SYLLABUS FOR M.Sc. PERFUSION TECHNOLOGY

Aims and objectives of the M.Sc. Perfusion technology:

To develop human resources in the field of perfusion technology with teaching ability and research temperament, who shall:

1) Provide the life saving health care to the sickest patients in efficient way using hi-tech gadgets.

2) Teach and train future students in this field of perfusion technology - both undergraduates and post graduates, in colleges, institutions, hospitals and such educational initiatives

3) To undertake and guide research activities to improve the practice of perfusion technology.

5) To develop administrative and organizing capabilities in their area to manage the resources (men and materials) with the sense of cost-effectiveness.

6) To learn the sense of responsibility & accountability in their services.

7) To create the sense of adopting best practices with a focus centered on patient safety.

8) To develop the system of audit and introspection through regular morbidity and mortality meetings and to improve the quality of services.

9) To impart the communicative skills related to their profession

10) To develop the conscience of team spirit, passion of professionalism, collegiality and maintenance of good rapport and relations with the other health care members

11) To participate in health teams to provide care during natural or man-made calamities

12) To keep abreast with the latest developments by self-learning and / or participating in continuing medical education programmes.

First year:

a. Advanced cardiac, vascular and respiratory physiology

b. Fundamentals of molecular science & Biochemistry – Carbohydrates, proteins, lipids, trace elements, iron, calcium, cellular metabolism, ionic transport across cell membranes, chemical mediators.

c. Basics of cardiology (ECG, cardiac catheterization, Intraaortic balloon pump)

d. Biomedical engineering - equipment principles and maintenance.

e. Hematology (coagulation system, blood and blood products, blood conservation)

f. Biostatistics, basics of research and publishing & community health care.

g. Common basic concepts: Patient safety, biomedical waste management, audit, database maintenance, quality in perfusion technology, health-economy.

Second year:

h. Neonatal physiology, general homeostasis & fluid management in pediatric age group, CPB effects on children.

i. Recent advances and updates in Cardiopulmonary bypass (CPB) and perfusion technology under the sections:
    i. Inflammatory mediators,
    ii. Heart lung machine,
    iii. Oxygenators,
    iv. Heater-cooler equipment,
    v. Heat exchanger,
    vi. Arterial filters,
    vii. Hemofiltration & hemofilters,
    viii. Pumps in extracorporeal circulation,

ix. Circuit and cannulae for CPB,
x. Hypothermia, circulatory arrest, normothermia in ECC,
xi. Myocardial protection and Cardioplegia,
xii. cell saver,
xiii. IABP
xiv. ECMO,
xv. Non-cardiac application of ECC.
xvi. Ventricular assist devices
xvii. Artificial heart.

b. Recent advances in perfusion in special condition:

1. Aortic aneurysms
2. Pregnancy
3. Complex congenital cardiac malformations
4. Transplantation
5. Trauma care
6. Malignancy
7. Organ transport

List of skills to be learnt at the end of the program:

- The candidate is expected to provide high quality in services related to perfusion technology with advanced skills and knowledge in operating the high end equipment of perfusion technology
- Should be able to perform simple biomedical repairs concerned with their gadgets
- Should develop research temperament and teaching potential in perfusion technology.

Teaching learning methods: Bedside rounds, journal club, topic review, clinical case presentation, group discussion, intraoperative hands-on experience, CME's, seminars, conferences, etc.

Posting in various units (if applicable):

- Biostatistics and Preventive and social medicine.
- Department of neonatal & pediatric ICU
- Blood bank
- Cardiology
- Biochemistry
- Physiology
- Biomedical engineering.

Other requirements:

1. Should prepare and submit the log book of his activities of the year
2. Should prepare a dissertation
3. Preferably publish at least 1 paper in an indexed / national / international journal
4. Preferably present 2 papers at national / international level conference
5. Should have attended at least 3 zonal / national / international conferences related to this specialty.
6. Should attend 3CME programmes / workshops or wet labs during the training period.

Reference Books:

1. Cardiac surgery – by Kirklin and Barrat Boyes – 4th edition.
2. Manual Of Perioperative Care In Adult Cardiac Surgery – by Robert M. Bojjar
3. Cardiac Surgery In Adults – by Lawrence H. Cohn – 4th edition.
4. Pediatric Cardiac Surgery – by Constantine Mauroudi - 4th edition.
5. A Practical Approach To Cardiac Anesthesia - by Glenn p. Gravlee
6. The ICU book – by Paul L. Marino - 4th edition.
7. Kaplan's Cardiac anaesthesia – by Kaplan Reich Sarino – 6th edition
8. Cardiopulmonary Bypass - by Gravlee – 3rd edition.
9. Cardiopulmonary bypass – by Sunit Ghosh – 1st edition.

Journals:

1. Perfusion
2. Circulation
3. Journal of Extracorporeal Technology
4. The Indian journal of Thoracic and Cardio Vascular Surgery
5. The Journal of Thoracic and Cardio Vascular Surgery
6. The Annals of Thoracic Surgery
7. European Journal of Cardio Thoracic Surgery
8. The Asian Annals of Cardio Thoracic Surgery