Revised Regulations and Curricula
For
Post Graduate Degree and Diploma Courses
in
Pre-Clinical Medical Sciences

2014

Rajiv Gandhi University of Health Sciences, Karnataka
4th ‘T’ Block, Jayanagar, Bangalore - 560 041
Revised Regulations and Curricula for Post Graduate Degree and Diploma Courses in Pre-Clinical Medical Sciences

This book can be had from:
The Registrar
Rajiv Gandhi University of Health Sciences, Karnataka
4th “T” Block, Jayanagar
Bangalore – 560041

Price: Rs. -----
Revised Regulations and Curricula for Post Graduate Degree and Diploma Courses in
Pre-Clinical Medical Sciences

(Annexure to University Notification No.AUTH/108Syn/ORD/006-007-008/2014-15
dated 16.09.2014)

Pre-Clinical Subjects

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The Emblem of the Rajiv Gandhi University of Health Sciences is a symbolic expression of the confluence of both Eastern and Western Health Sciences. A central wand with entwined snakes symbolises Greek and Roman Gods of Health called Hermis and Mercury is adapted as symbol of modern medical science. The pot above depicts AmruthaKalasham of Dhanvanthri the father of all Health Sciences. The wings above it depicts Human Soul called Hamsa (Swan) in Indian philosophy. The rising Sun at the top symbolises knowledge and enlightenment. The two twigs of leaves in western philosophy symbolises Olive branches, which is an expression of Peace, Love and Harmony. In Hindu Philosophy it depicts the Vanaspathi (also called as Oushadi) held in the hands of Dhanvanthri, which are the source of all Medicines. The lamp depicts human energy (kundalini). The script “DevahithamYadayahu” inside the lamp is taken from UpanishathShanthiManthram (BhadramKarnebhiShrunuyanadev…), which says “May we live the full span of our lives allotted by God in perfect health” which is the motto of the Rajiv Gandhi University of Health Sciences.
I. Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore

Vision Statement

The Rajiv Gandhi University of Health Sciences, Karnataka, aims at bringing about a confluence of both Eastern and Western Health Sciences to enable the humankind “Live the full span of our lives allotted by God in Perfect Health”

It would strive for achievement of academic excellence by Educating and Training Health Professionals who

- Shall recognize health needs of community,
- Carry out professional obligations Ethically and Equitably and in keeping with National Health Policy,

It would promote development of scientific temper and Health Sciences Research.

It would encourage inculcation of Social Accountability amongst students, teachers and institutions.

It would Support Quality Assurance for all its educational programmes

Motto

Right for Rightful Health Sciences Education
Notification

Sub: Revised Ordinance pertaining to Post Graduate Courses (Pre-Clinical Medical subject) course in Anatomy, Physiology and Biochemistry.

2. Minutes of the meeting of BOS Medicine (Pre-Clinical) (PG) held on 09/04/2014.
3. Minutes of the meeting of Faculty of Medicine held on 06/06/2014.
4. Minutes of the meeting of the Academic Council held on 19/06/2014.
5. Minutes of the 108th meeting of the syndicate held on 14/08/2014

In exercise of the powers conferred under 35(2) of the Rajiv Gandhi University of Health Science Act 1994, the Syndicate at its meeting held on 14/08/2014 has been pleased to approve the Revised Ordinance pertaining to Post Graduate Courses in Pre-Clinical Medical subjects – Anatomy, Physiology and Biochemistry as shown in the annexure appended herewith.

The revised ordinance shall come into force from the academic year 2014-15 and onwards.

By order

Sd/-
Registrar

To,

The Principles of all Medical Colleges conducting Medical PG courses, affiliated to RGUHS

Copy to:
1. The Secretary to Governor, Governor’s Secretariat, Raj Bhavan, Bangalore – 56001
2. The Secretary to Government, Medical Education, Department of Health and Family Welfare, VikasaSoudha, Bangalore -56001
3. All the member of the Syndicate/Senate/Academic Council
4. PA to VC/Registrar/Registrar (Evaluation)/Finance Officer
5. Programmer, Computer Section for Notification on the University Homepage on the internet, for general information of all interested.
6. Public Information Officer
7. Consultant, CDC/ DR Affiliation/DR Admission/ DR Examination
8. Guard File/Office Copy
Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore.

Chapter I

Revised Regulations and Curricula for Post Graduate Degree and Diploma Courses in Pre-Clinical Medical Sciences

1. Branches of Study

1.1 Postgraduate Degree Courses

The following courses of studies may be pursued.

A. M.D. (Doctor of Medicine) M.S. (Master of Surgery)

1. MD - Anaesthesiology
2. MD - Aviation Medicine
3. MD - Aviation Medicine/Aerospace Medicine
4. MD - Bio-Chemistry
5. MD - Bio-Physics
6. MD - CCM
7. MD - Community Health Administration
8. MD - Dermatology, Venereology & Leprosy
9. MD - Emergency Medicine
10. MD - Family Medicine
11. MD - Forensic Medicine/Forensic Medicine & Toxicology
12. MD - General Medicine
13. MD - Geriatrics
14. MD - Hospital Administration
15. MD - Immuno Haematology & Blood Transfusion
16. MD - Lab Medicine
17. MD - Maternity & Child Health
18. MD - Microbiology
19. MD - Nuclear Medicine
20. MD - Obstetrics & Gynaecology
21. MD - Paediatrics
22. MD - Palliative Medicine
23. MD - Pathology
24. MD - Pathology & Microbiology
25. MD - Pharmacology
26. MD - Physical Medicine & Rehabilitation
27. MD - Physiology
28. MD - Psychiatry
29. MD - Radio Diagnosis/Radiology
30. MD - Radiotherapy
31. MD - Rheumatology
32. MD - Social & Preventive Medicine / Community Medicine
33. MD - Sports Medicine
34. MD - Tropical Medicine
35. MD - Tuberculosis & Respiratory Diseases / Pulmonary Medicine
36. MD - Venereology
37. MD/MS - Anatomy
38. MD/MS - Obstetrics & Gynaecology
39. MD/MS - Ophthalmology
40. MD-Transfusion Medicine
41. MS - ENT
42. MS - General Surgery
43. MS – Orthopaedics

and such other subjects as might have been introduced by the Universities in Karnataka prior to commencement of Health University i.e., 1.6.1996, or recognised by Medical Council of India.

B. D.M. (Doctor of Medicine)

1. DM - Cardiac-Anaesthesia.
2. DM - Cardiology
3. DM - Clinical Haematology
4. DM - Clinical Immunology
5. DM - Clinical Pharmacology
6. DM - Critical Care Medicine
7. DM - Endocrinology
8. DM - Gastroenterology
9. DM - Geriatric Mental Health
10. DM - Haematology Pathology/Hematopthology
11. DM - Hepatology
12. DM - Immunology
13. DM - Infectious Disease
14. DM - Medical Genetics
15. DM - Neonatology
16. DM - Nephrology
17. DM - Neuro Anaesthesia
18. DM - Neuro Radiology
19. DM - Neurology
20. DM - Oncology
21. DM - Organ Transplant Anaesthesia & Critical Care
22. DM - Paediatric and Neonatal Anaesthesia
23. DM - Paediatric Critical Care
24. DM - Paediatric Haematology Oncology
25. DM - Paediatric Hepatology
26. DM - Paediatric Nephrology
27. DM - Paediatric Neurology
28. DM - Paediatric Oncology
29. DM - Paediatrics Cardiology
30. DM - Paediatrics Gastroenterology
31. DM - Pulmonary Medicine & Critical Care Medicine
32. DM - Pulmonary Medicine
33. DM - Reproductive Medicine
34. DM – Rheumatology

C. M.Ch (Master of Chirurgie)
1. M.Ch - Cardio Thoracic and Vascular Surgery
2. M.Ch - Cardio Thoracic Surgery
3. M.Ch - Endocrine Surgery
4. M.Ch - Gynaecological Oncology
5. M.Ch - HepatoPancreato Biliary Surgery
6. M.Ch - Neuro Surgery
7. M.Ch - Paediatric Surgery
8. M.Ch - Paediatric Cardio-Thoracic Vascular Surgery
9. M.Ch - Plastic Surgery
10. M.Ch - Surgical Gastroenterology/G.I. Surgery
11. M.Ch - Surgical Oncology
12. M.Ch - Thoracic Surgery
13. M.Ch - Urology/Genito-Urinary Surgery
14. M.Ch - Vascular Surgery
15. M.Ch. - Hand & Micro Surgery
16. M.Ch. - Hand Surgery
17. M.Ch. - Head and Neck Surgery

D. M.Sc (Master of Science)
1. M.Sc - Anatomy
2. M.Sc - Medical Anatomy
3. M.Sc - Medical Bacteriology
4. M.Sc - Medical Bio-chemistry
5. M.Sc - Medical Pathology
6. M.Sc - Medical Pharmacology
7. M.Sc - Pathology
8. M.Sc - Physiology

1.2 Postgraduate Diploma Courses
1. Diploma in Aviation Medicine
2. Diploma in Pathology & Bacteriology
3. Diploma (Marine Medicine)
4. Diploma in Dermatology, Venereology and Leprosy
5. Diploma in Allergy & Clinical Immunology
6. Diploma in Anaesthesia
7. Diploma in Bacteriology
8. Diploma in Basic Medical Sciences (Anatomy)
9. Diploma in Basic Medical Sciences (Pharmacology)
10. Diploma in Basic Medical Sciences (Physiology)
11. Diploma in Cardiology
12. Diploma in Child Health
13. Diploma in Clinical Pathology
14. Diploma in Community Medicine
15. Diploma in Dermatology
16. Diploma in Diabetology
17. Diploma in Forensic Medicine
18. Diploma in Health Education
19. Diploma in Health Administration
20. Diploma in Hospital Administration
21. Diploma in Immuno-Haematology and Blood Transfusion
22. Diploma in Industrial Health
23. Diploma in Industrial Hygiene
24. Diploma in Leprosy
25. Diploma in Maternity & Child Welfare
26. Diploma in Medical Radiology & Electrology
27. Diploma in Medical Virology
28. Diploma in Microbiology
29. Diploma in Obstetrics & Gynaecology
30. Diploma in Occupational Health
31. Diploma in Ophthalmology
32. Diploma in Orthopaedics
33. Diploma in Oto-Rhino-Laryngology
34. Diploma in Paediatrics
35. Diploma in Physical Medicine & Rehabilitation
36. Diploma in Psychological Medicine
37. Diploma in Public Health
38. Diploma in Radiation Medicine
39. Diploma in Radio Therapy
40. Diploma in Radio-Diagnosis
41. Diploma in Sports Medicine
42. Diploma in Tropical Medicine Health
43. Diploma in Tuberculosis & Chest Diseases
44. Diploma in Venereology

and such other subjects as might have been introduced by the Universities in Karnataka prior to commencement of Health University i.e., 1-6-1996, and recognised by Medical Council of India.

1.3 Post-doctoral certificate courses (PDCC)
1. PDCC - Aphaeresis Technology and Blood Component Therapy
2. PDCC - Cardiac-Anaesthesia
3. PDCC - Critical Care Medicine
4. PDCC - Gastro-Radiology
5. PDCC - Haemato-Oncology
6. PDCC - Infectious Diseases
7. PDCC - Interventional Radiology
8. PDCC - Laboratory Immunology
9. PDCC - Neuro-Aneesthesia
10. PDCC - Neuro-Radiology
11. PDCC - Nuclear Nephrology
12. PDCC - Organ Transplant Anaesthesia
13. PDCC - Paediatric Endocrinology
14. PDCC - Paediatric ENT
15. PDCC - Paediatric Gastroenterology
16. PDCC - Pain Management
17. PDCC - Renal Pathology
18. PDCC - Spine Surgery

1.4 PhD programmes (Doctor of Philosophy)

1. Ph. D - Anaesthesia
2. Ph. D - Anatomy
3. Ph. D - Bio- Chemistry
4. Ph. D - Bio-Statistics
5. Ph. D - Bio-Technology
6. Ph. D - Cardio Thoracic & Vascular Surgery
7. Ph. D - Cardiology
8. Ph. D - Community Medicine
9. Ph. D - Dermatology & Venereology
10. Ph. D - Endocrinology & Metabolism
11. Ph. D - ENT
12. Ph. D - Forensic Medicine
13. Ph. D - Gastro & Human Nutrition Unit
14. Ph. D - Gastrointestinal Surgery
15. Ph. D - Haematology
16. Ph. D - Histo Compatibility & Immunogenetics
17. Ph. D - Hospital Administration
18. Ph. D - Lab Medicine
19. Ph. D - Medical Biochemistry
20. Ph. D - Medical Oncology
21. Ph. D - Medical Physics
22. Ph. D - Medicine
23. Ph. D - Microbiology
24. Ph. D - Nephrology
25. Ph. D - Neuro Magnetic Resonance
26. Ph. D - Neuro Surgery
27. Ph. D - Neurology
28. Ph. D - Nuclear Medicine
29. Ph. D - Obst. & Gynaecology
30. Ph. D - Ocular Bio Chemistry
31. Ph. D - Ocular Microbiology
32. Ph. D - Ocular Pharmacology
33. Ph. D - Orthopedics
34. Ph. D - Pediatrics
35. Ph. D - Pediatric Surgery
36. Ph. D - Pathology
37. Ph. D - Physical Medicine & Rehabilitation
38. Ph. D - Physiology
39. Ph. D - Psychiatry
40. Ph. D - Radio Diagnosis
41. Ph. D - Radiotherapy
42. Ph. D - Surgery
43. Ph. D - Urology
44. Ph. D - Pharmacology

1.5 Fellowship Programmes
   1. F.C.P.S. (Medicine)
   2. F.C.P.S. (Mid. & Gynae)
   3. F.C.P.S. (Ophthalmology)
   4. F.C.P.S. (Pathology)
   5. F.C.P.S. (Surgery)
   6. M C P S

2. Eligibility for Admission

2.1 MD / MS Degree and Diploma Courses: A candidate affiliated to this university and who has passed final year M.B.B.S. examination after pursuing a study in a medical college recognised by the Medical Council of India, from a recognised Medical College affiliated to any other University recognised as equivalent thereto, and has completed one year compulsory rotating internship in a teaching Institution or other Institution recognised by the Medical Council of India, and has obtained permanent registration of any State Medical Council shall be eligible for admission.

2.2 D.M and M.Ch Courses:

D.M.: Candidate seeking admission for D.M courses in any subject must posses recognised degree of MD (or its equivalent recognised degree) in the subject specified in the regulations of the Medical Council of India from time to time.

M.Ch : Candidate seeking admission for M.Ch course in any subject must posses recognised degree of MS (or its equivalent recognised degree) in the subject specified in the regulations of the Medical Council of India from time to time.
3. Obtaining Eligibility Certificate by the University before making Admission

No candidate shall be admitted for any postgraduate degree/diploma course unless the candidate has obtained and produced the eligibility certificate issued by the University. The candidate has to make an application to the University with the following documents along with the prescribed fee:

1. MBBS pass / degree certificate issued by the University.
2. Marks cards of all the university examinations passed MBBS course.
3. Attempt Certificate issued by the Principal.
4. Certificate regarding the recognition of the medical college by the Medical Council of India.
5. Completion of internship certificate.
6. In case internship was done in a non-teaching hospital, a certificate from the Medical Council of India that the hospital has been recognised for internship.
7. Registration by any State Medical Council and
8. Proof of SC/ ST or Category I, as the case may be.

Candidates should obtain the Eligibility Certificate before the last date for admission as notified by the University.

A candidate who has been admitted to postgraduate course should register his / her name in the University within a month of admission after paying the registration fee.

4. Intake of Students

The intake of students to each course shall be in accordance with the ordinance in this behalf.

5. Duration of Study

a) M.D /M.S Degree Courses
The course of study shall be for a period of 3 years consisting of 6 terms.

b) D.M /M.Ch
The courses of study shall be for a period of 3 years consisting of 6 terms.

c) Diploma courses:
The course of study shall be for a period of 2 years consisting of 4 terms.

6. Method of training

The training of postgraduate for degree/diploma shall be residency pattern with graded responsibilities in the management and treatment of patients entrusted to his/her care. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions, grand rounds, case demonstration, clinics, journal review meetings, CPC and clinical meetings. Every candidate should be required to
participate in the teaching and training programme of undergraduate students. Training should include involvement in laboratory and experimental work, and research studies. Basic medical sciences students should be posted to allied and relevant clinical departments or institutions. Similarly, clinical subjects' students should be posted to basic medical sciences and allied speciality departments or institutions.

7. Attendance, Progress and Conduct

7.1 A candidate pursuing degree/diploma course should work in the concerned department of the institution for the full period as a full time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course.

7.2 Each year shall be taken as a unit for the purpose of calculating attendance.

7.3 Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons.

7.4 Every candidate is required to attend a minimum of 80% of the training during each academic year of the post graduate course. Provided further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every year.

7.5 Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.

8. Monitoring Progress of Studies:

8.1 Work diary / Log Book - Every candidate shall maintain a work diary and record of his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. (please see Chapter IV for model checklists and logbook specimen copy). Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The work diary shall be scrutinised and certified by the Head of the Department and Head of the Institution, and presented in the university practical/clinical examination.

8.2 Periodic tests: Incase of degree courses of three years duration (MD/MS, DM, MCh.), the concerned departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce. Records and marks obtained in such tests will be maintained by the Head of the Department and sent to the University, when called for.

In case of diploma courses of two years duration, the concerned departments may conduct two tests, one of them be at the end of first year and the other in the second
year three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.

8.3 Records: Records and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

9. Dissertation

9.1 Every candidate pursuing MD/MS degree course is required to carry out work on a selected research project under the guidance of a recognised post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

9.2 The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, and comparison of results and drawing conclusions.

9.3 Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

9.4 Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

9.5 The dissertation should be written under the following headings:

   i. Introduction
   ii. Aims or Objectives of study
   iii. Review of Literature
   iv. Material and Methods
   v. Results
   vi. Discussion
   vii. Conclusion
   viii. Summary
   ix. References
   x. Tables
   xi. Annexures

9.6 The written text of dissertation shall be not less than 50 pages and shall not exceed 150 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 be avoided. A declaration by the candidate that
the work was done by him/her should be included. It should be endorsed and certified by the guide, head of the department and head of the institution.

9.7 Four copies of dissertation thus prepared shall be submitted to the Registrar (Evaluation) along with a CD, through proper channel, six months before final examination on or before the dates notified by the University.

9.8 The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination. Grades will be awarded to the dissertation as under:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
<td>&gt; 70%</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
<td>60 - 70%</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>50 - 60%</td>
</tr>
<tr>
<td>D</td>
<td>Not Satisfactory</td>
<td>&lt; 50%</td>
</tr>
</tbody>
</table>

Could be accepted if there is possibility to provide corrections within the next 2 months and submit. If not accepted: candidate to take up theory exam after 6 months with submission of thesis. To be informed to the candidate before the exam fees is paid. The thesis evaluation report of the students to be sent to the college from the university before student writes the university theory exam.

9.9 Guide: The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work is as per Medical Council of India Minimum Qualifications for Teachers in Medical Institutions Regulations, 1998. Teachers in a medical college/institution having a total of eight years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining postgraduate degree shall be recognised as post graduate teachers.

A Co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognised for teaching/training by Rajiv Gandhi University of Health Sciences/Medical Council of India. The co-guide shall be a recognised postgraduate teacher of Rajiv Gandhi University of Health Sciences.

9.10 Change of guide: In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

10. Schedule of Examination

The examination for M.D / M.S courses shall be held at the end of three academic years (six academic terms). The examination for D.M and M.Ch courses shall be held at the end of three years. The examination for the diploma courses shall be held at the end of two academic years (four academic terms). The university shall conduct two examinations in a year at an
interval of four to six months between the two examinations. Not more than two examinations shall be conducted in an academic year.

11. Scheme of Examination

11.1 M.D. / M.S. Degree
M.D. / M.S. Degree examinations in any subject shall consist of dissertation, written paper (Theory), Practical/Clinical and Viva voce.

11.1.1 Dissertation: Every candidate shall carry out work and submit a dissertation as indicated in Sl.NO.9. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

11.1.2 Written Examination (Theory): A written examination shall consist of four question papers, each of three hours duration. Each paper shall carry 100 marks. Out of the four papers,

- Paper I in clinical subjects will be on applied aspects of basic medical sciences.
- Paper I will also include question on research methodology carrying 10 marks for all the subjects. (Preclinical, Paraclinical, and Clinical subjects).
- Recent advances may be asked in any or all the four papers.
- Reasoning type of questions shall be included in all or any of the question papers.
- Examiners shall be instructed to allot 25% of the marks for each paper to recent advances in that area.
- The questions shall be structured. Open ended questions shall be avoided.

Model question papers (I-IV) based on the above recommendations may be prepared and sent to the paper-setter along with the syllabus. Subheadings for the model answers are to be provided by the paper-setter.

11.1.3 Practical / Clinical Examination:
In case of practical examination, it should be aimed at assessing competence and skills of techniques and procedures as well as testing students ability to make relevant and valid observations, interpretations and inference of laboratory or experimental work relating to his/her subject.

In case of clinical examination, it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The total marks for practical / clinical examination shall be 200.

11.1.4 Viva Voce: Viva Voce Examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. The total marks shall be 100 and the distribution of marks shall be as under:
(i) For examination of all components of syllabus including dissertation topic 80 Marks  
(ii) For Pedagogy 20 Marks

A model checklist for the evaluation of the pedagogy session is provided.

**RGUHS MD/MS Postgraduate Viva Examination**

**Assessment /Evaluation of PEDAGOGY**

<table>
<thead>
<tr>
<th>Name of the candidate:</th>
<th>Date:</th>
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<tbody>
<tr>
<td>Register No</td>
<td>Centre:</td>
</tr>
<tr>
<td>Topic:</td>
<td>Max. Marks: 20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skill</th>
<th>Name of the Examiner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set induction (1.5 marks)</td>
<td></td>
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</tbody>
</table>
| • Aroused interest in the beginning by relating to previous learning, throwing a new idea, questioning, etc  
• Specified the objectives of presentation |  |
| Planning (5 marks) |  |
| • Organized material in a logical sequence  
• Used relevant content matter |  |
| Presentation (5 marks) |  |
| • Changed the pace of presentation by shifting emphasis, joke, etc  
• Used specific example to illustrate main ideas  
• Used non-verbal cues, eye contact, etc |  |
| Pupil participation (5 marks) |  |
| • Allowed questions from students  
• Asked question  
• Solicited/Raised questions  
• Rewarded pupil effort |  |
| Use of AV aids (2.5 marks) |  |
| • Used proper AV aids  
• used the aid(s) effectively |  |
| Closure (1 mark) |  |
| • Summarized most important points at the end of the session |  |

Overall marks ____________ (out of 20)

Signature of the Examiner
11.1.5 Examiners: There shall be at least four examiners in each subject. Out of them two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

11.1.6 Criteria for declaring as pass in University Examination*: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva voce examination.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Registrar (Evaluation).

* Amended as per notification UA/ORD-6/99-2000 dated 9.4.2001

11.1.7 Declaration of distinction: A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate marks is 75 percent and above. Distinction will not be awarded for candidates passing the examination in more than one attempt.

11.2 D.M / M.Ch:

The examination shall consist of theory, clinical/practical and viva voce examination.

11.2.1 (Theory) (Written Examination): The theory examination shall consist of four question papers, each of three hours duration. Each paper shall carry 100 marks. Out of the four papers, the first paper will be on basic medical sciences. Recent advances may be asked in any or all the papers.

11.2.2 Practical / Clinical Examination:

In case of practical examination it should be aimed at assessing competence, skills of techniques and procedures as well as testing student’s ability to make relevant and valid observations, interpretation and experimental work relevant to his / her subject.

In case of clinical examination it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The maximum marks for Practical / Clinical shall be 200.

11.2.3 Viva Voce: Viva Voce examination shall aim at assessing thoroughly depth of knowledge, logical reasoning, confidence and oral communication skills. The maximum marks shall be 100.

11.2.4 Examiners: There shall be at least four examiners in each subject. Out of them, two shall be external examiners and two shall be internal examiners. The qualification
and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

11.2.5 Criteria for declaring as pass in University Examination*: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva voce examination.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Registrar (Evaluation).

* Amended as per notification UA/ORD-6/99-2000 dated 9.4.2001

11.3 Diploma Examination:

Diploma examination in any subject shall consist of theory (written papers), Practical / Clinical and Viva - Voce.

11.3.1 Theory: There shall be three written question papers each carrying 100 marks. Each paper will be of three hours duration. In clinical subjects paper I shall have questions on Applied and basic medical sciences. In basic medical subjects and para clinical subjects, questions on applied clinical aspects should also be asked.

11.3.2 Practical / Clinical Examination:

In case of practical examination it should be aimed at assessing competence, skills related to laboratory procedures as well as testing students ability to make relevant and valid observations, interpretation of laboratory or experimental work relevant to his/her subject.

In case of clinical examination, it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The maximum marks for practical / Clinical shall be 150.

11.3.3 Viva Voce Examination: Viva Voce examination should aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. The total marks shall be 50.

11.3.4 Criteria for Pass: Criteria for declaring as pass in University Examination*: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva voce examination.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Registrar (Evaluation).
11. 3.5 Declaration of distinction: A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate marks is 75 percent and above. Distinction will not be awarded for candidates passing the examination in more than one attempt.

11.3.6 Examiners: There shall be at least four examiners in each subject. Out of them, two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

* Amended as per notification UA/ORD-6/99-2000 dated 9.4.2001

12. Number of Candidates per day. The maximum number of candidates for practical/clinical and viva-vocé examination shall be as under:

- MD / MS Course: Maximum of 6 per day
- Diploma Course: Maximum of 8 per day
- DM / M.Ch Course: Maximum of 3 per day
CHAPTER II

Goals and General Objectives of Postgraduate Medical Education Program

Goal

The goal of postgraduate medical education shall be to produce competent specialist and/or Medical teacher:

(i) who shall recognise the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy;

(ii) who shall have mastered most of the competencies, pertaining to the specialty, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system:

(iii) who shall be aware of the contemporary advances and developments in the discipline concerned;

(iv) who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology; and

(v) who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

General Objectives

At the end of the postgraduate training in the discipline concerned the student shall be able to:

i) Recognise the importance of the concerned speciality in the context of the health need of the community and the national priorities in the health sector.

ii) Practice the speciality concerned ethically and in step with the principles of primary health care.

iii) Demonstrate sufficient understanding of the basic sciences relevant to the concerned speciality.

iv) Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and promotive measures/strategies.

v) Diagnose and manage majority of the conditions in the speciality concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.

vi) Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty.
vii) Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.

viii) Demonstrate empty and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectations.

ix) Play the assigned role in the implementation of national health programmes, effectively and responsibly.

x) Organise and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.

xi) Develop skills as a self-directed learner, recognise continuing educational needs; select and use appropriate learning resources.

xii) Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyse relevant published research literature.

xiii) Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.

xiv) Function as an effective leader of a health team engaged in health care, research or training.

**Statement of the Competencies**

Keeping in view the general objectives of postgraduate training, each disciplines shall aim at development of specific competencies, which shall be defined and spelt out in clear terms. Each department shall produce a statement and bring it to the notice of the trainees in the beginning of the programme so that he or she can direct the efforts towards the attainment of these competencies.

**Components of the PG Curriculum**

The major components of the PG curriculum shall be:

- Theoretical knowledge
- Practical/clinical Skills
- Attitudes, including communication.
- Training in research methodology.

CHAPTER III

Subject wise Course Description

Curriculum

Pre-clinical Subjects

M.D. ANATOMY

I. **Goal**: The Postgraduate course M.D (Anatomy) should enable a medical graduate to become a competent specialist, acquire knowledge and skills in educational technology for teaching medical, dental and health sciences and conduct research in bio-medical sciences.

II. **Objectives**: At the end of the course, a Postgraduate in Anatomy shall be able to

1. Demonstrate comprehensive knowledge and understanding of gross and microscopic structure of human body and skills to demonstrate special dissection and histological and histochemical techniques.
2. Comprehend normal disposition, interrelationships, functional and applied anatomy of the various structures of the body.
3. Describe development of human body to provide an anatomical basis for understanding the structure and correlate with functions both in health and in disease presentations.
4. Demonstrate knowledge of basic and systemic embryology including genetic inheritance and sequential developments of organs and systems.
5. Recognize critical stages of development and the effects of common teratogens, genetic mutations and environmental hazards.
6. Explain development basis of major variations and abnormalities.
7. Aware of contemporary advances and developments in anatomy and related biomedical field.
8. Demonstrate competence in basic concepts of research and acquire a spirit of enquiry in research.
9. Critically evaluate published research literature.
10. Recognize continuing educational needs and develop skills as a self-directed learner.
11. Select and use appropriate learning resources and teaching techniques as applicable for teaching and evaluation of medical and allied health science students.
12. Carryout professional obligations ethically and in keeping with objectives of National Health Policy.
13. Function as an effective member in health care, research and training.
14. Exhibit interpersonal behavior in accordance with social norms and expectations.
15. Acquire knowledge relating to latest non-invasive techniques like X-rays, CT scan, MRI, Ultrasound and their interpretation in health and disease conditions.
16. Describe the methodology, techniques of embalming, preservation of cadavers and museum techniques and perform the procedures.
17. Describe and interpret Anatomy Act as in existence.

III. Outline of Course Contents

A. Theory
1. History of Anatomy
2. General Anatomy
3. Elements of Anatomy
5. Principles of Microscopy and Histological techniques.
6. General and Systemic Histology
7. General, and Systemic Embryology including Growth, Development and Teratology
8. Neuro Anatomy
9. Surface Anatomy
10. Radiological Anatomy including Principles of newer techniques and interpretation of CT Scan, Sonography and MRI
12. Museum Techniques, embalming techniques including medico legal aspects, and knowledge of Anatomy Act
13. Medical ethics
14. Recent Advances in Anatomy
15. To incorporate PBL training under different sections during PG training. One such example in Museum setting is enclosed.

B. Practical schedule
1. During the course-the PG students should dissect the entire human cadaver
2. They should embalm and maintain the record of embalming work done
3. They should prepare and mount at least 10 museum specimens
4. In Histology section
   Collection of tissues, fixing, block making, section cutting: use of different types of microtomes and preparation of general and systemic slides
   Haemotoxylin & Eosin –
   i. Preparation of stains
   ii. Staining techniques
Knowledge of special staining techniques like Silver Nitrate, PAS staining, Osmium Tetroxide, Van Gieson etc.

Embryo (Chick embryo) mounting and serial sections of embryo – should be taken, stained with Haematoxylin& Eosin.

Knowledge of light Microscope and electron microscope

Detailed microscopic study of all the tissues (General and Systemic slides)

IV. Method of Training

The candidate shall attend all the Undergraduate Theory and Practical Classes regularly. Rotation postings of PG students shall be made in all II and III years of the course as follows: Objectives of these postings – to learn the following from the respective postings

1. General Surgery 1 week
2. Orthopedics 1 week
3. Radio diagnosis 2 weeks
4. Pathology 2 weeks
5. Forensic Medicine 1 week
6. Genetics / Pediatrics 2 weeks

If Genetics not available in parent institution, should be posted to recognized genetics labs.

Suggestions: Genetics labs in Bangalore.

a. Gunasheela Infertility clinic
b. Desai Nursing Home
c. Lalbagh Nursing Home
d. Rao’s Clinical Laboratory, Rajajinagar

Learning Objectives

i. Pathology
   i. Special staining techniques at least one hands on experience.
   ii. Principle of Frozen microtomy or Cryostat, Electron microscopy

ii. Forensic Medicine
   i. Anthropometry and age estimation
   ii. If embalming if not available in Anatomy department, it should be learnt in Forensic Medicine
   iii. Any other topics relevant to Anatomy

iii. Radio diagnosis - Principles and recent advances in the following: CT, MRI, USG plain & contrast radiography

iv. General Surgery - Laparoscopic and Endoscopic visualization of viscera

v. Orthopaedics - Arthroscopic visualization of structures, nerve injury cases etc.,

vi. Genetics / Paediatrics - Syndromes and Karyotyping, Counseling

At the end of the posting, a certificate has to be obtained from the concerned heads of the departments for satisfactory learning.
During the three years of the course, the Postgraduate students shall take part in teaching undergraduate students in gross anatomy, histology, tutorials, group discussions and seminars

IV. Seminars & Journals Review Meetings
- The postgraduate students should actively participate in departmental seminar and journal reviews. A record showing the involvement of the student shall be maintained. A dairy should be maintained. Seminars journal review are suggested to be conducted alternatively once in every 15 days.
- These are to be assessed by the faculty as per the RGUHS curriculum assessment form

V. Maintenance of Record of Work Done
1. A dairy showing each day/s work has to be maintained by the candidate, which shall be submitted to the head of the department for scrutiny on the first working day of the each month.
2. A practical record of work done in Histology and Gross Anatomy with an emphasis on Cross sectional Anatomy has to be maintained by the candidate and duly scrutinized and certified by the head of the department and to be submitted to the external examiner during the final examination.
3. A list of the seminars and journal clubs that have been attended and participated by the student has to be maintained which should be scrutinized by the head of the department.
4. Two presentations in conference to be made mandatory, during PG course

VI. Periodical Assessment and Progress Report
- The post graduate students have to be assessed periodically by conducting written, practical and viva voce examination at the end of every year. The assessment should be based also on participation in seminars, journal review, and performance in the teaching and use of teaching aids and progress in dissertation work. Checklists are given in chapter IV for the assessments.
- The assessment will be done by all the recognized P.G. teachers of the department and the progress record should be maintained by the head of the department.

VII. Dissertation work
- During the course of study every candidate has to prepare a dissertation individually, on a selected topic under the direct guidance and supervision of a recognized postgraduate teacher as per MCI and RGUHS regulations.
- The suggested time schedule for dissertation work is:
  1. Preparation work for dissertation synopsis including pilot study and submission of the synopsis to the University within 6 months from the commencement of course or as per the dates notified by the University from time to time.
  2. Data collection for the dissertation and writing the dissertation.
  3. The candidates shall report the progress of the dissertation work to the concerned guide periodically and obtain clearance for the continuation of the dissertation work.
4. Submission of the dissertation six months prior to the final examination or as per the dates notified by the University from time to time.

**Registration of dissertation topic.**
Every candidate shall submit a synopsis in the prescribed proforma for registration of dissertation topic by the University after it is scrutinized by the PG training cum Research Committee of the concerned institution. The synopsis shall be sent to within the first 6 months from the commencement of the course or as notified by the University in the calendar of events, to the Registrar (Academic). For details see chapter 1, sl no 9.

**Submission of dissertation**
The dissertation shall be submitted to the Registrar (Evaluation) of the University six months prior to the final examination or as notified in the calendar of events. Approval of the dissertation by the panel of examiners is a prerequisite for a candidate to appear for the University examination. (For further details see sl.no.9 in chapter 1).

**IX. Scheme for Evaluation**

**A. Theory – 400 marks**
The written examination consists of four papers, with maximum marks of 100 for each paper. Each paper will be of three hours duration.

Each paper shall have 2 long essay questions of 20 marks (20x2= 40). And six short essay questions of 10 marks (10x6=60).

**Paper- I:**
- a. History of Anatomy
- b. General and Elements of Anatomy
- c. Gross Anatomy with applied aspects

**Paper- II:**
- a. General & systemic – Embryology including growth, development and Teratology

**Paper –III:**
- a. General & Systemic – Histology and Principles of Microscopy
- b. Histological, museum and embalming techniques including medico legal aspects.

**Paper- IV:**
- c. Recent advances in Anatomy.
Questions on recent advances may be asked in any or all papers*
*The topics assigned to the different papers are given as general guidelines. A strict division of the subjects may not be possible. Some overlapping of topics is inevitable. Students should be prepared to answer the overlapping topics. Preferably one question based on problem based learning in paper IV - Applied Anatomy. At least 50% of the questions in each paper can be application based. Questions should be structured so that evaluation is better, unbiased and uniform.

B. Practicals - 200 marks (Gross Anatomy – 100 marks, Histology – 100 marks).
  i) Gross Anatomy
  To dissect in 3 hours and display for discussion the allotted dissection exercise on a human cadaver.

  Distribution of Marks.
  Surface Anatomy = 10
  Dissection = 40
  Discussion = 50
  Total = 100 marks

ii) Histology

<table>
<thead>
<tr>
<th></th>
<th>Identification and discussion 10 stained sections which includes Neuroanatomy, Embryology and Human Genetics</th>
<th>10 x 4 = 40 marks</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>i) Preparation of a paraffin block</td>
<td>10 marks</td>
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<td></td>
<td>ii) Taking serial sections from blocks provided</td>
<td>10 marks</td>
</tr>
<tr>
<td></td>
<td>iii) Staining of given section with H &amp; E and discussion</td>
<td>20 marks</td>
</tr>
<tr>
<td></td>
<td>Discussion on Histological techniques</td>
<td>20 marks</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100 marks</td>
</tr>
</tbody>
</table>

C. Viva Voce - 100 marks
1. This includes all the components of the syllabus along with specimens, skiagrams, including newer imaging techniques, bones and embryology models including a problem solving exercise and discussion on dissertation topic submitted for the examination (80 Marks).
2. Pedagogy: Demonstration of teaching skill / techniques (20 Marks.)

<table>
<thead>
<tr>
<th>Maximum marks</th>
<th>Theory 400</th>
<th>Practicals 200</th>
<th>Viva – voce 100</th>
<th>Total 700</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.D. (Anatomy) Examination.</td>
<td></td>
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</table>

X. Recommended Text, Reference books and Journals
The Edition and Year of Publication listed here is current and latest, to a large extent.

GROSS ANATOMY


EMBRYOLOGY


**NEUROANATOMY**

**HUMAN GENETICS /MEDICAL GENETICS**
4. Alfred G KudsonJR., Genetics & Disease-McGraw Hill Book Company N.Y.,

**COMPARATIVE ANATOMY**

**PHYSICAL ANTROPOLOGY**

**EMBALMING TECHNIQUES**
1. Tompsett RH Anatomical Techniques.
2. Edwards JJ, Medical Museum Techniques, Oxford University Press

**JOURNALS**
1. Journal of Anatomical Society of India
2. Journal of anatomy
3. ActaAnatomica
4. American Journal of anatomy
5. American Journal of Physical Anthropology
6. Journal of Morphology, Embryology
7. Anatomical Record
8. American Journal of Medical Genetics
9. Annual Review of Genetics

**ADDITIONAL READING**
3. Santosh Kumar, the elements of research, writing and editing 1994, dept of urology, JIPMER, Pondicherry.
4. SrinivasaD.K. etal, Medical Education Principles and Practice, 1995, National Teacher Training centre, JIPMER Pondicherry
8. Indian National Science Academy, Guidelines for care and use of animals in scientific research, New Delhi, 1994.
**M. D. Biochemistry**

I. **Goal:**
The post graduate course M.D. Biochemistry should enable the student to acquire an in depth knowledge of the fundamental principles of the subject of biochemistry, so that he/she can apply this knowledge for understanding the basis of health and disease.

At the end of the course the student should have gained knowledge and expertise so that he/she is equipped to pursue a career in one or more of the following facets of biochemistry teaching, diagnostic work and research.

II. **Objectives**
At the end of the course the MD student have gained knowledge in the following key areas of the subject:

1. The chemical and three dimensional structures of various classes of bio molecules such as carbohydrates, proteins, lipids and nucleic acids as a prelude to understanding the correlation between structure and function.
2. An in-depth insight into the metabolic pathways of the major classes of bio molecules, regulatory mechanisms, interactions, significance and alterations in disease states.
3. Mechanism of energy release, conservation, utilization and de arrangements thereof.
4. Role of micro and macro nutrients such as vitamins and minerals in health and the pathophysiology of nutritional disorders.
5. Mechanism involved in the storage, transmission and expression of genetic information.
6. Biochemical techniques and methodology used to assess health and aid in the diagnosis and prognosis of diseases.
7. Develop skill in performing and interpreting data generated by advance biochemical techniques such as electrophoresis, chromatography, enzyme assays, organ function tests etc.

III. **Outline of course contents**

**THEORY**

**Paper I:** Bioorganic Chemistry, Biophysical Chemistry and Biochemical Techniques

proteins and different levels of structural organizations. Biological important peptides.
Conjugated proteins, lipoproteins and glycoproteins, structure of immunoglobulins.
Plasma proteins – Albumin (functions, clinical significance), globulins (alpha, beta, gamma), Separation by electrophoresis, transport proteins, Polymorphisms, acute phase proteins

2. Carbohydrates: biological importance of carbohydrates. Chemistry, structure and properties of monosaccharides, disaccharides and polysaccharides. Structure of functions of heteropolysaccharides,


5. Bio physical chemistry:
   ii. Henderson – Hasselbalch equation. Principles and procedures of determination of pH, PO2, PCO2, (blood gas analysis)
   iii. Isotopes – detection and measurement of stable and radioactive isotopes; their application in biochemistry.
   iv. Bioenergetics- free energy change, high energy linkages, redox potentials.

6. Biochemical techniques:
   i. Chromatography: principles and applications of paper, thin layer, ion exchange, gas phase and affinity chromatography, HPLC, gel filtration and its application.
   iii. Photometry and spectrophotometry: principles and applications.
   iv. Flame photometry: principles and applications.
   v. Ultracentrifugation techniques: their applications in the study of lipoproteins.
   vi. Radio immune assay: competitive binding assay- principles, procedures and applications. ELISA principles and applications.
vii. Ion selective electrodes: their applications in medicine.
viii. Cell fractionation: isolation and purification of sub cellular particles, biochemical markers of different subcellular organelles.
ix. Recent advances in Medical Laboratory Technology And Instrumentation: Semi Auto Analyzer, Auto Analyzer, PCR, etc
x. Molecular Biology techniques
xi. Cytogenetics – Karyotyping, FISH, centrometric probes, chromosome painting probes etc.
xii. Cell culture techniques
xiii. Microscopy – light, electron, fluorescent
xiv. Mass spectrometry
xv. Flow cytometry
xvi. Bioinformatics and Computational biology – Basics, application in medicine and research
xvii. Nanotechnology and Nanoparticles - Basics, application in medicine and research

**Paper 2 - Intermediary Metabolism and Biochemical Genetics**
i. Introduction to intermediary metabolism, various methods of study of intermediary metabolism with examples. Their advantages and disadvantages.

ii. Biological Oxidation – Structure of mitochondria, its role in biological oxidation, electron transport chain, mechanisms of electron transport and oxidative Phosphorylation. Regulation of oxidative Phosphorylation.

iii. Carbohydrate metabolism: A detailed discussion of the metabolic pathways as it occurs in humans.


vi. Integration of metabolic pathways of carbohydrate, protein and lipid. Regulation of metabolic pathways.

vii. Biosynthesis and catabolism of purine and pyrimidine, nucleotides.

viii. Protein biosynthesis in detail including regulation, mutations and their influences, latest aspects,

ix. Intracellular traffic and sorting of proteins

x. Free radicals, lipid peroxidation and antioxidants
xi. Detoxification, metabolism of xenobiotics

Paper 3- Enzymes, Nutrition and Specialized Tissues, Cell biology, Hemostasis

1. Enzymes:
   i. Classification, kinetics, specificity.
   ii. Isoenzymes and coenzymes.
   iii. Enzyme inhibitions- competitive, non-competitive, uncompetitive and allosteric, mechanism and application. Enzyme poisons.
   v. Immobilized enzymes- application.
   vii. Modification and supplement of dietary requirements in Health and Disease.

2. Nutrition:
   i. Detailed account of chemistry and biochemical roles of fat soluble and water soluble vitamins, requirements, source and deficiency symptoms. Antivitamins.
   ii. Detailed account of metabolism of the micronutrients.
   iv. Protein, carbohydrates and fat requirements, RDA, biological values of proteins. Protein energy malnutrition,
   v. Obesity – Risk factors, metabolic derangements, genetics, hormonal regulation of adipose tissue metabolism, hormonal regulation of eating behavior, adipokines
   vi. Malabsorption syndromes, parenteral nutrition.
   vii. Modification and supplementation of dietary requirements in Health and Disease.

3. Specialized tissues:
   i. Muscle tissue- composition, mechanism of muscle contraction, Muscle energy metabolism, Muscular dystrophy
   ii. Nerve tissue- composition, transmission of nerve impulse, neurotransmitters.
   iii. Erythrocytes- composition and metabolism, enzymology of RBC, Blood group antigens, other blood cells, Phagocytosis, Anemia, Abnormal hemoglobins, Hemoglobinopathies, Thalassemias,
   iv. Extracellular matrix: Connective tissue- composition, chemistry of collagen, elastin, proteoglycans and other fibrous proteins, connective tissue disorders
   v. Adipose tissue including brown adipose tissue metabolism.
vi. Bone and teeth – Composition, Markers of bone turnover, osteoporosis, osteoarthritis, rickets, Pagets disease

vii. Composition of lens- biochemical changes during cataractogenesis.

4. Cellbiology
   i. Stem cells and their differentiation
   ii. Cell cycle, regulation of cell cycle, apoptosis, biochemistry of aging
   iii. Cell surface molecules, cell-cell interactions and adhesion molecules
   iv. Cytogenetics
   v. Structure and function of cell, cell membrane and subcellular organelles, cytoskeleton
   vi. Different mechanisms of transport across cell membrane

5. Hemostasis and thrombosis
   i. The vessel wall, prostacyclin, Nitric oxide, Clotting factors, blood clotting.
   ii. Platelets, coagulation, Fibrinolysis, lab tests
   iii. Coagulation disorders, Bleeding disorders, Platelet disorders, anticoagulants

Paper 4 - Clinical Biochemistry
1) Clinical laboratory management
   i. Reference ranges and clinical utility of all lab tests
   ii. Setting up of clinical chemistry lab
   iii. Evidence based laboratory medicine
   iv. Specimen collection and processing
   v. Preanalytical variables and biological variables
   vi. Total quality management
   vii. Instrumentation, Automation, POCT, Quality control
   viii. Biomedical waste management
2) Diagnostic enzymology- an exhaustive account.
3) Inborn errors of metabolism involving amino acid, carbohydrate, lipid, purine, pyrimidine and porphyrin metabolism, mucopolysaccharidoses.
4) Plasma lipoproteins in health and disease.
5) Kidney function tests.
6) Pancreatic function tests.
7) Gastric function tests.
8) Endocrines- A detailed account of the mechanism of action, chemistry and regulatory role of hormones secreted by pituitary, pancreas, adrenal, thyroid, parathyroid and gonads. Endocrine disorders. Methods of assay and clinical interpretations.
9) Basic immunology, Immuno system, T & B Lymphocytes, antigen presenting cells, humoral immunity, cell mediated immunity, cytokines, lymphokines.
Immune regulation. Monoclonal antibodies, application of immunological techniques
Complement system, Molecular mechanisms of antibody production, Transposition of genes, Somatic recombination, and molecular structure of antigens, HLA antigens, Immunodeficiency states, monoclonal and polyclonal gammopathy
10) Disorders of calcium and phosphorus metabolism.
11) Water and electrolyte balance, acid base balance- their disturbances.
12) Composition of CSF, alterations in disease.
14) Systemic biochemistry:
   Biochemical basis of normal physiological functions, pathophysiology, complications, laboratory evaluation, biomarkers of various systemic disorders:
   - Diabetes mellitus, Obesity, Metabolic syndrome
   - Cardiovascular system – Atherosclerosis, Acute coronary syndrome, Myocardial infarction, Dyslipidemia and cardiovascular risk assessment, shock, Hypertension, congestive heart failure
   - Nervous system – Parkinsons disease, Schizophrenia, Myasthenia gravis, Huntington disease, Alzheimers disease, Stroke, Epilepsy
   - Renal system - Acute and chronic kidney disease, Glomerulonephritis, Nephrotic syndrome, Renal tubular acidosis, Renal stones, Renal transplantation
   - Hepatobiliary system – Jaundice, Hepatitis, fatty liver, cirrhosis, hepatic coma, Gall stones and Cholestasis.
   - Digestive system – Peptic ulcer, Malabsorption, hereditary and acquired enzyme defects, GI regulatory hormones, Investigations in diarrhea.
   - Pregnancy and reproductive endocrinology – Prenatal diagnosis, Screening tests, Pregnancy induced hypertension, anemia, gestational diabetes, Infertility
   - Biochemical processes in pediatric and geriatric population
   - Newborn screening and Inborn errors of metabolism
15) Therapeutic drug monitoring
16) Clinical Toxicology - Pathomechanisms and symptoms of most important types of toxic syndromes (anticholinergic, cholinergic, opioid, sedative, sympathomimetic). Pharmacology and analysis of specific drugs and toxins

PRACTICALS
Part 1= General Biochemistry
   1. Estimation of amino acids by ninhydrin method.
2. Estimation of protein by Folin’s method.
4. Titration of amino acids - Formal titration and pK values.
5. Amino acid - paper chromatography, TLC. Two Dimensional paper chromatography.
7. Absorption spectra of Phe, Tyr, Trp (UV).
8. Ion exchange chromatography of amino acids.
10. Separation of mono and disaccharides by paper chromatography.
15. Estimation of vitamin C.
16. Estimation of vitamin A.
17. Estimation of vitamin E.
19. Enzyme inhibitions.
20. Effect of pH, temperature on enzyme activity: Determination of Km, Vmax.
22. Gel chromatography. Molecular weight determination.
23. Immunodiffusion.

Part – II: Clinical Biochemistry
2. Plasma Urea method – Urease method
3. Plasma Uric acid – Uricase method
4. Serum Creatinine – Jaffe’s Kinetic and end point methods
5. Cholesterol/ HDL Cholesterol by enzymatic method
6. Albumin/ Globulin ratio
7. Serum Calcium
8. Flame photometry; Na, K, Li, determination
9. Serum Bilirubin – direct and indirect
10. Alkaline and Acid phosphatases
11. AST, ALT; UV kinetic methods and Colorimetric assay of Gamma GT
12. LDH isoenzymes, CPK isoenzymes
13. Serum Amylase – SomoyogiAmylolytic method
14. Fe, Fe binding capacity
15. Agar gel electrophoresis of serum proteins, Hb
16. Lipoproteins – Electrophoresis
17. 17 – Ketosteroids in urine
18. Estriol by fluorometry
19. Creatinine clearance
20. Plasma Cl, HCO₃, pH, PO₂, PCO₂. Blood gas analysis
21. CSF analysis
22. Urine analysis
23. Stone analysis
24. Thyroid profile by chemiluminescence/ELISA
25. Fertility profile by chemiluminescence/ELISA
26. Tumor markers – PSA, β-hCG by chemiluminescence
27. Cardiac troponin by chemiluminescence

IV. Practical training in Biochemistry: (First half of I year)

1. Introduction to research methodology and Biostatistics. One month every postgraduate student should be given an introductory course in research methodology and research techniques. He/ She must be taught as to how a research project can be planned and implemented. He/ She must also acquire a basic knowledge in the statistical methods and their applications.

2. Clinical Postings for a total duration of 6 months in the following departments:
   1. **Research methodology and Biostatistics** 15 days
   2. **Clinical postings**
      a. Medicine 1 Month
      b. Pediatrics 15 days
      c. Emergency medicine / ICU 15 days
      d. Cardiology 15 days
      e. Endocrinology (Including reproductive endocrinology) 15 days
      f. Nephrology 15 days

3. **Clinical Lab postings**
   a. Clinical Pathology 15 days
   b. Microbiology 15 days
   c. Molecular genetics 15 days
   d. Cytogenetics 15 days

Students may be posted to institution where these facilities are available for molecular genetics and cytogenetics (Govt. or Private)
Clinical postings in the forenoon to be attended and return to the department to do the experimental work in the afternoon.
Later half of I year, II year and first half of third year ( 2 years) study and training in the department of Biochemistry.
Third year (later half) Clinical Biochemistry (Exclusively) – 6 months
Every postgraduate student in Biochemistry shall be posted to clinical biochemistry laboratory of the department where clinical investigations of the attached hospital are done. Student should be trained in collection of samples, carrying out investigations, interpretation, reporting of the results and maintenance in records of investigations. Quality assurance.

**Skills to be acquired during the clinical postings**
During posting in medical and other related departments, the student should acquire relevant knowledge and skills. These generally include:

2. Investigations to be carried and their relevance
3. Drawing of blood, collection of urine and other specimens for investigations and their storage.
4. Biopsy techniques and handling of biopsy material to be sent for relevant tests/investigations.
5. Interpretation of laboratory data, X ray and biopsy results.
6. Clinical pathology postings:
   (Hematology, transfusion serology, coagulation and cellular immunology)
   a. Determination of ESR, Hb, Hematocrit, cell count, MCV, MCH, MCHC.
   b. Preparation and staining of blood smears
   c. Morphological investigation of bone marrow Smears, different staining procedures.
   d. Coagulation tests.
   e. Determination of coagulation factors.
   f. Investigation of fibrinolysis.
   g. Blood group-typing, Cross matching for transfusion.
   h. Investigation of transfusion reactions.
   i. Preparation and application of blood components.
   j. Immunohistochemistry
7. Microbiology
   (Covering bacteriology, virology, parasitology and mycology)
   a. Specimen collection.
   b. Specimen processing: smears, staining, culture and sensitivity.
   c. Serology tests
   d. Techniques for parasite and fungus identification.
   e. Immunological and molecular diagnosis (PCR) – HIV, Tuberculosis etc

**V. Practical record**
Student should maintain practical record for general and clinical biochemistry separately of all practicals done during the course and submit at the time of university examination after duly certified by the Head of the Department.
VI. Seminars and Journal clubs.
Students of biochemistry should be actively involved in departmental seminars and journal clubs. A record should be maintained for each student and the list of seminars and papers presented in journal club by each student should be presented at the time of university examination. These should be held fortnightly.
In addition, students should participate in undergraduate teaching, particularly in practicals and tutorial. For model check lists please see chapter IV
Clinical case presentations should be routinely conducted once in a month from 2nd year onwards

VII. Dissertation
Every student should submit dissertation on a selected research problem involving laboratory investigations. The dissertations has to be prepared by student and submitted to the university 6 months prior to the final examination as notified by the university. For further details please see chapter 1, Sl. No. 9. Acceptance of dissertation is a prerequisite for appearing in the university examination.

VIII. Periodical assessment and progress reports
Every student should be assessed. For assessment of performance, participation in seminars, journal clubs, standardization of analytical techniques and involvement in clinical laboratory investigations should be taken into consideration. Please see chapter IV for details.

IX. Scheme of Examination
A. THEORY
There shall be four papers of 100 marks each. Each paper shall be of 3 hours duration. Each paper shall have 2 long essay questions of 20 marks (20x2= 40). And six short essay questions of 10 marks (10x6=60).
The distribution of topics/chapters for the papers will be as under*
**Paper-I** – Bio-organic and Biophysical chemistry, biochemical techniques, etc.
**Paper-II** – Intermediary metabolism and biochemical genetics, etc
**Paper-III** – Enzymes, Nutrition and specialized tissues, etc.
**Paper- IV** – Clinical Biochemistry, etc
The topics assigned to the different papers are given as general guidelines. A strict division of subjects may not be possible. Some overlapping of topics is inevitable. Students should be prepared to answer the overlapping topics.

B. PRACTICAL EXAMINATION: 200 marks
Duration: Two days

**Part-I** – Laboratory procedures in general biochemistry
**Part-II** – Clinical examination of a patient and relevant investigations in clinical biochemistry.
The assignment of work under part I and part II should begin on day 1 and the candidate is expected to complete the work by forenoon on second day, so that viva voce and pedagogy examinations are held on the second day afternoon.

**Part I – General Biochemistry (Total Marks: 100)**

1. Qualitative identification of any Biological fluid (Urine, CSF, Pleural fluid) – interpretation and discussion (20 Marks)
2. Experiments on enzyme kinetics. (40 marks)
   Eg. Determination of pH optimum, Km value or temperature optimum etc.
3. Experiments involving chromatography or electrophoresis to be given, separation and identification of amino acids or carbohydrates by chromatography or separation and interpretation of serum proteins, lipoproteins, isoenzymes of (LDH and CPK) by electrophoresis to be given. (40 marks)

**Part- II – Clinical Examination and Clinical Chemistry Experiments (100 marks)**

Each candidate is expected to perform clinical examination and list the laboratory investigations he/she deems appropriate for the case. The candidate presents the case to the examiners would select 2 or 3 laboratory investigations, which the candidate will conduct.

1. Clinical examination and discussion (30 minutes) 25 marks
2. Clinical Biochemistry (3 relevant biochemical investigations including a separation procedure such as electrophoresis of plasma proteins) 75 marks

**C. VIVA – VOCE (Total Marks:100)**

1. Viva – Voce Examination: (80 marks)
   Viva Voce examination will be conducted conjointly by all the examiners to test comprehension, analytical approach, expression and interpretation of facts. Students shall also be given case reports, charts for interpretation. It includes discussion on dissertation.

2. Pedagogy Exercise: (20 marks)
   A topic would be given to each candidate along with the practical examination question paper on the first day. Student is asked to make a presentation on the topic on the second day for 20 minutes.

<table>
<thead>
<tr>
<th>Maximum marks</th>
<th>Theory</th>
<th>Practicals</th>
<th>Viva-Voce</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>200</td>
<td>100</td>
<td>700</td>
<td></td>
</tr>
</tbody>
</table>
Post Graduate Course in Physiology

M.D. PHYSIOLOGY

I. Goals: The Postgraduate course in MD Physiology should enable a medical graduate to be:
   i. A competent Physiologist
   ii. A good medical teacher in Physiology, practicing the required skills of teaching.

II. Objectives: At the end of the course a postgraduate student in Physiology should be able to:
   i. Demonstrate comprehensive knowledge and understanding of general and systemic Physiology.
   ii. Comprehend and understand physiological basis of health and disease affecting various organ systems.
   iii. Select and use appropriate teaching techniques and resources
   iv. To effectively use the library facilities including computer, C.D. ROM and medline search
   v. Critically evaluate published journal literature
   vi. Carryout research independently
   vii. Function as an effective member of teaching team and research team
   viii. Carryout professional obligations ethically and keeping in view of national health policy.

III. Outline of course contents

Theory
   i. Principles of biomedical instrumentation
   ii. Essentials of Research Methodology.
   iii. Issues related to ethics of experimental physiology (animal & human). As this is part of their dissertation work.
   iv. History of Medicine with specific reference to Experimental Physiology. In the Theory paper, question can be framed on specific issues. **eg: Describe the classical experiments that out lined the nature of the baroreflex, rather than write briefly on Claude Bernard / Pavlov etc., as is being done now.**
   v. General Physiology at Cellular, Sub Cellular and Molecular level. Biophysics and Genetics
   vi. Comparative Physiology includes adaptation and evolution of physiological characters between vertebrates and invertebrates in relation to organ systems.
   vii. Systemic Physiology. This includes the following organ systems-Hematology, Gastrointestinal Physiology, Renal physiology, Respiratory physiology, cardiovascular physiology, Endocrine and reproductive physiology, Nervous system, Special senses and Muscle Nerve Physiology.
   viii. Clinical and Applied Physiology includes : Pathophysiology and physiological basis of management as related to the systems mentioned in (7)


xi. Chrono Physiology - New born, adult and old age physiology, physiology of growth and development.

xii. Laboratory animal ethics- Guidelines for care and use of animals in scientific research. Breeding of and experiments on animals (control and supervision) rules, 1998 under prevention of cruelty of animals Act 1960.

Practical Training:

A) Animal Experiments

It is mandatory that each medical college be registered under the CPCSEA. The animals to be procured as per CPCSA guidelines and prior permission taken from the animal ethical committee of the college to conduct the experiments. Since animal experiments have been banned by the CPCSEA the practical will be held by way of interpretation of the pre-recorded graphs both for mammalian intact and isolated preparations and amphibian experiments listed in the respective sections. This section of the experiments will include asking questions as part of bench viva in the following areas:

i. Animals commonly used: dogs, rabbits, guinea pigs and rats

ii. Anesthesia: types of drugs used, advantages and Disadvantages, route of administration

iii. Equipment used for the experiments, their identification and uses.

iv. Dissection procedure

v. Composition and preparation of various mammalian fluids.

a) Amphibian : FROG

i. Skeletal Muscle

1) Effect of temperature

2) Velocity of nerve impulse
3) Determination of length tension relationship  
4) Effect of two successive and multiple successive stimuli  
5) Demonstration of Fatigue  
6) Effect of Load on Muscle  
7) To demonstrate compound action potential  
8) Effect of various strength of stimuli  

ii. **Cardiac Muscle**

1) Effect of temperature on Frog's Heart  
2) Effect of Stannius ligatures  
3) Properties of Cardiac Muscle  
4) To demonstrate extra systole and compensatory pause  
5) Effect of vagal stimulation on the Heart  
6) To demonstrate the effect of drugs on vagal stimulation  
7) Perfusion of Isolated Heart and to demonstrate effect of drugs  
8) Perfusion of Isolated Heart and to demonstrate effect of ions  
9) Otto Loewi experiment to demonstrate the chemical mediator with vagal stimulation of the heart.

**ALTERNATIVES ARE AVAILABLE FOR FROG EXPERIMENTS AND SHOULD BE USED FOR TRAINING AND FINAL ASSESSMENT.**

b) **Mammalian:**  
   i. **Isolated preparations:** Rat, Rabbit  
      1) Langendorff preparation  
      2) Intestinal movements  
      3) Uterine smooth muscle preparation  

*Effects of drugs and ions on the above preparation. The above experiments should include demonstration of dose responses as an integral part.*

ii. **Intact preparation:** Rat, rabbit  
    1) Measurement of BP and Respiration  
    2) Effects of haemorrhage, saline infusion on BP.  
    3) Effects of vagal stimulation on BP.  
    4) Effects of drugs namely sympathetic and parasympathetic drugs on BP and Respiration.  
    5) Carotid artery occlusion and its effects on BP and Respiration.

**ALTERNATIVE TO ANIMAL EXPERIMENTS: BY SUBSTITUTING WITH ANIMAL SIMULATION AND COMPUTER ASSISTED LEARNING SHOULD BE ADOPTED**

B) **Human Physiology:**  
   Laboratory procedures using normal subjects  

I. **Cardiovascular**
1) Evaluation of Cardio-respiratory fitness using any one of the following
   a. Harvard step test
   b. Tread mill
   c. Bicycle ergometer
2) To demonstrate cardio-respiratory responses to graded exercises.
3) To Compare the response of isotonic and isometric exercise on heart rate and blood pressure
4) Recording of ECG and interpretation

II. Respiratory system:
   A. Spirometry using Benedict Roth Spirometer
      1) Evaluation of lung functions in relation to FVC, FEV₁, PEFR
      2) To calculate Dyspnœic Index after making appropriate measurement
      3) To demonstrate chemical regulation of respiration

   B. Stethography: To demonstrate the effect of following manoeuvres on respiration.
      1) Effect of Hyperventilation
      2) Effect of Breathholding
      3) Effect of Rebreathing through a bag
      4) Breathing through a long tube
      5) Effect of deglutition

   C. Cardiopulmonary Resuscitation (CPR)
      Principles of Artificial Respiration and to demonstrate Manual method of Resuscitation provided mannequins are available in the department.

III. Body composition:
      Measurement of anthropometry and to comment on
      1) Nutritional status
      2) Central Obesity

IV. ANS:
      1) To evaluate the autonomic nervous system by using the following standard tests.
         i) Timed deep breathing
         ii) Sustained isometric contraction
         iii) Valsalva manoeuver
         iv) Effect of posture (lying to standing)
      2) Compare the contrasting effect of cold on Heart rate by the
         1) Ice cold pressor test
         2) Diving reflex (Head immersion)

V. Muscle - Nerve Physiology
   1) Using ergography to demonstrate fatigue in skeletal muscle
   2) To record EMG
   3) To measure nerve conduction
4) To demonstrate Strength Duration curve
5) To record Compound Action Potential.

The list of human experiments listed under each of the above topics is just an outline of practical exercises. Individual department is entitled to formulate and create more questions to evaluate the practical exercises.

C) **Clinical Physiology:**

Clinical Examination
i. CVS
ii. RS
iii. CNS
iv. Special Senses
v. Cranial Nerves

The subject could be a normal volunteer. The examiners should not insist on a patient to be brought from the Hospital. The students will be given a case history and based on the case the student will perform the examination of the system in normal subjects.

**Case History Clinical Examination**
A soldier in the war got a bullet shot at the Lumbar region and thereafter c/o loss of altered sensation on the right leg and paralysis of the left leg. Examine the given subject in the direction of the above case history and report.

D) **Biochemistry:**

1) Practicals to be performed from the following Biochemical investigations:
   
i) Blood Sugar
   ii) Blood urea
   iii) Blood creatinine
   iv) Blood Protein.
   v) Abnormal constituents of Urine

2) Students to be familiar with quality control procedures and the following terms:
   
i) intra - assay CV
   ii) inter - assay CV
   iii) quality control sample
   iv) Colorimeter – types, principle
   v) Standards

E) **Haematology:**

i) Haemocytometry
ii) Determination of Reticulocyte Count, platelet count, WBC count, RBC count, Eosinophil count in normal and diseased states.
iii) Differential count of WBC
iv) Haemoglobinometry, spectroscopy
v) Blood grouping and cross matching
vi) Determination of bleeding time, clotting time
vii) Fragility test
viii) ESR & PCV

The students will be given a case history and based on the case the student will perform one or more investigations which are most relevant.

**Example: Hematology Practical question**

A 40 year old woman with a 3 years h/o menorrhagia comes to the OPD with c/o tiredness and fatigability. O/E she has pronounced pallor. Perform the haematological examinations that would:

i. confirm the primary diagnosis
ii. Help you narrow down the causes of the problem.

**F) Histology:** Identification of histological feature of organ systems under light microscope followed by discussion.

**List of slides**

<table>
<thead>
<tr>
<th>1. Tendon</th>
<th>20. Spinal cord</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Elastic fibers</td>
<td>21. Eye ball</td>
</tr>
<tr>
<td>3. Hyaline Cartilage</td>
<td>22. Skin - thick</td>
</tr>
<tr>
<td>4. Elastic Cartilage</td>
<td>23. Esophagus</td>
</tr>
<tr>
<td>6. Cardiac Muscle</td>
<td>25. Ileum</td>
</tr>
<tr>
<td>9. Medium sized artery and vein</td>
<td>28. Spleen</td>
</tr>
<tr>
<td>10. Large sized artery</td>
<td>29. Kidney</td>
</tr>
<tr>
<td>11. Large sized vein</td>
<td>30. Urinary bladder</td>
</tr>
<tr>
<td>12. Mixed salivary gland</td>
<td>31. Testis</td>
</tr>
<tr>
<td>13. Lymph node</td>
<td>32. Ovary</td>
</tr>
<tr>
<td>14. Thymus</td>
<td>33. Adrenal - Supra renal glands</td>
</tr>
<tr>
<td>15. Tongue - filiform papillae</td>
<td>34. Mammary gland</td>
</tr>
<tr>
<td>16. Pituitary gland</td>
<td>35. Trachea</td>
</tr>
<tr>
<td>17. Thyroid</td>
<td>36. Umbilical Cord</td>
</tr>
<tr>
<td>18. Cerebrum - cerebral cortex</td>
<td>37. Seminal vesicle</td>
</tr>
<tr>
<td>19. Cerebellum</td>
<td>38. Medulla</td>
</tr>
</tbody>
</table>
39. Spinal Cord
40. Embryonic Cartilage
**IV. Time schedule and Rotation postings**

The candidates shall attend the entire undergraduate theory and practical classes regularly in the first year. During the second year of the course postings may be made to other clinical and Para clinical subjects in co-ordination with concerned departments, only in the forenoon sessions as follows:

<table>
<thead>
<tr>
<th>SL No</th>
<th>Department</th>
<th>Procedures</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cardiology dept.</td>
<td>Learn to operate ECG apparatus, Echo, Doppler, Cardiac monitor, Learn the methodology of cardiac catheterization. Resuscitation technique, interpretation of ECG &amp; other records &lt;br&gt; ASSIGNMENTS &lt;br&gt;i. Cardiac stress testing &lt;br&gt; ii. The ionic basis of antiarrhythmic drugs</td>
<td>15 days</td>
</tr>
<tr>
<td>2</td>
<td>Neurology</td>
<td>Observe and understand Neuro - Physiological Techniques (ENMG,EEG) (clinical Physiology) and its Interpretation and other investigation data. ASSIGNMENTS &lt;br&gt;i. Physiological basis of ENMG and its clinical application &lt;br&gt; ii. Evoked potentials and its clinical application</td>
<td>15 days</td>
</tr>
<tr>
<td>3</td>
<td>Medical Gastroenterology</td>
<td>To observe Endoscopic Techniques, Manometry Studies ASSIGNMENTS &lt;br&gt;i. Oesophagealmanometry and its application &lt;br&gt; ii. Investigative methods of biliary tract</td>
<td>15 days</td>
</tr>
<tr>
<td>4</td>
<td>Clinical Biochemistry</td>
<td>To understand the principles of clinical biochemical tests and interpretation of data &lt;br&gt; Liver function test. &lt;br&gt; Renal function test &lt;br&gt; Blood sugar estimation ASSIGNMENTS &lt;br&gt;i. Methodology and principle of the working of auto analyser &lt;br&gt; ii. Quality control in Biochemistry – Methods and standards</td>
<td>1 week</td>
</tr>
<tr>
<td>5</td>
<td>Clinical Hematology including pathology</td>
<td>To make peripheral blood smear and bone marrow smear &lt;br&gt; To identify normal and abnormal blood cells. &lt;br&gt; Blood Banking &lt;br&gt; Pregnancy tests and its interpretation &lt;br&gt; Semen analysis ASSIGNMENTS &lt;br&gt;i. Fractions of whole blood and their clinical</td>
<td>1 week</td>
</tr>
<tr>
<td>6</td>
<td>Paediatrics</td>
<td>ASSIGNMENTS</td>
<td>1 week</td>
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<tr>
<td></td>
<td></td>
<td>i. Jaundice in the new born – Basis of therapeutics options</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>ii. Basis of Growth chart and factors affecting growth</td>
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<tr>
<td>7</td>
<td>Neonatology</td>
<td>ASSIGNMENTS</td>
<td>1 week</td>
</tr>
<tr>
<td>8</td>
<td>Paediatric nephrology</td>
<td>ASSIGNMENTS</td>
<td>1 week</td>
</tr>
<tr>
<td>9</td>
<td>General Medicine</td>
<td>Clinical Examination, ECG</td>
<td>15 days</td>
</tr>
<tr>
<td>10</td>
<td>Chest Medicine</td>
<td>Pulmonary Function Tests, Sleep Lab ASSIGNMENTS</td>
<td>1 week</td>
</tr>
<tr>
<td></td>
<td></td>
<td>i. Mechanics of respiration and lung functions in</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>ii. Obstructive and restrictive lung disease</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Endocrinology</td>
<td>ASSIGNMENTS</td>
<td>1 week</td>
</tr>
<tr>
<td></td>
<td></td>
<td>i. Diabetes – types and monitoring</td>
<td></td>
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</tbody>
</table>

Total four months of clinical postings. At the end of these postings, a certificate has to be obtained from the concerned Heads of the Department about satisfactory learning or otherwise.

During three years of the course, the Postgraduate students shall participate in teaching the undergraduate students in practicals, tutorials and group discussions.

V. Seminars & Journal reviews.

The postgraduate students should actively participate in departmental seminars and journal clubs. A record showing the involvement of the student shall be maintained. A diary should be maintained. Seminars and journal clubs are suggested to be conducted alternately once in every 15 days. To attend and participate in all seminars and journal clubs conducted in the department. Log book to be maintained for attendance.

VI. Maintenance of Record of Work Done

1. A diary showing each day's work has to be maintained by the candidate, which shall be scrutinised by the Head of the Department once in every three months.
2. A practical record has to be maintained by the candidate and duly scrutinised and certified by the HOD and to be submitted to the external examiner during the final examination
3. A list of the Seminars and Journal reviews that has been attended and participated by the student has to be maintained which should be scrutinised by the Head of the Department.
VII. **Dissertation Work**
During the course of study every candidate has to prepare a dissertation individually on a selected topic under the direct guidance and supervision of a recognised post graduate teacher as per MCI and RGUHS regulations. The suggested time schedule for dissertation work is:

- Identification and selection of topic for dissertation - in first 4 weeks
- Preparatory work of dissertation / synopsis including pilot study if necessary and submission of the synopsis to the University within first 6 months from the beginning of course or a per the dates notified by the University
- Data collection for dissertation. Writing the dissertation in the following 1 1/2 years.
- Submission of the dissertation six months prior to the final examination or as per the dates notified by the University.

**Registration of dissertation topic**
Every candidate shall submit a synopsis in the prescribed proforma of the University. The post graduate Training cum Research Committee of the concerned institution will scrutinise the synopsis before it is sent to the university for approval and registration of the dissertation topic. The synopsis shall be sent within first 6 months from the commencement of course as notified in the University calendar of events, to the Registrar (Academic)

**Submission of dissertation**
The dissertation shall be submitted to the Registrar (Evaluation) of the University. Approval of the dissertation by the panel of examiners is a pre - requisite for a candidate to appear in the University examination.

VIII. **Periodical assessment and progress report** (Please see chapter IV)
A practical record has to be maintained by every candidate and duly scrutinised and certified by the head of the department and to be submitted to the external examiner during the final examination.

IX. **Scheme of Examination:**

**University Examination**

**A. Theory :**

1. The written examination consists of four papers of 100 marks each. Each paper will be of three hours duration.
2. In Theory Paper I in MD Physiology examination there shall be 10 marks allotted to research methodology & bio statistics
3. Each theory paper shall consist of:

   Long Essay type questions - 2 x 20 marks = 40
   Short Essay type questions - 6 x 10 marks = 60
   Total marks = 100

**Theory Paper I :**

i. General Physiology: Cellular structure and function, Membrane Physiology including transport, signaling and bioelectrical potentials, Genetics, Body fluid compartment
ii. New born to ageing (Chronobiology)
iii. Comparative Physiology
iv. Ethics
v. Research Methodology
vi. History of Medicine (Major contribution to Physiological concepts by Physiologists and Scientists)

Theory Paper II
i. Haematology
ii. Cardiovascular system
iii. Respiratory system
iv. Environment physiology

Theory Paper III
i. Renal system
ii. Gastro intestinal system
iii. Endocrine system
iv. Reproduction physiology

Theory Paper IV
i. Muscle Nerve
ii. CNS and
iii. Special Senses
iv. Exercise and sports physiology

B. Practical

Scheme of Examination for practicals (Total 200 marks)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Human Experiment</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>Clinical Examination</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>Mammalian (Isolated)*</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>Mammalian (Intact)*</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>Amphibian*</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Haematology</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>Biochemistry</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>Histology 5 slides (4 marks each)</td>
<td>20</td>
</tr>
</tbody>
</table>

*Interpretation of pre-recorded graphs

* USE OF ALTERNATIVES

C. VIVA VOCE: (100 marks) The division of Marks to be clearly demarcated:

- Dissertation Viva 20 marks
- Subject Viva 60 marks
- Pedagogy 20 marks

- Pedagogy to be assessed using a checklist by each examiner separately and finally tabulated.
- At the viva, there should be presentation of the dissertation work for 10 minutes by the candidate

Dissertation Viva: Evaluation should consists of:
1) Sending the thesis to FOUR examiners 6 months before the Theory exam
   1) Evaluation by 4 examiners excluding the guide. To send their comments/ report.
2) The thesis evaluated and the following grades will be assigned:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
<td>&gt; 70%</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
<td>60 - 70%</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>50 - 60%</td>
</tr>
<tr>
<td>D</td>
<td>Not acceptable</td>
<td>&lt; 50%</td>
</tr>
</tbody>
</table>

*Could be accepted* if there is possibility to provide corrections within the next 2 months and submit. **If not accepted:** candidate to take up Theory exam after 6 months with submission of thesis. To be informed to the candidate before the exam fees is paid. The thesis evaluation report of the students to be sent to the college from the university before student writes the university theory exam.

**Question Paper setting:** Following changes to be implemented

1. On each theory paper the topics have to be mentioned.
2. The questions should be structured. Open ended questions should be avoided.

<table>
<thead>
<tr>
<th>Maximum marks for</th>
<th>Theory</th>
<th>Practicals</th>
<th>Viva – Voce</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.D. Physiology Examination</td>
<td>400</td>
<td>200</td>
<td>100</td>
<td>700</td>
</tr>
</tbody>
</table>

Y. **Recommended Text, Reference books and Journals**

The Edition and Year of Publication listed here is current and latest, to a large extent.

**TEXTBOOKS**

1. Keele, Samson & Wright's, *Applied Physiology*
2. J B West, Best & Taylor, *Physiological basis of Medical Practice*
3. Guyton, *Text Book of Medical Physiology*
7. Principles of neural sciences - *Kandel, Schwartz, Jessel*
8. Williams - *Text book of Endocrinology*
9. Wintrobes - *Clinical Haematology*

**JOURNALS:**

1. *Journal of Applied Physiology* By American Physiological Society,
2. *Physiological Reviews* by American Physiological Society,
3. *Annual Review of Physiology* by American Physiological Society,
4. *Advances in Physiology Education* by American Physiological Society,
5. *Journal of Physiology* British Publication,
6. *Indian Journal of Physiology & Pharmacology* - IJPP by Association of Physiologists & Pharmacologists of India,
7. *Indian Journal of Medical Research* by Indian council of Medical Research -
8. News in Physiological sciences
10. British Medical Journal
11. Science
12. Nature
13. Lancet

**Additional Reading**
2. National Health Policy, Min. of Health & Family Welfare, Nirman Bhawan, New Delhi, 1983.
3. Santosh Kumar, The elements of Research, writing and editing 1994, Dept. of Urology, JIPMER, Pondicherry.
4. Srinivasa D K et al, Medical Education Principles and Practice, 1995. National Teacher Training Centre, JIPMER, Pondicherry
Chapter 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 outcomes to be assessed should included: (i) Personal Attitudes, (ii) Acquisition of Knowledge, (iii) Clinical and operative skills, and (iv) Teaching skills.

i) **Personal Attitudes.** The essential items are:
   - Caring attitudes
   - Initiative
   - Organisational ability
   - Potential to cope with stressful situations and undertake responsibility
   - Trust worthiness and reliability
   - To understand and communicate intelligibly with patients and others
   - To behave in a manner which establishes professional relationships with patients and colleagues
   - Ability to work in team
   - A critical enquiring approach to the acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

ii) **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 log book should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions 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, Chapter IV)

*Seminars / Symposia:* The topics should be assigned to the student well in advance to facilitate 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, Chapter IV)

*Clinico-pathological conferences:* This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter(s) are to be assessed using a checklist similar to that used for seminar.

*Medical Audit:* Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.
iii) **Clinical skills**  
*Day-to-Day work:* Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates’ sincerity and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter IV).

*Clinical meetings:* Candidates should periodically present cases to his peers and faculty members. This should be assessed using a checklist (see Model checklist IV, Chapter IV).

*Clinical and Procedural skills:* The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the logbook. (Table No.3, Chapter IV)

iv) **Teaching skills:** Candidates should be encouraged to teach undergraduate medical students 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 V, Chapter IV)

vi) **Periodic tests:** Three tests may conducted, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.

vii) **Work diary / Log Book**— Every candidate shall maintain a work diary and record his/her participation 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 clinical or laboratory procedures, if any conducted by the candidate.

viii) **Records:** Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

**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 log book. Collectively, log books 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 1,2 and 3 of Chapter IV. Copies may be made and used by the institutions.

**Procedure for defaulters:** Every department should have a committee to review such situations. The defaulting candidate is counselled 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 fulfil the requirements in spite of being given adequate chances to set himself or herself right.
**CHAPTER IV (Contd.)**

**Format of Model Check Lists**

**Check List - I.  MODEL CHECK-LIST FOR EVALUATION OF JOURNAL REVIEW PRESENTATIONS**

<table>
<thead>
<tr>
<th>Name of the Student:</th>
<th>Name of the Faculty/Observer:</th>
<th>Date:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Items for observation during presentation</th>
<th>Poor 0</th>
<th>Below Average 1</th>
<th>Average 2</th>
<th>Good 3</th>
<th>Very Good 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Article chosen was</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2.</td>
<td>Extent of understanding of scope &amp; objectives of the paper by the candidate</td>
<td></td>
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<tr>
<td>3.</td>
<td>Whether cross references have been consulted</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>4.</td>
<td>Whether other relevant publications consulted</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5.</td>
<td>Ability to respond to questions on the paper / subject</td>
<td></td>
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<tr>
<td>6.</td>
<td>Audio-Visual aids used</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>7.</td>
<td>Ability to discuss the paper</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8.</td>
<td>Clarity of presentation</td>
<td></td>
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<tr>
<td>9.</td>
<td>Any other observation</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Total Score**
### Check List - IV

**EVALUATION FORM FOR CLINICAL PRESENTATION**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Points to be considered</th>
<th>Poor 0</th>
<th>Below Average 1</th>
<th>Average 2</th>
<th>Above Average 3</th>
<th>Very Good 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Completeness of history</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Whether all relevant points elicited</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Clarity of Presentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Logical order</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mentioned all positive and negative points of importance</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td>Accuracy of general physical examination</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>Whether all physical signs elicited correctly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Whether any major signs missed or misinterpreted</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9</td>
<td>Diagnosis: Whether it follows logically from history and findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Investigations required</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Complete list</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Relevant order</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Interpretation of investigations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Ability to react to questioning Whether it follows logically from history and findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ability to defend diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ability to justify differential diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Others</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Grand Total**
### Check List - V

**MODEL CHECK LIST FOR EVALUATION OF TEACHING SKILL PRACTICE**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Strong Point</th>
<th>Weak Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Communication of the purpose of the talk</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Evokes audience interest in the subject</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>The introduction</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>The sequence of ideas</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>The use of practical examples and/or illustrations</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Speaking style (enjoyable, monotonous, etc., specify)</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Attempts audience participation</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Summary of the main points at the end</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Asks questions</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Answers questions asked by the audience</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Rapport of speaker with his audience</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Effectiveness of the talk</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Uses AV aids appropriately</td>
<td></td>
</tr>
</tbody>
</table>
Checklist VI

MODEL CHECK LIST FOR DISSERTATION PRESENTATION

Name:       Faculty/Observer:       Date:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Points to be considered divine</th>
<th>Poor 0</th>
<th>Below Average 1</th>
<th>Average 2</th>
<th>Good 3</th>
<th>Very Good 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Interest shown in selecting a topic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Appropriate review of literature</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3.</td>
<td>Discussion with guide &amp; other faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4.</td>
<td>Quality of protocol</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5.</td>
<td>Preparation of proforma</td>
<td></td>
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</tr>
</tbody>
</table>
## Checklist-VII

**CONTINUOUS EVALUATION OF DISSERTATION WORK BY GUIDE / CO-GUIDE**

Name of the Student:                        Name of the Faculty/Observer:                        Date:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Items for observation during presentation</th>
<th>Poor 0</th>
<th>Below Average 1</th>
<th>Average 2</th>
<th>Good 3</th>
<th>Very Good 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Periodic consultation with guide/co-guide</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2.</td>
<td>Regular collection of case material</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3.</td>
<td>Depth of analysis / discussion</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
<td>Departmental presentation of findings</td>
<td></td>
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<tr>
<td>5.</td>
<td>Quality of final output</td>
<td></td>
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<tr>
<td>6.</td>
<td>Others</td>
<td></td>
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</tr>
</tbody>
</table>

**Total Score**
LOG BOOK

Table 1: Academic activities attended

Name: 

Admission Year: 

College: 

<table>
<thead>
<tr>
<th>Date</th>
<th>Type of Activity</th>
<th>Particulars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specify Seminar, Journal Club, Presentation, UG teaching</td>
<td></td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>
LOG BOOK

Table 2: Academic presentations made by the student

Name: 

Admission Year: 

College: 

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Type of Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Specify Seminar, Journal Club, Presentation, UG teaching etc.</td>
</tr>
</tbody>
</table>
LOG BOOK

Table 3: Diagnostic and Operative procedures performed

Name:  
Admission Year:  
College:  

<table>
<thead>
<tr>
<th>Date</th>
<th>Name</th>
<th>ID No.</th>
<th>Procedure</th>
<th>Category O, A, PA, PI*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

* Key:  
O - Washed up and observed  
A - Assisted a more senior Surgeon  
PA - Performed procedure under the direct supervision of a senior surgeon  
PI - performed independently
## Model Overall Assessment Sheet

**Name of the College:**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Journal Review Presentations</td>
</tr>
<tr>
<td>2</td>
<td>Seminars</td>
</tr>
<tr>
<td>3</td>
<td>Clinical work in wards</td>
</tr>
<tr>
<td>4</td>
<td>Clinical presentation</td>
</tr>
<tr>
<td>5</td>
<td>Teaching skill practice</td>
</tr>
</tbody>
</table>

**Name of Student* and Mean Score**

<table>
<thead>
<tr>
<th></th>
<th>A*</th>
<th>B*</th>
<th>C*</th>
<th>D*</th>
<th>E*</th>
<th>F*</th>
<th>G*</th>
<th>H*</th>
<th>I*</th>
<th>J*</th>
</tr>
</thead>
</table>

**Total Score**

Note: Use separate sheet for each year.

**Signature of HOD**

**Signature of Principal**

The above overall assessment sheet used along with the 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 of all the scores of checklists 1 to 7.
- **A, B,...**: Name of the trainees.
Chapter V

Medical Ethics
Sensitisation and Practice

Introduction
There is now a shift from the traditional individual patient, doctor relationship, and medical care. With the advances in science and technology and the needs of patient, their families and the community, there is an increased concern with the health of society. There is a shift to greater accountability to the society. Doctors and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems. To accomplish the Goal (i), General Objective (ii) stated in Chapter II, and develop human values, it is urged that ethical sensitisation be achieved by lectures or discussion on ethical issues, clinical case discussion of cases with an important ethical component and by including ethical aspects in discussion in all case presentation, bedside rounds and academic postgraduate programmes.

Course Contents
1. Introduction to Medical Ethics
   What is Ethics
   What are values and norms
   Relationship between being ethical and human fulfillment
   How to form a value system in one’s personal and professional life
   Heteronomous Ethics and Autonomous Ethics
   Freedom and personal Responsibility

2. Definition of Medical Ethics
   Difference between medical ethics and bio-ethics
   Major Principles of Medical Ethics
   Beneficence = fraternity
   Justice = equality
   Self determination (autonomy) = liberty

3. Perspective of Medical Ethics
   The Hippocratic oath, The Declaration of Helsinki, The WHO Declaration of Geneva
   International code of Medical Ethics (1993)
   Medical Council of India Code of Ethics

4. Ethics of the Individual
   The patient as a person, The Right to be respected, Truth and Confidentiality
   The autonomy of decision, The concept of disease, health and healing
   The Right to health
   Ethics of Behaviour modification
   The Physician – Patient relationship
   Organ donation

5. The Ethics of Human life
   What is human life
   Criteria for distinguishing the human and the non-human
Reasons for respecting human life
The beginning of human life
Conception, contraception, Abortion
Prenatal sex-determination
In vitro fertilization (IVF), Artificial Insemination by Husband (AIH)
Artificial Insemination by Donor (AID), Surrogate motherhood, Semen Intrafallopian Transfer (SIFT),
Gamete Intrafallopian Transfer (GIFT), Zygote Intrafallopian Transfer (ZIFT), Genetic Engineering

6. *The Family and Society in Medical Ethics*
The Ethics of human sexuality
Family Planning perspectives
Prolongation of life
Advanced life directives – The Living Will
Euthanasia
Cancer and Terminal Care

7. *Profession Ethics*
Code of conduct
Contract and confidentiality
Charging of fees, Fee-splitting
Prescription of drugs
Over-investigating the patient
Low – Cost drugs, vitamins and tonics
Allocation of resources in health cares
Malpractice and Negligence

8. *Research Ethics*
Animal and experimental research / humanness
Human experimentation
Human volunteer research – Informed Consent
Drug trials

9. *Ethical workshop of cases*
Gathering all scientific factors
Gathering all human factors
Gathering all value factors
Identifying areas of value – conflict, Setting of priorities,
Working out criteria towards decisions

10. Law & Medicine
- Medical Council Act
- Consumer Protection Act
- Statutory Laws
  a). Article 21 of the Constitution – Right to life
  b). 304 IPC (Indian Penal Code)
  c). Drug Act

**Recommended Reading**
1. Francis C.M., Medical Ethics, 1I Ed, 2004, Jaypee Brothers, New Delhi, Rs. 150/-
2. Ethical Guidelines for Biomedical Research on Human Subjects, Indian Council of Medical Research (ICMR), New Delhi, 2000.