NATIONAL POSTGRADUATE MEDICAL COLLEGE OF NIGERIA

CARDIOTHORACIC ANAESTHESIA CURRICULUM

FACULTY OF ANAESTHESIA

APPROVED BY THE SENATE ON 5TH DECEMBER, 2024

DR F. A. AROGUNDADE, MD FMCP
COLLEGE REGISTRAR

FACULTY OF ANAESTHESIA
NATIONAL POSTGRADUATE MEDICAL COLLEGE OF NIGERIA
CURRICULUM FOR SUBSPECIALISATION IN CARDIOTHORACIC ANAESTHESIA
(FELLOWSHIP AND DOCTOR OF MEDICINE PROGRAMMES IN CARDIOTHORACIC ANAESTHESIA)

i) MD Programme: Doctor of Medicine, Cardiothoracic Anaesthesia. (MD, Cardiothoracic Anaesthesia)
ii) Fellowship Programme. Fellowship of the Medical College in Cardiothoracic Anaesthesia (FMCA, Cardiothoracic Anaesthesia).

A. INTRODUCTION

There is a pressing need to foster advancing knowledge, skills, and expertise in Cardiothoracic Anaesthesia (CTA). This is because of the diverse and rapidly evolving nature of Cardiothoracic Surgery and the need for continuous learning, multidisciplinary collaboration and the pursuit of excellence in patient care.

B. PHILOSOPHY

The philosophy behind the sub-specialization in Cardiothoracic Anaesthesia is to enhance the quality of care provided to varied patients with cardiothoracic lesions. Fellowship sub-specialization allows physicians to acquire advanced knowledge, skills and expertise in the subspecialty, enabling them to provide more targeted and specialized care for patients with complex medical and surgical conditions.
Overall, the philosophy behind this sub-specialization in cardiothoracic anaesthesia is centered on improving patient outcomes and advancing the field of cardiothoracic anaesthesia.

C. AIM AND OBJECTIVES

The main aim of this sub-specialization is to improve the needed critical workforce in this area of Medicine.

Objectives:

To manage complex conditions and emergencies
To provide comprehensive perioperative care
To optimize patient outcomes
To promote research and advancements in CTA
To train future Cardiothoracic Anaesthetists, who will become expert consultants, scholars and teachers of cardiothoracic anaesthesia.

Upon completion of the one-year program in cardiothoracic anaesthesia, the
Trainee must;

Be proficient in providing anaesthesia care for patients with cardiac or thoracic diseases undergoing cardiac surgery with and without extra corporeal circulation, surgery on the thoracic aorta, pulmonary and mediastinal surgery, nonoperative diagnostic and interventional cardiac and thoracic procedures, and electrophysiological procedures.

Develop skills in the conduct of preoperative patient evaluation and interpretation of cardiovascular and pulmonary diagnostic test data, haemodynamic and respiratory monitoring, advanced level perioperative transoesophageal echocardiography (TEE), management of cardiopulmonary bypass (CPB), pharmacological and mechanical haemodynamic support, perioperative critical care including ventilatory support and perioperative pain management including the use of regional techniques
Provide leadership in emergencies for cardiac and thoracic procedures
Be able to direct clinical research and have a manuscript ready for publication (Pre-Part II route)

D. ENTRY REQUIREMENTS (ELIGIBILITY)

Fellowship Programme: Part 1 Fellowship of the Faculty of Anaesthesia, National Postgraduate Medical College of Nigeria. Candidates must register for the programme within six months of passing the Part 1 Fellowship examination. Candidates must submit proposal for dissertation in cardiothoracic anaesthesia.
MD Programme: Candidates with the Part 1 Fellowship of the Faculty of Anaesthesia, NPMCN who have registered for the MD programme.

E. DURATION OF PROGRAMME

Fellowship Programme: Minimum of 36 months of which the last 18 months must be in the specialty of Cardiothoracic Anaesthesia.
MD Programme: Six (6) semesters or six (6) months before the Part 2 Final Fellowship examination.
The candidate is advised to do 3 months rotation in a fully accredited institution within the country or in a recognized institution outside the country

The postings in the first eighteen (18) months of the Senior Residency Programme are detailed below

F. THE FIRST STAGE OF SENIOR RESIDENCY TRAINING

The duration of this stage is eighteen (18) months.

i. GENERAL EDUCATIONAL OBJECTIVES

This period must be spent in acquiring further knowledge in the subspecialties of Anaesthesia. During this phase of training, residents are expected to perform at a higher proficiency level than they did during their junior residency, to assume a greater degree of responsibility for decision making in patient care as well as cover a much wider scope of anaesthetic practice and procedures, e.g. neonatology. More opportunities are provided at this stage to enable each senior resident participate in teaching junior colleagues, nurses and medical students. He is also introduced to principles of health resource management in addition to problem solving skills as applied to research and anaesthetic practice.

ii. FORMAT OF TRAINING

The posting rotations for the first stage of Senior Residency Training is as follows:

POSTING	**DURATION**
Cardiothoracic anaesthesia	2 months
Neuroanaesthesia	2 months
Paediatric (including neonatal) anaesthesia	2 months
Obstetric anaesthesia and analgesia	2 months
Anaesthesia for other surgical specialties- (General Surgery, Urology, Orthopaedics & Trauma, Maxillo-facial, Plastic & Reconstructive, Ophthalmic, Otorhinolaryngology, Gynaecology)	4 months
Intensive Care Medicine	2 months
Pain Medicine	2 months
Regional Anaesthesia	2 months
Total	**18 months**

iii. COGNITIVE SKILLS

Throughout the period of the Residency Programme, the Head of Department has the responsibility to expose the residents to a systematic schedule of didactic teaching covering the core knowledge pertinent to the practice of anaesthesia, so as to give them confidence and enable them to demonstrate good judgement in dealing with real problems.

This should be presented in form of seminars, tutorials and structured lectures, use of audio-visual aids, clinical case conferences, mortality and morbidity conferences, Information technology course, management course, teaching sessions, theatres and intensive care experience, journal reviews as well as research seminars. The Senior Resident must be updated from time to time on current opinions/research/practice of the specialty The planned schedule should identify the scope of knowledge to be covered in cycles of 36 months and thereby provide opportunities for residents to cover the same ground at least twice; one as a junior resident and one as a senior resident.

iv. PSYCHOMOTOR SKILLS

Each training institution should design its programme in such a way that the resident's acquisition of requisite anaesthetic skills spans over the 5-year (Junior and Senior Programmes) period. The mastery of specific psychomotor skills of increasing degree of complexity, such as stated below should be emphasized.

(a) The handling and care of anaesthetic machines and auxiliary equipment, storage of gases, safety devices.
(b) The organization, disinfection and sterilization of auxiliary anaesthetic equipment appropriate for a particular technique of anaesthesia.
(c) The preparation and setting up of monitoring devices during anaesthesia and intensive care.
(d) The preparation and positioning of patients for regional techniques and particular operations.
(e) Participation in the prevention of explosion and fire in the operating room.

v. RESEARCH SKILLS

The head of department in the training institution should encourage residents to cultivate the habit of systematic clinical problem solving, featuring observation, interpretation, deductive reasoning, and decision-making followed by further observation. These are basic requirements for competence in research, either in the context of clinical problems or basic research projects. Periodic departmental research seminars are recommended as the forum in which young researchers present their project for discussion, and receive the criticism and guidance of their teachers and peers.

vi. COMMUNICATION SKILLS

It is important that Consultant Anaesthetists should be effective communicators not only in the ordinary run of clinical practice dealing with anxious patients, medical records documentation, or case presentation; but also, in the context of scientific conference presentation, scientific journal publication, and indeed examination writing. Therefore training institutions must provide opportunities for the acquisition and testing of various levels of communication skills.

Computers have become important tools in all spheres of anaesthetic practice such as drug prescription, equipment for diagnosis and treatment, anaesthetic machine and others. Record keeping and auditing are also computer based. The knowledge of computer in anaesthesia is relevant in communication skill and should be stressed at this level. This should include literature search, use of internet, the use of statistical software, simulation and Microsoft Power Point for presentations.

vii. CONTACT HOURS AND CREDIT UNITS FOR THE FIRST STAGE OF SENIOR RESIDENCY TRAINING– 18 MONTHS

In addition to the curriculum outline for the Junior Residency training programme, the Senior Residency Curriculum is advanced with further knowledge of the subspecialties in Anaesthesia, Pain Medicine and Intensive Care

.

