POST GRADUATE MEDICAL EDUCATION

REGULATIONS AND CURRRICULUM

FOR

POST GRADUATE DEGREE COURSES 2016

ANATOMY

JAGADGURU SRI SHIVARATREESHWARA UNIVERSITY

MYSURU

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JAGADGURU SRI SHIVARATREESHWARA UNIVERSITY

SRI SHIVARATHREESHWARA NAGARA

MYSORE 570015

KARNATAKA, INDIA

THIS BOOK CAN BE OBTAINED FROM

THE REGISTRAR
JAGADGURU SRI SHIVARATREESHWARA UNIVERSITY
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CONTENTS

CHAPTER I

REGULATIONS FOR POST GRADUATE DEGREE AND DIPLOMA COURSES

1. Branch of study

1.1 Post graduate degree courses

1.1.1 Doctor of Medicine

a) Anaesthesiology
b) Anatomy
c) Biochemistry
d) Community medicine
e) Dermatology, venereology and leprosy
f) Emergency medicine
g) Forensic medicine
h) General medicine
i) Hospital administration
j) Microbiology
k) Pathology
l) Paediatrics
m) Pharmacology
n) Physiology
o) Psychiatry
p) TB and chest diseases
q) Radio Diagnosis

1.1.2 Master of Surgery

a) General surgery
b) Obstetrics and gynaecology
c) Ophthalmology
d) Orthopaedics
e) Oto rhino laryngology

1.2 Post graduate diploma courses

a) Anaesthesiology (DA)
b) Child Health (DCH)
c) Clinical Pathology (DCP)
d) Dermatology, Venereology & Leprosy (DDVL)
e) Medical Radio Diagnosis (DMRD)
f) Obstetrics & Gynaecology (DGO)
g) Ophthalmology (DO)
h) Orthopaedics (D Ortho)
i) Otolaryngology (DLO)
j) Psychiatric Medicine (DPM)

2. Eligibility for admission

MD / MS Degree and Diploma courses: A candidate who has passed final year MBBS examination after pursuing a study in a medical college recognized by the Medical Council of India and has completed one year compulsory rotating internship in a teaching institution or other institution recognized by the Medical Council of India, and has obtained permanent registration of any State Medical Council, shall be eligible for admission.

3. Admission

A candidate desirous of admission to Post Graduate Medical Programmes MD/ MS / PG Diploma Courses is required to complete the application form and submit to the University along with prescribed documents on or before the scheduled date. Eligibility criteria, application form and details of documents to be submitted are available in the University website: www.jssuni.edu.in.

4. Registration

A candidate who has been admitted to postgraduate course shall register in the university within a month of admission after paying the registration fee.

5. Intake of students

The intake of students to each course shall be in accordance with the MCI.

6. Duration of study

6.1 MD, MS Degree Courses: The course of study shall be for a period of 3 years consisting of 6 terms.

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

7. Methodology 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 shall 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 specialty departments or institutions.

8. Attendance, progress and conduct

8.1 A candidate pursuing degree/diploma course, shall work in the concerned department of the institution for the full period as full time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course, nor can he/she work in a nursing home or other hospitals/clinic/laboratory while studying postgraduate course.

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

8.3 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.

8.4 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.

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

9. Monitoring progress of study

9.1 **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 shall 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.

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

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

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

10. Dissertation

10.1 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.

10.2 The dissertation is aimed to train a postgraduate 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.

10.3 Every candidate shall submit to the Controller of Examinations 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 proper channel.

10.4 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.

10.5 The dissertation should be written under the following headings:

a) Introduction
b) Aims or Objectives of study
c) Review of Literature
d) Material and Methods
e) Results
f) Discussion
g) Conclusion
h) Summary
i) References
j) Tables
k) Annexure
l) Proof of Paper presentation and publication

10.6 The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexure. 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. The dissertation shall be certified by the guide, head of the department and head of the Institution.

10.7 Four copies of dissertation thus prepared shall be submitted to the Controller of Examinations, six months before final examination, on or before the dates notified by the University.

10.8 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.

10.9 Guide: The academic qualification and teaching experience required for recognition as a guide for dissertation work is as per MCI Minimum Qualifications for Teachers in Postgraduate Medical Education Regulations, 2000. Teachers in a medical college/institution having a total of eight years teaching experience out of which at least five years teaching experience as Assistant Professor gained after obtaining post graduate degree shall be recognised as post graduate teachers.

10.10 Co Guide: 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 JSS University / Medical Council of India.

10.11 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.

10.12 A postgraduate student is required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

11. Schedule of examination

The examination for MD / MS courses shall be held at the end of three academic years (six academic terms). The examination for the diploma courses shall be held at the end of two academic years (four academic terms).

For students who have already passed Post Graduate Diploma and appearing for MD examination, the examination shall be conducted after two academic years (four academic terms, including submission of dissertation) The University shall conduct two examinations in a year at an interval of four to six months between the two examination. Not more than two examinations shall be conducted in an academic year.

