmic- xylocard
- Vasodilators- nitro-glycerine & sodium nitroprusside
- Respiratory system- Bronchodilators
- Renal system- Diuretics, frusemide, mannitol.

Reference Books:-

a. Essentials of Medical Pharmacology, KD Tripathi
b. Medical Pharmacology, Uday Kumar (Author)

Basic computers and information Science, Communication, and soft skills

(40 Hours)

Learning Objectives

This course exposes students to computer technology, including topics such as computer organization, operating systems, software applications (MS Word, Excel, and PowerPoint), computer networks, internet applications, and computer use in healthcare settings. It also includes fundamental language and communication skills such as grammar, business communication, writing techniques, and oral presentations

Course Outcome

CO No.	Course Outcome	Bloom's Level
CO1	Explain the fundamental concepts of computers, including computer organization, generations, computer languages, input/output devices, CPU, memory, and storage devices.	**L2**
CO2	Demonstrate the use of operating systems and Windows environment for managing files, folders, desktop features, shortcuts, and basic system operations.	**L3**
CO3	Apply MS Word, MS Excel, and MS PowerPoint tools to create, edit, format, store, print, analyze, and present documents, worksheets, graphs, and presentations.	**L3**
CO4	Describe the fundamentals of computer networks, network topologies, operating systems, internet services, web browsers, and basic applications of the Internet.	**L2**
CO5	Apply computer and information technology skills, including internet and digital applications, for documentation, communication, data management, and other requirements in clinical and healthcare settings.	**L3**

Course Content

Basic computers and information science **(24 Hours)**

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

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

a) Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.

b) Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).

c) Processor and memory: The Central Processing Unit (CPU), main memory.

d) Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

e) Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).

f) Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

g) Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

h) Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

i) Introduction of Operating System: introduction, operating system concepts, types of operating system.

j) Computer networks: introduction, types of networks (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

k) Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

l) Application of Computers in clinical settings.

Practical on fundamentals of computers **30 Hours**

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

Practical Topics:-

This would involve hands-on training in computer systems and software applications. This includes learning about computer hardware components and their functions, input and output devices, processor and memory management, and storage devices.

Practical sessions can be conducted on operating systems such as MS Windows, with a focus on Students should also gain proficiency in using MS Word for document creation and formatting, MS Excel for data entry and manipulation, and MS PowerPoint for creating and delivering presentations.

Additionally, practical exercises on computer networks and internet applications, including email, file transfer, and web browsing, can be provided to enhance their understanding of computer usage in clinical settings.

Communication and soft skills

Major topics to be covered under Communication course: 16 Hours

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

  Barriers of communication & how to overcome 2 Hours

Practical in Communication & Soft Skills- 30 Hours

In terms of communication and soft skills, practical topics should aim to develop effective communication abilities for interacting with patients and healthcare professionals.

This can involve exercises in grammar and language skills, emphasizing business communication and spoken communication through conversations, discussions, and short presentations.

Practical sessions on various writing formats such as letters, emails, reports, and case studies should be included, focusing on proper organization and clarity.

Students should be taught the principles of good communication, including the special characteristics of health communication, and strategies for overcoming communication barriers. Role-playing scenarios and simulated patient interactions can also be incorporated to enhance their communication skills in a healthcare context.

Third Semester

Course Code	Course Title	Teaching Hours				Theory			Practical			Grand Total (Marks)
		L (hrs.)	P/ D	CL P	C R	SEE	IA	T	SEE	IA	T	
BAOTT-012	Basic Techniques of Anesthesia	100	…..	50	5	80	20	100	40	10	50	150
BAOTT-013	Basics of Surgical Procedures	100	…..	50	5	80	20	100	40	10	50	150
BAOTT-014	CSSD & Manifold area	50	…..	100	4	40	10	50	…..	…..	…..	50
BAOTT-015	Industrial Orientation & Industrial Visit	50	…..	0	2	40	10	50	…..	…..	…..	50
Total		**300**	**…..**	**200**	**16**	**…..**	**….**	**300**	**…..**	**…..**	**100**	
Grand Total		**510**			**……**							**400**

SEMESTER-III

Basic techniques of Anesthesia

Learning Objectives **(100 Hours)**

The learning objectives are designed to provide a thorough grasp of the significance of preoperative assessment and patient preparation in assessing Anaesthesia risks and planning appropriate care. The design, components, and performance of the anaesthesia machine, safety systems, fluid management strategies, emergency drugs, anaesthetic induction and airway management procedures, and airway devices are all covered in this course. It also discusses the principles of balanced anaesthesia, the administration of inhalation and intravenous anaesthetics, vital sign monitoring techniques, depth of anaesthesia, and oxygenation.

The training also delves into pain management and analgesia techniques such as systemic analgesics, regional anaesthesia, and patient-controlled analgesia. It also discusses anaesthetic considerations for typical general surgical operations as well as challenges in obstetric and gynaecological surgery. The course outcomes include demonstrating proficiency in conducting preoperative assessments, operating the Anaesthesia machine effectively and safely, implementing safety systems, implementing appropriate perioperative fluid management strategies, registering and managing emergencies, performing anaesthetic induction and airway management, demonstrating knowledge of pre-medication, pre-oxygenation, induction agents, intubation and reversal agents, vaporizers, , and demonstrating knowledge of vaporizers.

Course Outcomes

Course Learning Outcomes:

CO No.	Course Outcome	Bloom's Level
CO1	Explain the principles of preoperative assessment, patient preparation, and risk stratification for safe anaesthetic management.	L2
CO2	Describe the design, components, safety systems, flow systems, vaporizers, and functionality of anaesthesia machines.	L2
CO3	Apply perioperative fluid management principles, emergency medications, and monitoring techniques during anaesthesia care.	L3
CO4	Demonstrate the application of anesthetic induction techniques, airway management, intubation procedures, analgesia methods, and reversal agents.	L3
CO5	Analyze anaesthetic considerations for general, obstetric, and gynaecological surgeries and formulate appropriate management strategies for anaesthesia-related complications.	L4

Course content

Basics Techniques of Anesthesia

a) Preoperative assessment and patient preparation: Understanding the importance of preoperative evaluations, patient history, and physical examinations to assess Anaesthesia risks and plan appropriate care. - 10 Hours

b) Anesthesia Machine: Design, Components, and Functionality. - 5 Hours

c) Safety systems in Anesthesia machine. Flow systems, CO2 Absorbents, Circuit types, Humidification devices. - 5 Hours

d) Perioperative Fluid Management: Strategies and Considerations. (Crystalloids and Colloids). - 5 Hours

e) Perioperative Emergency Medications: Indications, Administration, and Management– -5 Hours

f) Anesthetic induction and airway management: Learning about various induction techniques, airway devices, and strategies for maintaining a patent airway during surgery. - 10 Hours

g) Brief Idea about Premedication, Pre oxygenation or denitrogenating, Induction and inducing agents, Sellick's maneuverer, Vaporizers, Principles and types, Intubation, and reversal agents. - 10 Hours

h) Maintenance of Anesthesia and monitoring: Understanding the principles of balanced Anaesthesia, administration of inhalation and intravenous anaesthetics, and monitoring techniques for vital signs, depth of Anaesthesia, and oxygenation. - 10 Hours

i) Pain management and analgesia: Exploring different methods of perioperative pain management, including systemic analgesics, regional Anaesthesia, and patient-controlled analgesia. - 10 Hours

j) Anesthetic considerations for common general surgical procedures: Studying the specific Anaesthesia considerations, techniques, and challenges associated with general surgical procedures like appendectomy, cholecystectomy, hernia repair, and laparotomy - 10 Hours

k) Anesthetic considerations for obstetric and gynaecological surgeries: Learning about the unique challenges and considerations for providing Anaesthesia during labor and delivery, caesarean section, gynaecological surgeries, and management of obstetric emergencies. - 10 Hours

l) Management of Anesthesia-related complications: Understanding the recognition and management of potential complications and adverse events related to Anaesthesia, including cardiovascular, respiratory, and allergic reactions. -10 Hours

Practical **(50 Hours)**

CO No.	Practical Course Outcome	Bloom's Level
CO1	Perform preoperative assessment including history taking, physical examination, and patient preparation.	L3
CO2	Demonstrate operation and safety checks of anaesthesia machines and associated equipment.	L3
CO3	Perform airway management and regional anaesthesia procedures using simulation models.	L3
CO4	Analyze and manage simulated anaesthesia-related emergencies such as airway obstruction, hypotension, and allergic reactions.	L4
CO5	Evaluate clinical scenarios and select appropriate anaesthetic interventions through simulation-based exercises.	L5

Practical or Clinical posting topics:

- Preoperative assessment and patient preparation include performing simulated preoperative assessments such as history taking and physical tests.
- Using patient features to stratify risk and make decisions for anesthesia treatment.
- Anesthesia machine and safety systems: Familiarization with the components and functionality of an anaesthesia machine through hands-on experience.
- Regional anesthesia procedures: Training in various regional anaesthesia techniques, such as peripheral nerve blocks and epidurals, using simulation.
- Management of anesthesia-related complications.
- Simulation of anesthesia-related problems such as airway obstruction, hypotension, and allergy through role-playing.

Reference Books:-

a. Drugs & Equipment in Anesthetic Practice by Arun Kumar Paul,
b. Short textbook on Anesthesia, Ajay Yadav,
c. Short Textbook of Anesthesia, Bajaj Kumar,
d. Understanding Anesthesia Equipment Dorsch & Dorsch,
e. Wards Anesthesia Equipment Andrew & Ali Diba,
f. The Anesthesia Technician & Technologists Manual Glenn Woodwort

Basics of Surgical procedure

Learning Objectives **(100 Hours)**

Understanding the operation theatre layout, WHO checklist, carbolization, and fumigation processes, as well as the concepts, indications, and techniques of typical general surgical procedures, are the learning objectives. They must also use aseptic technique and maintain a sterile field. Appendicitis, hernias, cholecystitis, gastrointestinal cancers, and peptic ulcer disease are among the diseases covered in the course, as are ectopic pregnancy, pelvic inflammatory disease, endometriosis, fibroids, ovarian cysts, and cervical and ovarian cancers.

The course outcomes include demonstrating understanding of the operation theatre layout, WHO checklist, carbolization, and fumigation procedures, effectively applying principles, indications, and techniques, identifying, and managing diseases in general surgical practice, managing diseases in obstetric/gynecologic practice, applying appropriate incision and wound closure techniques, recognizing and handling surgical instruments, and implementing site infection prevention and control. The learning objectives aim to provide a comprehensive understanding of general surgical procedures, obstetric/gynecologic procedures, and patient positioning requirements.

Course Outcomes

Course Learning Outcomes:		
CO No.	**Course Outcome**	**Bloom's Level**
CO1	Explain the layout of the operation theatre, WHO surgical safety checklist, carbonization, and fumigation procedures.	L2
CO2	Describe the principles of aseptic techniques, sterile field management, Spaulding's classification, and infection prevention practices.	L2
CO3	Explain common general surgical, obstetric, and gynaecological diseases and the principles of their surgical management.	L2
CO4	Apply knowledge of surgical instruments, incision techniques, wound closure methods, suturing materials, and dressing principles.	L3
CO5	Analyze surgical site infection prevention measures, anaesthesia considerations, and patient positioning requirements to ensure safe surgical outcomes.	L4

Basics of Surgical procedures **(100 Hours)**

- Layout of Operation Theatre, WHO Checklist, Carbonization and Fumigation: - 10 Hours
- Introduction to general surgical procedures: Understanding the principles, indications, and techniques of common general surgical procedures, such as appendectomy, cholecystectomy, and hernia repair. - 10 Hours
- Principles of aseptic technique and sterile field management: Spaulding's Classifications of zones. Learning the importance of maintaining a sterile environment in the operating room, including proper hand hygiene, gowning, gloving, and sterile draping techniques. - -10 Hours
- Diseases in General Surgical Practice: Appendicitis, Hernias, cholecystitis, Gastrointestinal (GI) Cancers, Peptic Ulcer Disease. - 10 Hours
- Diseases in Obstetric/ Gynecologic Practice": Ectopic Pregnancy, Pelvic Inflammatory Disease (PID), Endometriosis, Fibroids, Ovarian Cysts, Cervical and Ovarian Cancer -10 Hours
- Incision and wound closure techniques: Studying various surgical incision types, wound closure methods (such as sutures, staples, and adhesive tapes), and wound dressing principle -10 Hours
- Surgical instrument identification and handling: Familiarizing with surgical instruments commonly used in general surgery and obstetrics and gynecology, and understanding their functions, proper handling, and maintenance. -10 Hours
- Surgical site infection prevention and control: Exploring strategies and protocols to minimize the risk of surgical site infections, including preoperative skin preparation, antimicrobial prophylaxis, and aseptic practices - 10 Hours
- Anesthesia considerations and patient positioning in general surgery: Understanding the specific Anesthesia considerations and patient positioning requirements for general surgical procedures to optimize patient safety and surgical outcomes. - 10 Hours
- Common general surgical procedures in obstetrics and gynecology: Studying the specific surgical procedures performed in obstetrics and gynecology, such as caesarean section, hysterectomy, and ovarian cystectomy, and their related considerations -10 Hours

Practical / Clinical Postings topics: **(50 Hours)**

Course Learning Outcomes:

CO No.	Practical Course Outcome	Bloom's Level
CO1	Demonstrate operation theatre zoning and implementation of the WHO Surgical Safety Checklist.	L3

CO2	Perform sterile techniques including hand scrubbing, gowning, gloving, and draping procedures.	L3
CO3	Identify and appropriately handle commonly used surgical instruments and equipment.	L3
CO4	Demonstrate basic suturing techniques and wound closure procedures using suitable materials.	L3
CO5	Analyze patient positioning requirements and coordinate effectively with surgical and anaesthesia teams during simulated procedures.	L4

- Operation Theatre Layout and WHO Checklist: A guided tour of an operating theatre, covering the layout, equipment organization, and separate zones (sterile and non-sterile).
- Using the WHO Surgical Safety Checklist to demonstrate preoperative, intraoperative, and postoperative checklist components.
- Suturing materials and suturing techniques will be demonstrated.
- Scenarios were created to emphasize the need to keep a sterile area and avoid contamination during surgical procedures. Gloving, Gowning and Draping Techniques.
- Identification and uses of surgical instruments.
- Anesthesia and patient positioning: Demonstration and practice of patient positioning techniques for general surgical operations, considering patient safety, accessibility, and the demands of the surgeon.
- Simulations of communication and coordination between anaesthesia providers and surgical team members during patient placement.

Reference Books:-

a. Fullers Surgical Technology, Joanna Kotcher Fuller
b. D C Dutta textbook OG Gynecology, Hiralal Konar.
c. Laparoscopic Surgery, R. K. Mishra
d. Surgical Technology for the surgical technologist by association of surgical technologists.
e. Introduction to the Surgery by Marketa Duskova.
f.Textbook on Operation Theatre Technology, Bhagwan Ramachandran.
g. A PRACTICAL GUIDE TO OBSTETRICAL AND GYNECOLOGICAL INSTRUMENTS FOR Nurses, Chaitanya.C.
h. Instrument and Operative Surgery, A.K Gvalani,
i. Operation Theatre Nursing, I. Clement.

CSSD & Manifold Area

Learning Objectives **(50 Hours)**

The Central Sterile Services Department (CSSD) is responsible for infection control as well as the provision of sterile tools and equipment. It entails a variety of sterilization techniques, decontamination processes, and instrument preparation and packaging techniques. In addition, the department oversees sterile storage and distribution, which includes inventory control, firstin-first-out processes, and proper labeling and paperwork. Quality assurance and control procedures are put in place, such as monitoring sterilization processes and guaranteeing standard compliance. Hand hygiene, personal protective equipment use, aseptic procedures, and cross contamination prevention are also addressed as infection control practices.

Procedures for equipment maintenance and troubleshooting are also provided. Overall, the CSSD is critical to the safety and effectiveness of its operations.

Course Outcomes

Course Learning Outcomes:		
CO No.	**Course Outcome**	**Bloom's Level**
CO1	Explain the role and functions of CSSD in infection control and sterile supply management.	L2
CO2	Describe various sterilization and decontamination methods used in CSSD operations.	L2
CO3	Apply principles of instrument preparation, packaging, storage, distribution, and inventory management in CSSD.	L3
CO4	Analyze quality assurance measures, infection control practices, and maintenance procedures for CSSD equipment.	L4
CO5	Explain the design, operation, safety practices, troubleshooting, and regulatory requirements of hospital manifold systems.	L2

Course content

CSSD Procedure

- Introduction to Central Sterile Services Department (CSSD): Understanding the role and importance of CSSD in maintaining infection control and providing sterile instruments and equipment for surgical procedures. -3 Hours
- Sterilization methods: Exploring various sterilization methods used in CSSD, such as steam sterilization (autoclaving), ethylene oxide (ETO) sterilization, hydrogen peroxide plasma sterilization, and chemical sterilization. - 10 Hours
- Decontamination processes: Learning about the decontamination procedures involved in CSSD, including manual cleaning, mechanical cleaning (using ultrasonic cleaners), and enzymatic cleaning. - 4 Hours

- Instrument preparation and packaging: Understanding the proper techniques for instrument cleaning, inspection, assembly, and packaging to ensure their sterility and safe use in surgical procedures. - 3 Hours
- Sterile storage and distribution: Studying the appropriate storage and distribution methods in CSSD, including maintaining proper inventory control, implementing first-in- first-out (FIFO) system, and ensuring proper labelling and documentation. - 4 Hours
- Quality assurance and control: Exploring the quality assurance and control measures in CSSD, including biological and chemical monitoring of sterilization processes, documentation, and compliance with regulatory standards. - 6 Hours
- Infection control practices: Understanding the principles of infection control in CSSD, including hand hygiene, personal protective equipment (PPE) usage, aseptic techniques, and prevention of cross-contamination. - 4 Hours
- Equipment maintenance and troubleshooting: Learning about the maintenance and troubleshooting procedures for CSSD equipment, such as sterilizers, washers, and drying cabinets, to ensure their optimal performance . - 3 Hours

- **Manifold: (13 Hours)**
- Introduction to Hospital Manifold Systems, Types of Medical Gases, Design and Layout of Manifold Systems, Gas Pressure Regulation and Control, Maintenance and Safety Practices, Gas Outlets and Connection Systems, Gas Identification and Labelling, Liquid Medical Oxygen,
    - Emergency Response and Gas Shutdown Procedures,
    - Troubleshooting and Problem-solving,
    - Regulations and Compliance.

Practical Sessions for CSSD & Manifold Area: (100 Hours)

Course Learning Outcomes:

CO No.	Practical Course Outcome	Bloom's Level
CO1	Perform sterilization and decontamination procedures using autoclaves and cleaning equipment.	L3
CO2	Demonstrate instrument preparation, packaging, sterile storage, and inventory management practices.	L3
CO3	Identify and inspect components of hospital manifold systems and medical gas supply networks.	L3
CO4	Analyze and troubleshoot common operational issues in CSSD and manifold systems while maintaining safety standards.	L4

CSSD Procedures: **(60 Hours)**

Sterilization Methods:

- Autoclave Operation: Students will learn how to operate an autoclave for steam sterilization.
- Chemical Sterilization: Students will be introduced to chemical sterilization methods, such as using high-level disinfectants or low temperature sterilant.
- Decontamination Processes:
    - Manual Cleaning Techniques: Students will practice manual cleaning techniques for decontaminating surgical instruments.
    - Ultrasonic Cleaner Operation: Students will operate an ultrasonic cleaner and learn about its role in mechanical cleaning.

Sterile Storage and Distribution:

- Inventory Management: Students will learn how to maintain an organized inventory system in the CSSD.

Manifold Area: **(40 Hours)**

Hospital Manifold Systems:

- Manifold System Components: Students will explore the layout and components of a hospital manifold system.
- They will learn about the gas sources, pressure regulation devices, alarms, and safety features present in the system.
- Emergency Equipment Familiarization: Students will familiarize themselves with emergency equipment, such as gas shut-off valves, pressure relief devices, and emergency alarms.

Troubleshooting and Problem-Solving:

Manifold System Maintenance: Students will learn about common issues that can arise in the manifold system and practice troubleshooting techniques.

These practical sessions will provide students with hands-on experience, allowing them to apply their knowledge and develop essential skills related to CSSD procedures and manifold systems.

Reference Books:-

a. Essentials of Applied Microbiology for Nurses Including Infection Control and Safety by Apurba S Sastry, Sandhya Bhat.

b. medical gases: Health Technical Memorandum Medical gas pipeline systems, by Dept. of Health, UK Health Departments.

Industrial orientation and Industrial Visit

Learning Objectives **(50 Hours)**

Understanding the types of industries relevant to the field, recognising the importance of industrial visits for practical exposure, planning and preparing for an industrial visit, gaining orientation to the industry, and actively observing and interacting with professionals are among the learning objectives for Operation Theatre and Anaesthesia Technology. Understanding the industry's organisational structure, departments, and functions, witnessing and engaging with professionals, displaying ethical conduct, and commenting on the experience are among the course outcomes. The final report or presentation summarises major takeaways, observations, and experiences from the industrial tour. The goal of the course is to provide practical insights and relevance to the curriculum as well as future professional growth.

Course Outcomes

Course Learning Outcomes:		
CO No.	**Course Outcome**	**Bloom's Level**
CO1	Explain the structure, functions, and significance of industries related to Operation Theatre and Anaesthesia Technology.	L2
CO2	Describe the importance of industrial visits in understanding real-world healthcare and industrial practices.	L2
CO3	Apply principles of planning, logistics, safety compliance, and professional conduct during industrial visits.	L3
CO4	Analyze industrial workflows, operational processes, organizational structures, and professional responsibilities observed during visits.	L4
CO5	Evaluate industrial observations and prepare comprehensive reports highlighting their relevance to professional development and healthcare practice.	L5

Course Content:

Industrial orientation and Industrial Visit

a. Introduction to industrial settings: Understanding the various types of industries relevant to the field of Operation Theatre and Anaesthesia Technology, such as medical device manufacturing companies, pharmaceutical companies, hospitals, and healthcare facilities. - 6 Hours

b. Importance of industrial visits: Exploring the significance of industrial visits in gaining practical exposure, understanding real-world applications of theoretical knowledge, and observing professional work environment. - 6 Hours

c. Preparing for an industrial visit: Learning about the necessary preparations, including scheduling, logistics, and safety guidelines, for a successful and productive industrial visit. - 6 Hours

d. Orientation to the industry: Getting acquainted with the organizational structure, departments, and functions of the industry being visited, and understanding the roles and responsibilities of professionals working in that industry. - 6 Hours

e. Observation and interaction: Actively observing the operations, processes, and workflows within the industry, and interacting with professionals to gain insights into their work, challenges, and best practices. -6 Hours

f. Ethical considerations: Understanding ethical guidelines and professional conduct expected during the industrial visit, including respecting confidentiality, intellectual property, and workplace rules. -6 Hours

g. Reflective learning: Reflecting on the industrial visit experience, consolidating observations, and discussing the practical implications and relevance of the visited industry to the field of Operation Theatre and Anaesthesia Technology. - 6 Hours

h. Reporting and documentation: Summarizing the key learnings, experiences, and observations from the industrial visit in a comprehensive report or presentation, highlighting the relevance to the curriculum and future professional development. -8 Hours

Fourth Semester:

Course Code	Course Title	Teaching Hour				Theory			Practical			Grand Total (Marks)
		L (hrs.)	P / D	CL P	CR	SEE	IA	T	SEE	IA	T	
BAOTT-016	Advanced Anesthesi a Techniques	100	….	50	5	80	20	100	40	10	50	150
BAOTT-017	Advanced Surgical Procedures	100	….	50	5	80	20	100	40	10	50	150
BAOTT-018	Basic Intensive CARE	50	….	100	4	40	10	50	30	20	50	100
BAOTT-019	Clinical Medicine & Management	50	….	0	2	40	10	50	…..	…..	…..	50
Total		**300**	**…..**	**200**	**16**	**…..**	**….**	**300**	**…..**	**…..**	**150**	
Grand Total		**500**			**……**							**450**
(Hours)					**…….**							

SEMESTER-IV

Advanced Anesthesia Techniques

Learning Objectives **(100 Hours)**

The learning objectives cover various aspects of Anaesthesia, including ear, nose, and throat surgeries, airway management, ophthalmic surgeries, local and regional anaesthesia techniques, head and neck procedures, and complications specific to ENT and ophthalmic surgeries. Anaesthetic considerations for ear, nose, and throat surgeries include identifying challenges, understanding techniques for maintaining airway patency, evaluating risks and benefits, and developing strategies for pain and discomfort management. Advanced airway management techniques, such as fibreoptic intubation, supraglottic airway devices, and video laryngoscopy, are essential for securing and maintaining the airway during ENT procedures.

Ophthalmic surgeries involve unique considerations and challenges, with different techniques used for patient positioning, sedation, and monitoring. The advantages and disadvantages of different methods for specific ophthalmic procedures are also discussed. Local and regional anaesthesia techniques for head and neck procedures are also discussed, with the benefits, limitations, and potential complications of these techniques.

Complication management for ENT and ophthalmic surgeries involves recognizing potential complications, developing strategies for preventing and managing them, understanding the appropriate use of medications and interventions, and evaluating and implementing measures for optimizing patient safety and outcomes.

Course Outcomes

Course Learning Outcomes: The student will be able to

CO No.	Course Outcome	Bloom's Level
CO1	Explain anaesthetic considerations in ENT surgeries.	L2
CO2	Describe advanced airway management techniques used in ENT procedures.	L2
CO3	Apply anaesthetic techniques for ophthalmic surgeries.	L3
CO4	Apply local and regional anaesthesia techniques for head and neck procedures.	L3
CO5	Analyze and manage complications associated with ENT and ophthalmic surgeries.	L4

Course content

The course on Anaesthetic Considerations in ENT and Ophthalmic Surgeries aims to equip students with the skills to:

a) Anesthetic considerations for ear, nose, and throat surgeries: Demonstrate understanding of challenges and techniques involved in providing Anaesthesia for ENT procedures, apply appropriate methods and strategies for maintaining airway patency, and implement pain management protocols.

b) Airway management in ENT procedures: Use advanced techniques like fibreoptic intubation, supraglottic airway devices, and video laryngoscopy to maintain airway patency and manage complications.

c) Anesthetic techniques for ophthalmic surgeries: Understand the unique challenges and challenges in providing Anaesthesia, apply appropriate techniques for different procedures, and implement patient positioning, sedation, and monitoring protocols.

d) Local and regional anesthesia techniques for head and neck procedures: Demonstrate proficiency in administering local anaesthetics and performing nerve blocks, and select and apply regional techniques based on surgical requirements.

e) Management of complications specific to ENT and ophthalmic surgeries: Identify potential complications and adverse events, implement preventive measures, and address complications promptly and appropriately to ensure patient safety and optimize outcomes.

Advanced Anaesthesia Techniques (ENT and Ophthalmic Surgeries):

- Anaesthetic considerations for ear, nose, and throat surgeries: Understanding the specific challenges and techniques involved in providing Anaesthesia for ENT procedures such as tonsillectomy, adenoidectomy, and sinus surgery. - 20 Hours
- Airway management in ENT procedures: Learning about advanced airway management techniques, such as fibreoptic intubation, supraglottic airway devices, and video laryngoscopy, for securing the airway during ENT surgeries. -20 Hours
- Anaesthetic techniques for ophthalmic surgeries: Studying the unique considerations for providing Anaesthesia during eye surgeries, including cataract extraction, retinal surgeries, andglaucomaprocedures. - 20 Hours
- Local and regional Anaesthesia techniques for head and neck procedures: Exploring the principles and administration techniques for local anaesthetics, nerve blocks, and regional Anesthesia for head and neck surgeries. - 20 Hours

- Management of complications specific to ENT and ophthalmic surgeries: Understanding the potential complications and adverse events related to Anaesthesia in ENT and ophthalmic surgeries and learning strategies for their prevention and management. - 20 Hours

Practical Sessions: (50 Hours)

CO No.	Practical Course Outcome	Bloom's Level
CO1	Demonstrate patient positioning and anaesthetic administration in ENT surgeries.	L3
CO2	Perform fibreoptic intubation and supraglottic airway device insertion.	L3
CO3	Demonstrate ophthalmic anaesthesia techniques and nerve blocks.	L3
CO4	Manage difficult airway situations and ophthalmic emergencies.	L4

- Considerations for Anesthesia in ENT Surgery:
- Tonsillectomy and Adenoidectomy: Patient Positioning and Airway Access: During tonsillectomy and adenoidectomy operations, students will practice optimal patient positioning and techniques for preserving a patent airway.
- Anesthetic Agent Selection and Administration: Students will learn about the proper selection of anaesthetic agents for ENT operations, including inhalational and intravenous agents. They will put their administration and monitoring skills to the test.
- Anesthetic Techniques for Sinus Surgery: Students will learn about the anaesthetic considerations unique to sinus surgery, such as keeping a clear operative field, limiting bleeding, and managing patient placement. They will put these strategies to the test in simulated circumstances.

Airway Control in ENT Procedures:

- Fibreoptic Intubation Techniques: Students will practice fiberoptic intubation with airway manikins. They will learn how to use the fiberscope correctly to secure the airway in difficult ENT cases.
- Supraglottic Airway Devices: Insertion and Positioning of Supraglottic Airway Devices: In simulated ENT settings, students will practice the insertion and correct positioning of supraglottic airway devices such as laryngeal mask airways (LMAs).

Ophthalmic Surgery Anaesthesia Techniques:

- Topical Anaesthesia Techniques for Cataract Extraction: Students will learn and practice different topical anesthetic approaches for cataract extraction, such as eye drops, subconjunctival injections, and intracameral anaesthesia.

Retinal Surgery and Glaucoma Treatments:

- Blocks for the peribulbar and retrobulbar areas: Students will study and practice peribulbar and retrobulbar blocks, which are often used to provide anaesthesia during retinal and glaucoma treatments. On manikins, they will practice proper needle insertion and pharmaceutical deposition techniques.

Complication Management in ENT and Ophthalmic Surgery:

- Difficult Airway Scenarios and Airway Obstruction:
- Airway blockage Simulation: Students will take part in simulated scenarios involving airway blockage and difficult airway circumstances in ENT surgery. They will practice effective management strategies such as emergency airway maneuvers and the placement of an alternate airway device.

Complications of Ophthalmic Surgery:

- Ocular Emergencies Simulation: During ophthalmic procedures, students will encounter simulated ocular emergencies such as rapid loss of vision or high intraocular pressure.
- They will learn and practice the necessary emergency management strategies.

Students will be able to apply their theoretical knowledge in a simulated clinical settingduring these practical sessions, allowing them to develop skills and confidence in managing anaesthetic considerations, airway management, and complications specific to ENT and ophthalmic surgeries.

Reference Books:-

a. Drugs & Equipment in Anesthetic Practice by Arun Kumar Paul,
b. short textbook on Anesthesia, Ajay Yadav,
c. Understanding Anesthesia Equipment Dorsch & Dorsch,
d. Handbook of Mechanical Ventilation, B Umesh Kumar,
e. Wards Anesthesia Equipment Andrew & Ali Diba,
f. The Anesthesia Technician & Technologists Manual Glenn Woodworth.
g. Miller‟s Anesthesia.

Advanced Surgical Procedure

Learning Objectives: **(100 Hours)**

The learning objectives for this course include understanding surgical procedures in ear, nose, and throat (ENT), diseases in otolaryngology (ENT), eye diseases, laser precautions, surgical techniques in ophthalmology, endoscopic procedures in ENT and ophthalmology, laser-assisted surgical procedures in ENT and ophthalmology, minimally invasive approaches in ENT and ophthalmology, and management of complications in ENT and ophthalmology.

The course covers various surgical procedures, diseases, and complications in ENT, ophthalmology, laser-assisted surgical procedures, minimally invasive approaches, and management of complications. Students will gain knowledge about the etiology, pathophysiology, clinical presentation, and diagnostic approaches for each ENT disease, as well as the medical and surgical treatment options available for managing ENT diseases.

The course also covers laser safety training, proper laser warning signage, and interlock systems. Students will also learn about the instruments and techniques involved in ophthalmic surgeries, as well as the preoperative, intraoperative, and postoperative considerations for these procedures.

The course also covers endoscopic procedures, laser-assisted surgical procedures, and minimally invasive approaches in ENT and ophthalmology. Students will explore the advantages, limitations, and patient selection criteria for these approaches and evaluate the outcomes and potential complications.

In conclusion, this course provides a comprehensive understanding of surgical procedures, diseases, and complications in ENT and ophthalmology. By understanding these areas, students will be better equipped to manage and optimize patient outcomes during these procedures.

Course Outcome

CO No.	Course Outcome	Bloom's Level
CO1	Explain common ENT surgical procedures and associated diseases.	L2
CO2	Describe ophthalmic diseases and their surgical management.	L2
CO3	Apply laser safety precautions and ophthalmic surgical techniques.	L3

CO4	Demonstrate knowledge of endoscopic, laser-assisted, and minimally invasive surgical approaches in ENT and ophthalmology.	L3
CO5	Analyze and manage complications associated with ENT and ophthalmic surgeries.	L4

Course content

Advanced Surgical Procedures

- Surgical procedures in ear, nose, and throat (ENT): Learning about the various surgical procedures performed in ENT, including tonsillectomy, septoplasty, laryngectomy, and sinus surgery, and understanding the specialized instruments and techniques used, and positioning for each surgery. -15 Hours
- Diseases in Otolaryngology (ENT) : Chronic Sinusitis, Tonsillitis, Deviated Septum Otitis Media, Vocal Cord Nodules or Polyps, Obstructive Sleep Apnea (OSA),Laryngeal Cancer, Nasal Polyps, Salivary Gland Disorders, Cochlear Implantation. -15 Hours

Diseases in Ophthalmology:- - 20 Hours

- Cataracts - Cataract Extraction and Intraocular Lens (IOL) Implantation,
- Glaucoma - Trabeculectomy, Shunt Implantation, Laser Therapy
- Age-related Macular Degeneration (AMD) - Intravitreal Injections, Laser Therapy, Photodynamic Therapy
- Diabetic Retinopathy - Vitrectomy, Laser Therapy
- Retinal Detachment - Retinal Detachment Repair
- Dry Eye Syndrome - Punctal Occlusion Surgery
- Conjunctivitis - Symptomatic Treatment (Medications, Eye Drops)
- Corneal Diseases - Corneal Transplantation (Keratoplasty)
- Refractive Errors - LASIK (Laser-Assisted in Situ Keratomileusis), PRK
- (Photorefractive Keratectomy)
- Retinoblastoma - Chemotherapy, Radiation Therapy, Enucleation (Eye Removal)

Laser Precautions: Laser Safety Training, Protective Eyewear, Fire Safety Laser Plume Management, Patient Safety, Laser Device Maintenance, Laser Warning Signage, Laser Interlock Systems, Laser Hazard Assessment Compliance with Regulatory Standards. - 6 Hours

Surgical techniques in ophthalmic surgery: Exploring the specific surgical procedures performed in ophthalmology, such as cataract extraction, corneal transplantation, vitrectomy, and refractive surgeries, and understanding the instrumentation and surgical principles involved. -10 Hours

Endoscopic procedures in ENT and ophthalmic surgery: Understanding the principles and techniques of endoscopic surgeries in ENT and ophthalmology, including endoscopic sinus surgery, laryngoscopy, tracheostomy, and arthroscopy. - 4 Hours

Laser-assisted surgical procedures in ENT and ophthalmology: Learning about the use of lasers in surgical procedures in ENT and ophthalmology, including laser-assisted tonsillectomy, laser-assisted stapedotomy, and laser refractive surgeries. - 10 Hours

Minimally invasive approaches in ENT and ophthalmic surgery: Exploring minimally invasive surgical techniques, such as laparoscopic and robotic-assisted procedures, in ENT and ophthalmology, and understanding their advantages and limitations. - 10Hours

Management of complications in ENT and ophthalmic surgeries: Understanding the potential complications and adverse events that may arise during ENT and ophthalmic surgeries, and learning strategies for prevention, recognition, and management -10 Hours

Practical's: (50 Hours)

CO No.	Practical Course Outcome	Bloom's Level
CO1	Identify and arrange instruments used in ENT and ophthalmic surgical procedures.	L3
CO2	Demonstrate operative setup and instrument handling for tonsillectomy, septoplasty, sinus surgery, and ophthalmic procedures.	L3
CO3	Perform endoscopic instrument arrangement and assist in simulated endoscopic ENT procedures.	L3
CO4	Apply techniques for disease assessment, surgical assistance, and management of intraoperative complications in ENT and ophthalmic surgeries.	L4

- Surgical procedures in ear, nose, and throat (ENT) include tonsillectomy, septoplasty, sinus surgery, endoscopic sinus surgery, chronic sinusitis, tonsillitis, ophthalmic surgery, cataract extraction, corneal transplantation, and laryngoscopic examination. Students will know the identification of all surgical instruments of the above specialties.
- Students will practice arrangement techniques for cold knife dissection, electrocautery, and coblation, as well as the proper use of specialized instruments like tonsil snares, dissectors, and hemostatic agents. They will also learn the principles of maintaining nasal airway patency and proper positioning of nasal packing.
- Endoscopic sinus surgery involves hands-on experience with endoscopic instruments, including sinus scopes and instrumentation.