Specialties	Months	Contact academic (hours)	Theatre/ Clinical contact (hours)	Credit units
ANE 931. Cardiothoracic anaesthesia	2	30	180	6
ANE 932. Neurosurgical anaesthesia	2	30	180	6
ANE 933. Paediatric including neonatal anaesthesia	2	30	180	6
ANE 934. Obstetric Anaesthesia & Analgesia	2	30	180	6
ANE 935. Anaesthesia for other surgical specialties- General Surgery, Urology, Orthopaedics & Trauma, Emergency, Maxillofacial, Plastic & Reconstructive Surgery, Ophthalmology and Otorhinolaryngology and Gynaecology	4	30	180	6
ANE 936. Intensive Care Medicine	2	30	180	6
ANE 938 Pain Medicine.	2	30	180	6
ANE 939 Regional Anaesthesia	2	30	180	6
Total	**18**			**48**

viii (a). SKILLS TO BE ACQUIRED IN FIRST STAGE (18 MONTHS) SENIOR RESIDENCY TRAINING

	SKILLS	NUMBER REQUIRED TO BE PERFORMED
1	Intubation- routine	150
2	Intubation- nasal	13
3	Intubation- awake	5
4	Intubation- fibreoptic	5
5	Use of supraglottic airway devices	30
6	Difficult airway management	10
7	Double lumen tube insertion	7
8	Cricothyroidotomy	3
9	Percutaneous tracheostomy	3
10	Mini tracheostomy	3
11	Central venous cannulation	10

12	Intra-arterial cannulation	10
13	Intra-osseus cannulation	5
14	Peripheral venous cut-down	3
15	Subarachnoid block	50
16	Epidural block- lumbar	30
17	Epidural block- thoracic	1
18	Combined spinal-epidural block	20
19	Caudal block	25
20	Nerve blocks- brachial plexus, sciatic etc	10
21	Intravenous regional anaesthesia	10
22	Hypotensive anaesthesia	5
23	Total intravenous anaesthesia	5
24	One lung ventilation	7
25	Awkward positioning	25
26	CVP monitoring	5
27	Invasive blood pressure monitoring	5
28	Cardiac echocardiography	Observed/participated
29	Focused assessment for sonography (FAST)	Observed/participated

viii (b). OTHER RELEVANT SKILLS TO BE ACQUIRED IN THE FIRST STAGE (18 MONTHS) SENIOR RESIDENCY TRAINING

	SKILLS	**NUMBER REQUIRED TO BE PERFORMED**
1	Chest tube insertion	1
2	Ultrasound-guided vascular access	2
3	Ultrasound-guided nerve blocks	2
4	Critical care- initiation and weaning off ventilator	20
5	Critical care- arterial blood gas analysis	20
6	Critical care- sedation	12
7	Critical care- use of inotropes, vasopressors, syringe drivers and volumetric pumps	12
8	Critical care- cardiac output studies	Observed/participated
9	Critical care- cardioversion/pacing	2

10	Patient stabilization and transfer	8
11	Advanced Trauma Life Support Course	Attend 1
12	Cardiopulmonary resuscitation Course- adult/paediatric	Attend 1
13	Neonatal resuscitation	13
14	Chronic pain management	5
15	Epidural analgesia	3

Note:

1) The candidate must be able to manage complex surgical cases as itemized in each module

2) Each Candidate is expected to do a minimum of 30 hours of theatre/ clinical sessions per week throughout the 18 months of the first stage of Senior Residency period, taking into cognizance the period of annual leave.

3) A Senior resident is expected to attend at least two (2) local or international conferences and the certificate of attendance should be submitted with the examination application form

4) A senior resident must attain a minimum of 75% attendance at academic sessions. This must be duly signed up by the supervising consultant.

5) The candidate must provide a certificate of Training from a recognized CPR training programme within the 18 months of the first stage of the Senior Residency Training.

G. THE SECOND STAGE OF SENIOR RESIDENCY TRAINING (M.D. and Subspecialty in Cardiothoracic anaesthesia)

The duration of this second stage is eighteen (18) months.

LIST OF COURSES AND DETAILED COURSE DESCRIPTION

The Cardiothoracic Anaesthesia curriculum provides 18 months training dedicated to mastering the principles, practice, and techniques of cardiothoracic anaesthesia.

The training will consist of the following:

7 months in the main operating room providing anaesthesia to patients undergoing cardiothoracic procedures,

2 weeks in the perfusion unit,

1month in surgical intensive care unit,

2 weeks in the cardiothoracic surgery unit,

2 weeks each in the adult and paediatric cardiac units,

1 month dedicated to training in echocardiography and
2weeks of non- operating room procedures including the electrophysiology and cardiac catheterization laboratories.
2 weeks leave

The following curriculum will be provided through lectures, seminars, conferences and workshops as necessary to supplement clinical experience in the following areas:

COURSE CODE	COURSE TITLE	DURATION (weeks)	LECTURES (hours)	PRACTICALS (hours)	CREDIT UNITS
ANE 941 .1	Anatomy for cardiothoracic anaesthesia	4	45	-	3
ANE 941.2	Pathophysiology for cardiothoracic anaesthesia	4	45	-	3
ANE 941.3	Pharmacology for cardiothoracic anaesthesia	4	45	135	6
ANE 941.4	Clinical management of cardiac and thoracic diseases.	6	30	90	4
ANE 941.5	Cardiac anaesthesia	12	30	180	6
ANE 941.6	Thoracic anaesthesia	12	30	180	6
ANE 941.7	Monitoring and diagnosis in cardiothoracic anaesthesia.	8	30	135	5
ANE 941.8	Pain management in cardiothoracic surgical patients	8	30	135	5
ANE 941.9	Cardiothoracic Critical Care	8	30	135	5
PMC 995	Advanced Research Methodology	1	30	-	2
PMC 996	Health Resource Management	1	30	-	2
ANE 999	Dissertation/Thesis	4	270	-	12
#PMC 998	MD seminars	2	30	-	2
	TOTAL	**72 (#74)**			**59 (#61)**

 # For MD Candidates

In addition to the listed courses above, candidates who are registered in the MD Programme will take the College Medical Education Course and Faculty Specialty-Based Courses as stipulated in each Specialty-MD curriculum.

ANE 941.1 Anatomy for cardiothoracic anaesthesia **3 Units**

Cardiothoracic structures including embryology. Heart and chambers, blood and nerve supply. Lungs. Pericardium. Bronchopulmonary anatomy. Pleura. Bony structures of the thorax.

ANE 941.2 Pathophysiology for cardiothoracic anaesthesia 3 Units

Cardiomyopathy. Heart failure. Cardiac tamponade. Ischemic heart disease. Acquired and congenital valvular heart disease. Congenital heart disease. Electrophysiologic disturbances. Neoplastic and Infectious cardiac diseases. Pleural disease. Bronchopulmonary. Neoplastic, Infectious and Inflammatory diseases. Thoracic vascular. Tracheal, esophageal, and mediastinal diseases including infectious, neoplastic and inflammatory processes.

ANE 941.3 Pharmacology for cardiothoracic anaesthesia 6 units

Pharmacokinetics and pharmacodynamics of medications prescribed for medical management of adult cardiothoracic patients. Cardiomyopathy. Heart failure. Cardiac tamponade. Ischemic heart disease. Acquired and congenital valvular heart disease. Congenital heart disease. Electrophysiologic disturbances. Neoplastic and Infectious cardiac diseases. Pleural disease. Bronchopulmonary. Neoplastic, Infectious and Inflammatory diseases. Thoracic vascular, Tracheal, esophageal, and mediastinal diseases including infectious, neoplastic and inflammatory processes. Pharmacokinetics and pharmacodynamics of medications prescribed for management of hemodynamic instability: inotropes, chronotropes, vasoconstrictors and vasodilators.

ANE 941.4: Clinical management of cardiac and thoracic diseases. 4 units

Cardiomyopathy. Heart failure. Cardiac tamponade. Ischemic heart disease. Acquired and congenital valvular heart disease. Congenital heart disease. Electrophysiologic disturbances. Neoplastic and Infectious cardiac diseases. Pleural disease. Bronchopulmonary. Neoplastic, Infectious and Inflammatory diseases. Thoracic vascular, Tracheal, esophageal, and mediastinal diseases including infectious, neoplastic and inflammatory processes.

ANE 941.5. Cardiac Anaesthesia 6 units

Preanaesthetic evaluation and preparation of adult cardiothoracic patients and children with congenital heart diseases. Anaesthesia for cardiac surgical procedures- minimally invasive myocardial revascularization, valve repair and replacement. Pericardial disease. Neoplastic procedures. Heart and lung transplantation. Cardiac Trauma. Pacemaker. Implantable cardioverter defibrillator (ICD) insertion and modes of action. Extracorporeal circulation. Anaesthesia for non-complicated congenital heart diseases.

ANE 941.6. Thoracic Anaesthesia 6 Units

Anaesthesia for thoracic aortic surgery. Ascending, transverse, and descending aortic surgery with circulatory arrest. CPB employing low flow and or retrograde perfusion. Anaesthesia for pulmonary surgery. Thoracoscopic or open, lung reduction. Bronchopulmonary lavage. One-lung ventilation. Lobectomy. Pneumonectomy. Bronchoscopy: endoscopic, fiberoptic, rigid and laser resection. Anaesthesia for Oesophageal surgery. Foreign body removal. Stricture and tracheoesophageal fistula. Chest Trauma.

ANE 941.7. Monitoring and diagnosis in cardiothoracic anaesthesia. 5 Units

Non-invasive cardiovascular evaluation: electrocardiography, transthoracic (TTE)/transoesophageal (TEE) echocardiography, stress testing and cardiovascular imaging. Cardiac catheterization procedures and their diagnostic interpretation. Invasive cardiac catheterization procedures, including angioplasty, stenting, transcatheter laser treatments and mechanical ablations. Non-invasive pulmonary evaluation. Pulmonary function tests. Blood gas and acid-base analysis. Oximetry. Capnography and pulmonary imaging. Peri-anaesthetic monitoring (non-invasive and invasive): intraarterial, central venous, pulmonary artery, mixed venous saturation and cardiac output. Interpretation of chest radiograph.

ANE 931.8. Pain management in cardiothoracic surgical patients **5 Units**

Perioperative pain management including parenteral administration and regional analgesia. Interpleural block. Intercostal nerve block. Paravertebral block. Thoracic epidural analgesia.

ANE 941.9. Cardiothoracic Critical Care **5 units**

Haemodynamic monitoring. Circulatory assist devices- intra-aortic balloon counter pulsation, left and right ventricular assist devices and biventricular assist devices. Post-anaesthetic critical care of adult cardiothoracic surgical patients and paediatric patients. Perioperative ventilator management-intraoperative anaesthetic, and critical care unit ventilation and techniques.

PMC 995. Advanced Research Methodology (College Course). **2 units**

The main objective of this course is to facilitate acquisition of sound knowledge and necessary skills for research in anaesthesia. Definition, Spectrum and Types of Health Research Design. Defining Research problems, Setting Objectives, Statistics and Research Methods. Writing Research Proposals (Planning, Protocol Development and Report Writing) Good Clinical Practices and Clinical Trials. Role of Computer in Medical Research (EPI Info and SPSS). Literature review, Use of Physical and Virtual Library, Use of Internet, Search Engines, Systematic Reviews and Meta-analysis. Ethical considerations in medical research. Clinical Governance. Writing –Up, presentation and defense of Theses. Evidence Based Health Care. Statistical Methods (Summary, Inferences and Interpretation). Principles of Writing Articles for Publications. Research integrity and Plagiarism. Budget and Sources of Funding for Research.

PMC 996. Health Resource Management (College Course). **2 units**

The objective is to facilitate acquisition of knowledge and necessary skills required for management of health resources in Health institutions and for programme implementation. Principles and application of Management. Strategic Management. Health Care Planning. Health Policy formulation and evaluation. Health Resources mobilization and allocation. Human Resources Management. Organization. Monitoring and Evaluation of Health Services. Performance Management. Sustainable Development. Problem Solving and Decision-Making skills. Emotional Intelligence. Leadership. Management of Change. Risk Management. Financial Management, Material Resources Management. Quality assurance in health and equity in health. Managing the Health Team-Leadership and Team building. Health Care Financing. Financial Resources Management and Cost-Recovery Systems. Health Economics- the Economic appraisal of Health Programme. Public Private Partnership (PPP). Health Services Management Information Systems. Essentials of Budgeting and Accounting. Social Marketing of Health Programmes. Ethical and Legal Considerations in Medical practice.

ANE 999. Dissertation/Thesis **12 Units**

An approved Dissertation/Thesis based on original work of candidate on an appropriate topic in cardiothoracic anaesthesia which will be supervised and will be presented for assessment at the end of the programme.

G. Clinical Duties and Call

The trainee will be on call as dictated by the load of clinical duty and also engage in the supervision of anaesthesia residents rotating through cardiothoracic anaesthesia.

Skills and procedures: 300 cases to include100 cardiothoracic cases plus 350 procedures

*Logbook of 300 patients and 350 procedures (Endotracheal intubation with double lumen tube, Fibreoptic Laryngoscopy and Bronchoscopy, Arterial Cannulation, Central Venous Canulation, Setting up Mechanical Ventilation, Defibrillation and Cardioversion)) performed or watched during the training period.

Procedure	Observed	Assisted	Performed	Score/Grade
DLT intubation				
Fibreoptic intubation				
Arterial cannulation				
Central venous cannulation (IJV)				
Subclavian vein cannulation				
Setting up Mechanical ventilation				
Lung ultrasound				
Defibrillation				
cardioversion				
Pacemaker insertion				

Percutaneous tracheostomy				
Chestube insertion				
TTE				
Others				

See details in the logbook.