12. Scheme of examination

12.1 MD/MS

12.1.1 **Dissertation:** Every candidate shall carryout work and submit a dissertation as indicated in Sl No 10. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

12.1.2 **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, the 1st paper in clinical subjects will be on applied aspects of basic medical sciences. Recent advances may be asked in any or all the papers. In basic medical subjects and para-clinical subjects, questions on applied clinical aspects shall also be asked.

Pattern of Theory Examination Question Paper:

Each paper shall consist of two long essay questions each carrying 20 marks, 3 short essay questions each carrying 10 marks and 6 short answer questions each carrying 5 marks. Total marks for each paper shall be 100.

12.1.3 **Practical/Clinical Examination:** In case of Practical examination for the subjects in Basic Medical Sciences Practical Examination shall be conducted to test the knowledge and competence of the candidates for making valid and relevant observations based on the experimental/Laboratory studies and his ability to perform such studies as are relevant to his subject.

Clinical examination for the subjects in Clinical Sciences shall be conducted to test the knowledge and competence of the candidates for undertaking independent work as a specialist/Teacher, for which candidates shall examine a minimum one long case and two short cases.

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

12.1.4 **Viva Voce:** Viva Voce shall be thorough and shall aim at assessing the candidate knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the speciality, which form a part of the examination.

The total marks shall be 100 and the distribution of marks shall be as under:

i) For examination of all components of syllabus 80

ii) For Pedagogy 20

If there is skills evaluation, 10 marks shall be reserved for Pedagogy and 10 marks for skill evaluation.

12.1.5 **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.

12.1.6 **Criteria for declaring as pass in University Examination:** A candidate shall pass theory and practical including clinical and viva-voce examination separately and shall obtain 40% marks in each theory paper and not less than 50% marks cumulatively in all the four papers for post graduate degree examination to be declared as pass.

A candidate obtaining less than 40% marks in any paper and obtaining less than 50% of marks cumulatively in all the four papers for post graduate degree examination shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

12.1.7 **Declaration of class:** A successful candidate passing the University examination in first attempt and secures grand total aggregate 75% of marks or more will be declared to have passed the examination with distinction, 65% but below 75% declared as First Class and 50% but below 65% declared as Second Class.

A candidate passing the University examination in more than one attempt shall be declared as Pass Class irrespective of the percentage of marks.

12.2 Post Graduate Diploma Examinations

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

12.2.1 **Theory:** There shall be three written question papers each carrying 100 marks. Each paper will be of three hours duration. In clinical subjects one paper out of this shall be on basic medical sciences. In basic medical subjects and Para- clinical subjects, questions on applied clinical aspects shall also be asked.

Pattern of Theory Examination Question Paper:

Each paper shall consist of two long essay questions each carrying 20 marks, 3 short essay questions each carrying 10 marks and 6 short answer questions each carrying 5 marks. Total marks for each paper shall be 100.

12.2.2 **Practical Clinical Examination:** In case of practical examination it shall 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 shall aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate shall examine at least one long case and two short cases.

The maximum marks for Practical / Clinical shall be 150.

Viva Voce Examination: Viva Voce examination shall be thorough and shall aim at assessing the candidate's knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the speciality, which shall from a part of the examination. The total marks shall be 50.

12.2.3 **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.

12.2.4 **Criteria for declaring as pass in University Examination:** A candidate shall pass theory and practical including clinical and viva-voce examination separately and shall obtain 40% marks in each theory paper and not less than 50% marks cumulatively in all the three papers for post graduate diploma examination to be declared as pass.

A candidate obtaining less than 40% marks in any paper and obtaining less than 50% of marks cumulatively in all the three papers for post graduate diploma examination shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

12.2.5 **Declaration of class:** A successful candidate passing the University examination in first attempt and secures grand total aggregate 75% of marks or more will be declared to have passed the examination with distinction, 65% but below 75% declared as First Class and 50% but below 65% declared as Second Class.

A candidate passing the University examination in more than one attempt shall be declared as Pass Class irrespective of the percentage of marks.

13. Number of candidates per day

The maximum number of candidates to be examined in Clinical/ practical and Oral on any day shall not exceed eight for M.D./M.S. degree, eight for diploma.

CHAPTER II

GOALS AND GENERAL OBJECTIVES OF POSTGRADUATE MEDICAL EDUCATION PROGRAM

GOAL

The goal of postgraduate medical education shall be to produce competent specialists and/or medical teachers:

1. Who shall recognize the health needs of the community and carry out professional obligations ethically and in keeping with the objectives of the national health policy.
2. Who shall have mastered most of the competencies, pertaining to the speciality, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system.
3. Who shall be aware of the contemporary advance and developments in the discipline concerned.
4. Who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology and
5. 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:

1. Recognize the importance to the concerned speciality in the context of the health needs of the community and the national priorities in the health section.
2. Practice the speciality concerned ethically and in step with the principles of primary health care.
3. Demonstrate sufficient understanding of the basic sciences relevant to the concerned speciality.
4. 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 primitive measure/strategies.
5. Diagnose and manage majority of the conditions in the speciality concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.

6. Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the speciality.
7. Demonstrate skills in documentation of individual case details as well as morbidity and mortality rate relevant to the assigned situation.
8. Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectations.
9. Play the assigned role in the implementation of national health programme, effectively and responsibly.
10. Organize and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.
11. Develop skills as a self-directed learner, recognize continuing education needs; select and use appropriate learning resources.
12. Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyze relevant published research literature.
13. Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
14. 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 discipline 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 POSTGRADUATE CURRICULUM:

The major components of the Postgraduate curriculum shall be:

- Theoretical knowledge
- Practical and clinical skills
- Thesis skills.
- Attitudes including communication skills.
- Training in Research Methodology, Medical Ethics and Medicolegal aspects.

(Source: Medical Council of India, Regulations on Postgraduate Medical Education, 2000)

CHAPTER III

Monitoring Learning Progress

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring shall be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Model checklists are given in this chapter which may be copied and used.

The learning out comes to be assessed should include:

1. Personal Attitudes.
2. Acquisition of Knowledge.
3. Clinical and operative skills and
4. Teaching skills.

1. <u>Personal Attitudes</u>: The essential items are:

a) Caring attitude.
b) Initiative.
c) Organisational ability.
d) Potential to cope with stressful situations and undertake responsibility.
e) Trust worthiness and reliability.
f) To understand and communicate intelligibly with patients and others.
g) To behave in a manner that establishes professional relationships with patients and colleagues.
h) Ability to work in a team.
i) A critical enquiring approach to the acquisition of knowled ge.

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.

2. <u>Acquisition of Knowledge</u>: 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.

a) **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 III)

b) **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 III)

c) **Clinico-pathological conferences.** This should be a multidisciplinary 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 check list similar to that used for seminar.

d) **Medical Audit.** Periodic morbidity and mortality meeting shall be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

3. Clinical skills:

a. **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 III).

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

c. **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 log book. (Table No.3, Chapter III).

4. 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 III).

5. **Periodic tests:** In case of degree courses of three years duration, the department 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. In case of diploma courses of two year duration, the departments may conduct two tests. One of them 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, practical / clinical and viva voce.

6. **Work diary:** 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.

7. **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.

8. **Log book:** The log book 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 log book for the different activities is given in Tables 1, 2 and 3 of Chapter III. 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 counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the require ments in spite of being given adequate chances to set him or herself right.

Format of Model Check Lists

Check List-I

MODEL CHECK-LIST FOR EVALUATION OF JOURNAL REVIEW PRESENTATIONS

Name of the Student:

Name of the Faculty/Observer:

Date:

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

Check List – II

MODEL CHECK-LIST FOR EVALUATION OF SEMINAR PRESENTATIONS

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl No	Items for observation during presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Whether other relevant publications consulted					
2.	Whether cross references have been consulted					
3.	Completeness of Preparation					
4.	Clarity of Presentation					
5.	Understanding of subject					
6.	Ability to answer questions					
7.	Time scheduling					
8.	Appropriate use of Audio-Visual aids					
9.	Overall Performance					
10.	Any other observation					
	Total Score					

Check List - III

MODEL CHECK LIST FOR EVALUATION OF

CLINICAL WORK IN WARD / OPD

(To be completed once a month by respective Unit Heads, including posting in other departments)

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl No	Points to be considered	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Regularity of attendance					
2.	Punctuality					
3.	Interaction with colleagues and supportive staff					
4.	Maintenance of case records					
5.	Presentation of cases during rounds					
6.	Investigations work up					
7.	Beside manners					
8.	Rapport with patients					
9.	Counseling patient's relatives for blood donation or Postmortem and Case follow up.					
10.	Overall quality of ward work					
	Total Score					

Check List - IV

EVALUATION FORM FOR CLINICAL PRESENTATION

Name of the Student:

Name of the Faculty:

Date:

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

Check List - V

MODEL CHECK LIST FOR EVALUATION OF TEACHING SKILL PRACTICE

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

Check List - VI

MODEL CHECK LIST FOR DISSERTATION PRESENTATION

Name of the Student:

Name of the Faculty:

Date:

Sl No	Points to be considered divine	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Interest shown in selecting a topic					
2.	Appropriate review of literature					
3.	Discussion with guide & other faculty					
4.	Quality of Protocol					
5.	Preparation of proforma					
	Total Score					

Check List - VII

CONTINUOUS EVALUATION OF DISSERTATION WORK BY GUIDE / CO GUIDE

Name of the Student:

Name of the Faculty:

Date:

Sl No	Items for observation during presentations	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Periodic consultation with guide/co-guide					
2.	Regular collection of case Material					
3.	Depth of analysis / discussion					
4.	Departmental presentation of findings					
5.	Quality of final output					
6.	Others					
	Total Score					

LOG BOOK

Table 1: Academic activities attended

Name: Admission Year:

Date	Type of Activity Specify Seminar, Journal Club, Presentation, UG teaching	Particulars

LOG BOOK

Table 2: Academic presentations made by the student

Name: Admission year:

Date	Topic	Type of Presentation Specify Seminar, Journal Club, Presentation, UG teaching

LOG BOOK

Table 2: Diagnostic and Operative procedures performed

Name: Admission year:

College:

Date	Name	ID No.	Procedure	Category O, A, PA, PI*

*** 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

Academic Year:

Sl No	Faculty Member & Others	Name of Student and Mean Score*									
		A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
1.	**Journal Review Presentations**										
2.	**Seminars**										
3.	**Clinical work in wards**										
4.	**Clinical presentation**										
5.	**Teaching skill practice**										
	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 IV

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 patients, 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 and General Objective stated in Chapter II and develop human values it is urged that ***ethical sensitisation*** be achieved by lectures or discussion on ethical issues, clinical 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 Intra-fallopian Transfer (SIFT).
- Gamete Intra-fallopian Transfer (GIFT).
- Zygote Intra-fallopian 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 care.
- Malpractice and Negligence.

8. Research Ethics

- Animal and experimental research / humaneness.
- 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.

Recommended Reading

1. Francis C.M., Medical Ethics, 1 Ed, 1993, Jaypee Brothers, New Delhi, p 189, Rs. 150/-

2. Good Clinical Practices : GOI Guidelines for clinical trials on Pharmaceutical Products in India (www.cdsco.nic.in)

3. INSA Guidelines for care and use of Animals in Research – 2000.

4. CPCSEA Guidelines 2001 (www.cpcsea.org.)

5. Ethical Guidelines for Biomedical Research on Human Subjects, 2000, ICMR, New Delhi.

6. ICMR Guidelines on animal use 2001, ICMR, New Delhi.

Chapter V
Syllabus

GOAL: The postgraduate course in MD 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.

OBJECTIVES:

At the end of the three years' post-graduate training in Anatomy the student should be able to:

1. Acquire in depth knowledge of structure of human body from the gross to the microscopic anatomy level, and correlate it with the functions.
2. Comprehend the principles underlying the structural organization of body and provide anatomical explanations for altered functions.
3. Acquire knowledge of basic principles of normal growth and differentiation. Understand the process of human growth and development of all the organ systems of body. Analyze the congenital malformations and etiological factors including genetic mechanisms involved in abnormal development.
4. Acquire and apply comprehensive knowledge of the basic structure and correlated function of all the system in order to understand various clinical conditions.
5. Identify, locate and demonstrate surface marking of clinically important structures in the cadaver and correlate it with living anatomy
6. Competently Procure, Embalm and Preserve the human cadavers
7. Acquire mastery in tissue preparation, staining and museum specimens preparation
8. Plan and implement teaching & learning programmes for under-graduate medical students.
9. Use different teaching learning methods and modern learning resources for under-graduate teaching.
10. Plan and conduct assessment for under-graduate students.
11. Develop an attitude of scientific enquiry and learn prevailing research methodologies.
12. Understand the recent scientific advances; identify lacunae in the existing knowledge in a given area and to plan for research.

COURSE OUTCOMES:

After completing the course the postgraduate should:

1. Have acquired the competencies pertaining to the subject of Anatomy that are required to be practiced at all levels of health system.
2. Competently carryout the Body Donation Program, Prepare histology slides and maintain the museum
3. Be able to discharge responsibilities and participate in National Health Education Programme.

4. Be oriented to the principles of research methodology
5. Have acquired skills in educating medical and paramedical professionals.
6. Have acquired skills in effectively communicating with the students and colleagues from various medical and paramedical fields.
7. Have acquired skills of integrating anatomy with other disciplines as and when required.
8. Have acquired qualities of a good teacher capable of innovations in teaching & learning methodology.

COMPETENCIES:

At the end of the course, the student should have acquired following competencies:

A. Cognitive domain

1. Describe gross anatomy of entire body including upper limb, lower limb, thorax, abdomen, pelvis, perineum, head and neck, brain and spinal cord.
2. Explain the normal disposition of gross structure, and their interrelationship in the human body.
3. Should be able to analyze the integrated functions of organs systems and locate the site of gross lesions according to deficits encountered.
4. Describe the process of gametogenesis, fertilization, implantation and placenta formation in early human embryonic development along with its variation and applied anatomy.
5. Demonstrate knowledge about the sequential development of organs and systems along with its clinical anatomy, recognize critical stages of development and effects of common teratogens, genetic mutations and environmental hazards.
6. Should be able to explain developmental basis of variations and congenital anomalies.
7. Explain the principles of light, transmission and scanning, compound, electron, fluorescent and virtual microscopy.
8. Describe the microscopic structure of various tissues & organs and correlate structure with functions as a prerequisite for understanding the altered state in various disease processes.
9. Demonstrate knowledge about cell and its components, cell cycle, cellular differentiation and proliferation.
10. Describe structure, number, classification, abnormalities and syndromes related to human chromosomes.
11. Describe important procedures in cytogenetics and molecular genetics with its application.
12. Demonstrate knowledge about single gene pattern inheritance, intermediate pattern and multiple alleles, mutations, non-mendelian inheritance, mitochondrial inheritance, genome imprinting and parental disomy.
13. Describe multifactorial pattern of inheritance, teratology, structure gene, molecular screening, cancer genetics and pharmacogenetics.
14. Demonstrate knowledge about reproduction genetics, assisted reproduction, prenatal diagnosis, genetic counseling and ethics in genetics.
15. Explain principles of gene therapy and its applied knowledge.