- Endoscopic procedures in ENT and ophthalmic surgery include simulated endoscopic sinus surgery scenarios using anatomical models, focusing on sinus visualization, polyp removal, and ostium widening. Students will also practice arranging instruments required for laryngoscopic examination using laryngoscope models, learning proper insertion, and positioning of laryngoscope blades, visualization of vocal cords, and identification of laryngeal structures. These practical sessions provide students with hands-on experience and simulation-based training to develop skills and competence in advanced arrangement for surgical procedures, disease assessment, surgical techniques, and management of complications in ENT and ophthalmic surgeries.

Reference Books:-

a. Fullers Surgical Technology, Joanna Kotcher Fuller
b.Diseases in ENT, Head & Neck Surgery, PL Dhingra & Shruti Dhingra.
c. Laparoscopic Surgery, R. K. Mishra.
d. Surgical Technology for the surgical technologist by association of surgical technologists.
e. Manipal manual of Surgery, Rajagopal Shenoy, Anitha Shenoy.

Basic Intensive Care

Learning Objectives: **(50 Hours)**

a) Recognize proper care and maintenance practices for ventilators, suction machines, and monitoring equipment.

b) Check, clean, and troubleshoot this equipment on a regular basis.

c) Recognize prevalent flaws and take corrective action.

d) Understand the concepts of ventilator sterilization and disinfection.

e) Recognize the proper sterilization processes and disinfectants for ventilators.

f) Know how to care for, maintain, and operate beds, lights, and other pieces of equipment.

g) Recognize the significance of air conditioning and pollution control in the ICU setting.

h) Recognize HVAC systems and air filtration procedures in order to maintain air quality.

i) Be familiar with the attachment and intraoperative use of ventilators and monitoring devices.

j) Adult and pediatric patients who are unconscious are cared for.

k) Recognize unique care requirements, such as posture, hygiene, and monitoring.

l) Course Outcomes: Recognize and manage any potential difficulties or crises that may arise while caring for unconscious patients.

m) Become familiar with physiotherapy procedures, feeding, Ryle's tube insertion, and hyperalimentation.

n) recognize suctioning and posture techniques in semiconscious and unconscious patients.

o) Understand the concepts and procedures of oxygen therapy, including identifying and selecting appropriate delivery systems and masks based on patient needs.

p) Assess ventilation during a patient emergency.

q) Assist with ventilation using mouth-to-mouth, mouth-to-ET tube, or bag-valve mask construction procedures.

r) Depending on the patient's condition and response, implement suitable ventilation methods.

Course Outcomes

CO No.	Course Outcome	Bloom's Level
CO1	Explain the care, maintenance, sterilization, and troubleshooting of ventilators, suction machines, and monitoring devices.	L2
CO2	Describe ICU equipment, air conditioning systems, pollution control measures, and attachment of ventilators and monitors.	L2
CO3	Apply principles of care for unconscious and semiconscious patients, including feeding, suctioning, posturing, and physiotherapy techniques.	L3
CO4	Demonstrate knowledge of oxygen therapy, airway management, ventilation support, ABG analysis, and resuscitation techniques.	L3
CO5	Analyze the principles and clinical applications of ventilators, monitoring equipment, hemodialysis, hemofiltration, and ICU patient management.	L4

Course content

Basic Intensive Care

- Care and maintenance of ventilators, suction machine, monitoring devices. -2Hours
- Sterilization and disinfection of ventilators. - 1 Hour
- Care, maintenance and operational capabilities of beds, lights and other apparatus.- 1 Hour
- Air conditioning and control of pollution in ICU. - 1 Hour
- Attachment and intraoperative utility of ventilators and monitoring devices. - 1 Hour
- Care of unconscious adult and paediatric patients. - 3 Hour
- Physiotherapy techniques, feeding, Ryle‟s tube insertion and hyper alimentation. -3 Hours
- Suctioning and posturing of semiconscious and unconscious patients. -2 Hours
- Oxygen therapy, maintenance of clear Airway, Various types of masks. -6 Hours
- Ventilation of patient in crisis: -2 Hours
- Resuscitator/ bag valve mask assembly -2 Hours
- Different types of Airways. -2 Hours
- Short term ventilation/ Transport ventilators. -1 Hours
- ABG techniques & analysis. -3 Hours
- Management of asepsis. -4 Hours

- Psychological aspects of the patient, relative and staff. -2 Hours
- Hemofiltration and hemodialysis. -4 Hours
- Jet Ventilation. -2 Hours
- Ventilators: Principles of working of different ventilators:
- Volume cycled/Time cycled/Pressure cycled ventilators. -8 Hours
- High frequency ventilators and other types.
    - Methods of measuring the expired gases from the patient; Types of spirometers, Principles of working of spirometers. Clinical application of above apparatus.
    - Apparatus and techniques of measuring of blood pressure and temperature; Principle and working of direct/indirect blood pressure monitoring apparatus; structure, principle and working of the Oscillo tonometer. Principles and working of aneroid manometer type B.P. instrument.
    - Laryngeal sprays; Types, material, principle, and mechanism.
    - Monitoring techniques and equipment; Cardiac monitors, Respiratory monitors, Spirometers, Temperature monitors

Practical/ Clinical Postings: (100 Hours)

CO No.	Practical Course Outcome	Bloom's Level
CO1	Demonstrate ventilator care, maintenance, sterilization, troubleshooting, and alarm management.	L3
CO2	Perform ICU equipment handling, bed maintenance, and infection control procedures.	L3
CO3	Demonstrate airway management, oxygen therapy, bag-valve-mask ventilation, and care of unconscious patients.	L3
CO4	Apply physiotherapy techniques, Ryle's tube insertion, hemodialysis/hemofiltration setup, and effective communication in ICU settings.	L4

- Ventilator Care and Maintenance:
    - Hands-on practice in the proper care and maintenance of ventilators, including cleaning, sterilization, and disinfection techniques.
    - Understanding the different functions and operation of modes and settings of ventilators.
    - Troubleshooting common ventilator issues and alarm management.

- Bed and Apparatus Care:
    - Practical demonstration of bed maintenance, including adjustment of height, positioning, and proper use of bed controls.
    - Familiarization with the operational capabilities of ICU lights and other apparatus, such as infusion pumps and monitors.
    - Cleaning and disinfection procedures for bed surfaces and equipment.
- Air Conditioning and Pollution Control in ICU:
    - Practical session on the management of air conditioning systems in the ICU to maintain optimal temperature, humidity, and air quality.
    - Understanding the importance of infection control measures and strategies to minimize airborne contaminants in the ICU environment.
- Care of Unconscious Patients:
    - Simulation-based training on the care and management of unconscious adult and pediatric patients, including monitoring vital signs, maintaining airway patency, and providing basic hygiene.
    - Practice in the proper positioning and turning techniques for unconscious patients to prevent pressure ulcers.
- Oxygen Therapy and Airway Management:
    - Hands-on practice in administering oxygen therapy using different types of masks and nasal cannulas.
    - Simulation of airway management techniques, including insertion and securing of endotracheal tubes, use of different types of airways, and bag-valve mask ventilation.
- Physiotherapy Techniques and Feeding Methods:
    - Practical demonstration and practice of physiotherapy techniques, such as chest physiotherapy and postural drainage, to promote airway clearance.
    - Training on safe and proper insertion of Ryle's tube for enteral feeding, followed simulated feeding procedures and maintenance.
- Hemofiltration and Hemodialysis:
    - Introduction to the principles and techniques of hemofiltration and hemodialysis for renal replacement therapy.
    - Simulation-based training on the setup and operation of hemofiltration and hemodialysis machines, including the monitoring of patients during the procedure.
- Psychological Aspects of Patients, Relatives, and Staff:
    - Interactive sessions focusing on the psychological aspects of patients, their relatives, and healthcare staff in the ICU setting.
    - Role-playing exercises to develop effective communication skills and strategies for providing emotional support to patients and their families

Reference Books:-

a. Principles of Critical Care, Udwadia Erach Farokh (Author)
b. The Protocol Book of Intensive Care, Soumitra Kumar.
c. Oxford‟s Handbook of Critical Care, M Singer, A. Webb.
d. Essentials of Anesthesia & Critical Care, Anshul Jain,

e. Essentials of Critical Care Nursing, Jaya Kuruvilla.
f. The ECG made easy, John R. Hampton,
g. Advanced Emergency Life Support Protocol, Gireesh Kumar K P. h. ICU manual, Goel, Joshi, Jain

Clinical Medicine & Related Management

Learning Objectives **(60 Hours)**

Practical topics for students in the field of respiratory and cardiovascular system include handson training in examinations and investigations, such as ECG interpretation and pulmonary function tests, as well as simulations for managing emergencies like cardiac arrest. They should also learn about specific conditions like ischemic heart disease, asthma, and pneumonia through case discussions and observation of relevant procedures. Additionally, practical sessions on airway management, chest tube insertion, and the use of diagnostic tools in diagnosing and managing lung diseases like tuberculosis and lung cancer are essential.

Course Outcomes

Course Learning Outcomes: The student will be able to		
CO No.	**Course Outcome**	**Bloom's Level**
CO1	Explain the anatomy, physiology, examination, and investigations of the cardiovascular and respiratory systems.	L2
CO2	Describe the etiology, clinical features, diagnosis, and management of common cardiovascular disorders.	L2
CO3	Apply knowledge in the assessment and management of respiratory diseases including asthma, COPD, and pneumonia.	L3
CO4	Interpret clinical findings and diagnostic investigations related to respiratory and cardiovascular disorders.	L3
CO5	Analyze the causes, diagnosis, and management of respiratory failure, pulmonary tuberculosis, lung cancer, and other pulmonary conditions.	L4

Course content

Clinical Medicine & Related Management

- Respiratory & cardiovascular system 4 hours
- Examination and Investigations relevant to cardiovascular system 4 hours
- Ischemic heart disease 2 hours
- Valvular heart diseases 4 hours
- Common arrhythmias encountered in clinical practice 2 hours

• Hypertension	2 hours
• Heart failure	2 hours
• Cardiomyopathies	2 hours
• Examination and Investigations relevant to respiratory system	2 hours
• Asthma and COPD	4 hours
• Pneumonia	2 hours
• Pulmonary tuberculosis	4 hours
• Bronchiectasis	2 hours
• Lung abscess	4 hours
• Pneumothorax	2 hours
• Pleural effusion	4 hours
• Respiratory failure-types, causes and management	6 hours
• Carcinoma lung	6 hours

Reference Books:-

a. Harrison's principles of Internal Medicine,

b. Toohey's Medicine, R Indrani.

Fifth Semester:

Course Code	Course Title	Teaching Hour				Theory			Practical			Grand Total (Marks)
		L (hrs.)	P/ D	CL P	CR	SEE	IA	T	SEE	IA	T	
BAOTT -020	Specialized Anesthesia-1	100	…..	50	5	80	20	100	40	10	50	150
BAOTT -021	Specialized Surgery-1	100	…..	50	5	80	20	100	40	10	50	150
BAOTT -022	Recent Advances in Anesthesia & Surgical Field	50	…..	50	5	80	20	100	…..	…..	…..	100
BAOTT -023	Disaster Management & Environ mental Science	100	…..	0	2	40	10	50	…..	…..	…..	50
Total		**400**	**…..**	**150**	**17**	**…..**	**….**	**350**	**…..**	**…..**	**100**	**450**
Grand Total (Hours)		**510**			**……**							

SEMESTER -V

Specialized Anaesthesia-1

Learning Objectives **(100 Hours)**

The learning goals span a wide range of anesthetic procedures, including orthopedic, pediatric, urological, regional, and regional anaesthesia. Comprehending special anaesthetic concerns and problems is required for orthopedic surgery, whereas comprehending distinct physiological and pharmacological aspects is required for paediatric anaesthesia. Exploring problems and considerations, understanding the influence of individual anomalies on anaesthetic management and perioperative care, and establishing strategies to optimize results and minimize risks are all part of anaesthetic management of patients with congenital anomalies. Understanding specialized anesthesia management procedures, such as prostatectomy, nephrectomy, and cystoscopy, as well as controlling probable problems and perioperative issues, are required for urological surgery. Regional anesthesia techniques for orthopedic and urological procedures entail learning pain management principles and techniques, performing peripheral nerve blocks and spinal anaesthesia, and comprehending indications, contraindications, and potential complications associated with regional anaesthesia.
Students will learn how to grasp anaesthetic considerations, techniques, and challenges in orthopedic surgeries, how to use appropriate techniques for paediatric patients, how to address congenital anomalies in paediatric patients, and how to use regional anaesthesia techniques for pain control. It also addresses potential problems and adverse events, provides safe and effective care, and exhibits expertise in monitoring techniques and management tactics. Students work with the surgical team to improve patient outcomes, use evidence-based practices, and keep their knowledge and abilities up to date. The course also promotes a proactive approach to anaesthesia difficulties Specialized Anaesthesia-1

Course Outcomes

Course Learning Outcomes: The student will be able to

CO No.	Course Outcome	Bloom's Level
CO1	Explain anaesthetic considerations, techniques, and challenges associated with orthopedic surgeries.	L2
CO2	Describe paediatric anaesthesia techniques, airway management, and perioperative care.	L2
CO3	Apply anaesthetic management principles for paediatric patients with congenital anomalies.	L3

CO4	Apply appropriate anaesthetic techniques and perioperative management for urological surgeries.	L3
CO5	Analyze and utilize regional anaesthesia techniques for orthopedic and urological procedures while managing associated complications.	L4

Course content

Specialized Anaesthesia-1

a) Anesthetic considerations for orthopedic surgeries: Studying the specific Anaesthesia considerations, techniques, and challenges associated with orthopedics procedures such as joint replacements, fracture fixation, and spine surgeries. - 20 Hours

b) Paediatric Anaesthesia techniques and considerations: Understanding the unique physiological and pharmacological considerations for providing Anaesthesia to paediatric patients, including preoperative preparation, induction, airway management, and pain management. - 20 Hours

c) Anaesthetic management of paediatric patients with congenital anomalies: Exploring the Anaesthesia challenges and considerations when managing paediatric patients with congenital anomalies undergoing surgical procedures. - 20 Hours

d) Anaesthesia for urological surgeries: Learning about the specific Anaesthesia considerations and techniques for urological procedures such as prostatectomy, nephrectomy, and cystoscopy. - 20 Hours

e) Regional Anesthesia techniques for orthopedics and urological procedures: Studying the principles and techniques of regional Anaesthesia, including peripheral nerve blocks and spinal Anaesthesia, for pain management during orthopedic and urological surgeries. - 20 Hours

Practical Topics: Specialized Anaesthesia-1 (50 Hours)

Orthopedic Surgery:

- Simulation-based training on anaesthetic considerations and techniques for joint replacement surgeries, such as patient positioning, regional anaesthesia techniques, and intraoperative pain management.
- Anesthetic treatment for fracture fixation procedures, including the use of various types of anaesthesia and monitoring measures, is demonstrated in practice.
- Role-playing scenarios to better grasp the problems and decision-making involved in giving spinal anaesthesia.

Paediatric Surgery:

- Hands-on practice in pediatric airway care using suitable devices and techniques, such as mask ventilation, intubation, and supraglottic airway devices.
- Simulation scenarios concentrating on the special issues for inducing and maintaining anaesthesia in paediatric patients, including as dose calculation, monitoring, and intraoperative care.
- A hands-on session on juvenile pain management strategies, such as regional anaesthesia and multimodal analgesia.
- Anaesthesia for Paediatric Patients with Congenital abnormalities: Interactive sessions addressing anesthetic problems and considerations when caring for children with congenital abnormalities.
- Case studies and role-playing exercises are used to learn about preoperative evaluation, anaesthesia planning, and intraoperative care of unique congenital abnormalities.
- Simulations of emergency situations and crisis management in paediatric patients with congenital abnormalities.

Urological surgeries:

- Anaesthesia for Urological Surgeries: This course provides a practical demonstration of anaesthetic considerations and techniques for various urological surgeries such as prostatectomy, nephrectomy, and cystoscopy.
- Training in urological surgery positioning and patient preparation, including the use of regional anaesthetic and intravenous sedation procedures.
- Scenarios based on simulation to better understand intraoperative problems and management of fluid balance, hemodynamic, and pain control during urological procedures.
- Techniques of Regional Anesthesia for Orthopedic and Urological Procedures:
- Practical experience with peripheral nerve blocks, including landmark recognition, needle insertion, and local anaesthetic administration.
- Training in spinal anaesthetic procedures using simulation, including patient placement, sterile technique, and dose calculation.

Anaesthesia Considerations:

- Case-based discussions on anesthesia considerations specific to orthopedic, Pediatric, and urological surgeries, focusing on patient assessment, anesthesia induction, and intraoperative monitoring.

- Interactive sessions on pain management strategies for surgical patients in these specialties, including the use of regional anesthesia techniques, multimodal analgesia, and patient-controlled analgesia.
- Simulation scenarios to practice crisis management during surgery, such as intraoperative bleeding, anaphylactic reactions, or airway emergencies.

Postoperative Care and Rehabilitation:

- Practical demonstration of postoperative care protocols for orthopedic, pediatric, and urological surgical patients, including wound care, monitoring vital signs, and early mobilization techniques.
- Role-playing exercises to simulate patient education and discharge planning, including instructions on medication management, activity restrictions, and follow-up appointment.
- Hands-on practice with rehabilitation exercises specific to orthopedic, pediatric, and urological surgical patients, focusing on maintaining joint mobility, strengthening, and functional recovery.

Reference Books:-

a. Drugs & Equipment in Anesthetic Practice by Arun Kumar Paul,

b. Short textbook on Anesthesia, Ajay Yadav,

c.Understanding Anesthesia Equipment Dorsch & Dorsch,

d. Wards Anesthesia Equipment Andrew & Ali Diba,

e. The Anesthesia Technician & Technologists Manual Glenn Woodworth.

f. Miller‟s Anesthesia**.**

Specialized surgery 1

Learning Objectives: **(100 Hours)**

The learning objectives cover various aspects of orthopedics, Pediatric surgery, urological diseases, and related surgeries. orthopedic diseases include osteoarthritis, fractures, herniated discs, scoliosis, and ligament injuries. Orthopedic surgical procedures include joint replacement, fracture fixation, spinal surgeries, and carpal tunnel release. Understanding the principles and techniques involved in surgical management of orthopedic conditions is crucial.

C-arm and radiation safety are also covered, including pregnancy and Paediatric radiology considerations, contrast media safety, infection control, equipment maintenance, calibration, patient identification and consent, emergency preparedness, and radiation dose optimization. Effective communication, documentation, quality assurance, and accreditation are also essential in the use of C-arm.

Paediatric surgical procedures include hernia repair, pyloromyotomy, congenital anomaly correction, and laparoscopic surgeries. Specimens, techniques, and patient positioning are also discussed. Postoperative care protocols, pain management, and patient education are also covered.

Urological diseases and related surgeries include kidney stones, urinary tract infections, urinary incontinence, benign prostatic hyperplasia, bladder cancer, prostate cancer, erectile dysfunction, and vesicoureteral reflux. Understanding surgical treatment options and techniques for urological diseases is essential. Anaesthesia considerations and specialized techniques are also discussed, along with the principles of postoperative care and rehabilitation specific to urological surgical patients.

The course is designed to give learners a thorough awareness of prevalent disorders in orthopedics, pediatric surgery, and urology, as well as suitable surgical procedures and techniques. Patient positioning, pain management, perioperative care, C-arm fluoroscopy, anaesthesia, postoperative care protocols, and rehabilitation programmes are all covered. Through continued professional development, students will also learn to effectively work with the surgical team, use evidence-based practices, and regularly update their knowledge and abilities in orthopedic, pediatric, and urological surgery.

Course Outcomes

Course Learning Outcomes: The student will be able to

CO No.	Course Outcome	Bloom's Level
CO1	Explain common orthopedic diseases and related surgical procedures, including instrumentation and patient positioning.	L2
CO2	Describe pediatric surgical diseases, procedures, and specialized perioperative considerations.	L2

CO3	Apply knowledge of urological diseases, surgical procedures, instrumentation, and catheterization techniques.	L3
CO4	Demonstrate understanding of minimally invasive surgical techniques and anesthesia considerations in orthopedic, pediatric, and urological surgeries.	L3
CO5	Analyze postoperative care, rehabilitation protocols, and perioperative challenges to optimize patient outcomes.	L4

Course content

a) **Diseases in Orthopedics** - 12 Hours

- Osteoarthritis: Degenerative joint disease-causing joint pain and stiffness. Surgeries include joint replacement (e.g., total hip replacement, total knee replacement).
- Fractures: Broken bones that require surgical intervention for realignment and stabilization. Surgeries may include open reduction and internal fixation (ORIF), external fixation, or intramedullary nailing.
- Herniated Disc: Protrusion of intervertebral disc causing nerve compression. Surgical
- options include discectomy or spinal fusion.
- Scoliosis: Abnormal curvature of the spine. Surgery may be performed in severe cases to correct the curvature, such as spinal fusion or insertion of spinal rods.
- Carpal Tunnel Syndrome: Compression of the median nerve in the wrist. Surgical treatment involves carpal tunnel release to alleviate pressure on the nerve.
- Rotator Cuff Tears: Tears in the tendons of the rotator cuff in the shoulder. Surgical repair or reconstruction may be required, such as arthroscopic rotator cuff repair.
- Ligament Injuries: Injuries to ligaments, such as anterior cruciate ligament (ACL) tear in the knee. Surgical reconstruction may be performed using grafts, such as ACL reconstruction.
- Spinal Stenosis: Narrowing of the spinal canal, causing compression of the spinal
- cord or nerves. Surgery options include laminectomy or spinal decompression to
- relieve pressure.
- Bone Tumours: Abnormal growths in bones that may require surgical removal, such as
- tumor resection or limb-sparing surgeries.
- Osteoporosis: Loss of bone density, leading to increased fracture risk. Surgical procedures may include vertebroplasty or kyphoplasty for spinal compression fractures.

- Orthopaedic surgical procedures: Studying the specific orthopedic surgical procedures, including joint replacement surgeries (such as total knee replacement and total hip replacement), fracture fixation (fracture table), and spine surgeries, and understanding the instrumentation, implants, techniques involved and positioning for each surge -20 Hours
- C-arm. Radiation Safety: Pregnancy and Pediatric Radiology, Contrast Media Safety, Infection Control, Equipment Maintenance and Calibration, Patient Identification and Consent, Emergency Preparedness, Radiation Dose Optimization, Communication and Documentation, Quality Assurance and Accreditation -3 Hours

b) Diseases in Pediatric Surgery: - 15 Hours

- Cleft Lip and Palate: Facial birth defects involving the lip and/or palate. Surgical procedures are performed to repair and reconstruct the cleft lip and palate, typically in multiple stages.
- Pediatric Hernias: Abnormal protrusions of organs or tissues through weak spots or openings in the abdominal wall, such as inguinal hernia or umbilical hernia. Surgical treatment involves hernia repair to close the defect.
- Pediatric Urological Conditions: Disorders affecting the urinary system in children, such as hypospadias, cryptorchidism (undescended testicles), or vesicoureteral reflux (VUR), PUJO. `Surgical interventions may include hypospadias repair, orchidopexy, or ureteral reimplantation.
- Pediatric Gastrointestinal Disorders: Conditions like pyloric stenosis, malrotation, or Hirschsprung's disease that affect the digestive system in infants and children. Surgical procedures are performed to correct the underlying issues, such as pyloromyotomy or bowel resection.
- Pediatric orthopedic Conditions: Disorders involving the musculoskeletal system in children, such as clubfoot, developmental dysplasia of the hip (DDH), or scoliosis. Surgeries may include corrective procedures like clubfoot correction, hip reduction, or spinal fusion.
- Pediatric Neurosurgical Conditions: Neurological disorders affecting children, such as hydrocephalus, spina bifida, or brain tumors. Surgical interventions may involve shunt placement for hydrocephalus, repair of spina bifida defects, or tumor resection.
- Pediatric Trauma: Surgical management of traumatic injuries in children, including fractures, burns, or lacerations. Surgeries aim to repair and stabilize the injured areas.

C) Pediatric surgical procedures: Exploring the surgical procedures performed in Paediatric surgery, such as Pediatric hernia repair, pyloromyotomy, congenital anomaly correction, and Paediatric laparoscopic surgeries, and understanding the specialized considerations, techniques for Paediatric patients and positioning for each surgery. - 15 Hours

D) Urological Diseases and Related Surgeries: -20 Hours

- Kidney Stones: Surgical procedures may include:
- Extracorporeal Shock Wave Lithotripsy (ESWL): Non-invasive procedure that uses shock waves to break down kidney stones into smaller pieces, making them easier to pass.
- Ureteroscopy with Laser Lithotripsy: Minimally invasive procedure where a thin tube is inserted into the ureter to remove or break down stones using a laser.
- Urinary Tract Infections (UTIs): Surgeries are not typically required for UTIs. Treatment usually involves antibiotics to eliminate the infection.
- Urinary Incontinence: Surgical options for urinary incontinence include:
- Sling Procedures: Placement of a sling or mesh to support the urethra and prevent leakage of urine.
- Bladder Neck Suspension: Surgical procedure to provide support to the bladder neck and urethra.
- Artificial Urinary Sphincter: Placement of an artificial valve around the urethra to control urine flow.
- Benign Prostatic Hyperplasia (BPH): Surgical procedures for BPH include:
- Transurethral Resection of the Prostate (TURP): Removal of excess prostate tissue using a resectoscope inserted through the urethra.
- Laser Surgery: Techniques like photo selective vaporization of the prostate (PVP) or holmium laser enucleation of the prostate (HoLEP) can be used to remove or vaporize prostate tissue.
- Bladder Cancer: Surgical treatment options for bladder cancer include:
- Transurethral Resection of Bladder Tumor (TURBT): Removal of bladder tumors using a resectoscope inserted through the urethra.
- Radical Cystectomy: Surgical removal of the entire bladder, often followed by the creation of a urinary diversion.
- Prostate Cancer: Surgical procedures for prostate cancer include:

- Testicular Cancer: Surgical treatment for testicular cancer typically involves:
- Radical Inguinal Orchiectomy: Surgical removal of the affected testicle through an incision in the groin area.
- Erectile Dysfunction: Surgical options for erectile dysfunction include:
- Penile Implants: Surgical insertion of inflatable or malleable implants to restore erectile function.
- Vascular Surgery: Procedures to improve blood flow to the penis, such as arterial bypass surgery or penile venous ligation.
- Vesicoureteral Reflux (VUR): Surgical options for VUR include:
- Deflux Injection: Endoscopic procedure where a bulking agent is injected into the bladder wall to create a flap that prevents urine from flowing back into the ureters.
- Ureteral Reimplantation: Surgical procedure to reposition the ureter and create a new valve mechanism to prevent reflux.
- Renal Tumours: Surgical treatment for renal tumors may include:
- Partial Nephrectomy: Removal of the tumor while preserving healthy kidney tissue.
- Radical Nephrectomy: Surgical removal of the entire affected kidney.

Urological surgical procedures:

- Learning about urological surgical procedures, including nephrectomy, prostatectomy, urinary tract reconstruction, and cystectomy, and understanding the specific instrumentation, techniques, considerations involved and positioning for each surgery.
- Catheter types and sizes, Catheterization techniques, Different types of scopes used in Urology (Nephoscope, cystoscope, resectoscope, Ureteroscope).
- Minimally invasive techniques in orthopedic, Pediatric, and urological surgery: Understanding the principles and techniques of minimally invasive approaches, including arthroscopy, laparoscopy, and robotic-assisted surgeries, in Orthopedics,
- Pediatric surgery, and urology.

e) Anaesthesia considerations and specialized techniques in these surgical specialties:

Gaining knowledge of the Anaesthesia considerations and specialized techniques required for orthopedic, Pediatric, and urological surgeries, including patient positioning, pain management, and perioperative care. -5 Hours

f) Postoperative care and rehabilitation in orthopedic, Pediatric, and urological surgeries:

- Understanding the postoperative care protocols, rehabilitation techniques, and patient education specific to orthopedic, Pediatric, and urological surgical patients. -5 Hours

Practical Topics – **(50 Hours)**

CO No.	Practical Course Outcome	Bloom's Level
CO1	Demonstrate surgical positioning, instrument handling, and operative setup for orthopedic procedures.	L3
CO2	Apply sterile techniques and perioperative management principles in pediatric surgical procedures.	L3
CO3	Perform catheterization techniques and assist with urological instruments and scopes.	L3
CO4	Demonstrate arthroscopic, laparoscopic, and robotic-assisted surgical techniques while managing perioperative challenges.	L4

Specialized surgery 1

Orthopedic Surgeries:

- Practical demonstration of surgical positioning techniques for different orthopedic procedures, such as joint replacement surgeries, fracture fixation, and spine surgeries.
- Hands-on practice with orthopedic surgical instruments, implants, and techniques used in specific procedures like total knee replacement or fracture fixation.
- Simulation-based training on postoperative care and rehabilitation exercises for orthopedic patients, including mobility assistance and range of motion exercises.

Pediatric Surgery:

- Practical session on sterile techniques and instrument handling specific to pediatric surgeries, such as cleft lip and palate repair or hernia repair in children.
- Simulation scenarios focusing on the management of pediatric patients during different stages of surgery, including preoperative preparation, anesthesia induction, and intraoperative care.
- Role-playing exercises to understand the unique considerations in postoperative care for pediatric surgical patients, including pain management and family support.

Urological Surgeries:

- Hands-on training on catheterization techniques, including different types of catheters and sizes used in urological procedures.

- Practical demonstration of the use of various urological scopes, such as nephroscope, cystoscope, and ureteroscope, for diagnostic and surgical purposes.
- Simulation-based scenarios to understand the perioperative management of urological surgical patients, including anesthesia considerations, positioning, and intraoperative complications.

Minimally Invasive Techniques:

- Practical session on arthroscopy techniques used in orthopedic surgeries, including joint examination, instrument handling, and diagnostic procedures.
- Hands-on practice with laparoscopic instruments and techniques for pediatric and urological surgeries, including trocar insertion, camera navigation, and suturing.
- Simulation-based training on robotic-assisted surgical procedures, such as robotic- assisted prostatectomy or pediatric robotic surgeries, to understand the robotic system setup and surgical techniques

Reference Books:-

a. Fullers Surgical Technology, Joanna Kotcher Fuller
b. Laparoscopic Surgery, R. K. Mishra
c. Surgical Technology for the surgical technologist by association of surgical technologists.
d. Essential Orthopedics, Maheshwari & Makar,
e. Orthopedic Surgical approach, Miller, Chhabra, Browne, Park, Shen.
f. Urology Instrumentation, Ravindra B Sabnis,

Recent Advancements in Anesthesia and Surgical Fields

Learning Objectives **(100 Hours)**

Recent advances in anaesthesia and surgical fields offer exciting opportunities for students to expand their knowledge and skills. By exploring topics such as minimally invasive surgery, enhanced recovery after surgery (ERAS), patient safety in the operating room, advances in anaesthetic techniques, and perioperative pain management, students can achieve specific outcomes. The first set of outcomes focuses on understanding and appreciating these advancements. Students will develop a clear understanding of the principles, advantages, and limitations of minimally invasive surgical techniques, as well as the concept and significance of ERAS in improving surgical outcomes. They will also recognize the importance of patient safety protocols and their application in the operating room.

In the second set of outcomes, students will delve into the details of recent advancements. They will acquire knowledge about specific topics such as advanced anaesthetic techniques, including total intravenous anaesthesia (TIVA) and target-controlled infusion (TCI). Students will explore the use of neuromuscular monitoring and understand its relevance in anaesthesia management. Furthermore, they will grasp the principles of multimodal analgesia and gain insights into regional anaesthetic techniques for effective pain management. These outcomes will equip students with up-to-date information and enhance their ability to analyze the impact of these advancements on patient outcomes and safety.

The final set of outcomes emphasizes the application of knowledge and skills in practice. Students will develop critical thinking abilities by evaluating the benefits and potential risks associated with recent advances in anaesthesia and surgical fields. They will also learn strategies for preventing surgical site infections and other complications, as well as strategies for optimizing patient preparation and postoperative care within an enhanced recovery framework. By achieving these outcomes, students will be well-prepared to contribute to the evolving healthcare landscape, ensuring the delivery of high-quality care while prioritizing patient safety and optimal outcomes.

Overall, these outcomes and learning objectives provide a comprehensive framework for B.AOTT students to explore and understand recent advances in anaesthesia and surgical fields. By attaining these outcomes, students will be equipped with the necessary knowledge, skills, and mindset to adapt to the changing healthcare landscape and make a positive impact in their future professional practice.

Course Outcomes

Course Learning Outcomes: The student will be able to		
CO No.	**Course Outcome**	**Bloom's Level**
CO1	Explain recent advancements in minimally invasive surgery, ERAS protocols, and patient safety practices in the operating room.	L2
CO2	Describe modern anaesthetic techniques, perioperative pain management strategies, and advanced imaging technologies.	L2
CO3	Apply knowledge of advanced anaesthetic monitoring, multimodal analgesia, and image-guided surgical techniques in clinical settings.	L3
CO4	Analyze the impact of emerging technologies, endoscopic procedures, and surgical innovations on patient outcomes and safety.	L4
CO5	Evaluate recent advancements in anaesthesia and surgical fields for improving quality of care, patient safety, and healthcare outcomes.	L5

Course content

Recent Advancements in Anesthesia and Surgical Fields

- Minimally Invasive Surgery: Exploring the advancements in minimally invasive surgical techniques, such as laparoscopy, robotic surgery, and endoscopic procedures, and their benefits in terms of reduced trauma, faster recovery, and improved patient outcomes.

  -15 Hours
- Enhanced Recovery After Surgery (ERAS): Understanding the concept of ERAS protocols, which involve a multidisciplinary approach to optimize patient preparation, surgical techniques, anaesthesia management, and postoperative care, leading to shorter hospital stays, reduced complications, and enhanced recovery. - 15 Hours
- Patient Safety in the Operating Room: Discussing the importance of patient safety in the operating room and highlighting recent initiatives and technologies aimed at improving safety, such as surgical checklists, surgical site infection prevention measures, and the use of simulation training for healthcare professionals. - 15 Hours
- Advances in Anaesthetic Techniques: Exploring recent developments in anaesthetic techniques, including total intravenous anaesthesia (TIVA), target-controlled infusion (TCI),

BIS monitoring, CNAP monitoring and the use of neuromuscular monitoring to improve drug dosing and patient safety during anaesthesia. - 15 Hours

- Perioperative Pain Management: Discussing novel approaches and advancements in perioperative pain management, such as the use of multimodal analgesia techniques, regional anaesthesia, and the role of non-opioid analgesics in reducing opioid consumption and improving pain control. - 10 Hours
- Advances in Imaging Technology: Exploring the use of advanced imaging techniques, such as intraoperative ultrasound, 3D imaging, and image-guided navigation systems, in surgical planning, intraoperative decision-making, and improved surgical accuracy. - 10 Hours
- Surgical Innovation and Emerging Technologies: Discussing the latest trends and innovations in surgical techniques and technologies, including the use of 3D printing for surgical models and implants, virtual reality and augmented reality in surgical training and planning, and the potential of artificial intelligence in surgical robotics and decision support systems. - 10 Hours
- Advances in Endoscopic Procedures: Examining the latest developments in endoscopic procedures, such as single-incision laparoscopy, natural orifice transluminal endoscopic surgery (NOTES), and advanced endoscopic imaging modalities, and their impact on minimally invasive surgery and patient outcomes. -10 Hours

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Reference Books:-

a. Fullers Surgical Technology, Joanna Kotcher Fuller

b. Laparoscopic Surgery, R. K. Mishra

c. SRB‟s manual of Surgery, Sriram Bhat M,

d. Miller‟s Anesthesia,

e. Advances In Anesthesia For Laparoscopic Surgeries Regional Anesthesia And The Road Ahead.

Disaster Management & Environmental Sciences

Learning Objectives **(50 Hours)**

Studying environmental sciences equips students with a deep understanding of ecological concepts, environmental issues, and scientific principles, while also fostering practical skills for data analysis, resource management, and environmental assessment. By developing critical thinking, problem-solving abilities, and effective communication skills, students are empowered to address real-world environmental challenges, promote sustainability, and advocate for the protection of our planet. These outcomes enable students to make informed decisions, contribute to sustainable practices, and create positive change for the environment and future generations

Course Outcomes

Course Learning Outcomes: The student will be able to

CO No.	Course Outcome	Highest Bloom's Level
CO1	Explain the principles of disaster preparedness, emergency management, and disaster response systems.	L2
CO2	Describe environmental concepts including water, air, pollution, sanitation, and waste management.	L2
CO3	Apply disaster management strategies, resource management, and risk reduction measures in emergency situations.	L3
CO4	Analyze environmental problems, pollution hazards, and their impact on public health and ecosystems.	L4

Course content

Disaster preparedness and management **(25 Hours)**

- The objective of this section will be to provide knowledge on the principles of on-site disaster
- management. Concepts to be taught should include-
- Fundamentals of emergency management,
- Psychological impact management,
- Resource management,
- Preparedness and risk reduction,

- Key response functions (including public health, logistics and governance, recovery, rehabilitation, and reconstruction), information management, incident command and
- institutional mechanisms.