Academic component:

Journal club presentation
Seminar presentation
Conference attendance and paper presentation

H. CORE COMPETENCIES – LEARNING OBJECTIVES

By the end of training curriculum, the trainee will be required to demonstrate competency in the 6 areas listed below as they pertain to patients with cardiac and thoracic diseases:

i. Patient Care: Compassionate, appropriate and effective for the treatment of health problems and the promotion of health. i.e., Patient care that is safe, timely, effective, efficient, equitable and patient- centered.

ii. Medical Knowledge: Be familiar with established and evolving biomedical, clinical and cognate (e.g. epidemiological and social-behavioral) sciences, as well as the application of this knowledge to patient care. i.e., what needs to be known to provide patient care that is safe, timely, effective, efficient, equitable and patient-centered.

iii. Interpersonal and Communication Skills: Effective information exchange and teamwork with patients, their families, and other health professionals. i.e., what is necessary to say to provide patient care that is safe, timely, effective, efficient, equitable and patient-centered.

iv. Professionalism: Manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. How to act to provide patient care that is safe, timely, effective, efficient, equitable and patient-centered.

v. Systems-Based Practice: Manifested by actions demonstrating awareness and responsiveness to the larger context and system of health care, and the ability to effectively call on system resources to provide care that is of optimal value. Who the trainee depends on and who depends on the trainee to provide patient care that is safe, timely, effective, efficient, equitable and patient-centered.

vi. Practice-Based Learning and Improvement: Investigation and evaluation of patient care, appraisal, and assimilation of scientific evidence and improvements in patient care.

I. ASSESSMENT/EXAMINATIONS

Formative Assessment

i. The trainee will be objectively assessed on competence in patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and compliance with institutional practice and policies.
ii. The evaluation report will document progressive performance improvement.
iii. The trainee will be provided with feedback on performance and progress. This will perform on a 3-monthly basis.

Summative Assessment.

Candidates is eligible to take the MD or Fellowship examination after completing the total 36 months of academic and clinical training. Standard setting with the **Modified Angoff method** will be used for assessment of the candidates.

i) MD Programme: Candidates will defend the MD thesis in Cardiothoracic Anaesthesia during the MD defense examination.
To proceed to the Fellowship, candidates will take the following during the Part 2 Fellowship examinations (Theory Paper-MCQ/SBA, OSCE and Structured Oral examination

- Theory Paper: 2 hours. MCQ (SBA). 100. Cardiothoracic Anaesthesia- Applied Basic Sciences (20), Medicine (15), Surgery (15) and Paediatrics (15) as applicable to the specialty, Principles and Practice of Cardiothoracie Anaesthesia (35).
- **OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE):** SIX STATIONS: Duration of 1 hour comprising: (a) HISTORY TAKING/COMMUNICATION- 10 marks. (b) PHYSICAL EXAMINATION- 15 marks. (c) SKILLS-. 20 marks. (d) SKILLS. - 20 marks (e) INVESTIGATIONS (XRAYS, CT, HAEMATOLOGY, ECHO. ECG, ABG. CLINICAL CHEMISTRY)- 15 marks. (f) PATIENT MANAGEMENT- 20 marks
- Structured Oral examination. General (50%) and subspecialty (50%)

ii) Fellowship Programme: Part 2 Fellowship Examination
The Part 2 Fellowship examination consists of the following: Theory Paper-MCQ/SBA, OSCE and Structured Oral examination

- Theory Paper: 2 hours. MCQ (SBA). 100. Cardiothoracic Anaesthesia- Applied Basic Sciences (20), Medicine (15), Surgery (15) and Paediatrics (15) as applicable to the specialty, Principles and Practice of Cardiothoracie Anaesthesia (35).

- **OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE):** SIX STATIONS: Duration of 1 hour comprising: (a) HISTORY TAKING/COMMUNICATION- 10 marks. (b) PHYSICAL EXAMINATION- 15 marks. (c) SKILLS-. 20 marks. (d) SKILLS. - 20 marks (e) INVESTIGATIONS (XRAYS, CT, HAEMATOLOGY, ECHO. ECG, ABG. CLINICAL CHEMISTRY)- 15 marks. (f) PATIENT MANAGEMENT- 20 marks (TOTAL 100 marks)
- Structured Oral examination. General (50%) and subspecialty (50%). Duration is 1 hour
- Dissertation presentation and defense in Cardiothoracic Anaesthesia

GRADING OF MARKS

GRADE	PERCENTAGE %
A (excellent)	≥ 70%
B (very good)	60-69%.
C (good)	55-59%
D (pass)	50-54%
E (borderline)	45-49%
F (fail)	< 45%

• Logbook of 350 patients and 350 procedures (Endotracheal intubation with double lumen tube, Fibreoptic Laryngoscopy, Arterial Cannulation, Central Venous Canulation, setting up Mechanical Ventilation, Defibrillation and Cardioversion)) performed or watched during the training period. The 350 cases will include at least 100 cases in cardiothoracic anaesthesia.

J. CONDITION FOR A PASS:

i) Candidate must pass all sections of the examination to be awarded a pass

ii) Candidate who fails any section(s) of the examination will be required to repeat the failed section(s) in a subsequent examination.

K. ACCREDITATION REQUIREMENTS

i) General Requirements for Residency Training: The anaesthesia training programme is aimed at producing specialists in anaesthesia of a high degree of competence, comparable in the extent and depth of the training of anaesthesia Fellows in other parts of the world. The anaesthesia specialist should have a firm grasp of the scientific basis of anaesthesia, be skilled in the performance of anaesthetic duties and be conversant with research methodology and the interpretation of research data. The provision of facilities for this level of training must be based on the objectives of the training and should cover the main areas of modern anaesthetic practice.

The institution must have accreditation for general fellowship training in addition to accreditation for training in anaesthesia.

Number of Trainers, related surgical specialties, minimum case load and variety cases, and, training facilities specific for the neuro-anaesthesia

(a) Clinical Anaesthesia: Pre-Operative Care. Intra-Operative Care. Post-Operative Care

(b) Resuscitation

(c) Intensive Care

(d) Pain Medicine

As much as possible, adequate facilities should be available in all these areas to give the candidate enough practice both in quantity, quality and variety.

Related disciplines and ancillary facilities for investigation must also be available. These include the core departments of Internal Medicine, Paediatrics, Surgery, Obstetrics & Gynaecology, Pathology, Radiology, and Medical Records. Details of their equipment in all areas are given below:

(i) An Institution for Postgraduate Training in Anaesthesia must have a Department of Anaesthesia run by specialists in general and other subspecialties of anaesthesia, pain medicine and intensive care medicine, who are themselves Fellows of the National Postgraduate Medical College of Nigeria or are Fellows of other recognized Colleges or have equivalent qualifications. A minimum of two Fellows supported by residents in training would be required as a basic teaching unit.

(ii) As many branches of surgery as possible should be available in the hospital. These include General Surgery, Obstetrics & Gynaecology, Urology, Ophthalmology, E.N.T. Surgery, Orthopaedic and Trauma Surgery, Dental Surgery, Paediatrics and Plastic Surgery. While it is desirable to have a neurosurgical unit and a cardio-thoracic unit, it is not mandatory for basic specialist training. Residents in institutions without neurosurgical and cardio-thoracic units must do senior and junior residency rotations in fully accredited institutions as specified by the Faculty.

(iii) There must be an out-patient complex with Emergency Rooms and facilities for resuscitation, as well as out-patient theatre(s) for minor surgery and casualty.

(iv) Laboratories – The hospital must also have facilities for investigation in: (a) Chemical Pathology. (b) Microbiology for routine and special investigations, and emergency. (c) Haematology and Blood Bank.

(v) There should be an Intensive Care Unit for the management of critically ill or traumatized patients.

(vi) There should be a Departmental laboratory for research.

(vii) There must be a suitable number of operating theatres to give the various specialties of surgery adequate operating time. Each theatre should have an anaesthetic room attached to it and should be fully equipped with anaesthetic, monitoring and resuscitation equipment. It is vital that there should be a recovery room equipped with monitors, resuscitation equipment to take a minimum, of two to four beds depending on the number of theatres.

(viii) The Radiology Department must be capable to doing routine – X-rays and other sophisticated investigations (CT, MRI, contrast studies, Ultrasound, Doppler) which may be required by existing specialties and such facilities should extend to theatre and ICU.

(ix) There must be a good library with current anaesthesia journals and books in anaesthesia and related subjects. Internet connectivity and subscription to data bases should be available.

(x) Other departments viz: Medicine, Paediatrics, Surgery, Obstetrics & Gynaecology and Psychiatry must be suitably well developed to give the residents in training some experience in these disciplines.

(xi) There must be a suitable number of Anaesthetic and Monitoring equipment in all areas of Anaesthetic service. In addition to service equipment, there should also be equipment and simulation devices for teaching and research including teaching aids, models, audio-tapes, computers, CD Rom, etc.

ii) Additional Specific Accreditation Requirements for Cardiothoracic Anaesthesia.

Basic Requirement

The institution must have current Full accreditation for post-graduate training in Anaesthesia.

Qualified personnel

The institution must have at least 2 Cardiothoracic Anaesthetists by training, one of whom must be a Fellow of NPMCN.

Trainers/ Trainees ratio

A ratio of not more than 1:2 is ideal. The Cardiothoracic Anaesthetist Consultant must have the Fellowship of the NPMCN or any other sister post graduate College.

Opportunities for learning / skill acquisition

The institution must be able to provide ample opportunity for training and acquisition of skills in Cardiothoracic Anaesthesia. This should be shown in records of a minimum of 200 Cardiothoracic cases done yearly.

Details of additional specific requirements for accreditation in Cardiothoracic Anaesthesia are indicated below.

a) Information on Cardiac and Thoracic Surgery Support:

1. Number of qualified Cardiac and/or Thoracic Surgeons
2. Number of qualified Cardiologists
3. Number of qualified Pulmonologists
4. Number of dedicated cardiothoracic theatres
5. Number of cardiothoracic cases/weeks
6. Number of cardiothoracic operations / year (average over the last two years). Provide list of operations carried out in the last 12 calendar months
7. Number of Elective surgeries (last 12 months)
8. Number of Emergency surgeries (last 12 months)
9. Dedicated Cardiothoracic ICU if available
10. Number of admissions to ICU in the 12 calendar months

b) Facilities in the Cardiothoracic theatre/s

1. Anaesthesia machines (No. & manufacturer/model)

2. Monitors- ECG. NIBP. IBP/CVP. Pulse oximetry. Capnography. Temp-Core & peripheral
3. Defibrillator with or without internal paddles
4. Fluoroscopy
5. Cardiopulmonary bypass Machine plus ABG and ACT monitor
6. Active warming device/s
7. Adjustable Operating Theatre tables
8. Infusion pumps
9. Syringe drivers
10. Blood warmer
11. Pressure infusor
12. Fibreoptic broncho-/laryngoscope
13. Double lumen tubes
14. LMAs
15. Any other airway devices
16. PACU facilities with multi-parameter patient monitor

c) Facilities/Personnel in ICU

1. ICU ventilator per bed and manufacturer/model
2. Monitoring facilities: ECG. NIBP. IBP. Pulse oximetry. Capnography. Blood gas analyzer
3. Infusion pumps (Total no)
4. Syringe drivers (Total no.)
5. Mobile X-ray
6. Bronchoscope
7. Transport Ventilator
8. Round-the clock Biochemistry
9. Round the clock X-Ray service
10. Microbiology back-up
11. Renal replacement backup
12. Physiotherapy
13. Trained ICU Nurses
14. Trained Intensivists
15. Suction machine
16. Two O_2 delivery ports per bed

d) Facilities in Radiology

1. Angiography
2. CT Scan
3. MRI
4. Dedicated fully functional anaesthesia machine
5. Monitoring facilities: ECG. SPO2. NIBP/IBP. Capnography.
6. Infusion pumps/Syringe drivers
7. MRI-Compatible anaesthesia machine/monitor

e) Other supporting services

Laboratories (Microbiology, Chem Pathology, Haematology + Blood Bank)
Physiotherapy

f) Staff of Cardiothoracic Anaesthesia

1. Number of dedicated Cardiothoracic Anaesthetists
2. Number of other Consultant Anaesthetists doing Cardiothoracic Anaesthesia
3. Number of Senior Residents
4. Number of Junior Residents
5. Number of Anaesthesia Technicians
6. Number of Residents per ICU (day)
7. Number of Residents per ICU (night)
8. Consultant coverage for ICU available
9. Number of Residents on Call
10. Number of Consultants for emergency

g) Proposed Teaching programmes

1. Number of seminars per week
2. Number of journal clubs per week
3. Number of case presentations per week (A minimum of three hours of class-room teaching is mandatory per week in addition to bed-side discussions)

h) Library

1. Books on anaesthesia (< 10-year-old editions)

2. Specific books of Cardiac and Thoracic Anaesthesia
3. Journals of anaesthesia- local and international
4. Journals pertaining to Cardiac and Thoracic Anaesthesia
5. Internet access for the programme
6. On-line material (books, journals subscribed for by the institution).

i) Seminar Room

1. Sitting capacity,
2. Computers/laptops
3. LCD projector / OHP
4. Training aids including manikins for airway, CPR, Epidural/Spinal anaesthesia