16. Describe immune system and cell types involved in defense mechanisms of the body. Also explain gross features, cytoarchitecture, functions, development and histogenesis of various primary and secondary lymphoid organs in the body.
17. Demonstrate knowledge about common techniques employed in cellular immunology and histocompatibility testing.
18. Demonstrate applications of knowledge of structure & development of tissue organ system to comprehend deviations from normal.
19. Demonstrate knowledge about recent advances in medical sciences which facilitate comprehension of structure function correlations and applications in clinical problem solving.
20. Explain collection, maintenance and application of stem cells, cryobanking and principles of organ donation from recently dead bodies.
21. Demonstrate knowledge about surface marking of all regions of the body.
22. Able to interpret various radiographs of the body, normal CT Scan, ultrasound and MRI.
23. Demonstrate knowledge about different anthropological traits and use of related instruments.
24. Demonstrate knowledge about outline of comparative anatomy of whole body and basic human evolution
25. Demonstrate knowledge about identification of human bones, determination of sex, age, and height for medico legal application of anatomy

B. Affective domain

1. Demonstrate self-awareness and personal development in routine conduct. (Self awareness)
2. Practice selflessness, integrity, responsibility, accountability and respect.
3. Communicate effectively with peers, students and teachers in various teaching learning activities in a manner that encourages participation and shared decision-making.
   (Communication)
4. Demonstrate ability to communicate adequately, sensitively, effectively and respectfully with body donors and their relatives. (Communication)
5. Demonstrate
   a. Due respect and follows the correct procedure while handling human body parts, cadavers during dissection & other biological tissues. (Ethics & Professionalism)
   b. Humane touch while demonstrating living surface marking in subject/patient.

   (Ethics & Professionalism)
6. Acquire capacity of not letting his/her personal beliefs, prejudices and limitations come in the way of duty.
7. Appreciate the issues of equity and social accountability while exposing students to early clinical exposure. (Equity and social accountability)

C. Psychomotor domain

At the end of the course the student should be able to:

1. Identify, locate and demonstrate surface marking of clinically important structures in the cadaver and correlate it with living anatomy.
2. Acquire mastery in dissection skills, embalming, tissue preparation, staining and museum preparation.
3. Locate and identify clinically relevant structures in dissected cadavers.
4. Locate and identify cells & tissues under the microscope.
5. Identify important structures visualized by imaging techniques, specifically radiographs, computerized tomography (CT) scans, MRI and ultrasonography.
6. Demonstrate various movements at the important joints and actions of various groups of muscles in the human body.
7. Demonstrate anatomical basis of common clinical procedures expected to be performed by a basic medical doctor.
8. Demonstrate different methods of teaching-learning and make presentations of the subject topics and research outputs.

Course content

Part I: Gross anatomy

Gross Anatomy of entire body including upper limb, lower limb, thorax, abdomen, pelvis, perineum, head and neck, brain and spinal cord

Part II: Developmental anatomy/embryology

1. General embryology: gametogenesis, fertilization, implantation and placenta, early human embryonic development.
2. Systemic embryology: development of organ systems and associated common congenital abnormalities with teratogenesis.
3. Physiological correlations of congenital anomalies.

Part III: Histology and histochemistry

1. Cell Structure: Cytoplasm - cytoplasmic matrix, cell membrane, cell organelles, cytoskeleton, cell inclusions, cilia and flagella. Nucleus - nuclear envelope, nuclear matrix, DNA and other components of chromatin, protein synthesis, nucleolus, nuclear changes indicating cell death. Cell cycle - mitosis, meiosis, cell renewal. Cellular differentiation and proliferation.
2. Microscopic structure of the body: Principles of light, transmission and scanning, electron, fluorescent, confocal and virtual microscopy. The systems/organs of body - Cellular organization, light and electron microscopic features, structure - function correlations, and cellular organization.

Part IV: Neuroanatomy:

Brain and its environment, Development of the nervous system, Neuron and Neuroglia, Somatic sensory system, Olfactory and optic pathways, Cochleovestibular and gustatory pathways, Motor pathways, Central autonomic pathways, Hypothalamo-hypophyseal system, Limbic system, Basal ganglia, Reticular system, Cranial nerves, Ventricular system, Cross Sectional anatomy of brain and spinal cord. Detailed structure of the central nervous system and its applied aspect.

Part V: Genetics:

1. Human Chromosomes - Structure, number and classification, methods of chromosome preparation banding patterns. Chromosome abnormalities, Autosomal and Sex chromosomal abnormalities syndromes, Molecular and Cytogenetics.
2. Single gene pattern inheritance: Autosomal and Sex chromosomal pattern of inheritance, Intermediate pattern and multiple alleles, Mutations, Non Mendelian inheritance, Mitochondrial inheritance, Genome imprinting, parental disomy.
3. Multifactorial pattern of inheritance: Criteria for multifactorial inheritance, Teratology, Structure gene, Molecular Screening,
4. Cancer Genetics - Haematological malignancies, Pharmacogenetics.
5. Reproduction Genetics - Male and Female Infertility, Abortuses, Assisted reproduction, Preimplantation genetics, Prenatal diagnosis, Genetic Counseling and Ethics of Genetics. Principles of Gene therapy and its applied knowledge.

Part VI:Immunology:

Immune system and the cell types involved in defense mechanisms of the body. Gross features, cytoarchitecture, functions, development and histogenesis of various primary and secondary lymphoid organs in the body. Biological and clinical significance of the major histocompatibility complex of man including its role in transplantation, disease susceptibility/resistance and genetic control of the immune response. Common techniques employed in cellular immunology and histocompatibility testing. Molecular hybridization and PCR technology in immunology research particularly mechanism of antigen presentation, structural and functional relevance of the T cell receptor, genetic control of the immune response, molecular basis of susceptibility to disease.

Part VII: Applied anatomy and recent advances

Clinical correlations of structure and functions of human body. Anatomical basis and explanations for clinical problems. Applications of knowledge of development, structural (microscopy), neuroanatomy to comprehend deviations from normal.

Recent advances in medical sciences which facilitate comprehension of structure function correlations and applications in clinical problem solving. Collection, maintenance and application of stem cells, cryobanking and principles of organ donation from recently dead bodies.

Part VIII: Surface Marking and Radiology

Surface marking of all regions of the body. Interpretation of normal radiographs of the body including special contrast procedures including barium studies, cholicystrography, pylography, salphingography. Normal CT Scan, MRI and Ultrasound.

Teaching & Learning Methods

1. **Didactic Teaching**: Topics in gross anatomy, surface and cross sectional anatomy, Histology, embryology, neuroanatomy, histochemistry, and genetics taught by faculty members.
2. **Training in communication skills**: Journal club, seminars, demonstrations, tutorials, lectures, quizzing. Scientific paper presentation at conferences

3. **Practical training**:

Gross anatomy:

- Procurement, Embalming and Preservation of human cadavers
- Preparation of tanks for preserving bodies.
- Dissection of cadaver, Window dissection of important regions.
- Dissection of brain and spinal cord for teaching and learning purpose. Preparing macroscopic and microscopic sections of brain and spinal cord and identification of different parts in them.
- Preparation of specimens for museum with display - soft parts, models &charts. Preparation and preservation of human bones / skeleton

Histology:

- Preparation of common fixatives embalming fluid 10% formalin, Bouin's fluid etc.
- Making paraffin blocks and section cutting and mounting
- Preparation of staining set for H and E staining and staining paraffin sections with the stain
- Making celloidin, araldite, gelatin blocks and their section cutting
- Processing hard tissues, decalcification of bones, block making and sectioning, preparation of ground sections of calcified bones.
- Frozen section cutting on freezing microtome and cryostat
- Honing and Stropping of microtome knives, including sharpening by automatic knife sharpener
- Histology file in which LM and EM pictures of all the organs and tissues of the body should be drawn and a small description of salient features written Techniques in microanatomy, neuroanatomy, gross anatomy, embryology, histochemistry, genetics, and microscopy.
- Practical classes for staining of glycogen, mucopolysaccharides, alkaline phosphatase acid phosphatase, and calcium
- Embryo (chick embryo) mounting, serial sections & stain it with haematoxyline & eosin.

Interpret normal radiological anatomy and sectional anatomy of the human body as studied by various imaging techniques.

4. **Teaching**: Participate in the teaching and training programme of undergraduate students and interns. Preparation of Audio Visual aids for teaching, posters/manuscripts for presentation in conferences/workshops and publication in journals. Comprehend horizontal integration of various subdivisions of anatomy with relevant physiology and biochemistry. Participation in formulating evaluation methods: Setting objective questions, Short Answer Questions, Multiple Choice Questions and Objective Structured Practical Examination (OSPE).

5. **Log Book**: Every student should maintain a logbook in which a record of the practical exercises completed, Seminars & journal clubs details, Conferences/ workshops/ CME details, teaching learning activities etc should be entered. The Log books shall be checked and assessed periodically by the faculty members

imparting the training. Duly scrutinized and certified by the head of the department and to be submitted to the external examiner during the final examination.

6. **Record Book**: 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.

7. Research/Dissertation:

- 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 JSSU regulations.
- Hands on Workshop on synopsis & dissertation writing, paper & poster presentation skills & writing research papers.

Method of Training

The candidates shall attend all the undergraduate theory and practical classes regulary. Rotation postings of PG students shall be made in the II and III years of the course as follows:

Sl no	Year	Department	Duration in Weeks
1	I	General surgery	2
2		Orthopaedics	2
4		Pathology	2
5	II	Radiodiagnosis	2
		Paediatrics	2
6		Obstetrics & gynaecology	2
7		Genetics	2

Assessment

The examination for M.D shall be held at the end of 3rd academic year. It will be 3 parts- Thesis, Written exam and Practical with Viva Voce. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole.

Formative assessment: Periodical examinations during the course of training. Assessment should be frequent, cover all domains of learning and provide feedback to improve learning; it should also cover professionalism and communication skills.
The Internal Assessment in theory and practical/clinical examination during 1st, 2nd and 3rd year.

Summative Assessment:

University Examination pattern:

MD (Anatomy) Examination	Theory	Practical	Viva-voce (Pedagogy & Thesis discussion)	**Total**
Maximum marks	400	200	100	**700**

1. **Thesis**:
Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Written Exam: 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.
Paper I: Gross Anatomy
Paper II: Embryology, Microscopic Anatomy and Genetics
Paper III: Neuroanatomy
Paper IV: Applied Human Anatomy and recent advances in anatomical Sciences

Each Theory paper consists of:

Sl No	**Type of Question**	**Marks**
1	Long Essay (2)	2 X 20= 40
2	Short Essay (6)	6 X 10= 60
Total		**100 marks**

Paper I: Gross Anatomy:

a) Gross Anatomy of whole human body i.e. upper limb, lower limb thorax, abdomen, pelvis, head and neck
b) Method of preservation of human body and its parts, radiological anatomy, sectional anatomy.
c) Museum techniques.

Paper II: Embryology, Microscopic Anatomy and genetics:

a) General Principles of genetics, Cytogenetic as applicable to medicine and different genetic disorders, gene therapy.

b) General Embryology, Systemic Embryology, methods of experimental embryology, clinically oriented embryology and teratology
c) Histology (including fine structure) of tissues and organs of the body.
d) Principles of light, transmission and scanning electron microscopy, confocal, virtual microscopy.

Paper III: Neuroanatomy:
Gross anatomy of CNS and its applied aspects

Paper IV: Applied Human Anatomy and recent advances in medical sciences:

a) Clinical and applied aspect of Anatomy
b) Recent advances in the application of knowledge of anatomy on human body
c) Collection, maintenance and uses of stem cells
d) Cryobanking
e) Basics of principles of organ donation from recently dead bodies.

3. Practical's: 200 marks (Gross Anatomy - 100 marks, Histology - 100 marks) Spread over a minimum of 2 days

A. Gross Anatomy:

Dissection of the topic allotted on a human cadaver and display for discussion. Time allotted will be 03 hrs.

Distribution of Marks:

Sl NO	Topics	Marks
1	Surface Anatomy	10
2	Dissection	40
3	Discussion	50
Total		**100**

B. Histology:

Identification and discussion of 10 stained sections which includes neuroanatomy, embryology and human genetics. Preparation of paraffin blocks, serial section cutting of the given block and staining the given slide with H and E stain, followed with discussion.

Sl NO	Topics	Marks
1	Identification and discussion of 10 slides	40
2	Preparation of a paraffin block	10
3	Taking serial sections from blocks provided	10
4	Staining of the given section with H & E and	20

	Discussion	
5	Discussion on histological techniques	20
Total		**100**

C. Viva –Voce & Pedagogy: 100 marks

Viva Voce(80 Marks): Grand Viva of all the components of the syllabus along with specimens, skiagrams including newer imaging techniques, bones and embryology models including a problem solving exercise.

A short synopsis of the thesis work should be presented by the post graduate student and discussion on the topic.

Pedagogy(20 Marks): Demonstration of teaching skill / techniques. Microteaching of a short topic to assess teaching skills

Recommended reading

Gross Anatomy:

1. Susan Strandring: Gray's Anatomy: The anatomical basis of clinical practice, Churchill Livingstone Elsevier. 41nd edition
2. Dutta A.K. Human Anatomy vol I to III. (I- V edition, Vol II- VI edition Vol III-IX Edition) Current publisher.
3. Dutta A.K. Principle of General Anatomy. Current Publisher.
4. Romanes. Cunningham's Manual of Practical Anatomy vol. I-III, 16th edition Oxford.
5. Keith and Moore Clinical Oriented Anatomy. VII edition Lippincot Williams and Willkins.
6. R.S Snell. Clinical Anatomy by regions. 9th edition Lippincot Williams and Wilkins.
7. J.V. Basmajin. Grant's Method of Anatomy. 11th edition Williams and Wilkins.
8. R.J. Last. Anatomy Regional and Applied. 11th edition Churchill Livingston.
9. Lee McGregor's Synopsis of Surgical Anatomy, 12 edition Varghese Publishing House.
10. Snell. Clinical anatomy by regions. VIII edition Lippincotts, Williams and Wilkins.
11. Hollinshed W Henry. Anatomy for surgeons. Vol. I-III Lippincotts, Williams and Wilkins.
12. Vishram Singh. Clinical and Surgical Anatomy. Elsevier. Vol I-III, II edition
13. Vishram Singh. Textbook of general anatomy. Elsevier.
14. Frank H. Netter. Atlas of Human Anatomy. Vth edition Saunders Elsevier.

Histology:

1. Young B. and Heath J.Wheater's Functional Histology. VI edition Churchill Livingstone.
2. M.H. E Ross. Histology: A textbook and atlas. VI edition Williams and Wilkins.
3. Difiore's. Atlas of histology with functional co-relation. 11th edition
4. Junqueira Basic histology - Text book and Atlas XIV edition
5. Bloom and Fawcett. Text book of histology. XII edition
6. Carlton's. Histology Technique.
7. E.C. Clayden. Practical of section cutting and staining.
8. D W Cormack. Ham's Histology. IX edition Lippincotts, Williams and Wilikins.

Genetics:

1. J.S Thompson and Thompson . Genetics in medicine. VII edition W.B. Saunders and Co.
Philadelphia, London.
2. George Fraser and Oliver Mayo. Text book of Human Genetics. Blackwell Scientific Publications London, Oxford Edinburg, Melbourne.
3. Hann Sellwerger and Jame Simpson. Chromosomes of Man. Sparsher's International Medical Publications.

Embryology:

1. Hamilton, Boyd. and Mossman. Human Embryology. IV edition
2. TW Sadler. Langman's Medical Embryology. Lippincotts, Williams and Wilikins. 12th edition
3. Keith L Moore and T.V.N. Persaud. The Developing Human. VII edition Saunders.
4. Larsen's Human embryology Schoenwolf, Bleyl, Brauer, Francis-West 7th edition
5. AK Datta Essentials of Human embryology 7th edition
6. Vishram singh Textbook of clinical Embryology 2nd edition

Neuroanatomy:

1. Richard S. Snell. Clinical Neuroanatomy for Medical Students. VII edition Williams and Wilkins.
2. A. Parent. Carpenter's Human neuroanatomy. Williams and Wilkins.
3. Vishram Singh. Clinical Neuroanatomy. II edition Elsevier.
4. A. K. Dutta. Essentials of Neuroanatomy. IV edition Current books international.
5. John A. Kiernan. Barr's the human nervous system, Lippincott, Williams and Wilkins.

Statistics:

1. David E. Matthews and Vernon T. Farewell. Using and Understanding Medical Statistics. 4th edition Karger.

Radiology:

1. T.B. Moeller et.al. Sectional Anatomy CT and MRI Vol. I, II, III New York. Theme Stuttgart.
2. J.B. Walter et.al. Basic Atlas of Sectional Anatomy with correlated imaging. Saunders Elsevier.

Surface anatomy:

1. SP John, Lumley editors. Surface Anatomy, The Anatomical basis of clinical examination. II edition London: Churchill Livingstone.
2. A. Halim. and A.C. Das. Surface Anatomy II edition Lucknow. ASI, KGMC.

Recommended reading

Gross Anatomy:

1. Susan Strandring: Gray's Anatomy: The anatomical basis of clinical practice, Churchill Livingstone Elsevier. 2. Dutta A.K. Human Anatomy vol. I-III Current Publisher.
3. Dutta A.K. Principle of General Anatomy. Current Publisher.
4. Romanes. Cunningham's Manual of Practical Anatomy vol. I-III, Oxford.
5. Keith and Moore Clinical Oriented Anatomy. Lippincot Williams and Willkins.
6. R.S Snell. Clinical Anatomy by regions. Lippincot Williams and Wilkins.
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2. M.H. E Ross. Histology: A textbook and atlas. Williams and Wilkins.
3. V. Bharihoke. Text book of human histology. Delhi AITBS.
4. Difiore's. Atlas of histology with functional co-relation.
5. Bloom and Fawcett. Text book of histology.
6. Carlton's. Histology Technique.
7. E.C. Clayden. Practical of section cutting and staining.
8. D W Cormack. Ham's Histology. Lippincotts, Williams and Wilikins.
9. Bloom and Fawcett. Textbook of Histology.

Genetics

1. J.S Thompson and Thompson . Genetics in medicine. W.B. Saunders and Co. Philadelphia, London.
2. George Fraser and Oliver Mayo. Text book of Human Genetics. Blackwell Scientific Publications London, Oxford Edinburg, Melbourne.
3. Hann Sellwerger and Jame Simpson. Chromosomes of Man. Sparsher's International Medical Publications.

Embryology

1. Hamilton, Boyd. and Mossman. Human Embryology.
2. TW Sadler. Langman's Medical Embryology. Lippincotts, Williams and Wilikins.
3. Keith L Moore and T.V.N. Persaud. The Developing Human. Saunders.
4. Rani Kumar. Text book of embryology. I.K. International New Delhi

Neuroanatomy

1. Richard S. Snell. Clinical Neuroanatomy for Medical Students. Williams and Wilkins.

2. A. Parent. Carpenter’s Human neuroanatomy. Williams and Wilkins.
3. Vishram Singh. Clinical Neuroanatomy. Elsevier.
4. A. K. Dutta. Essentials of Neuroanatomy. Current books international.
5. John A. Kiernan. Barr's the human nervous system, Lippincott, Williams and Wilkins.

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2. A. Halim. and A.C. Das. Surface Anatomy Lucknow. ASI, KGMC.

Journals