Environmental science **(25 Hours)**

- Water-safe water, reservoir
- Water pollution
- Water related diseases.
- Purification of water
- Composition of air
- Air pollution
- Environment protection act
- Noise pollution
- Radiation & Its hazards
- Housing and health
- Disposal of solid waste-solid, liquid & biochemical waste
- Disposal of liquid waste
- Disposal of biochemical waste
- Sanitation & general hygiene

Reference books:

1. Textbook of Environmental Science — Dr Aruna Kumari Nakkella — 2022 4.Environmental Studies — Purnima Das - 2023

Sixth Semester:

Course Code	Course Title	Teaching Hour				Theory			Practical			Grand Total (Marks)
		L (hrs.)	P / D	CL P	CR	SEE	IA	T	SEE	IA	T	
BAOTT-024	Specialized Anesthesia-2	100	…..	50	5	80	20	100	40	10	50	150
BAOTT-025	Specialized Surgery-2	100	…..	50	5	80	20	100	40	10	50	150
BAOTT-026	Specialized Anesthesia & Surgical-3	100	…..	50	5	80	20	100	40	10	50	150
BAOTT-027	Research Methodolog y & Biostatics“	50	…..	0	2	40	10	50	…..	…..	…..	50
Total		**350**	**…..**	**150**	**17**	**…..**	**….**	**350**	**…..**	**…..**	**150**	**500**
Grand Total (Hours)		**500**			**……**							

SEMESTER VI

Specialized Anaesthesia-2

Learning Objectives **(100 Hours)**

The learning objectives include anaesthetic considerations for cardiovascular and thoracic surgery, as well as hemodynamic management strategies and monitoring approaches. They also cover central venous catheters, arterial line insertion, cardiac bypass and valve replacement procedures, controlling hemodynamic changes during cardiothoracic surgeries, and neurosurgery. To guarantee patient safety and ideal surgical conditions, the objectives also involve NeuroAnesthesia procedures and monitoring, such as total intravenous anaesthesia (TIVA). Understanding the principles and methods of neurophysiological monitoring is essential for ensuring patient safety and optimal surgical circumstances.

The course aims to teach students about anaesthesia considerations for cardiovascular and thoracic surgeries, including hemodynamic management techniques and monitoring methods. It covers anaesthesia protocols for coronary artery bypass grafting, valve replacement, and lung resection surgeries. Students will also demonstrate proficiency in selecting and inserting central venous catheters and applying infection control measures during insertion. They will also perform arterial line insertion with precision and safety, and assess collateral circulation using Allen's test. in neurosurgery Specialized Anaesthesia-2.

The course also covers anaesthesia techniques for cardiac bypass and valve replacement procedures, managing cardiopulmonary bypass effectively during open-heart procedures, and ensuring stable hemodynamics throughout the procedure. Students will also manage hemodynamic changes during cardiothoracic surgeries, including hypotension and hypertension, using transesophageal echocardiography (TEE) for accurate hemodynamic monitoring.

The course also covers anaesthesia considerations for neurosurgical procedures, including patient positioning, intracranial pressure management, and neurophysiological monitoring. It also emphasizes patient safety during brain and spine surgeries. Neuro-anesthesia techniques and monitoring include total intravenous Anaesthesia (TIVA) and neurophysiological monitoring methods to optimize surgical conditions and patient outcomes.

Course Outcomes

Course Learning Outcomes: The student will be able to		
CO No.	**Course Outcome**	**Bloom's Level**
CO1	Explain anaesthetic considerations, monitoring techniques, and hemodynamic management for cardiovascular and thoracic surgeries.	L2

CO2	Describe central venous catheterization, arterial line insertion techniques, and anesthesia protocols for cardiac bypass and valve replacement surgeries.	L2
CO3	Apply anesthesia management strategies for cardiothoracic and neurosurgical procedures, including TIVA and neurophysiological monitoring.	L3
CO4	Analyze hemodynamic changes and intracranial pressure management during cardiothoracic and neurosurgical procedures.	L4
CO5	Evaluate anesthesia techniques, monitoring modalities, and patient safety measures to optimize perioperative outcomes.	L5

Course content

- Anesthetic considerations for cardiovascular and thoracic surgeries: Understanding the specific Anaesthesia considerations, hemodynamic management, and monitoring techniques for cardiac and thoracic surgeries such as coronary artery bypass grafting, valve replacement, and lung resection. -15 Hours
- Central Venous catheter and various insertions techniques (IJV, Femoral, PICC and subclavian) - 6 Hours
- Arterial Line insertion and various techniques (including Allen‟s test) - 4Hours
- Anesthesia techniques for cardiac bypass and valve replacement procedures: Learning about the specific anaesthetic protocols, cardiopulmonary bypass management, and strategies for maintaining stable hemodynamic during open-heart surgeries. -15 Hours
- Management of hemodynamic changes during cardiothoracic surgeries: Exploring the principles and techniques for managing hemodynamic changes, such as hypotension and hypertension, during cardiothoracic surgeries and TEE. - 20 Hours
- Anaesthetic considerations for neurosurgical procedures: Understanding the unique challenges and considerations in providing Anaesthesia for brain and spine surgeries, including patient positioning, intracranial pressure management & neurophysiological monitoring. - 20 Hours
- Neuro-Anesthesia techniques and monitoring in neurosurgery: Learning about the specific anaesthetic techniques, such as total intravenous Anaesthesia (TIVA) and neurophysiological

monitoring, used in neurosurgical procedures to ensure patient safety and optimal surgical conditions. -20 Hours

Practical- Specialized Anaesthesia-2: (50 Hours)

CO No.	Practical Course Outcome	Bloom's Level
CO1	Demonstrate hemodynamic monitoring, central venous catheter insertion, and arterial line placement techniques.	L3
CO2	Perform anesthesia management and teamwork practices during cardiac bypass and valve replacement procedures.	L3
CO3	Apply neuro-anesthesia techniques, patient positioning, and intraoperative monitoring in neurosurgical procedures.	L4
CO4	Evaluate and manage perioperative complications, hemodynamic instability, and crisis situations in CTVS and neurosurgery.	L5

- Cardiovascular and Thoracic Surgeries: Simulation-based training on hemodynamic monitoring techniques for cardiovascular and thoracic surgeries, such as non-invasive blood pressure measurement, pulse oximetry, and capnography.
- Techniques for Inserting a Central Venous Catheter: Hands-on practice with simulation models or manikins to learn the many techniques for inserting a central venous catheter, including the internal jugular vein (IJV), femoral vein, peripherally inserted central catheter (PICC), and subclavian vein.
- Arterial Line Insertion and skills: A hands-on session with simulation models or manikins to explore the stages needed and practice aseptic skills.
- Cardiac Bypass and Valve Replacement Anaesthesia Techniques.
- Case studies and video presentations illustrate the anaesthesia techniques and considerations unique to cardiac bypass and valve replacement procedures.
- Scenarios concentrate on the management of hemodynamic changes after cardiac procedures, such as preserving cardiopulmonary stability and dealing with probable consequences.

- During cardiac bypass procedures, role-playing exercises are used to simulate communication and cooperation among the anesthesia team, perfusionists, and surgeons.
- Management of Hemodynamic Changes During Cardiothoracic Surgery: Interactive sessions and case discussions on the management of typical hemodynamic changes observed during cardiothoracic surgery, such as hypotension, hypertension, and volume status optimization.
- Simulation-based training in the use of non-invasive approaches to monitor hemodynamic parameters like stroke volume variation (SVV) or pulse pressure variation (PPV) to assist fluid management.
- Simulation scenarios concentrating on intracranial pressure management and cerebral ischemia prevention during neurosurgery procedures.
- Neuro-anesthesia Techniques and Monitoring in Neurosurgery: A hands-on seminar on the principles and techniques of total intravenous anaesthesia (TIVA) for neurosurgical procedures, including the use of TCI pumps

Reference Books:-

a. Understanding Anesthesia Equipment Dorsch & Dorsch,
b. Wards Anesthesia Equipment Andrew & Ali Diba,
c. The Anesthesia Technician & Technologists Manual Glenn Woodworth. d. Miller‟s Anesthesia.

Specialized Surgery-2

Learning Objectives **(100 Hours)**

The learning objectives include understanding common diseases in cardiovascular and thoracic surgery, such as coronary artery disease, valvular heart disease, aortic aneurysm, congenital heart defects, arrhythmias, lung cancer, peripheral artery disease, and deep vein thrombosis, and their surgical interventions. Recognizing congenital heart defects and their anatomical and physiological implications, understanding surgical options and techniques for repairing or reconstructing congenital heart defects, understanding different cardiac and thoracic surgical procedures, and understanding specific neurosurgical procedures. Anaesthetic considerations and techniques for CTVS and neurosurgery are also discussed, along with appropriate monitoring techniques and management strategies. Intraoperative monitoring modalities, such as ECG, arterial pressure monitoring, TEE, and neurophysiological monitoring, are also discussed, with skills in interpreting data for optimizing patient outcomes. Perioperative management of complications is also discussed, identifying potential complications and adverse events, and acquiring strategies for preventing, recognizing, and managing them to ensure patient safety and positive surgical outcomes.

The course aims to teach students the pathophysiology of major disorders in cardiovascular and thoracic surgery, as well as congenital heart problems. Students will also learn about CTVS procedures such CABG, valve replacement, lung resection, and thoracotomy, as well as how to use specialized techniques for safe and effective surgeries. They will also study neurosurgical operations such as craniotomy, spinal fusion, tumor removal, and deep brain stimulation, as well as patient placement and instrumentation. Anaesthetic concerns and approaches for CTVS and neurosurgery, as well as suitable monitoring techniques and management strategies for preserving hemodynamic stability, fluid balance, and neurophysiological monitoring, will be covered. To improve patient outcomes, intraoperative monitoring modalities such as ECG, arterial pressure monitoring, TEE, and neurophysiological monitoring will be used. Complication care during surgery will be critical, including recognizing and managing potential complications and adverse events, as well as adopting preventive initiatives to maintain patient safety and excellent surgical results.

Course Outcomes

Course Learning Outcomes: The student will be able to		
CO No.	**Course Outcome**	**Highest Bloom's Level**
CO1	Explain common diseases and surgical procedures in cardiovascular, thoracic, and congenital heart disorders.	L2

CO2	Describe neurosurgical procedures, instrumentation, patient positioning, and specialized equipment used in CTVS and neurosurgery.	L2
CO3	Apply knowledge of anesthesia considerations, monitoring techniques, and intraoperative management in CTVS and neurosurgical procedures.	L3
CO4	Analyze intraoperative monitoring data and perioperative complications to support clinical decision-making.	L4
CO5	Evaluate management strategies for complex surgical cases to improve patient safety and surgical outcomes.	L5

Course content

a) Diseases in CTVS: - 25 Hours

- Coronary Artery Disease: Narrowing or blockage of the coronary arteries supplying blood to the heart. Surgeries include:
- Coronary Artery Bypass Grafting (CABG): Surgical procedure to bypass the blocked or narrowed coronary arteries using grafts from other blood vessels.
- Percutaneous Coronary Intervention (PCI): Minimally invasive procedure to open blocked coronary arteries using balloon angioplasty and stent placement.
- Valvular Heart Disease: Dysfunction or damage to the heart valves. Surgeries may include:
  - Valve Repair: Restoration of the valve structure and function through surgical techniques.
  - Valve Replacement: Surgical removal of the damaged valve and implantation of a prosthetic valve.
- Aortic Aneurysm: Abnormal enlargement of the aorta, the main blood vessel supplying blood to the body. Surgeries include:
- Aneurysm Repair: Surgical repair of the weakened or enlarged section of the aorta, often through open surgery or endovascular stent grafting.
- Congenital Heart Defects: Structural abnormalities in the heart present at birth. Surgeries
- depend on the specific defect and may include:
- Cardiac Defect Repair: Surgical correction of congenital heart defects, such as atrial septal defect (ASD), ventricular septal defect (VSD), or Tetralogy of Fallot.
- Arrhythmias: Abnormal heart rhythms. Surgeries may include:
  - Pacemaker Implantation: Surgical placement of a device that helps regulate the heart's electrical activity.
  - Ablation Procedures: Minimally invasive techniques to destroy or isolate abnormal electrical pathways in the heart.
- Lung Cancer: Malignant tumors in the lungs. Surgeries for lung cancer include:

- Lobectomy: Surgical removal of a lobe of the lung.
- Pneumonectomy: Surgical removal of an entire lung.
- Wedge Resection: Surgical removal of a small, localized portion of the lung.

- Peripheral Artery Disease (PAD): Narrowing or blockage of arteries outside the heart, typically in the legs. Surgeries may include:
- Peripheral Artery Bypass: Surgical creation of a bypass using a graft to restore blood flow to the affected area.
- Angioplasty and Stenting: Minimally invasive procedures to open blocked arteries and place stents to maintain blood flow.
- Deep Vein Thrombosis (DVT): Formation of blood clots in deep veins, commonly in the legs. Surgeries may involve:
  - Thrombectomy: Surgical removal of the blood clot from the affected vein.
  - Vein Bypass: Surgical creation of a bypass using a graft to redirect blood flow around the blocked vein.

b) Congenital Heart Defects: Structural abnormalities in the heart present at birth, such as atrial septal defect (ASD), ventricular septal defect (VSD), or Tetralogy of Fallot. Surgeries include heart repair or reconstruction, such as ASD/VSD closure or open-heart surgery. -10 Hours

c) Cardiovascular and thoracic surgical procedures (CTVS): Learning about the various cardiac and thoracic surgical procedures, including coronary artery bypass grafting (CABG), valve replacement, lung resection, and thoracotomy, and understanding the specialized equipment, techniques, and considerations in CTVS. - 15 Hours

d) Neurosurgical procedures: Exploring the specific neurosurgical procedures, such as craniotomy, spinal fusion, tumor resection, and deep brain stimulation, and understanding the principles, instrumentation, and patient positioning requirements in neurosurgery (Placement of horseshoe, Cranial pins and Stereotactic devices). -15 Hours

e) Anesthetic considerations and techniques for CTVS and neurosurgery: Understanding the unique Anaesthesia considerations, monitoring techniques, and management strategies for patients undergoing CTVS and neurosurgical procedures, including hemodynamic stability, fluid management, and neurophysiological monitoring. - 15 Hours

f) Intraoperative monitoring in CTVS and neurosurgery: Learning about the various intraoperative monitoring modalities used in CTVS and neurosurgery, such as electrocardiography (ECG), arterial pressure monitoring, transesophageal echocardiography (TEE), and neurophysiological monitoring, and their interpretation. -10 Hours

g) Perioperative management of complications in CTVS and neurosurgical procedures: Understanding the potential complications and adverse events that may occur during CTVS and neurosurgical procedures, and learning strategies for their prevention, early recognition, and appropriate management. - 10 Hours

Practicals- Specialized Surgery-2: (50 Hours)

CO No.	Practical Course Outcome	Bloom's Level
CO1	Demonstrate setup, handling, and operation of specialized equipment used in CTVS procedures.	L3
CO2	Perform patient positioning, instrumentation handling, and operative assistance in neurosurgical procedures.	L3
CO3	Apply intraoperative monitoring techniques and anesthesia management principles in CTVS and neurosurgery.	L4
CO4	Evaluate and manage perioperative complications through effective teamwork, communication, and crisis management.	L5

a) Cardiovascular and Thoracic Surgical Procedures (CTVS):

- Demonstration and hands-on practice of setting up and familiarizing with specialized equipment used in CTVS, such as heart-lung machines, cardiopulmonary bypass circuits, and intraoperative monitoring devices.
- Simulation-based training on patient positioning and draping techniques for different CTVS procedures, including CABG, valve replacement, and lung resection.
- Role-playing exercises to simulate communication and coordination among the surgical team, including anesthesiologists, surgeons, perfusionists, and nurses during CTVS procedures.

b) Neurosurgical Procedures:

- Practical session on the instrumentation used in neurosurgical procedures, including the placement of horseshoe headrests, cranial pins, and stereotactic devices.
- Hands-on practice with simulation models or manikins to understand the principles of patient positioning and draping for different neurosurgical procedures, such as craniotomy and spinal fusion.

- Interactive discussions on the role of different instruments and equipment used in neurosurgery, including microscopes, drill systems, and neuro-endoscopes.
- Anesthetic Considerations and Techniques for CTVS and Neurosurgery:
- Case-based discussions and interactive sessions on the unique anesthesia considerations for CTVS and neurosurgical procedures, such as preoperative assessment, airway management, and selection of anesthetic agents.
- Simulation scenarios to practice anesthetic techniques specific to CTVS and neurosurgery, including induction and maintenance of anesthesia, hemodynamic management, and optimization of cerebral perfusion.
- Role-playing exercises to simulate communication and coordination between the anesthesia team and surgical team during CTVS and neurosurgical cases.

c) Intraoperative Monitoring in CTVS and Neurosurgery:

- Practical training on the setup and interpretation of various intraoperative monitoring modalities used in CTVS and neurosurgery, such as ECG, arterial pressure monitoring, TEE, and neurophysiological monitoring.
- Case discussions and interactive sessions on the significance of intraoperative monitoring data and its role in decision-making during CTVS and neurosurgical procedures.
- Hands-on practice with simulation models or manikins to understand the proper placement and troubleshooting of monitoring devices commonly used in CTVS and neurosurgery.
- Perioperative Management of Complications in CTVS and Neurosurgical
- Procedures:
- Interactive sessions and case discussions on the potential complications and adverse events that may arise during CTVS and neurosurgical procedures, focusing on prevention, early recognition, and appropriate management strategies.
- Simulation-based training on managing hemodynamic instability, intraoperative bleeding, and neurologic complications in a simulated environment.
- Role-playing exercises to practice effective communication, teamwork, and crisis management skills during perioperative complications in CTVS and neurosurgery.

Reference Books:-

a.Fullers Surgical Technology, Joanna Kotcher Fuller

b.Surgical Technology for the surgical technologist by association of surgical technologists.
c.The Neurosurgical Instrument Guide, Christopher.S. Eddlemand.
d.Neurology & Neurosurgery illustrated, Lindsay,Bone, Fuller.

Specialized Anaesthesia & Surgery 3

Learning Objectives **(100 Hours)**

The course aims to provide students with a comprehensive understanding of robotic-assisted surgical procedures, anesthetic considerations and techniques, and the role of operating theatre (OT) and Anaesthesia team (AT) professionals in assisting these procedures. It also covers the use of BIS, NMT, ultrasound, and navigation systems in anaesthesia practice, their applications, principles, and interpretation in patient monitoring and procedural guidance.

The course also covers the role of NORA (Non-Operative Room Anaesthesia) in modern anaesthesia practice, including radiation safety, sedation techniques, paediatric NORA, regional anaesthesia in non-operating room settings, critical care anaesthesia outside the ICU, safety and patient selection, teamwork and communication, equipment and resources, quality improvement, and patient outcomes.

The course also covers organ transplantation procedures, including kidney, liver, and heart transplants, and their perioperative management, immunosuppression strategies, and ethical considerations. Students will learn about preoperative assessment and optimization processes for transplant recipients, as well as the multidisciplinary approach to preoperative management. Postoperative care and immunosuppression in transplant surgeries will be identified, including immunosuppressive drug regimens, infection prevention strategies, and long-term follow-up care. Students will demonstrate understanding of the unique challenges and considerations in postoperative management of transplant recipients.

Course Outcomes

Course Learning Outcomes: The student will be able to

CO No.	Course Outcome	Bloom's Level
CO1	Explain the principles of robotic-assisted surgeries, NORA, and advanced monitoring technologies used in anaesthesia practice.	L2
CO2	Describe anaesthetic considerations, patient safety measures, and perioperative management in robotic and non-operative room procedures.	L2

CO3	Apply BIS, NMT, ultrasound, navigation systems, and NORA techniques for patient monitoring and procedural guidance.	L3
CO4	Analyze preoperative evaluation, perioperative management, and postoperative care of organ transplant recipients.	L4
CO5	Evaluate immunosuppression strategies, ethical considerations, and multidisciplinary approaches for optimizing transplant outcomes.	L5

Course content

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

Demonstrate knowledge and understanding of robotic-assisted surgical procedures, collaborate effectively in OT team, apply appropriate anaesthesia considerations and techniques, ensure patient safety, comfort, and optimal surgical conditions during robotic procedures.

By completing the course, students will be able to effectively collaborate in OT team, apply appropriate anaesthesia considerations and techniques, and effectively manage transplant recipients' postoperative care and immunosuppression.

Specialized Surgery-2

a) Robotic-assisted surgical procedures: Learning about the principles and techniques of robotic-assisted surgeries, such as robotic-assisted prostatectomy, robotic-assisted hysterectomy, and robotic-assisted colorectal surgeries, and understanding the roles and responsibilities of the OT and AT professionals in assisting these procedures. - 4 Hours

b) Anaesthetic considerations and techniques for robotic surgeries: Understanding the Anaesthesia considerations specific to robotic-assisted surgeries, including patient positioning, pneumoperitoneum management, and anesthetic agents and techniques suitable for these procedures. - 3 Hours

c) BIS, NMT, Ultrasound, Navigation. - 2 Hours

d) NORA (Non-Operative Room Anesthesia) is a field within anesthesia that focuses on providing anesthesia services outside the traditional operating room setting. Here are some potential topics related to NORA: - 36 Hours

- Introduction to NORA: Overview of Non-Operative Room Anesthesia, its scope, and its role in modern anesthesia practice.
- Procedures in Non-Operative Settings: Anesthetic management for various procedures performed outside the operating room, such as interventional radiology, endoscopy, cardiac catheterization, and bronchoscopy,

- Radiation Safety: Pregnancy and Pediatric Radiology, Contrast Media Safety, Infection Control, Equipment Maintenance and Calibration, Patient Identification and Consent, Emergency Preparedness, Radiation Dose Optimization, Communication and Documentation, QualitAssurance and Accreditation.
- Sedation Techniques: Techniques and protocols for sedation in non-operating room settings, including patient assessment, drug selection, monitoring, and managing complications.
- Pediatric NORA: Special considerations and techniques for providing anesthesia to pediatric patients in non-operating room settings, including sedation for imaging studies, dental procedures, and emergency department interventions.
- Regional Anesthesia in NORA: The use of regional anesthesia techniques, such as nerve blocks and epidurals, in non-operating room settings for pain management and surgical procedures.
- Critical Care Anesthesia Outside the ICU: Anesthetic management and monitoring of critically ill patients in non-operating room locations, such as the emergency department, radiology suite, or cardiac catheterization lab.
- Safety and Patient Selection: Strategies for patient selection, risk assessment, and ensuring patient safety during NORA procedures, including pre-procedure evaluation, informed consent, and appropriate monitoring.
- Teamwork and Communication: Effective collaboration and communication among anesthesia providers, proceduralists, and other healthcare professionals involved in NORA to optimize patient care and outcomes.
- Equipment and Resources: Considerations for equipment, resources, and infrastructure needed to provide safe and efficient anesthesia care in non- operating room settings, including portable anesthesia machines, monitoring devices, and emergency equipment.
- Quality Improvement and Patient Outcomes: Assessment of outcomes, patient satisfaction, and quality improvement initiatives specific to NORA, aiming to enhance patient care, safety, and efficiency.

e) Organ transplantation procedures: Exploring the principles and techniques of organ transplantation surgeries, such as kidney transplant, liver transplant, and heart transplant, and understanding the perioperative management, immunosuppression, and ethical considerations associated with transplant surgeries. - 25 Hours

f) Preoperative evaluation and management of transplant recipients: Studying the preoperative assessment, optimization, and management of transplant recipients, including organ allocation, cross-matching, and immunological considerations -15 Hours.

g) Postoperative care and immunosuppression in transplant surgeries: Understanding the postoperative care protocols, including immunosuppressive drug regimens, infection prevention strategies, and long-term follow-up care for transplant recipients. -15 Hours

Practicals in Specialized Surgery-2: (50 Hours)

CO No.	Practical Course Outcome	Bloom's Level
CO1	Demonstrate robotic surgical system handling, instrument docking, and OT team coordination during robotic-assisted procedures.	L3
CO2	Perform BIS, NMT, ultrasound-guided regional anaesthesia, and navigation-assisted monitoring techniques.	L3
CO3	Apply sedation, radiation safety, infection control, and patient management principles in NORA settings.	L4
CO4	Evaluate perioperative and postoperative management strategies, immunosuppressive therapies, and complications in organ transplantation.	L5

a) Robotic-Assisted Surgical Procedures:

- Demonstration and hands-on practice with robotic surgical systems, such as da Vinci Surgical System, including instrument docking, console operation, and manipulation of robotic arms.
- Role-playing exercises to simulate the roles and responsibilities of OT and AT professionals during robotic-assisted surgeries, focusing on effective communication, teamwork, and coordination.
- Interactive discussions on patient positioning considerations, pneumoperitoneum management, and the role of anesthesia in facilitating robotic-assisted procedures.

b) BIS, NMT, Ultrasound, Navigation:

- Hands-on training on the use of monitoring devices like Bi-spectral Index (BIS) and neuromuscular monitoring (NMT), including electrode placement, calibration, and interpretation of data.

- Practical sessions on ultrasound-guided regional anesthesia techniques, such as nerve blocks, highlighting the principles of probe handling, needle visualization, and local anesthetic administration.
- Introduction to navigation systems used in surgeries, such as image-guided navigation for spine surgery, and demonstration of their use in surgical planning and intraoperative guidance.

c) Non-Operative Room Anesthesia (NORA):

- Case-based discussions and interactive sessions on the different procedures performed in non-operating room settings, including interventional radiology, endoscopy, and cardiac catheterization.
- Simulation-based training on sedation techniques in non-operating room settings, focusing on patient assessment, drug selection, monitoring, and management of sedation-related complications.
- Practical sessions on radiation safety protocols, infection control measures, and communication/documentation practices specific to NORA procedures.

d) Organ Transplantation Procedures:

- Interactive discussions on the principles and techniques of organ transplantation surgeries, such as kidney transplant, liver transplant, and heart transplant, including organ preservation, graft implantation, and vascular anastomosis.
- Simulation scenarios to understand the perioperative management of transplant recipients, including preoperative evaluation, optimization, and immunosuppressive drug regimens.
- Role-playing exercises to simulate postoperative care scenarios for transplant recipients, focusing on infection prevention strategies, long-term follow-up care, and coordination with multidisciplinary teams.

e) Preoperative Evaluation and Management of Transplant Recipients:

- Case discussions and interactive sessions on the preoperative assessment and management of transplant recipients, including organ allocation, cross-matching, and immunological considerations.
- Hands-on training on laboratory techniques used in transplant medicine, such as HLA typing and cross-matching tests.
- Interactive sessions on ethical considerations in organ transplantation, including organ donation, allocation policies, and patient selection criteria.

f) Postoperative Care and Immunosuppression in Transplant Surgeries:

- Practical training on the management of immunosuppressive drug regimens commonly used in transplant recipients, including drug interactions, dose adjustments, and monitoring of therapeutic levels.
- Simulation-based training on infection prevention strategies for transplant recipients, focusing on identifying and managing postoperative infectious complications.
- Role-playing exercises to simulate long-term follow-up care scenarios for transplant recipients, including monitoring graft function, managing complications, and promoting adherence to immunosuppressive therapies.

Reference Books:-

a.Miller‟s Anesthesia,
b.Advances In Anesthesia For Laparoscopic Surgeries Regional Anesthesia And The Road Ahead
c.Fullers Surgical Technology, Joanna Kotcher Fuller
d. Laparoscopic Surgery, R.K .

Research Methodology and Biostatistics

Learning Objectives **(60 Hours)**

The course's goal is to give learners a thorough understanding of research methodologies, their applications, and the necessity of expanding knowledge and solving issues. It discusses numerous research methodologies and their applications in various fields, as well as research ethics issues such as informed permission, confidentiality, and privacy. Students will also gain knowledge of research design, fundamental biostatistics principles, data kinds, research tools and data collection methods, sampling procedures, and formulating a research proposal.

The course also emphasizes the significance of ethical issues in research, such as informed consent, confidentiality, and privacy, as well as the significance of ethical rules and legislation. Students will also learn about different forms of data, data gathering methods, and the peer review and ethical approval procedure for research ideas.

After completing the course, students will be able to identify and formulate research problems and questions, evaluate ethical considerations, select appropriate research designs, apply basic biostatistics concepts, classify and handle different types of data in research analysis, effectively use various research tools and data collection methods, and develop a well-structured research report

Course Outcomes

CO No.	Course Outcome	Bloom's Level
CO1	Explain the principles, types, and importance of research methodology and biostatistics in healthcare.	L2
CO2	Describe research problems, ethical issues, research designs, and data collection methods.	L2
CO3	Apply sampling methods, research tools, and basic biostatistical techniques in healthcare research.	L3
CO4	Analyze different types of data and interpret research findings using appropriate statistical methods.	L4
CO5	Evaluate research proposals and develop scientifically valid research studies following ethical guidelines.	L5

Course content

Research Methodology and Biostatistics

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

- Introduction to research methods 5 Hours
- Identifying research problem 5 Hours
- Ethical issues in research 5 Hours
- Research design 5 Hours
- Basic Concepts of Biostatistics 10 Hours
- Types of Data 5 Hours
- Research tools and Data collection methods 5 Hours
- Sampling methods 5 Hours
- Developing a research proposal 5 Hours

Reference Books:-

a. Research methodology by C R Kothari
b. .1ntroduction to research methodology — Bhanwar Lal Garg, Renu Kavdia, Sulochana Agarwal & Umesh kumar Agarwal — 2019
c. .Research methodology for health professionals — RC Goyal — 2nd edition — 2023
d. .Research Methodlogy and applied statistics —DN Sansanwal - 2020

SEMESTER- VII& VIII

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

GUIDELINES FOR INTERNSHIP:

1. The internship is compulsory.
2. Duration of the internship shall be one year.
3. Maintain professionalism at all times, including OT attire, communication and interactions with respect to patient confidentiality and adhere to Hospital and University rules & regulations.
4. Follow the chain of command and communicate effectively with supervisors and team members.
5. The degree of Baccalaureate in Anaesthesia and Operation Theatre Technology shall be awarded after the completion of internship.
6. The candidate should make the entries in the log book daily, countersigned by (Concern faculty) the Assistant Professor /Associate Professor / Professor / Head of the Department.
7. The logbook is to be submitted to the Department at the time of the final examination.

Evaluation of Internees:

A. Educative assessment/Assessment for learning: Assessment of the internees on daily basis during internship and postings should done by the Head of the Department.

Objective – To develop minimum professional skills. Maintaining Log book by internees

B. Cumulative assessment: Under the observation of Technical staff/Faculty of the concerned department and maintained Log book by the interns. Certificate shall be issued after these two evaluations.

C. Duration of Internship: One year

Total working hours – Minimum 1440 hours

Total working hours/day - 8 hours/day

Lunch Time – 1 hour

Learning Objectives:

1. Develop proficiency in setting up and maintaining anaesthesia and surgical equipment.
2. Gain skills in assisting with patient preparation, positioning, and draping.
3. Learn to assist anaesthesia providers during induction, maintenance, and emergence phases.
4. Acquire knowledge of sterile technique and infection control practices.
5. Develop abilities to recognize and respond to intraoperative emergencies.
6. Enhance communication skills for effective patient interaction and advocacy.
7. Foster teamwork and collaboration within the interdisciplinary surgical team.
8. Demonstrate professionalism and ethical conduct in all interactions.
9. Engage in continuous learning and professional development activities.
10. Develop critical thinking and problem-solving abilities for perioperative challenges.

Expected Outcomes:

1. Demonstrated competence in anaesthesia and surgical equipment setup and maintenance.
2. Provision of compassionate and attentive care to surgical patients.
3. Effective collaboration and communication within the surgical team.
4. Ability to respond appropriately to intraoperative emergencies.
5. Adherence to professionalism and ethical standards in practice.
6. Engagement in on-going education and professional development.
7. Application of critical thinking skills to perioperative situations.
8. Accurate documentation of procedures and interventions.
9. Advocacy for patient safety, comfort, and well-being.
10. Adherence to infection control and safety protocols.

Note/Protocols

1. **Documentation:**
    a) Accurately document all procedures, observations, and interventions in the patient's medical record.
    b) Use clear and concise language following University/institutional guidelines for documentation.
2. **Leave for Interns:**
    a) No leave / absence is allowed to an Intern except as may be permitted by University/Institute
    b) Total leave allowed – Maximum 30 days during whole one year of internship
    c) Maximum leave allowed at a time: 10 days.

3. **Communication:**

a) Communicate relevant information to the anesthesia team, surgeon, and nursing staff during handoffs and transitions of care.

b) Document any verbal orders or instructions received during procedures promptly.

4. **Safety Precautions:**

a) Adhere to protocols for infection control and aseptic technique in the operating room.

b) Verify patient identification, surgical site, and procedure before the start of each case.

c) Follow established procedures for the handling and disposal of biohazardous materials.

5. Incident Reporting:

a) Report any adverse events, near misses, or equipment malfunctions promptly to the appropriate personnel.

b) Document incidents accurately and thoroughly using the institution's incident reporting system.

6. Confidentiality:

a) Maintain patient confidentiality at all times, both in verbal communication and electronic documentation.

b) Avoid discussing patient information in public areas or with unauthorized individuals.

Curriculum

Teaching and Examination Pattern

Here is a proposed teaching and examination pattern for the Bachelor in Anaesthesia & Operation Theatre Technology program.

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

Seventh and Eighth Semester:

Course Code	Course Title	Time Period
BAOTT-028	B.AOTT Internship (Anesthesia, Surgery, Specialties)	One Year

B.AOTT INTERNSHIP LOGBOOK PROFORMA:

Institute Name & Logo

Logbook for BAOTT Internship Program

Student Name .....

Year & Month .....

Regd. No. .....

BIODATA OF THE STUDENT

Name	
D.O. B	
Parents Name	
Regd. No	
Year of Passing 10+2	
Date of Joining B.AOTT	
Date of completion of Final Semester	
Permanent Address	
Postal Address	
Mobile No. of Student	
Mobile No. of Parents	
Email	
Other Achievements	

Logbook Proforma: (B.AOTT INTERNSHIP)

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						
Signature of Faculty/Senior Resident						

MODEL QUESTION PAPER

Bachelor of AOTT Semester-I

Code- BAOTT001

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – I

Introduction to Healthcare Delivery System in India
Time: 1.5 Hours | Maximum Marks: 40

Q.1 Essay Type Question (Attempt Any 1)1 × 15 = 15 Marks

A. Describe the healthcare delivery system in India at Primary, Secondary and Tertiary levels of care. (CO1, L1)

B. Explain the role of National Health Mission (NHM) and community participation in healthcare delivery. (CO2, L2)

Q.2 Short Answer Questions (Attempt Any 5) 5 × 5 = 25 Marks

A. What is National Health Policy? Write its objectives. (CO2, L2)

B. Explain the importance of the private sector in healthcare services. (CO3, L2)

C. Write a short note on principles of Ayurveda and Homeopathy. (CO4, L2)

D. Define Demography and explain its importance. (CO5, L2)

E. What are Vital Statistics? Explain their significance. (CO5, L2)

F. Define Epidemiology and state its uses in public health. (CO5, L2)

G. Explain the concept of immunization and cold chain. (CO5, L3)

MODEL PAPER

Bachelor of AOTT Semester-I

Code- BAOTT002

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)

Semester – I

Medical Terminology and Record Keeping

Time: 3 Hours | Maximum Marks: 40

Q.1 Essay Type Question (Attempt Any 1) 1 × 15 = 15 Marks

A. Explain medical terms, word roots, prefixes, suffixes and their role in the formation of medical terminology with suitable examples. (CO1, CO2, L2)

B. Describe medical abbreviations, and the interpretation of medical orders and reports in healthcare practice. (CO4, L3)

Q.2 Short Answer Questions (Attempt Any 5)5 × 5 = 25 Marks

A. Describe medical terminology used for the endocrine system. (CO3, L3)

B. Explain the rules for formation of plurals in medical terminology. (CO2, L2)

C. Write short notes on common medical abbreviations and symbols. (CO1, L2)

D. Explain medical terms related to the cardiovascular system. (CO3, L3)

E. Describe medical terminology used for the respiratory system. (CO3, L3)

F. Explain the importance of electronic health records (EHR) in healthcare. (CO5, L3)

G. Write a short note on data entry and management in electronic health record systems. (CO5,L3)

MODEL PAPER

Bachelor of AOTT Semester-I

Code- BAOTT 003

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – I
Anatomy

Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Type Questions (Attempt Any 2) 2 × 15 = 30 Marks

A. Describe the anatomy of the heart, including its chambers, valves, pericardium and coronary arteries. (CO2, L2)

B. Explain the structure of the different organs involved in digestive system. tract. (CO3, L2)

C. Describe the organization of the nervous system, including the brain, spinal cord and peripheral nerves. (CO4, L2)

Q.2 Short Essay Questions (Attempt Any 7) 7 × 5 = 35 Marks

A. Define anatomy and explain basic anatomical terminology. (CO1, L1)

B. Describe the clavicle and scapula. (CO1, L1)

C. Write a short note on the thoracic cage. (CO2, L2)

D. Explain the structure of the lungs and bronchial tree. (CO2, L2)

E. Describe the muscles of the arm and their functions. (CO3, L2)

F. Explain the structure and functions of the kidneys. (CO3, L2)

G. Write a short note on digestive enzymes. (CO3, L2)

H. Describe the structure of a neuron. (CO4, L2)

I. Explain cranial nerves and their importance. (CO5, L2)

Q.3 Short Answer Questions (Attempt Any 5) 5 × 3 = 15 Marks

A. Name the bones of the forearm. (CO1, L1)

B. Define pleura. (CO2, L1)

C. What is the function of the trachea? (CO2, L2)

D. Define sternum and state its function. (CO5, L1)

E. Define ureter. (CO3, L1)

F. What is a spinal nerve. (CO4, L1)

G. Name any four cranial nerves. (CO4, L1)

MODEL PAPER

Bachelor of AOTT Semester-I

Code- BAOTT 004

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)

Semester – I

Physiology

Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Type Questions (Attempt Any TWO) 2 × 15 = 30 Marks

A. Describe the composition of blood and explain the functions of blood cells and plasma proteins. (CO1, L1)

B. Explain the physiology of the cardiovascular system, including cardiac cycle, cardiac output and blood pressure. (CO2, L2)

C. Discuss the physiology of the excretory system and the role of kidneys in maintaining acid-base balance. (CO2, CO3, L2)

Q.2 Short Essay Questions (Attempt Any SEVEN) 7 × 5 = 35 Marks

A. Explain acid-base balance and its importance in the body. (CO1, L1)

B. Write a short note on haemoglobin and its functions. (CO1, L1)

C. Describe blood groups and Rh factor. (CO1, L2)

D. Explain heart sounds and their significance. (CO2, L2)

E. Define lung volumes and lung capacities. (CO5, L2)

F. Write a short note on Glomerular Filtration Rate (GFR). (CO2, L2)

G. Explain spermatogenesis. (CO2, L2)

H. Describe the functions of cerebrospinal fluid (CSF). (CO4, L2)

I. Explain the functions of thyroid and adrenal hormones. (CO2, L2)

Q.3 Short Answer Questions (Attempt Any FIVE) 5 × 3 = 15 Marks

A. Define alkalosis. (CO1, L1)

B. What is Erythrocyte Sedimentation Rate (ESR)? (CO1, L1)

C. State any three functions of platelets. (CO1, L1)

D. Define hypertension. (CO2, L1)

E. What is oxygenation? (CO2, L1)

F. Define menstruation. (CO2, L1)

G. Name any three pancreatic hormones. (CO2, L1)

MODEL PAPER

Bachelor of AOTT Semester-I

Code- BAOTT 005

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)

Semester – I

Health Care Quality & Patient Safety

Time: 3 Hours | Maximum Marks: 40

Q.1 Essay Type Question (Attempt Any 1) 1 × 15 = 15 Marks

A. Explain Basic Life Support (BLS), CPR and the use of Automated External Defibrillator (AED) in emergency care. (CO5, L2)

B. Describe infection prevention and control practices, including hand hygiene, and use of Personal Protective Equipment (PPE). (CO4, L2)

Q.2 Short Answer Questions (Attempt Any FIVE) 5 × 5 = 25 Marks

A. Define vital signs and explain their importance in patient assessment. (CO1, L1)

B. Write a short note on first aid and triage. (CO2, L2)

C. Explain choking management and rescue breathing methods. (CO2, L2)

D. Define Biomedical Waste and explain its color-coding system. (CO4, L2)

E. Describe methods used for segregation and disposal of biomedical waste. (CO4, L2)

F. Explain the concepts of Quality of Care and Quality Improvement. (CO3, L2)

G. Write a short note on NABH guidelines in healthcare organizations. (CO3,L2)

MODEL QUESTION PAPER

Bachelor of AOTT Semester-II
Code- BAOTT006

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – II

Medical Law and Ethics, Professionalism & Values, Principles of Management
Time: 3 Hours | Maximum Marks: 40

Q.1 Essay Type Question (Attempt Any ONE) 1 × 15 = 15 Marks

A. Explain the basic principles of medical ethics, patient rights, confidentiality and informed consent. (CO2, L2)

B. Describe the functions of management and explain the importance of planning and organizing in healthcare organizations. (CO3, L2)

Q.2 Short Answer Questions (Attempt Any FIVE) 5 × 5 = 25 Marks

A. Define medical ethics and state its goals. (CO1, L1)

B. Explain malpractice and negligence in healthcare practice. (CO3, L2)

C. Write a short note on professional values and integrity. (CO2, L2)

D. Explain the importance of professional accountability and responsibility. (CO2, L2)

E. Describe Maslow's Theory of Motivation. (CO3, L2)

F. Explain barriers to effective communication in healthcare organizations. (CO3, L2)

G. Write a short note on Consumer Protection Act (CPA) in healthcare services. (CO4, L3)

MODEL QUESTION PAPER

Bachelor of AOTT Semester-II

Code- BAOTT007

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – II

Basics of Biomedical Sciences in Surgery and Anaesthesia
Time: 3 Hours | Maximum Marks: 40

Q.1 Essay Type Question (Attempt Any ONE) 1 × 15 = 15 Marks

A. Explain the principles and functions of surgical and anaesthesia equipment used in the operation theatre, including video laryngoscope. (CO2, L2)

B. Describe anaesthesia delivery systems and physiological monitoring devices used during anaesthesia. (CO4, CO5, L3)

Q.2 Short Answer Questions (Attempt Any FIVE) 5 × 5 = 25 Marks

A. Define Biomedical Engineering and explain its role in surgery and anaesthesia. (CO1, L1)

B. Write a short note on Pulse Oximeter and its clinical importance. (CO5, L3)

C. Explain the working principle of a Blood Pressure Monitor. (CO2, L2)

D. Describe the components and uses of a Laparoscopic Cart. (CO2, L2)

E. Write a short note on Biomedical Imaging techniques in surgery. (CO3, L2)

F. Explain the principles and applications of Surgical Navigation Systems. (CO3, L2)

G. Describe the interpretation of physiological monitoring parameters during anaesthesia.(CO5, L3)

MODEL QUESTION PAPER

Bachelor of AOTT Semester-II
Code- BAOTT008

Bachelor of Anesthesia and Operation Theatre Technology
Semester – II
Paper: Biochemistry & Hematology
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Type Questions (Attempt Any TWO) 2 × 15 = 30 Marks

A. Describe fat-soluble and water-soluble vitamins and explain their functions in the human body. (CO1, L1)

B. Explain acids, bases, pH, buffers and the importance of acid-base balance in the body. (CO2, L2)

C. Discuss hemoglobin, blood cell counts and differential leukocyte count (DLC). (CO3, L2)

Q.2 Short Essay Questions (Attempt Any SEVEN) 7 × 5 = 35 Marks

A. Write a short note on major minerals and trace elements. (CO1, L1)

B. Explain Basal Metabolic Rate (BMR) and its significance. (CO1, L2)

C. Describe Respiratory Quotient (RQ) and its importance. (CO1, L2)

D. Explain Henderson-Hasselbalch equation and its application. (CO2, L2)

E. Write a short note on anemia and its causes. (CO4, L3)

F. Explain polycythemia and its types. (CO4, L3)

G. Describe thrombocytopenia and its clinical significance. (CO4, L3)

H. Explain coagulation disorders. (CO5, L3)

I. Write a short note on hazards and complications of blood transfusion. (CO4, L3)

Q.3 Short Answer Questions (Attempt Any FIVE) 5 × 3 = 15 Marks

A. Define vitamin. (CO1, L1)

B. What is molarity? (CO2, L1)

C. Define buffer. (CO2, L1)

D. What is hemoglobin? (CO3, L1)

E. Define differential count (DC). (CO3, L1)

F. Expand INR and state its use. (CO5, L3)

G. Define bleeding time (BT). (CO3, L1)

MODEL QUESTION PAPER

Bachelor of AOTT Semester-II
Code- BAOTT009

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – II
Pathology & Microbiology
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Type Questions (Attempt Any TWO)2 × 15 = 30 Marks

A. Explain cell injury, cellular adaptations, and cell death with suitable examples. (CO1, L1)
B. Describe acute and chronic inflammation and their outcomes. (CO1, CO2, L2)
C. Explain the morphology, growth, and cultivation of bacteria and the role of culture media in diagnosis. (CO3, L2)

Q.2 Short Essay Questions (Attempt Any SEVEN) 7 × 5 = 35 Marks

A. Write a short note on immunity disorders. (CO1, L2)
B. Explain fungal infections and their importance in human diseases. (CO2, L2)
C. Describe benign and malignant neoplasms. (CO2, L2)
D. Write a short note on environmental and nutritional disorders. (CO2, L2)
E. Explain sterilization and disinfection methods used in microbiology laboratories. (CO3, L2)
F. Describe vaccines and immunization schedules. (CO3, L2)
G. Explain laboratory diagnosis of Staphylococcal infections. (CO4, L3)
H. Write a short note on Plasmodium and malaria. (CO4, L3)
I. Describe HIV infection and its prevention. (CO4, L3)

Q.3 Short Answer Questions (Attempt Any FIVE) 5 × 3 = 15 Marks

A. Define necrosis. (CO1, L1)
B. What is inflammation? (CO1, L1)
C. Define neoplasia. (CO2, L1)
D. What is a culture medium? (CO3, L1)
E. Define autoclave. (CO3, L1)
F. Expand ELISA. (CO3, L1)
G. Name any four viruses causing human diseases. (CO4, L1)

MODEL QUESTION PAPER

Bachelor of AOTT Semester-II

Code- BAOTT 0010

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)

Semester – II

Paper–V: Basic Concepts in Pharmacology

Time: 3 Hours | Maximum Marks: 40

Q.1 Essay Type Question (Attempt Any ONE) 1 × 15 = 15 Marks

A. Explain pharmacokinetics, pharmacodynamics and routes of drug administration with suitable examples. (CO1, L1; CO4, L3)

B. Describe emergency drugs used in anaesthesia practice, including their dosage, dilution, administration and effects. (CO3, CO5, L3)

Q.2 Short Answer Questions (Attempt Any FIVE) 5 × 5 = 25 Marks

A. Define Pharmacology and explain its importance in healthcare. (CO1, L1)

B. Write a short note on NSAIDs and their uses. (CO2, L2)

C. Explain the uses of Atropine and Glycopyrrolate as antisialagogues. (CO2, L2)

D. Describe the indications and adverse effects of Midazolam. (CO3, L2)

E. Write a short note on Propofol as an induction agent. (CO2, L2)

F. Explain the uses of Vecuronium and Atracurium. (CO2, L2)

G. Describe the uses of local anesthetics with examples. (CO3, L2)

MODEL QUESTION PAPER

Bachelor of AOTT Semester-II
Code- BAOTT 0011

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – II
Basic Computers and Information Science, Communication and Soft Skills
Time: 3 Hours | Maximum Marks: 40

Q.1 Essay Type Question (Attempt Any ONE) 1 × 15 = 15 Marks

A. Explain the components of a computer system, including input devices, output devices, CPU, memory, and storage devices. (CO1, L1)

B. Describe the principles of good communication, types of communication, barriers to communication, and methods to overcome them. (CO2, L2)

Q.2 Short Answer Questions (Attempt Any FIVE) 5 × 5 = 25 Marks

A. Define a computer and explain its characteristics. (CO1, L1)

B. Write a short note on different generations of computers. (CO1, L1)

C. Explain the features of MS Word and its applications. (CO2, L2)

D. Describe the uses of MS Excel in healthcare data management. (CO2, L2)

E. Write a short note on computer networks and types of networks (LAN, MAN, WAN). (CO2, L2)

F. Explain the applications of the Internet in healthcare settings. (CO2, L2)

G. Describe business communication skills and their importance in healthcare practice. (CO2, L2)

MODEL PAPER

Bachelor of AOTT Semester-III
Code: BAOTT012

Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)

Semester III
Basic Techniques of Anaesthesia
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Questions (Attempt any 2) (2 × 15 = 30 Marks)

A. Explain preoperative assessment and patient preparation for anaesthesia. (CO1, L2)
B. Describe the design, components and functions of an anaesthesia machine. (CO2, L2)
C. Explain airway management and intubation during anaesthesia. (CO4, L3)

Q.2 Short Essay Questions (Attempt any 7) (7 × 5 = 35 Marks)

A. Explain the importance of risk stratification before surgery. (CO1, L2)
B. Describe the safety systems used in an anaesthesia machine. (CO2, L2)
C. Explain the role of CO_2 absorbents in anaesthesia circuits. (CO2, L2)
D . Illustrate the principles of perioperative fluid management. (CO3, L3)
E. Summarize the uses of emergency medications during anaesthesia. (CO3, L3)
F. Differentiate between various types of vaporizers used in anaesthesia practice. (CO2, L2)
G.Explain balanced anaesthesia. (CO4, L2)
H. Discuss pain management and analgesia during the perioperative period. (CO4, L3)
I. Explain anaesthetic considerations during caesarean section. (CO5, L3)

Q.3 Short Answer Questions (Attempt any 5) (5 × 3 = 15 Marks)

A. Define preoperative assessment. (CO1, L1)
B. List any three components of an anaesthesia machine. (CO2, L1)
C. Differentiate between crystalloids and colloids. (CO3, L3)
D. Define preoxygenation. (CO4, L1)
E. List any three airway devices. (CO4, L1)
F. Mention any three monitoring parameters during anaesthesia. (CO3, L1)
G. List any three anaesthesia-related complications. (CO5, L1)

MODEL PAPER

Bachelor of AOTT Semester-III
Code: BAOTT013

Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)
Semester III
Basics of Surgical Procedures
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Questions (Attempt any 2) (2 × 15 = 30 Marks)

A. Explain the principles of aseptic technique and sterile field management in the operation theatre. (CO2, L2)

B. Describe various surgical incision types and wound closure techniques used in surgical practice. (CO4, L3)

C. Explain the common surgical procedures performed in obstetrics and gynaecology with their indications. (CO3, L2)

Q.2 Short Essay Questions (Attempt any 7) (7 × 5 = 35 Marks)

A. Describe the layout of an operation theatre.	(CO1, L2)
B. Explain the WHO Surgical Safety Checklist.	(CO1, L2)
C. Discuss Spaulding's classification.	(CO2, L2)
D. Explain appendicitis and its surgical management.	(CO3, L2)
E. Describe hernia and its types.	(CO3, L2)
F. Explain the principles of surgical dressing.	(CO4, L3)
G. Discuss the identification and handling of surgical instruments.	(CO4, L3)
H. Explain measures for prevention of surgical site infection.	(CO5, L3)
I. Describe patient positioning during general surgical procedures.	(CO5, L3)

Q.3 Short Answer Questions (Attempt any 5) (5 × 3 = 15 Marks)

A. Define fumigation.	(CO1, L1)
B. List four zones of operation theatre.	(CO1, L1)
C. Define asepsis.	(CO2, L1)
D. List any three surgical instruments used for cutting.	(CO4, L1)
E. Mention any three causes of surgical site infection.	(CO5, L1)
F. Define endometriosis.	(CO3, L1)
G. List any three wound closure materials.	(CO4, L1)

MODEL PAPER

Bachelor of AOTT Semester-III
Code: BAOTT014

Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)
Semester III
CSSD & Manifold Area
Time: 1.5 Hours | Maximum Marks: 40

Q.1 Essay Questions (Attempt any 1) (1 × 15 = 15 Marks)

A. Explain various sterilization methods used in CSSD and their applications. (CO2, L2)

B. Describe the design, components and safety practices of hospital manifold systems. (CO5, L2)

Q.2 Short Answer Questions (Attempt any 5) (5 × 5 = 25 Marks)

A. Explain the role and functions of CSSD in a hospital. (CO1, L2)

B. Describe decontamination processes used in CSSD. (CO2, L2)

C. Explain instrument preparation and packaging procedures. (CO3, L3)

D. Discuss sterile storage and distribution methods. (CO3, L3)

E. Explain infection control practices followed in CSSD. (CO4, L3)

F. Describe quality assurance measures in CSSD. (CO4, L3)

G. Explain gas pressure regulation and control in manifold systems. (CO5, L2)

MODEL PAPER

Bachelor of AOTT Semester-III
Code: BAOTT015

Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)
Semester III
Industrial Orientation & Industrial visit
Time: 1.5 Hours | Maximum Marks: 40

Q.1 Essay Questions (Attempt any 1) (1 × 15 = 15 Marks)

A. Explain the importance of industrial visits in healthcare education and professional development. (CO2, L2)

B. Describe the organizational structure and functions of industries related to Operation Theatre and Anaesthesia Technology. (CO1, L2)

Q.2 Short Answer Questions (Attempt any 5) (5 × 5 = 25 Marks)

A. Explain various industries related to Operation Theatre and Anaesthesia Technology. (CO1, L2)

B. Discuss the preparations required before an industrial visit. (CO3, L3)

C. Explain the importance of safety guidelines during industrial visits. (CO3, L3)

D. Describe the roles and responsibilities of professionals observed during industrial visits. (CO4, L3)

E. Explain ethical considerations during industrial visits. (CO4, L3)

F. Discuss the importance of reflective learning after an industrial visit. (CO5, L3)

G. Explain the significance of report writing and documentation after an industrial visit. (CO5, L3)

MODEL PAPER

Bachelor of AOTT Semester-IV
Code: BAOTT016

Bachelor of Anaesthesia and Operation Theatre Technology
Semester IV
Advanced Anaesthesia Techniques
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Questions (Attempt any 2) (2 × 15 = 30 Marks)

A. Discuss the anaesthetic considerations for ear, nose and throat surgeries with special reference to tonsillectomy and sinus surgery. (CO1, L2)

B. Illustrate the principles and techniques of advanced airway management used during ENT procedures. (CO2, L2)

C. Demonstrate the role of local and regional anaesthesia techniques in head and neck procedures. (CO4, L3)

Q.2 Short Essay Questions (Attempt any 7) (7 × 5 = 35 Marks)

A. Outline the challenges encountered during anaesthesia for adenoidectomy. (CO1, L2)

B. Classify supraglottic airway devices used in ENT surgeries. (CO2, L2)

C. Summarize the advantages of fibreoptic intubation. (CO2, L2)

D. Discuss anaesthetic considerations during cataract extraction. (CO3, L3)

E. Illustrate the use of video laryngoscopy in airway management. (CO2, L3)

F. Differentiate between peribulbar and retrobulbar blocks. (CO4, L2)

G. Explain patient positioning and monitoring during ophthalmic surgeries. (CO3, L3)

H. Apply suitable measures for prevention of airway complications during ENT surgeries. (CO5, L3)

I. Discuss the management of common complications associated with ophthalmic procedures. (CO5, L3)

Q.3 Short Answer Questions (Attempt any 5) (5 × 3 = 15 Marks)

A. Define fibreoptic intubation. (CO2, L1)

B. List any three indications of supraglottic airway devices. (CO2, L1)

C. State the purpose of topical anaesthesia in ophthalmic surgery. (CO3, L1)

D. Name any three ENT surgeries. (CO1, L1)

E. List any three complications of ophthalmic surgery. (CO5, L1)

F. Define nerve block. (CO4, L1)

G. Mention any three airway management techniques. (CO2, L1)

MODEL PAPER

Bachelor of AOTT Semester-IV
Code: BAOTT017

Bachelor of Anaesthesia and Operation Theatre Technology
Semester IV
Advanced Surgical Procedures
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Questions (Attempt any 2) (2 × 15 = 30 Marks)

A. Discuss the surgical procedures performed in ENT with reference to tonsillectomy, septoplasty and sinus surgery. (CO1, L2)

B. Illustrate the surgical management of cataract and glaucoma along with the instruments used. (CO2, L2)

C. Demonstrate the principles and applications of endoscopic and laser-assisted procedures in ENT and ophthalmology. (CO4, L3)

Q.2 Short Essay Questions (Attempt any 7) (7 × 5 = 35 Marks)

A. Outline the surgical management of chronic sinusitis. (CO1, L2)

B. Summarize the causes and management of tonsillitis. (CO1, L2)

C. Discuss surgical treatment options for retinal detachment. (CO2, L2)

D. Explain laser safety precautions in the operation theatre. (CO3, L3)

E. Differentiate between LASIK and PRK procedures. (CO2, L2)

F. Illustrate the role of endoscopy in ENT surgeries. (CO4, L3)

G. Discuss minimally invasive surgical approaches and their advantages. (CO4, L3)

H. Apply suitable measures for prevention of intraoperative complications during ENT surgery. (CO5, L3)

Q.3 Short Answer Questions (Attempt any 5) (5 × 3 = 15 Marks)

A. Define septoplasty. (CO1, L1)

B. List any three indications of laryngoscopy. (CO1, L1)

C. State the purpose of laser warning signage. (CO3, L1)

D. Name any three ophthalmic surgical procedures. (CO2, L1)

E. List any three advantages of minimally invasive surgery. (CO4, L1)

F. Define cataract. (CO2, L1)

G. Mention any three complications of ENT surgeries. (CO5, L1)

MODEL PAPER

Bachelor of AOTT Semester-IV
Code: BAOTT018

Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)
Semester IV
Basic Intensive Care
Time: 1.5 Hours | Maximum Marks: 40

Q.1 Essay Questions (Attempt any 1) (1 × 15 = 15 Marks)

A. Discuss the organization and functions of an Intensive Care Unit (ICU). Highlight the role of monitoring in critically ill patients. (CO1, L2)

B. Illustrate the principles of mechanical ventilation and explain its indications in intensive care practice. (CO3, L3)

Q.2 Short Answer Questions (Attempt any 5) (5 × 5 = 25 Marks)

A. Discuss the admission and discharge criteria followed in an Intensive Care Unit. (CO1, L2)

B. Summarize the indications and contraindications of oxygen therapy. (CO2, L2)

C. Explain the components and working of a mechanical ventilator. (CO3, L2)

D. Differentiate between invasive and non-invasive monitoring. (CO2, L2)

E. Write the principles of infection control in intensive care units. (CO4, L3)

F. Discuss the role of arterial blood gas analysis in patient management. (CO3, L3)

G. Explain the nursing and supportive care required for critically ill patients. (CO5, L2)

MODEL PAPER

Bachelor of AOTT Semester-IV
Code: BAOTT019

Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)
Semester IV
Clinical Medicine & Related Management
Time: 1.5 Hours | Maximum Marks: 40

Q.1 Essay Questions (Attempt any 1) (1 × 15 = 15 Marks)

A. Discuss the clinical features, diagnosis and management of diabetes mellitus and its complications. (CO2, L2)

B. Illustrate the causes, clinical manifestations and management of hypertension in adult patients. (CO3, L3)

Q.2 Short Answer Questions (Attempt any 5) (5 × 5 = 25 Marks)

A. Outline the clinical features and management of bronchial asthma. (CO1, L2)

B. Explain the causes and management of anaemia. (CO2, L2)

C. Summarize the signs, symptoms and treatment of chronic kidney disease. (CO3, L2)

D. Differentiate between angina pectoris and myocardial infarction. (CO2, L2)

E. Explain the role of lifestyle modification in the prevention and management of diabetes mellitus. (CO4, L3)

F. Discuss the management of patients with chronic obstructive pulmonary disease (COPD). (CO3, L3)

G. Explain the preventive measures for cardiovascular diseases. (CO5, L2)

MODEL PAPER

Bachelor of AOTT Semester-V
Code: BAOTT020

Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)
Semester V
Paper I: Specialized Anesthesia – I
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Questions (Attempt any 2) (2 × 15 = 30 Marks)

A. Explain the anaesthetic considerations for major orthopaedic surgeries and the challenges associated with joint replacement surgeries. (CO1, CO5, L4)

B. Describe the principles of paediatric anaesthesia and explain the anaesthetic considerations for children undergoing surgery. (CO2, CO3, L3)

C. Examine the anaesthetic considerations for urological surgeries and in detail its perioperative patient care. (CO4, CO5, L4)

Q.2 Short Essay Questions (Attempt any 7) (7 × 5 = 35 Marks)

A. Explain the anaesthetic considerations for fracture fixation surgeries. (CO1, L2)

B. Describe the physiological and pharmacological considerations in paediatric anaesthesia. (CO2, L2)

C. Explain the techniques of airway management in paediatric patients. (CO2, L2)

D. Explain the anaesthetic considerations for paediatric patients with congenital anomalies. (CO3, L3)

E. Describe the anaesthetic considerations for nephrectomy or prostatectomy. (CO4, L3)

F. Differentiate between spinal anaesthesia and peripheral nerve block with suitable indications. (CO5, L3)

G. Explain the perioperative anaesthetic considerations for cystoscopy. (CO4, L3)

H. Illustrate the factors influencing the selection of regional anaesthesia for orthopaedic procedures. (CO5, L4)

I. Describe the complications of regional anaesthesia and explain their management. (CO5, L4)

Q.3 Short Answer Questions (Attempt any 5) (5 × 3 = 15 Marks)

A. Explain the importance of patient positioning during orthopaedic surgery. (CO1, L2)

B. State the advantages of supraglottic airway devices in paediatric anaesthesia. (CO2, L2)

C. Explain the role of multimodal analgesia in paediatric pain management. (CO2, L2)

D. Outline the preoperative assessment of paediatric patients with congenital anomalies. (CO3, L3)

E. Explain the importance of fluid balance during urological surgeries. (CO4, L3)

F. Differentiate between spinal anaesthesia and general anaesthesia in orthopaedic procedures. (CO5, L3)

G. Outline the management of hypotension following spinal anaesthesia. (CO5, L3)

MODEL PAPER

Bachelor of AOTT Semester-V
Code: BAOTT021

Bachelor of Anesthesia and Operation Theatre Technology(B.AOTT)
Semester V
Specialized Surgery – I
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Questions (Attempt any 2) (2 × 15 = 30 Marks)

A. Describe the surgical management of fractures and joint disorders, highlighting the role of implants, and patient positioning in successful outcomes. (CO1, L4)

B. Discuss the specialized considerations involved in paediatric surgical procedures with perioperative management of paediatric patients. (CO2, L5)

C. Describe minimally invasive techniques used and justify their advantages over conventional surgical approaches. (CO4, L4)

Q.2 Short Essay Questions (Attempt any 7) (7 × 5 = 35 Marks)

A. Explain the surgical management of osteoarthritis and the role of joint replacement surgery. (CO1, L2)

B. Discuss the indications and principles of fracture fixation techniques. (CO1, L2)

C. Illustrate the surgical correction of cleft lip and palate. (CO2, L2)

D. Describe perioperative management principles in paediatric hernia repair. (CO2, L3)

E. Explain the surgical management of benign prostatic hyperplasia (BPH). (CO3, L3)

F. Differentiate between nephroscope, and ureteroscope with their applications. (CO3, L3)

G. Discuss the importance of C-arm imaging and radiation safety during orthopaedic procedures. (CO4, L4)

H. Discuss the role of laparoscopic and robotic-assisted techniques in modern surgery. (CO4, L4)

I. Evaluate postoperative rehabilitation strategies in orthopaedic surgical patients. (CO5, L5)

Q.3 Short Answer Questions (Attempt any 5) (5 × 3 = 15 Marks)

A. Differentiate between ORIF and external fixation. (CO1, L2)

B. Explain the significance of patient positioning during spine surgery. (CO1, L2)

C. State the indications of orchidopexy. (CO2, L2)

D. Identify the applications of cystoscopy in urological surgery. (CO3, L2)

E. Explain the purpose of catheterization in urological procedures. (CO3, L2)

F. Discuss radiation safety measures during C-arm usage. (CO4, L3)

G. Explain the role of postoperative patient education following orthopaedic surgery. (CO5, L3)

MODEL PAPER

Bachelor of AOTT Semester-V
Code: BAOTT022

Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)
Semester V
Recent Advancements in Anaesthesia and Surgical Fields
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Questions (Attempt any 2) (2 × 15 = 30 Marks)

A. Describe the role of minimally invasive surgical techniques in improving patient recovery and surgical outcomes. (CO4, L4)

B. Explain recent advancements in anaesthetic techniques, including TIVA, TCI, BIS monitoring, and neuromuscular monitoring. (CO4, L4)

C. Describe the principles of Enhanced Recovery After Surgery (ERAS) protocols in perioperative patient management and discuss their benefits. (CO3, L3)

Q.2 Short Essay Questions (Attempt any 7) (7 × 5 = 35 Marks)

A. Explain the principles and benefits of Enhanced Recovery After Surgery (ERAS) protocols. (CO1, L2)

B. Explain the role of surgical safety checklists in reducing operative complications. (CO1, L2)

C. Illustrate the applications of multimodal analgesia in perioperative pain management. (CO3, L3)

D. Describe the role of BIS monitoring during anaesthesia. (CO2, L2)

E. Discuss image-guided navigation systems in surgical planning and execution. (CO3, L3)

F. Distinguish the advantages and limitations of robotic surgery. (CO4, L4)

G. Compare conventional laparoscopy with single-incision laparoscopic surgery. (CO4, L4)

H. Explain the role of simulation-based training in enhancing patient safety. (CO5, L5)

I. Assess the impact of advanced endoscopic procedures on minimally invasive surgery. (CO5, L5)

Q.3 Short Answer Questions (Attempt any 5) (5 × 3 = 15 Marks)

A. Explain the concept of ERAS. (CO1, L2)

B. Differentiate between TIVA and TCI. (CO2, L2)

C. State the purpose of BIS monitoring. (CO2, L2)

D. Explain the role of non-opioid analgesics in pain management. (CO3, L3)

E. Identify the applications of intraoperative ultrasound. (CO3, L3)

F. Explain the significance of 3D printing in surgical planning. (CO4, L3)

G. Discuss one application of artificial intelligence in surgery. (CO5, L3)

MODEL PAPER

Bachelor of AOTT Semester-V
Code: BAOTT023

Bachelor of Anaesthesia and Operation Theatre Technology(B.AOTT)
Semester V
Disaster Management & Environmental Sciences
Time: 1.5 Hours | Maximum Marks: 40

Q.1 Essay Questions (Attempt any 1) (1 × 15 = 15 Marks)

A. Explain the principles of disaster preparedness and the role of emergency management in disaster response. (CO1, L2)

B. Describe the major environmental pollution hazards and their impact on human health and the environment. (CO2, L2)

Q.2 Short Notes / Short Answer Questions (Attempt any 5) (5 × 5 = 25 Marks)

A. Outline the key functions of disaster management during emergency situations. (CO1, L2)

B. Explain the importance of resource management in disaster response. (CO3, L3)

C. Illustrate the role of information management and incident command systems during disasters. (CO3, L3)

D. Differentiate between water pollution and air pollution with suitable examples. (CO2, L2)

E. Explain the health hazards associated with radiation exposure. (CO2, L2)

F. Illustrate the methods for disposal of biomedical waste in healthcare settings. (CO3, L3)

G. Discuss the role of sanitation and general hygiene in disease prevention. (CO2, L2)

MODEL PAPER

Bachelor of AOTT Semester-VI
Code- BAOTT024

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – VI
Specialized Anesthesia – II
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Type Questions (Attempt Any 2) **2 × 15 = 30 Marks**

A. Explain anesthetic considerations and monitoring techniques for cardiovascular and thoracic surgeries. (CO1, L2)
B. Describe central venous catheterization and various insertion techniques (IJV, Femoral, PICC and Subclavian). (CO2, L2)
C. Explain anesthetic considerations for neurosurgical procedures, including patient positioning and intracranial pressure management. (CO3, L3)

Q.2 Short Essay Questions (Attempt Any 7) **7 × 5 = 35 Marks**

A. Write a short note on coronary artery bypass grafting (CABG). (CO1, L2)

B. Explain valve replacement surgery and its anesthetic considerations. (CO1, L2)

C. Describe arterial line insertion and the importance of Allen's test. (CO2, L2)

D. Explain cardiopulmonary bypass management during cardiac surgery. (CO2, L2)

E. Write a short note on hypotension during cardiothoracic surgery. (CO4, L4)

F. Describe the role of Transesophageal Echocardiography (TEE) in cardiac surgery. (CO4, L4)

G. Explain neurophysiological monitoring in neurosurgery. (CO3, L3)

H. Write a short note on Total Intravenous Anesthesia (TIVA). (CO3, L3)

I. Describe patient safety measures during neurosurgical procedures. (CO5, L5)

Q.3 Short Answer Questions (Attempt Any 5) **5 × 3 = 15 Marks**

A. Define central venous catheter (CVC). (CO2, L1)

B. What is an arterial line? (CO2, L1)

C. Define hemodynamic monitoring. (CO1, L1)

D. What is intracranial pressure (ICP)? (CO4, L1)

E. Expand TIVA. (CO3,+ L1)

F. Expand PICC. (CO2, L1)

G. Define neuro-anesthesia. **(**CO3, L1**)**

MODEL PAPER

Bachelor of AOTT Semester-VI
Code- BAOTT025

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – VI
Specialized Surgery – II
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Type Questions (Attempt Any 2) **2 × 15 = 30 Marks**

A. Explain Coronary Artery Disease and discuss Coronary Artery Bypass Grafting (CABG). (CO1, L2)

B. Describe congenital heart defects and the surgical management of ASD, VSD and Tetralogy of Fallot. (CO2, L2)

C. Explain neurosurgical procedures and its patient positioning and specialized devices used in neurosurgery. (CO2, L2)

Q.2 Short Essay Questions (Attempt Any 7) **7 × 5 = 35 Marks**

A. Write a short note on Percutaneous Coronary Intervention (PCI). (CO1, L2)

B. Explain valve repair and valve replacement procedures. (CO1, L2)

C. Describe aortic aneurysm and its surgical treatment. (CO1, L2)

D. Write a short note on pacemaker implantation. (CO2, L2)

E. Explain lobectomy and pneumonectomy. (CO2, L2)

F. Describe spinal fusion surgery and its indications. (CO2, L2)

G. Explain anesthetic considerations for CTVS procedures. (CO3, L3)

H. Write a short note on neurophysiological monitoring. (CO3, L3)

I. Analyze the role of arterial pressure monitoring during major cardiac surgeries. (CO4, L4)

Q.3 Short Answer Questions (Attempt Any FIVE) **5 × 3 = 15 Mark**

A. Define Coronary Artery Disease (CAD). (CO1, L1)

B. What is an ASD? (CO1, L1)

C. Define thoracotomy. (CO2, L1)

D. What is a craniotomy? (CO2, L1)

E. Expand ECG. (CO3, L1)

F. Expand TEE. (CO4, L1)

G. Define Deep Vein Thrombosis (DVT). (CO1, L1)

MODEL PAPER

Bachelor of AOTT Semester-VI
Code- BAOTT026

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – VI
Specialized Anaesthesia & Surgery – III
Time: 3 Hours | Maximum Marks: 80

Q.1 Essay Type Questions (Attempt Any 2) 2 × 15 = 30 Marks

A.Explain the principles of robotic-assisted surgical procedures and explain the role of Anesthesia Technologists during robotic surgeries. (CO1, L2)

B. Describe NORA (Non-Operative Room Anaesthesia), its scope, and anaesthetic management for procedures performed outside the operating room. (CO2, L2)

C. Explain organ transplantation procedures and its perioperative management and ethical considerations in transplant surgeries. (CO5, L5)

Q.2 Short Essay Questions (Attempt Any 7) 7 × 5 = 35 Marks

A. Write a short note on robotic-assisted hysterectomy. (CO1, L2)

B. Explain anaesthetic considerations for robotic surgeries. (CO2, L2)

C. Describe BIS monitoring and its clinical importance. (CO3, L3)

D. Write a short note on ultrasound-guided procedures in anaesthesia. (CO3, L3)

E. Explain radiation safety measures in NORA. (CO2, L2)

F. Describe sedation techniques used in non-operative room settings. (CO3, L3)

G. Explain regional anaesthesia in NORA. (CO3, L3)

H. Write a short note on preoperative evaluation of transplant recipients. (CO4, L4)

I. Describe postoperative care and immunosuppressive therapy in transplant patients. (CO4, L4)

Q.3 Short Answer Questions (Attempt Any 5) 5 × 3 = 15 Marks

A. Expand NORA. (CO1, L1)

B. Define pneumoperitoneum. (CO2, L1)

C. Expand BIS. (CO3, L1)

D. Expand NMT. (CO3, L1)

E. Define organ transplantation. (CO1, L1)

F. What is cross-matching? (CO4, L1)

G. Define immunosuppression. (CO5, L1)

MODEL PAPER

Bachelor of AOTT Semester-VI
Code- BAOTT027

Bachelor of Anesthesia and Operation Theatre Technology (B.AOTT)
Semester – VI

Research Methodology and Biostatistics
Time: 3 Hours | Maximum Marks: 40

Q.1 Essay Type Question (Attempt Any ONE) **1 × 15 = 15 Marks**

A. Explain the concept, importance, and steps of research methodology in healthcare. (CO1, L2)

B. Describe research design and discuss various methods of data collection used in healthcare research. (CO2, L2)

Q.2 Short Answer Questions (Attempt Any FIVE) **5 × 5 = 25 Marks**

A. Define research and state its importance in healthcare. (CO1, L2)

B. Explain the characteristics of a good research problem. (CO2, L2)

C. Write a short note on ethical issues in research. (CO2, L2)

D. Explain the basic concepts of biostatistics. (CO1, L2)

E. Describe different types of data used in research. (CO4, L4)

F. Write a short note on sampling methods. (CO3, L3)

G. Explain the components of a research proposal. (CO5, L5)

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