

Faculty of Medicine



JSS Academy of Higher Education & Research

(Deemed to be University)

Accredited "A" Grade by NAAC

Sri Shivarathreshwara Nagar, Mysuru – 570 015

Regulation & Syllabus

Post Graduate Degree Programs

PHYSIOLOGY 2016

MD

Regulation & Syllabus

MD PHYSIOLOGY

2016



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REGULATION AND SYLLABUS FOR POST GRADUATE DEGREE PROGRAMS 2016

MD PHYSIOLOGY



CONTENTS

| | | Page No |
|-------------|------------------------------|----------------|
| Chapter I | Regulation | 04 |
| Chapter II | Goals and General Objectives | 11 |
| Chapter III | Monitoring Learning Process | 13 |
| Chapter IV | Ethics | 26 |
| Chapter V | Syllabus - Degree | 28 |
| | - Diploma | 55 |

CHAPTER I

REGULATION FOR POST GRADUATE DEGREE AND DIPLOMA COURSES

1. Branch of study

Post graduate degree courses

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) Tuberculosis and Respiratory Medicine
- q) Radio Diagnosis

Master of Surgery

- a) General surgery
- b) Obstetrics and gynaecology
- c) Ophthalmology
- d) Orthopaedics
- e) Otorhinolaryngology

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 Deemed to be 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 Deemed to be University website: www.jssuni.edu.in.

4. Registration

A candidate who has been admitted to postgraduate course shall register in the Deemed to be 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

MD, MS Degree Courses: The course of study shall be 3 completed years including the period of examination.

Provided that in case of students having a recognized 2 years postgraduate diploma course in the same subject, the period of training including the period of examination shall be 2 years.

Diploma courses: The course of study shall be 2 completed years including the examination period.

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

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.

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

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.

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.

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

9. Monitoring progress of study

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 scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the Deemed to be University practical/clinical examination.

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 Deemed to be University, when called for.

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.

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

10. Dissertation

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.

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.

Every candidate shall submit to the Controller of Examinations of the Deemed to be 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 Deemed to be University. The synopsis shall be sent through proper channel.

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

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

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.

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 Deemed to be University.

The dissertation shall be valued by examiners appointed by the Deemed to be University. Approval of dissertation work is an essential precondition for a candidate to appear in the Deemed to be University examination.

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.

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 Deemed to be University / Medical Council of India.

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 Deemed to be University.

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.

For students who have already passed Post Graduate Diploma and appearing for MD examination, the examination shall be conducted after two academic years including submission of dissertation. The Deemed to be 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.

12. Scheme of examination

MD/MS

Dissertation: Every candidate shall carry out 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.

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.

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.

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.

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.

Criteria for declaring as pass in Deemed to be 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 postgraduate 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.

Declaration of class: A successful candidate passing the Deemed to be 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 Deemed to be University examination in more than one attempt shall be declared as Pass Class irrespective of the percentage of marks.

Post Graduate Diploma Examinations

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

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.

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 form a part of the examination. The total marks shall be 50.

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.

Criteria for declaring as pass in Deemed to be 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.

Declaration of class: A successful candidate passing the Deemed to be 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 Deemed to be 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 specialty, 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 specialist concerned ethically and in step with the principles of primary health care.
3. Demonstrate sufficient understanding of the basic sciences relevant to the concerned specialty.
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 specialty.
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 behavior 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
- Dissertation 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 outcomes to be assessed should include:

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

1. Personal Attitudes: The essential items are:

- a) Caring attitude.
- b) Initiative.
- c) Organisational ability.
- d) Potential to cope with stressful situations and undertake responsibility.
- e) Trustworthiness 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 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.

2. 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.

- 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 Deemed to be 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 requirements 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:

| SI 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 logically from history and findings | | | | | |
| 10. | Investigations required <ul style="list-style-type: none"> • 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

| SI 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:

| SI 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 |
|-------------|--|--------------------|
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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 |
|-------------|--------------|--|
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LOG BOOK

Table 3: Diagnostic and Operative procedures performed

Name:

Admission year:

College:

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

| SI 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.
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

M D PHYSIOLOGY

1. Goals:

The goal of postgraduate training in Physiology is to produce a competent physiologist equipped with required skills for teaching and applied research. The guidelines will help the post graduate students to achieve the same.

2. Specific learning Objectives:

At the end of the course a post graduate student in physiology should be able to:

A. Cognitive Domain

1. Demonstrate comprehensive knowledge and understanding of general and systemic physiology.
2. Comprehend the physiological basis of health and disease affecting various organ systems.
3. Analyze the research work, publish scientific articles in peer reviewed journals and critically evaluate published journal literature.
4. Effectively use the library facilities including CD Rom and internet search.
5. Conduct clinical and experimental research, as would have a significant-bearing on human health and patient care.

B. Affective Domain

1. Communicate effectively with peers, students and teachers in various
2. teaching - learning activities.
3. Function as an effective member of teaching team & / or research team.
4. Carry out professional obligations ethically and keeping in view national health policies.

C. Psychomotor Domain

1. Demonstrate and perform appropriate experiments in physiology
2. Effectively teach UG medical students the basic physiological mechanisms, pathophysiology of diseases and their management using appropriate teaching techniques and resources.
3. Acquire skills in conducting collaborative research in the field of physiology & allied sciences.

Course outcome

After completing the course the postgraduate should:

1. Have mastered most of the competencies, with awareness of the contemporary advances and developments in physiology.
2. Be a competent teacher in physiology, who shall have acquired the basic skills in teaching of the medical and paramedical professionals.
3. Be a researcher who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology.
4. Be able to explain the conceptual knowledge of physiology that can be effectively used by the clinicians in various clinical settings to diagnose and treat the clinical conditions.
5. Be able to interact with allied departments and render services in advanced laboratory investigations.

3. Course contents

A. Theory (Cellular, sub cellular and molecular levels)

1. General physiology

- i. History of Medicine with special reference to physiology
- ii. Cell physiology – Cell cycle, organization and physical structure of cell, apoptosis
- iii. Homeostasis: Internal environment, Control systems of body
- iv. Body fluids compartments and measurements, oedema and dehydration
- v. Transport across cell membrane
- vi. Membrane potentials and its measurements
- vii. Genetics: Genetic code, its expression and regulation of gene expression
- viii. Biophysical principles

2. Blood

- i. Blood: composition and functions, Blood volume and its measurements
- ii. Plasma proteins: types, properties and functions
- iii. RBC's: formation, functions
- iv. Haemoglobin – structure, synthesis, types – normal & abnormal,
- v. Fate of RBC's and haemoglobin, jaundice, Anemia's and Polycythemia
- vi. WBC's: Types, formation, structure and functions of each type
- vii. Leukocytosis, leucopenia and leukemia
- viii. Immunity: Reticuloendothelial system, Cell mediated, Humoral immunity and immune reactions
- ix. Platelet's: structure, formation, functions
- x. Haemostasis: Definition and Steps, coagulation, fibrinolytic system, anti-coagulants and coagulation tests
- xi. Blood groups: Major and minor blood group systems
- xii. Blood transfusion and its hazards
- xiii. Lymph: formation and functions

3. Nerve Muscle physiology

- i. Neuron, Neuroglia and Nerve fibres – Classification & properties
- ii. Degeneration and regeneration of nerve fibres, nerve growth factors
- iii. Neuromuscular transmission and its disorder, Drugs acting at Neuromuscular junction.
- iv. Skeletal muscle: Structure, Excitation and contraction coupling, molecular basis of contraction, Types of contraction Muscle types and properties and energy sources
- v. EMG and Muscle disorders
- vi. Smooth muscle: Types, electrical activity and molecular basis of contraction Properties of smooth muscle
- vii. Cardiac muscle: Structure, properties, molecular basis of contraction

4. Gastrointestinal physiology

- i. General overview of GI system - Organization of Gastrointestinal wall, Innervation of GIT
- ii. Oral Cavity: Mastication and digestion in mouth and its importance. Salivary secretion: mechanism, composition, functions and regulation.
- iii. Physiology of deglutition : Definition, stages, neural control and applied aspects.
- iv. Stomach : Overview of functions, gastric secretion – mechanism, com-

- position, function and regulation. Experimental procedures to elucidate and phases of gastric secretion.
- v. Gastric motility – characteristics and control, gastric emptying and antral pump mechanism, peptic ulcer.
 - vi. Pancreatic secretions: Composition, mechanism, functions and regulation.
 - vii. Liver: Functions, Bile formation, secretion and regulation, Entero hepatic circulation.
 - viii. Gall bladder: Functions, Mechanism and regulation of gall bladder contraction
 - ix. Jaundice, Physiological basis of liver function tests
 - x. Small intestine : Secretion, movement and control.
 - xi. Large intestine : Functions, secretions, movements.
 - xii. Defaecation : Mechanism and control.
 - xiii. Physiology of vomiting, diarrhoea, constipation.
 - xiv. Gastrointestinal hormones
 - xv. Digestion and absorption.

5. Excretory system

- i. Functional anatomy, Structure and function of a Juxta glomerular apparatus. Renal circulation.
- ii. Mechanism of urine formation involving processes of filtration, tubular reabsorption, Secretion and concentration. Water diuresis and osmotic diuresis.
- iii. Regulation of acid base balance.
- iv. Renal mechanisms for regulation of ECF volume, blood pressure and ionic composition.
- v. Innervations of bladder, micturition and abnormalities of micturition.
- vi. Renal Function tests
- vii. Renal failure, Artificial kidney, dialysis and renal transplantation. Diuretics,
- viii. Integumentary system; Structure of Skin and its functions, sweat glands and thermoregulation

6. Respiratory system

- i. Functional anatomy of respiratory system
- ii. Mechanics of breathing: Movements of thoracic cage during respiration, intrapleural And pulmonary pressure and volume changes, pressure-volume inter-relationships, lung compliance, surfactant, airway resistance, work of breathing.
- iii. Spirometry, lung volumes & capacities: Definitions, normal values and its significance
- iv. Alveolar ventilation, Dead space ventilation, Ventilation perfusion ratio and its Importance in respiratory diseases.
- v. Diffusion of gases: Alveolar-capillary membranes, diffusion capacities, partial pressure gradients and factors influencing diffusion of gases.
- vi. Gas Transport: Oxygen transport – oxygen dissociation curve- factors affecting its shift and Bohr's effect.
- vii. Carbon dioxide transport – tissue uptake, carriage in blood and release at the lungs importance of red blood cell, chloride shift, Haldane effect.
- viii. Regulation of respiration : Neural and chemical regulation, integrated responses.
- ix. Abnormal breathing : