# SRI VENKATESWARA INSTITUTE OF MEDICAL SCIENCES

# TIRUPATI – 517 507

***(A University established by an act of Andhra Pradesh State Legislature)***

# 1ST BOARD OF STUDIES MEETING

# M.Sc. CARDIO-PULMONARY PERFUSION TECHNOLOGY COURSE

**12/03/2021**

**TIRUMALA TIRUPATI DEVASTHANAMS**

**SRI VENKATESWARA INSTITUTE OF MEDICAL SCIENCES,TIRUPATI**

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## CONTENTS


| S. No. | PARTICULARS | Page No. |
|---|---|---|
| I | Aims and Objectives | 04 |
| II | General Regulations | 05 |
| III | **Course Content (Syllabus)**<br><br>**M.Sc.Cardio-Pulmonary Perfusion Technology**<br><br>**I year**<br>1. Cardiology & Cardiac Surgery<br>2.Introduction to OT & Cardio-Pulmonary PerfusionTechnology<br>3.Equipments in Cardio-Pulmonary Perfusion Technology,<br>Physiology & Pathology of Cardio Pulmonary Perfusion<br>Pharmacology of cardiovascular drugs<br>4. Epidemiology & Bio-statistics including Research Methodology<br><br>**II year**<br>1.Clinical applications of Cardio Pulmonary Perfusion Technology<br>2.Cardiac surgery without CPB<br>Mechanical circulatory support& Robotic Cardiac Surgery<br>3.Organ transplantation<br>4.Hematology as relevant to Cardio-Pulmonary Perfusion<br>Technology, Blood Transfusion and Blood conservation<br>5.Dissertation | 12 |
| IV | Monitoring Learning progress, Log book | 25 |
| V | Checklist I, II, III, IV & V | 26 |
| VI | Ethics in M.Sc. Cardio Pulmonary Perfusion Technology | 31 |
| VII | Categories of Bio-Medical waste: Annexure – I | 33 |
| VIII | Transcript | 34 |

## SECTION-I

## AIMS AND OBJECTIVES

**1. Aims and Objectives:**

The main goals of postgraduate training in M.Sc Cardio Pulmonary Perfusion Technology are :

- The student should be thought full and have an understanding of the basic sciences relevant to respective department.
- He/ She should be able to acquire the detailed knowledge about the fundamentals and the upcoming advances in the respective field.
- He/ She should be able to critically analyse and evaluate various concepts and views and to adopt the one which is appropriate.
- He/ She should efficiently, effectively and skillfully practice cardio pulmonary perfusion which would be based on the scientific knowledge.
- The student should continue to strive and have keen interest in professional development both in teaching and in clinical practice.
- He / She should have a caring and a gentle attitude and would be empathic towards all,
- The student should be able to maintain high ethical standards.
- He/ She should be willing to share the knowledge and skills with the fresh learners, junior or a colleague.
- Medicine is a continuous processes of learning. Every second there is change in the technology and the techniques hence one needs to keep updated with the recent. This knowledge could only be acquired by self-study and by attending courses, conferences and seminars relevant to the speciality.
- He/ She should be able to undertake audit; use information and carryout research with the aim of publishing or presenting the work at various scientific gatherings**.**

The student should be able to acquire adequate skills and competence in performing various tasks as required.

- He or She should be able to adopt ethical principles in all aspects of the professional practice**.**
- He or She should be able to practice professional honesty and integrity.
- He or She should be able to carry out the duties irrespective of social status, caste, creed or religion of the patient.
- He or She should develop oral and written communication skills, which is very important for efficient functioning of the team.
- He or She should have leadership quality so as to get the best out of his or her team in a congenial working atmosphere.
- The student should be able to apply high moral and ethical standards while carrying out research related in its field.
- The student should be humble and accept the limitations in his or her knowledge and skill and should not hesitate to ask for help from colleagues when needed.

## SECTION - II
## GENERAL REGULATIONS

1. **Title of the Course**
   Master of Science degree in Cardio-Pulmonary Perfusion Technology
2. **Duration of the Course**
   The duration of the course shall be 2- years on full time basis

3. **Eligibility for Admission**

   a) B.Sc. in Cardio Pulmonary Perfusion Technology (B.Sc. CPPT)
   b) B,Sc. in Perfusion technology with an equivalent course / syllabus from a recognized University.
   c) B.Sc. Degree + 2 yrs. PG Diploma in CPPT.
   d) Candidates with Correspondence and Diploma courses in CPPT shall not be considered
   e) Candidates passing B.Sc. in Perfusion technology (Pertaining to dialysis Perfusion) shall not be eligible.
4. **Selection Criteria**
   Selection shall be based on the academic merit/entrance test conducted inthe qualifying exam.

5. **Admission schedule :**
   a) Commencement of Course: August every year
   b) The admissions are closed by 30th September or 60 days from the date of commencement of the programme.
6. **Yearly intake: 2 students per year.**
7. **Medium of instruction.**

   English shall be the medium of instruction for the subjects of study as well as for the Examination.
8. **Course of study**
   The course shall be pursued on full time basis. In the end of first year and second year there shall be an examination. Students shall be posted to SVIMS and SPMC hospitals during the practical hours.

   Subjects for study and teaching hours for first year and second year of the PG courses are shown below;

**M.Sc.Cardio-Pulmonary Perfusion Technology**

**Table - I Distribution of Teaching Hours**

**First Year**

| S.No. | Main subject | Theory No. of Hours | Practical No. of Hours | Total |
|---|---|---|---|---|
| 1. | Cardiology and Cardiac Surgery | 80 | 60 | 140 |
| 2. | Introduction to OT& Cardio Pulmonary Perfusion Technology | 80 | 60 | 140 |
| 3. | Equipments In Cardio Pulmonary Perfusion Technology & Physiology & Pathology Of Cardio Pulmonary Perfusion<br>Pharmacology of Cardiovascular Drugs | 80 | 60 | 140 |

| | | | | |
|---|---|---|---|---|
| 4. | Epidemiology & Bio-statistics including Research Methodology | 80 | - | 80 |
| | **Total:** | **320** | **180** | **500** |

**Second year**

| S.No. | Branches | Theory No. of Hours | Practical No. of Hours | Total |
|---|---|---|---|---|
| 5. | Clinical Applications Of Cardio Pulmonary Perfusion Technology | 60 | 80 | 140 |
| 6. | Cardiac Surgery Without CPB Mechanical Circulatory Support & Robotic Cardiac Surgery. | 60 | 80 | 140 |
| 7. | Organ Transplantation. | 60 | 80 | 140 |
| 8. | Hematology as Relevant to Cardio Pulmonary Perfusion, Blood Transfusion and Blood Conservation | 60 | 80 | 140 |
| | **Total:** | **240** | **320** | **560** |

**9 a) Attendance**:

A candidate is required to put in minimum 80% of attendance both in theory and practical separately of each paper before admission to the university examination. Participation in NCC, NSS, sports and games, educational tours, professional meetings and conferences or other co-curricular activities representing the institution/university will not count as absence.

**b) Condonation for lack of attendance:**

The condonation of attendance on medical grounds or on absence under extraordinary circumstances to those who are having the attendance between 70% and 79% in each paper will be granted in genuine cases. The students who have shortage of attendance in the particular papers have to apply to the controller of examinations, indicating the reasons for shortage of attendance. The representation to be forwarded by the HOD &Principal I/c,AHS. If the reason is on the medical grounds, the relevant medical certificate has to be enclosed to the representation. If any student falls below the 70% of attendance, he/she will not be allowed to write the university examinations.

**10. Scheme of examination**

a) The examination for the degree shall consist of written papers, practical and oral.
b) There shall be two examinations viz., Preliminary and final. The preliminary examination shall be taken at the end of the first year. The final examination shall be taken at the end of 2nd year.
c) The examination shall be conducted ordinarily twice a year, viz., July/August and January/February.

**Preliminary Examination**

This consists of theory, practical and oral.

## Table - I. University Examination and Distribution of marks

**First year**

| S.No | Subjects | Paper | Theory | | Practical (Marks) | | Viva | Grand Total |
|---|---|---|---|---|---|---|---|---|
| | | | IA | UE | IA | UE | | |
| 1. | Cardiology and Cardiac Surgery | I | 20 | 80 | 15 | 60 | 25 | 200 |
| 2. | Introduction to OT & Cardio Pulmonary Perfusion Technology | II | 20 | 80 | 15 | 60 | 25 | 200 |
| 3. | Equipments In Cardio Pulmonary Perfusion Technology & Physiology & Pathology of Cardio Pulmonary Perfusion Pharmacology of Cardiovascular Drugs | III | 20 | 80 | 15 | 60 | 25 | 200 |
| 4. | Epidemiology & Bio-statistics including Research Methodology | IV | 20 | 80 | - | - | - | 100 |
| | **Total** | | | | | | | **700** |

**Second year**

| S.No | Subjects | Paper | Theory | | Practical (Marks) | | Viva | Grand Total |
|---|---|---|---|---|---|---|---|---|
| | | | IA | UE | IA | UE | | |
| 5. | Clinical Applications Of Cardio Pulmonary Perfusion Technology | V | 20 | 80 | 15 | 60 | 25 | 200 |
| 6. | Cardiac Surgery without CPB Mechanical Circulatory Support & Robotic Cardiac Surgery. | VI | 20 | 80 | 15 | 60 | 25 | 200 |
| 7. | Organ Transplantation | VII | 20 | 80 | 15 | 60 | 25 | 200 |
| 8. | Hematology as Relevant to Cardio Pulmonary Perfusion, Blood Transfusion and Blood Conservation | VIII | 20 | 80 | 15 | 60 | 25 | 200 |
| 9. | Dissertation | | | | | 100 | 50 | 150 |
| | **Total** | | | | | | | **950** |

**11. Dissertation:**

The student should submit dissertation one month before the final examination. Those students who have not submitted the dissertation shall not be allowed to appear for the final examination. The dissertation shall be assessed at the time of orals by all the examiners.

The dissertation shall be written under the following headings:

Introduction; Aims or objectives of study; Review of literature; Materials and methods; Results; Discussion; Conclusion; Summary; References; Tables; Annexure

The Dissertation shall be reviewed in the form of a presentation every month by the Guide / HOD CVTS.

The written text of dissertation shall not be less than 50 pages and shall not exceed 100 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should not be done. A declaration by the candidate that the work was done by him/her shall be included. The Guide and Head of the Department shall certify the bonafide of the dissertation.

Three copies of dissertation shall be submitted to the university through proper channel along with a soft copy (CD), one month before the final examinations.

**12. Internal assessment (IA):**

a) A student must secure at least 35% marks of the maximum marks fixed for internal assessment in a particular subject, to be eligible to appear for the university examination of that subject.
b) There shall be three internal assessment tests and the average of these tests shall be considered for awarding final marks.
c) If the candidate is absent for any of the exams, the marks in that exam shall be taken as zero.
d) The computed internal assessment marks as per the regulation a & b shall be sent to the controller of exams 15 days before the commencement of the University exam.
e) The internal assessment marks should be signed by the concerned teaching faculty or HOD and counter signed by the HOD before being forwarded to the Controller of Examinations.
f) For those who failed in internal assessment test/s, have to reappear as per the regulations before he/she appears for the university examination.
g) For those who want to improve their marks in internal assessment tests, they can appear again as per the regulation. For such students, the internal assessment marks of the student at the time of first appearance will be compared with the marks obtained at the present appearance and the higher of the two will be taken as his/her internal assessment marks.

**13. Examination fee structure** : The examination fee shall be applicable as existing to the Other M.Sc. Courses (AHS).

**14. Minimum for a pass:**

a) 35% in internal assessment of each theory paper and practicals/viva voce
b) 40% in each theory paper of university examination.
c) 50% on the total marks of theory university examination and internal assessment clubbed together, applicable to each paper.
d) Where, viva voce involved which is part of theory examination, 50% on the total marks of theory university examination, internal assessment and viva voce clubbed together, applicable to each paper.
e) Where there is no internal assessment marks, 50% on the total theory marks, 50% in practicals/viva voce applicable to each subject.

**15. Classification of successful candidates:**

Percentage of Marks for declaring Class:

| | |
|---|---|
| Distinction | - 75% and above of the total marks. |
| First Class | - 65 - 75% of the total marks. |
| Second Class | - 50- 64% of the total marks. |
| Pass Class | - If the student does not pass all the subjects withinthe duration of the course, the class will not be awarded and the final results will be declared as "Pass". Those who have break in the middle of the course due to attendance shortage, it will be taken into consideration as not completed within the duration of the course and the final results will be declared as "Pass". |

**16. Panel of examiners:**

a) There shall be a panel of four external examiners as advised by the Head of the department..
b) Theory paper setting to be done by the examiners locally, within the state or outside the state. For practical and viva-voce

c) No.of Examiners Required - Two
No.of Internal Examiner. - One
No.of External Examiner. - One

Eligibility for the examinership:

a) The examiner shall be a full time teacher in the college or institution he or she is working.

b) Academic qualification and teaching/professional experience for examiners:

- External / Internal Examiner: M.Sc in Cardio pulmonary Perfusion Technology / or equivalent syllabus for M.Sc Perfusion technology with minimum of five years of teaching / professional experience.
- External / Internal Examiner: M.Ch / DNB in Cardio Thoracic Surgery shall have not less than 5 years of teaching experience in the speciality concerned and working as Asst Prof. Or above in a teaching hospital.

**17. Reappearance:**

The student has to pass both theory and practicals/viva voce, if any student pass in theory examination and fail in practicals/viva voce examination or vice versa, the concerned student has to appear again for both theory and practicals/viva voce examination.

**18. Carry-over Provision:**

The students are permitted to complete the course period irrespective of their success in the preliminary part. However, the final results will be kept under "withheld" until he/she passes all the previous papers".

**19. Maximum duration for completion of course:**

A candidate shall complete the course within four years from date of admission. Failing which, the candidate will be discharged.

**20. Eligibility for award of degree:**

A candidate shall have passed in all the subjects of first and second year to be eligible for award of degree.

**21. Model Question Paper:**

(Common for all papers – 1st & 2nd year)

**THEORY**

Each theory paper will have

1) Essay questions – 03 nos. carrying 10 marks each - 03 x 10 = 30
2) Short answer questions – 10 nos. carrying 05 marks each - 10 x 05 = 50

Total **= 80**

Internal assessment = 20

**PRACTICAL**

(a) Internal assessment : 15
University examination : 60

Total = **75**

(b) Viva = 25

**22. Minimum Requirement of Infrastructure, Laboratory Facilities and Staff:**

**(i). Basic Infrastructure:**

Institute should have its own hospital with full-fledged cardiac surgical service with the following facilities:

- 3 cardiac operating rooms
- Chief Perfusionist and 2 Assistant Perfusionist
- Class Room with capacity for 10 students
- One departmental Seminar room with capacity of 30 students with A.V aids – OHP, Slide projector and computer with accessories are compulsory. LCD Projector (optional)
- Institute should have the following infrastructure criteria- Principals room, students common room, staff room, Library, office room, Store room, preparation room etc will be as per minimum criteria.
- Minimum of 250 open-heart procedures per year.

**(ii). Infrastructure subject wise**

- Anatomy laboratory
- Physiology laboratory
- Perfusion equipments
    i. Heart Lung Machine and Accessories
    ii. Heater Cooler – one machine per patient
    iii. IABP - 2
    iv. A C T Machine - 2
    v. Blood Gas Analyzer - 2

**(iii). Teaching staff requirement:**

Teaching staff should be actively involved in imparting education in the particular subject:

- Professor – 1
- Associate Professor (5 years teaching experience) – 1
- Assistant Professor (3 years teaching experience) – 1
- Chief Perfusionist / Lecturer (B.Sc. Cardio Pulmonary Perfusion Technology) - 1
- Assistant Perfusionist / Tutor (B.Sc. / Diploma with experience of 5 years in Cardio pulmonary Perfusion Technology).

## SECTION -III
# Course content (Syllabus)

## I YEAR THEORY

### Paper –I: CARDIOLOGY and CARDIAC SURGERY 80 Hours

**CARDIOLOGY**

1. **The Electrical Activity of the Heart: the Electrocardiogram:** The cardiac action potential, the electrocardiogram.
2. **Diseases of the Coronary Arteries:** Causes, Pathology and Prevention, Coronary Heart Disease – Angina and Unstable Angina; Coronary Heart Disease – Myocardial Infarction: Treatment of acute infraction, complications of acute myocardial infarction and their management, late complications of infraction, risk stratification at hospital discharge, drug treatment at discharge, rehabilitation.
3. **Heart Failure:** The Pathophysiology of heart failure, clinical syndromes of heart failure, the management pf cardiac failure, acute circulatory failure (shock), cardiac transplantation.
4. **Disorders of Rate, Rhythm and Conduction:** Mechanisms of arrhythmias, disturbances of rate and rhythm, disorders of conduction, investigation of arrhythmias, management of arrhythmias.
5. **Rheumatic Fever and its Sequelae, Disorders of the Cardiac Valves:** Mitral valve disease, aortic valve disease, tricuspid valve disease, pulmonary valve disease, infective endocarditis.

**6. Congenital Heart Disease:** The varieties of congenital heart disease.

**CARDIAC SURGERY**

1. **Ischaemic Heart Disease:** Pathophysiology of ischaemic disease: Indications for CABG, Contraindication to CABG, Planning coronary artery surgery, Conduit, selection, Principles of saphenous vein harvest, Saphenous vein harvest, LIMA harvest, RIMA harvest, Alternative conduits, Distal anastomoses on bypass, Jump or sequential grafts, Endarterectomy, Positioning the heart in OPCAB , Proximal anastomoses to aorta, Redo coronary artery bypass surgery , Problem scenarios in redo surgery , Left ventricular aneurysm , LV aneurysmectomy ,Ischaemic ventriculoseptal defect (VSD), Ischaemic mitral regurgitation, Results of coronary artery bypass surgery.

2. **Valvular Heart Disease:** Pathophysiology of aortic stenosis, Pathophysiology of aortic regurgitation, Timing of surgery – aortic, Principles of aortic valve replacement, Aortic valve implantation, Stentless aortic valve replacement, Homograft aortic valve replacement, The Ross procedure, Aortic root replacement, Aortic root enlargement, Principles of valve sparing procedures, Results of aortic valve surgery, Pathophysiology of mitral stenosis, Pathophysiology of mitral regurgitation, Timing of surgery – mitral, Principles of mitral valve repair, Mitral Valvotomy, Principles of mitral valve repair, Mitral valve replacement, Tricuspid valve disease, Surgery for infective endocarditis, Combined Valvular procedures, Alternative approaches, Results of mitral and tricuspid valve surgery.

3. **Congenital heart disease:** Overview of congential heart surgery, Patent ductus arteriosus, Anomalous pulmonary venous connection, Coarctation of the aorta, Atrial septal defects, Ventricular septal defects, Atrioventricular septal defects, Truncus arteriosus, AV alignment abnormalities, Transposition of the arteries, Ebstein's anomaly , Tetralogy of Fallot ,

Hypoplastic left heart syndrome, Basic operative technique , Arterial switch (Jatene), Rastelli operation, Damus-kaye-stansel operation, Norwood operation, Glenn shunt and hemi – Fontan, Fontan operation, Pulmonary artery banding, Aortopulmonary shunts, Tetralogy of Fallot repair, Pulmonary valvotomy, Aortopulmonary window repair, Coarctation of the aorta repair, Interrupted aortic arch repair, LVOT obstruction repair.

4. **Diseases of the thoracic aorta**: Pathology of aortic dissection, Diagnosis of type A aortic dissection, Management of type A dissections, Set – up for repair of aortic dissection, Repair of Debakey type II dissection, Repair of Debakey type I dissection, Management of type B dissections, Other repair techniques, Pathology of aortic aneurysms, Diagnosis of aortic aneurysms, Management of aortic aneurysms, Surgery for ascending aneurysms, Valve sparing surgery techniques, Surgery for aortic arch aneurysms, Repair of descending aortic aneurysms, Bypass for descending aorta surgery, Traumatic aortic transaction.

5. **Minimal access surgery:** Incisions, Options for Cardiopulmonary bypass, LIMA harvest, Coronary artery bypass grafting (CABG), Valve surgery.

6. **Complications of cardiac surgery:** Normal postoperative course, Overview of complications, Hypotension and tamponade, Chest pain and ischemia, Late arrhythmias, Hypertension, Pericardial problems, Complications of valve surgery, Respiratory complications, Renal Complications, Gastrointestinal symptoms, Gastrointestinal complications, Hepatobiliary complications, Stroke, Management of stroke, Neurological complications, Wound infections, wound complications, Haematological complications.

7. **Cardiac Anaesthesia:** Basic Principles of anaesthesia, Conduct of anaesthesia, Pre-bypass anaesthetic management, Anaesthetic management of bypass, Anaesthetic management post – bypass, Anaesthesia for off – pump surgery.

**PAPER - II INTRODUCTION TO – OT & CARDIO PULMONARY PERFUSION TECHNOLOGY: 80 Hours**

1. **Introduction to the operating room environment & protocols:** General protocols followed in the operating room, Hand washing, Unsterile-substerile-sterile methods followed in the O R environment, Handling of Disposables in the O R, Handling &maintenance of equipments in the OR, Protocols followed in CCU

2. **Introduction to the various components of Cardiopulmonary bypass system**

3. **Introduction to the basics of CPB procedures**

4. **Basics of electricity & functioning of electro medical equipments.** Electric safety (Earthing) & care of apparatus. Electricity & electro medical equipments& safe guards Static electricity

5. **Sterilization – material & methods**

6. **Cardiopulmonary resuscitation:** Basic cardiac life support, Advanced cardiac life support

7. **Intensive coronary unit & recovery room concepts**

8. **Biomedical waste & its management**

**Textbooks:**

1. Cardiopulmonary bypass; Principles and practice, Glenn P. Gravelee, Richard F. Davis , Mark Kurusz& Joe R. Utley; 2nd edition; Lippincott Williams & Wilkins 2000.
2. Techniques in Extracorporeal circulation, Philip H. Kay & Christopher M. Munsch

## PAPER III : EQUIPMENTS IN CARDIO PULMONARY PERFUSION TECHNOLOGY & PHYSIOLOGY & PATHOLOGY OF CARDIO PULMONARY PERFUSION

### PHARMACOLOGY OF CARDIOVASCULAR DRUGS 80 Hours

#### EQUIPMENTS IN CARDIO PULMONARY PERFUSION TECHNOLOGY

1. Blood Pumps, Principles of Oxygenator Function: Gas Exchange, Heat Transfer, and Operation
2. Circuitry and Cannulation Techniques, Cardiotomy Suction and Venting

#### PHYSIOLOGY & PATHOLOGY OF CARDIO PULMONARY PERFUSION

3. Blood – Surface Interface, Pulsatile Cardiopulmonary Bypass
4. Hemodilution and Priming Solutions, Hypothermia: Physiology and Clinical Use
5. Surgical Myocardial protection, Changes in the pharmacokinetics of Drugs Administered During Cardiopulmonary Bypass
6. Immune and Inflammatory responses after Cardiopulmonary Bypass, Embolic Events, Endocrine, Metabolic, and Electrolyte response
7. Cardiopulmonary Bypass and the Lung, Cardiopulmonary Bypass and the Kidney
8. Splanchnic, Hepatic, and Visceral effects, Neurologic Effects
9. Recent developments in equipments in cardio Pulmonary perfusion technology & physiology & pathology of Cardio Pulmonary perfusion

**Textbooks:**

1. Cardiopulmonary bypass; Principles and practice, Glenn P. Gravelee, Richard F. Davis, Mark Kurusz& Joe R. Utley; 2nd edition; Lippincott Williams & Wilkins 2000.
2. Techniques in Extracorporeal circulation, Philip H. Kay & Christopher M. Munsch
3. Warm heart surgery, Tomas Antonio Salerno

#### PHARMACOLOGY OF CARDIOVASCULAR DRUGS

**1. Anti-anginal agents:** Beta-blocking antes, nitrates, calcium channel blockers

**2. Anti-failure agents:** Diuretics

**3. Angiotensin – converting enzyme (ACE):** inhibitors, angiotensin-II, Receptor Blockers (ARBs) and aldosterone antagonism

**4. Digitalis:** acute inotropes and inotropic dilators

**5. Antihypertensive drugs:**

**6. Antiarrhythmic drugs**

**7. Antithrombotic agents**: platelet inhibitors, anti coagulants and fibrinolytics

**8. Lipid –lowering and antiatherosclerotic drugs**

**9. Recent developments in pharmacology of cardiovascular drugs**

**Textbooks:**

Drugs for the heart, Lionel HOpie, Bernard J Gersh, 5th Edition

## Paper – IV

### Epidemiology & Bio-statistics including Research Methodology

## Total hours: 80

| Sl. No. | Topics | 80 Hours |
|---|---|---|
| 1 | **Introduction**<br>Introduction to Biostatistics& Research Methodology, types of variables & scales of measurements, measures of centraltendency and dispersion, Skewness and Kurtosis Rate, Ratio, proportion, incidence, prevalence and their meaning. | 6 |
| 2 | **Sampling**<br>Random & non random sampling, various methods ofsampling-simple random, stratified, systematic, cluster andmultistage. Sampling and non sampling errors. | 6 |
| 3 | **Basic probability distribution and sampling distributions**<br>Concept of probability distribution, normal, Poison andBinomial distributions, parameters and applications.Concept of sampling distributions. Standard error andconfidence intervals. | 8 |
| 4 | **Tests of Significance**<br>Basics of testing of hypothesis – Null and alternate, hypothesis, type I and type II errors, level of significance and power of the test, p value. Tests of significance (parametric) T – test (paired & unpaired), Chi square test and test of proportion, one way analysis of variance. Repeated measures analysis of variance. Tests of significance (nonparametric) – Mann Whitney U Test,Wilcoxon Test, Kruskal – Wallis analysis of variance Friedmann's analysis of variance. | 12 |
| 5 | **Correlation and Regression**<br>Simple correlation –Pearson'sand Separman's methods ;testing the significance of correlation co-efficient simple and multiple linear regression. | 6 |
| 6 | **Sample size determination**<br>General concept Sample size for estimating means andproportion, testing of difference in means, proportions oftwo groups and more than two groups. | 6 |

| | | |
|---|---|---|
| 7 | **Study Designs**<br>Descriptive epidemiological methods – case series analysis and prevalence studies. Analytical epidemiological methods– case control and cohort studies, Clinical trials / inter ventionstudies, odds ratio and relative risk, stratified analysis. | 12 |
| 8 | **Multivariate analysis**<br>Concept of multivariate analysis, introduction to logisticregression and survival analysis | 8 |
| 9 | **Reliability and validity evaluation of Diagnostic Tests**<br>Cronbach's alpha and Test- retest methods | 6 |
| 10 | **Format of Scientific documents**<br>Structure of Research protocol, structure of thesis/research report, formats of reporting in scientific journals. Systematic review and meta analysis. | 10 |

**Suggested Reading**


1. Surendar a Rao PSS and J Richard. Introduction Biostatics an Research Methods, Prentice Hall of India (2006).
2. AbhayaIndrayan and Rajeev Kumar Malhotra, Medical Biostatics, 4$^{th}$Editiin, CRC Press (2017)
3. Indrayan and Satyanarayana, Biostatics for Medical, Nursing and pharmacy students, prentice Hall of India (2006)
4. Sarma K.V.S, Statistics made simple – do it yourself on PC, 2$^{nd}$ edition, Prentice Hall (2010)

# PRACTICALS – I YEAR

## Paper –I :

**CARDIOLOGY AND CARDIAC SURGERY** **60 Hours**

**CARDIOLOGY**

Clinical scenario given to the candidate for diagnosis and treatment of following disorders:

a. Unstable angina
b. Myocardial infarction
c. Left ventricular aneurysm
d. Congestive heart failure
e. Cardiac arrhythmia
f. Atrial septal defect
g. Ventricular septal defect
h. Tetralogy of Fallot
i. Hypertension

**CARDIAC SURGERY**

Brief description of surgical steps involved in:

a. Coronary artery bypass grafting (on pump CABG)
b. Mitral valve replacement
c. Aortic valve replacement
d. ASD closure
e. VSD closure
f. TOF repair
g. Redo sternotomy
h. Off-pump CABG

Recommended Reading and Reference books

**Textbooks:**

**Cardiology:**


1. Cardiology, 7th Edition, Desmond G. Julian, J. Campbell Cowan, James M. McLenachan

2. Davidson's Principles and Practice of Medicine, Edited by Nicki R.Colledge, Brian R.Walker, StuaratH.Ralston.

3. Pefloff's Clinical Recognition of Congenital Heart Disease. Author: JK Perloff, Ariane J.Marelli

4. Valvular heart Disease Author. Joseph S Alpert, James E Dalan and Shahbuddin H Rahimtoola

5. Text Book of Cardiology by Braunwald


**Cardiac Surgery :**


6. Cardiac Surgery: Oxford specialist handbook in surgery (Cardio thoracic surgery), Indian Edition, Joanna Chikwe, Emma Beddow, Brain Glenville.

7. Cardiac Surgery Author: Kirklin/ Barratt-Boyes

**Cardio Pulmonary Perfusion:**

8. Text Book on Cardiopulmonary bypass Principles and Practice Author: Glen P. Gravalee, Richard F Davis, Alfred H Stammers and Ross M.Ungerleider

9. Cardiopulmonary bypass Principles and management Edited by : Kanneth M. Taylor

**Pharmacology:**

10. Test Book of Pharmacology : . Gabriel Khan

11. Drugs for the heart – Opie

12. Text Book of Pharmacology by Satoskar

**Anatomy**

Test Book
1. Medical Embryology Langmans, Inderbir Singh
2. Anatomy : Chaurasia
3. Anatomy by Gray's Anatomy

ECG : Schamroth

## Paper –II :

**INTRODUCTION TO – OT & CARDIO PULMONARY PERFUSION TECHNOLOGY:**

**60 hours**

- Practical aspects of the theory topics

**Simlation:**

Priming techniques
Assembly of a circuit
Leakage detection
Air bubble removal
Roller pump Caliberation
Wet runs
Monitoring parameters, Sampling and data Recording
Drug management
Equipment maintenance
Coordination with Surgeon and Anaesthetist

## Paper –III:

**EQUIPMENTS IN CARDIO PULMONARY PERFUSION TECHNOLOGY & PHYSIOLOGY & PATHOLOGY OF CARDIO PULMONARY PERFUSION PHARMACOLOGY OF CARDIOVASCULAR DRUGS:**

**60 hours**

**Equipments In Cardio Pulmonary Perfusion Technology & Physiology & Pathology of Cardio Pulmonary Perfusion:**

1. The candidate should be able to recognize and describe the various parts of the following equipments:
   a. Integrated membrane Oxygenator system
   b. Roller pump.
   c. Centrifugal pump.
   d. Arterial line filter.
   e. Various types of connectors & tubing's.
   f. Various types of cannulae.
   g. Cardioplegia delivery system
2. Able to assemble an Adult Extra Corporeal Bypass Circuit..
3. Able to handle a Heart Lung machine with an Extra Corporeal circuit.
4. Priming and de-airing of an assembled Extra Corporeal Circuit.
5. Priming and de-airing of an Online Cardioplegia delivery system.
6. Determination of occlusion in a roller pump.
7. Method to calibrate the Heart Lung machine.
8. Should know about the Safety features of the Heart Lung machine.
9. Calculation PCV on CPB and amount of blood to be added to bring the PCV to the target PCV. Calculation body surface area of an individual, Systemic Vascular Resistance.

(1). Interpretation and correction of a given arterial blood gas report. (2). Interpretation and correction of a given electrolyte abnormality, (3). Performing and ACT estimation and interpretation of results (4). Other methods to monitor anti coagulation on CPB.

**Pharmacology of Cardiovascular Drugs:**

Common cardiovascular drugs and main actions & side effects:

a. Nitrates
b. β-Blockers
c. Calcium channel blockers
d. Digoxin
e. Angiotensin receptor antagonists
f. Angiotensin receptor blockers
g. Common anti-arrhythmic agents
h. Heparin
i. GP II b / III a blockers
j. Aspirin &clopidogrel

## Second Year– Theory

**Paper I : CLINICAL APPLICATIONS OF CARDIO PULMONARY PERFUSION TECHNOLOGY** **60 Hours**

1. Conduct of cardiopulmonary bypass & termination of bypass
2. Management of unusual problems encountered in initiating and maintaining cardiopulmonary bypass.
3. Cardiopulmonary bypass in infants and children
4. Extra corporeal membrane oxygenation for respiratory or cardiac support
5. Extra corporeal cardiopulmonary support for resuscitation and invasive cardiology outside the suite
6. Non-cardiovascular applications of cardiopulmonary bypass
7. Perfusion for thoracic aortic surgery
8. Cardiopulmonary bypass for port – access cardiac surgery
9. Recent developments clinical applications of Cardio Pulmonary perfusion technology

**Textbooks:**

1. Cardiopulmonary bypass; Principles and practice, Glenn P. Gravelee, Richard F. Davis, Mark Kurusz& Joe R. Utley; 2nd edition; Lippincott Williams & Wilkins 2000.
2. Techniques in Extracorporeal circulation, Philip H. Kay & Christopher M. Munsch
3. Warm heart surgery , Tomas Antonio Salerno

**Paper II : CARDIAC SURGERY WITHOUT CPB**
**MECHANICAL CIRCULATORY SUPPORT &ROBOTIC CARDIAC SURGERY**

**60 Hours**

**Cardiac surgery without CPB**

Patients selection for less invasive operations (MID CAB, OP-CABG), technical considerations in off-pump surgery, stabilizing devices, intra coronary stunts, primary off-pump CABG in impaired left ventricular function, alternative approaches to coronary artery disease, beating heart surgery supported by assist devices.

**Mechanical circulatory support**

1. IABP
2. Should have knowledge of Cardiac assist devices
   a. General aspects of mechanical support
   b. Extracorporeal devices
   c. Intracorporeal devices
   d. Future devices
3. Knowledge regarding the Devices used as bridge to transplantation
   a. Thoratec VAD
   b. Novacor LVAD
   c. Heart mate
   d. Totally artificial heart

**Robotic cardiac surgery**: The candidate should have knowledge regarding the following :
Cardio pulmonary bypass during port – access surgery and robotic surgery: endovascular catheter system, minimally invasive cardiac surgery, directs vision, micro-incision and video-assisted, and robotic operations.

**Recent developments issues in Cardio Pulmonary perfusion**

**Textbooks:**

1. Cardiac assists devices, Daniel J. Goldstein & Mehmet C.Oz, Futura Publishing Company, 2000
2. Cardiopulmonary bypass; Principles and practice, Glenn P. Gravelee, Richard F. Davis, Mark Kurusz& Joe R. Utley; 2nd edition; Lippincott Williams & Wilkins 2000.
3. Techniques in Extracorporeal circulation, Philip H. Kay & Christopher M. Munsch

**PAPER III: ORGAN TRANSPLANTATION 60 Hours**

**1. Heart transplantation**

Basic transplant immunology, Patient and donor selection, Matching donor to recipient, Donor preparation, Orthotopic / heterotropic Cardiac transplantation, Intensive care management, Immunosuppression and rejection, Surgical complications and results.

**2. Heart-lung transplantation**

Recipient selection, donor selection and graft harvest, surgical procedure, Pathophysiology before / after transplantation, preoperative management.

**3. Lung transplantation**

Recipient selection, Donor selection and graft harvest, surgical procedures of lung transplantation (single-lung / double-lung transplantation) , Pathophysiology before / after transplantation, postoperative management.

**4. Liver transplantation:** role of perfusionist

**5. Renal transplantation:** role of perfusionist

**6. Prosthetic heart valves** (mechanical/ bioprosthetic) and the **annuloplasty rings**

Mechanical and bioprosthetic heart valves: ball & cage valve, tilting-disc valves (porcine, bovine and stent – less valves), Annuloplasty rings: Rigid rings, complete & partial rings, soft rings, bio-degradable sings.

**7. Homografts**

**Grafts (**Synthetic): synthetic grafts, pre-clotted grafts, collagen – coated grafts, bifurcatedgrafts:

**Recommended Books for organ transplantation**

**Text Book:** Cardiac Surgery Author: Kirklin/ Barratt-Boyes Sabistons

**Reference books :**

1. Clinical Guide to Heart Transplantation Editors: **Kobashigawa**, Jon (Ed.)
2. Lung And Heart - Lung Transplantation(Lung Biology In Health And Disease Vol. 217) by Joseph P Lynch and David J Ross, Taylor & Francis

3. Kaplan's Cardiac Anaesthesia, 5th Edition, Joel A Kaplan (Editor) Elsevier Saunders, Philadelphia 2006.

4. Oxford specialist handbook in surgery (Cardio thoracic surgery), Indian Edition, Joanna Chikwe, Emma Beddow, Brain Glenville.
5. Ventricular Assist Devices in Advanced-Stage Heart Failure Editors: **Kyo**, Shunei (Ed.)

**Paper IV: HEMATOLOGY AS RELEVANT TO CARDIO PULMONARY PERFUSION, BLOOD TRANSFUSION AND BLOOD CONSERVATION 60 Hours**

**A.Hematology:** Anticoagulation for cardiopulmonary bypass, Heparin neutralization, Hematologic effects of cardiopulmonary bypass, Management of coagulopathy associated with cardiopulmonary bypass. Coagulation Cascade and clotting factors

**B.Blood transfusion**: Transfusion practices, Transfusion algorithms Various transfusion reactions

**C.Blood conservation**: Autologous blood donation, acute perioperative normovolemichemodilution or "blood pooling", intraoperative blood salvage, postoperative autologous blood salvage, erythropoietion therapy to replace blood loss, Pathophysiology and epidemiology of hemostatic abnormalities, Topical agents for reducing blood loss.

**Textbook**

1. Cardiopulmonary bypass; Principles and practice, Glenn P. Gravelee, Richard F. Davis, Mark Kurusz& Joe R. Utley; 2nd edition; Lippincott Williams & Wilkins 2000.
2. Techniques in Extracorporeal circulation, Philip H. Kay & Christopher M. Munsch
3. Physiology - Ganong
4.Text book physiology – Gluyton

## PRACTICALS – II YEAR

### Paper –I :

**CLINICAL APPLICATIONS OF CARDIO PULMONARY PERFUSION TECHNOLOGY**

**80 Hours**

1. Able to assemble an ideal pediatricCPB circuit and should be able to describe the differences between adult and pediatric circuit.
2. Should be able to assemble an ECMO circuit and describe the components
3. Should be able to assemble ECMO circuit and prime it.
4. Should be able to design an ideal CPB circuit for an Aortic arch repair surgery and should know the advantages
5. Should know how to change an oxygenator during CPB
6. Should know how to change of pump loop
7. Management of massive air embolism during CPB.
8. Management of arterial pump failure
9. Should be able to deal with the catastrophic events which could occur during CPB like : Manage a simulated perfusion accident on a dummy CPB circuit including changing oxygenators when on CPB, managing falling/leaking reservoir levels, venous airlocks, air in the arterial line, cardioplegia delivery failure, increased arterial line pressure, recognition of a possible dissection, run away pump head, recognition of heat exchanger water leak into the CPB circuit, reaction time assessment etc.
10. Should be able to calculate vascular resistance on CPB and management of increased perfusion pressure on bypass.

### Paper –II :

**CARDIAC SURGERY WITHOUT CPB**

**MECHANICAL CIRCULATORY SUPPORT &ROBOTIC CARDIAC SURGERY**

**80- hours**

1. Should know about the LVAD / RVAD circuit and be able to know the parts of the components
2. Should have knowledge of LVAD/RVAD circuit and prime.
3. Set up of an IABP; indentation the dicrotic notch, end diastolic point, unassited systole, and assisted systole.
4. Description of proper timing, timing errors, complications and contra indications of IABP therapy. Diagrammatic representation of picture of pressure wave of 1:2 assist.
5. Identification & use of octopus in off-pump CABG
6. Identification & use of star fish in off-pump CABG
7. Indications for use of IABP for off-pump procedures
8. Shunts used for systemic –pulmonary shunts in pediatric cardiac surgery and for aortic surgery.
9. Intra coronary shunts in off-pump CABG

## Paper –III:

**ORGAN TRANSPLANTATION** **80- hours**

**PRACTICALS**

i). Should be able to identify
various mechanical and bioprosthetic heart valves
ball & cage valve, tilting-disc valves (porcine, bovine and stent – less valves),
Annuloplasty rings : Rigid rings , complete & partial rings , soft rings , bio-degradable sings.

ii). Should be able to identify various homografts specimens.
Describe the process of harvest, processing preservation and handling of homografts

iii).Should have knowledge and be able to identify various grafts (synthetic):
Desirable materials used for manufacture of synthetic grafts, pre-clotted grafts, collagen – coated grafts, bifurcated grafts:
Methods of sterilization of systemic grafts.
Difference between homografts and synthetic grafts.

## Paper –IV

**HEMATOLOGY AS RELEVANT TO CARDIO PULMONARY PERFUSION, BLOOD TRANSFUSION AND BLOOD CONSERVATION** **80- hours**

1. Draw and discuss coagulation cascade
2. Describe action and uses of heparin
3. Describe action & side effects of protamine
4. Describe on heparin alternatives
5. Platelet dysfunction during CPB
6. Leukocyte depletion during CPB
7. Factors causing hemolysis during CPB
8. Monitoring of anti-coagulation during CPB

    a). ACT
    b). Heparin protration titration
    c). Heparin concentration
    d). Sonoclot
    e). Thromboelastography
9. Discuss coagulation disorder associated CPB
10. Draw and discussion on algorithm approach for hemostatic therapy in cardiac patients.
11. Draw and discussion on algorithm approach for postoperative red cell transfusion in cardiac surgical patients.
12. Cost effectiveness of autologous blood donation in cardiac surgery.

## SECTION-IV
## MONITORING LEARNING PROGRESS

It is essential to monitor the learning progress of each candidate through continuous appraisal and

regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Model Checklists are given in this Chapter, which may be copied and used.
The learning out comes to be assessed should include:

i) ***Acquisition of Knowledge***: The methods used comprise of `Log Book' which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed. If the list is not complete, the department may include additional activities, if so, desired.

***Journal Review Meeting (Journal Club):*** The ability to do literature search, in depth study,presentation skills, and use of audio- visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting using a checklist (see Model Checklist – I, Section IV)

***Seminars / Symposia:*** The topics should be assigned to the student well in advance tofacilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio- visual aids are to be assessed using a checklist (see Model Checklist-II, Section IV)

***ii) Teaching skills:*** Candidates should be encouraged to teach undergraduate medicalstudents and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (See Model checklist III, Section IV)

**iii) Dissertation:** Please see checklist IV and V in Section IV.

**iv) Work diary / Log Book**- Every candidate shall maintain a work diary and record his/herparticipation in the training programmes conducted by the department such as journal, reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of experiments or laboratory procedures, if any conducted by the candidate.

**v) *Records:*** Records, log books and marks obtained in tests will be maintained by the Headof the Department and will be made available to the University.

**Logbook:**

The logbook is a record of the important activities of the candidates during his training; Internal assessment should be based on the evaluation of the logbook. Collectively, logbooks are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

**Format for the logbook** for the different activities is given in Tables 1 and 2 of Section IV.
Copies may be made and used by the department.

**Procedure for defaulters:** Every department should have a committee to review suchsituations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right. **Format of Model Checklists**

## SECTION - V

### Checklist - I

### Model Checklist for Evaluation of Journal Review Presentations

Name of the student:_____ Date:_____

Name of the faculty/ Observer:_____

| Sl. No. | Items for observation during presentation | Poor | Below average | Average | Good | Very Good |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 |
| 1 | Article chosen was | | | | | |
| 2 | Extent of understanding of scope & objectives of the paper by the candidate | | | | | |
| 3 | Whether cross- references have been consulted | | | | | |
| 4 | Whether other relevant references have been consulted | | | | | |
| 5 | Ability to respond to questions on the paper /subject | | | | | |
| 6 | Audio-visuals aids used | | | | | |
| 7 | Ability to defend the paper | | | | | |
| 8 | Clarity of presentation | | | | | |
| 9 | Any other observation | | | | | |
| | **Total score** | | | | | |

**Checklist - II**

**Model Check List for the Evaluation of the Seminar Presentations**

Name of the student:_____Date:_____

Name of the faculty/ Observer:_____

| Sl. No. | Items for observation during presentation | Poor | Below average | Average | Good | Very Good |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 |
| 1 | Article chosen was | | | | | |
| 2 | Extent of understanding of scope & objectives of the paper by the candidate | | | | | |
| 3 | Whether cross- references have been consulted | | | | | |
| 4 | Whether other relevant references have been consulted | | | | | |
| 5 | Ability to respond to questions on the paper /subject | | | | | |
| 6 | Audio-visuals aids used | | | | | |
| 7 | Ability to defend the paper | | | | | |
| 8 | Clarity of presentation | | | | | |
| 9 | Any other observation | | | | | |
| | **Total score** | | | | | |

**Checklist – III**

**Model Check list for Evaluation of Teaching Skill**

Name of the student:_____Date:_____

Name of the faculty/ Observer:_____

| SL. No. | | Strong Point | Weak point |
|---|---|---|---|
| 1 | Communication of the purpose of the talk | | |
| 2 | Evokes audience interest in the subject | | |
| 3 | The introduction | | |
| 4 | The sequence of ideas | | |
| 5 | The use of practical examples and /or illustrations | | |
| 6 | Speaking style (enjoyable, monotonous, etc., specify) | | |
| 7 | Summary of the main points at the end | | |
| 8 | Ask questions | | |
| 9 | Answer questions asked by the audience | | |
| 10 | Rapport of speaker with his audience | | |
| 11 | Effectiveness of the talk | | |
| 12 | Uses of AV aids appropriately | | |

**Checklist - IV**

**Model Check list for Dissertation / Project Work Presentations**

Name of the student:_____ Date:_____

Name of the faculty/ Observer:_____

| Sl. No. | Points to be considered | Poor | Below average | Average | Good | Very Good |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 |
| 1 | Interest shown in selecting topic | | | | | |
| 2 | Appropriate review | | | | | |
| 3 | Discussion with guide and other faculty | | | | | |
| 4 | Quality of protocol | | | | | |
| 5 | Preparation of proforma | | | | | |
| | **Total score** | | | | | |

**Checklist – V**

Continuous Evaluation of dissertation / project work By

Guide/ Co-Guide

Name of the student: _____Date:_____

Name of the faculty/ Observer:_____

| Sl. No. | Items for observation during presentation | Poor | Below average | Average | Good | Very Good |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 |
| 1 | Periodic consultation with guide/ co-guide | | | | | |
| 2 | Depth of Analysis/ Discussion | | | | | |
| 3 | Department presentation of findings | | | | | |
| 4 | Quality of final output | | | | | |
| 5 | Others | | | | | |
| | **Total score** | | | | | |

**Overall Assessment Sheet**

Date:

| Check list No. | Name of the students | | | |
|---|---|---|---|---|
| | **A** | **B** | **C** | **D** |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |

**Course i/c** **Signature of the HOD** **Signature of the Principal i/c AHS**

The above overall assessment sheet used along with logbook should form the basis for certifying satisfactory completion of course of study, in addition to the attendance requirement.

KEY

Mean score: Is the sum all the scores of checklists 1 to 5

A, B, C: Name of the students

**LOG BOOK**

Table 1: Academic activities attended

**Name:**

**Admission Year:**

**College:**

| **Date** | **Type of activity, Specific Seminar, Journal club, presentation, UG teaching** | **Particulars** |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**LOG BOOK**

Table-2: Academic presentations made by the student

**Name:**

**Admission Year:**

**College:**

| Date | Topic | Type of activity, Specific Seminar, Journal club, presentation and UG teaching |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

## SECTION-VI

## ETHICS IN M.Sc. CARDIO PULMONARY PERFUSION TECHNOLOGY

**(Should be taught to the 1st year students of M.Sc. Cardio Pulmonary Perfusion Technology)**

**Introduction:** With the advances in science and technology and the increasing needs of the patient, their families and community, there is a concern for the health of the community as a whole. There is a shift to greater accountability to the society. It is therefore absolutely necessary for each and every one involved in the health care delivery to prepare themselves to deal with these problems. Technicians like the other professionals are confronted with many ethical problems.

Standards of professional conduct for technicians are necessary in the public interest to ensure an efficient laboratory service. Every technician should not only be willingly to play his part in giving such a service, but should also avoid any act or omission which would prejudice the giving of the services or impair confidence, in respect, for technician as a body.

To accomplish this and develop human values, it is desired that all the students undergo ethical sensitization by lectures or discussion on ethical issues.

**Introduction to ethics-**

What is ethics?
General introduction to Code of Laboratory Ethics
How to form a value system in one's personal and professional life?
International code of ethics

**Ethics of the individual-**
Technician relation to his job
Technician in relation to his trade
Technician in relation to medical profession
Technician in relation to his profession

**Professional Ethics-**
Code of conduct
Confidentiality
Fair trade practice
Handling of prescription
Mal practice and Negligence
Professional vigilance

**Research Ethics-**
Animal and experimental research/ humanness
Human experimentation
Human volunteer research - informed consent
Clinical trials
Gathering all scientific factors
Gathering all value factors
Identifying areas of value – conflict, setting priorities
Working out criteria towards decision

ICMR/ CPCSEA/ INSA Guidelines for human / animal experimentation

**Recommended reading**


- Francis C.M., Medical Ethics, I Edition, 1993, Jay pee Brothers, New Delhi p189.
- Good Clinical Practices: GOI Guidelines for clinical trials on Pharmaceutical Products in India (www.cdsco.nic.in)
- INSA Guidelines for care and use of Animals in Research – 2000.
- CPCSEA Guidelines 2001(www.cpcsea.org).
- Ethical Guidelines for Biomedical Research on Human Subjects, 2000, ICMR, New Delhi.
- ICMR Guidelines on animal use 2001, ICMR, New Delhi.

## SECTION -VII

## ANNEXURE-I

## CATEGORIES OF BIO-MEDICAL WASTE

| | Waste Category ** Type | Treatment a Disposal ** Options |
|---|---|---|
| Category No. 1 | Human Anatomical Waste:<br>(human tissues, organs, body parts) | Incineration deep burial |
| Category No. 2 | Animal Waste:<br>(animal tissues, organs, body parts, carcasses, blooding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals colleges, discharge form hospitals, animal houses) | Incineration deep burial |
| Category No. 3 | Microbiology & Biotechnology Waste: (wastes from laboratory cultures, stocks or specimens or micro-organisms live or attenuated vaccines, human and animal<br>Cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures) | Local autoclaving / micro waving / incineration. |
| Category No. 4 | Waste sharps:<br>(Needles, syringes, scalpels, blades, glass, etc, that may cause puncture and cuts. This includes both used and unused sharps) | Disinfection (chemical treatment / autoclaving / micro –waving and mutilation / shredding |
| Category No. 5 | Discarded Medicines and Cytotoxic drugs:<br>(wastes comprising of outdated, contaminated and discarded medicines) | Incineration / destruction and drugs disposal in secured landfills. |
| Category No. 6 | ** Solid Waste:<br>(Items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, Eners, beddings, other material contaminated with blood) | Incineration<br>Autoclaving / micro waving |
| Category No. 7 | Solid Waste:<br>(Wastes generated form disposable items other than the waste ** sharps such as tubings, catheters, intravenous sets, etc) | Disinfection by chemical treatment, autoclaving / micro-waving and mutilation / shredding |
| Category No. 8 | Liquid Waste:<br>(Waste generated from laboratory and washing, cleaning, housekeeping and disinfecting activities) | Disinfection by chemical treatment and discharge into drains |
| Category No. 9 | Incineration Ash:<br>(Ash from incineration of any biomedical waste) | Disposal in municipal landfill |

**SECTION - VIII**

# SRI VENKATESWARA INSTITUTE OF MEDICAL SCIENCES

# TIRUPATI – 517 507

***(A University established by an act of Andhra Pradesh State Legislature)***

## TRANSCRIPT

### *Master of Science in Cardio-Pulmonary Perfusion Technology*

We hereby certify that the person named here below was a bonafide post-graduate student of SVIMS University. Further, we certify that the contents herein are accurate and complete.

Name

University Reg. No.

Gender :

Date of Birth :

Nationality :

Permanent Address :

Mailing Address :

EDUCATION

| School/University | Place | Years | Degree obtained |
|---|---|---|---|

| Sl. No. | Subject | No. of Contact Hours | Code | Grade | Remarks |
|---|---|---|---|---|---|
| 1. | Cardiac Embryology | 20 | C,L | P | |
| 2. | Fetal and neonatal circulation | 2 | C,L | P | |
| 3. | Ultrasound physics and instrumentation | 146 | C,L,P,PL | P | |
| 4. | Clinical Cardiology | 133 | C,L,PL | P | |
| 5. | Cardiovascular Pharmacology | 10 | C,L | P | |
| 6. | Electrophysiology | 4 | C,L | P | |
| 7. | Acute coronary syndrome | 8 | C,L | P | |
| 8. | BLS/ACLS | 10 | C,L,P | P | |
| 9. | Ischemic Heart Disease | 17 | L | P | |
| 10. | Valvular Heart disease | 32 | L | P | |
| 11. | Congenital Heart Disease | 44 | L | P | |
| 12. | Cardiac surgery | 10 | L,C, PL | P | |
| 13. | Echocardiography for lschemic Heart disease | 70 | C,P,PL | P | |
| 14. | Echocardiography for Valvular heart disease | 70 | C,PL,P | P | |
| 15. | Echocardiography for Congenital Heart disease | 140 | C,PL,P | P | |
| 16. | Epedemiology and Biostastics | 60 | L | P | |
| 18. | Ehocardiography of other heart diseases | 25 | PL, C,L,P | P | |
| 19. | Myopericardial, Aortic, Systemic disorder & non cardiac diagnosis | 137 | C,L,P,PL | P | |
| 20. | Recent Advances | 168 | C,L,PL,P | P | |
| 21. | Medical ethics | 10 | L | P | |
| 22. | Fetal Echocardiography | 2 | L,P | P | |
| 23. | Peripheral Ultrasound | 2 | L,P | P | |
| 24. | Seminar presentation | SS, I(G) | Classes for UG's | | |
| 25. | Attending rounds with Cardiologists | 10 | C | P | |

**DESCRIPTION OF CODES**

C : Clinical Teaching

D : Demonstration of Faculty

I : Independent Work by Student

I (G) : Independent Work by Student Guided by Faculty

L : Classroom Lectures by Faculty

P : Hands on Practical Work by Students

SD : Self Directed Study by Student

SD (E) : Self Directed Study by Student with Faculty Evaluation
SS : Student Conducted Seminars with Faculty Moderation and Evaluation by Peers and Faculty
PL : Practical / Clinical Lab Posting

**Prof.& Course Incharge Prof.& HOD Principal I/c AHS**

**CHECKLIST - I**
**Model Check List for Evaluation of Teaching Skill**

| SL. No. | | Poor 0 | Below average 1 | Average 2 | Good 3 | Very good 4 |
|---|---|---|---|---|---|---|
| 1 | Communication of the purpose of the talk | | | | | |
| 2 | Evokes audience interest in thesubject | | | | | |
| 3 | The introduction | | | | | |
| 4 | The sequence of ideas | | | | | |
| 5 | The use of practical examples and /or illustrations | | | | | |
| 6 | Speaking style (enjoyable,monotonous, etc., specify) | | | | | |
| 7 | Summary of the main points at theend | | | | | |
| 8 | Ask questions | | | | | |
| 9 | Answer questions asked by the audience | | | | | |
| 10 | Rapport of speaker with his audience | | | | | |
| 11 | Effectiveness of the talk | | | | | |
| 12 | Uses of AV aids appropriately | | | | | |

**CHECKLIST - II**

**Model check list for Dissertation / Project Work Presentations**

| Sl. No. | Points to be considered | Poor 0 | Below average 1 | Average 2 | Good 3 | Very Good 4 |
|---|---|---|---|---|---|---|
| 1 | Interest shown in selecting topic | | | | | |
| 2 | Appropriate review | | | | | |
| 3 | Discussion with guide and other faculty | | | | | |
| 4 | Quality of protocol | | | | | |
| 5 | Preparation of proforma | | | | | |
| | **Total score** | | | | | |

**Overall Assessment of the student by the clinical/Lab work:**

| Sl. No | Points to be considered | Poor 0 | Below Average 1 | Average 2 | Good 3 | Very Good 4 | Excellent 5 |
|---|---|---|---|---|---|---|---|
| 1 | Attendance | | | | | | |
| 2 | Punctuality | | | | | | |
| 3 | Interaction with colleagues and support staff | | | | | | |
| 4 | Maintenance of case records | | | | | | |
| 5 | Topic Presentation | | | | | | |
| 7 | Time sense | | | | | | |
| 8 | Knowledge | | | | | | |
| 9 | Rapport with patient. | | | | | | |
| 10 | Overall quality of work | | | | | | |
| | **Total Score** | - - | - - | - - | | | |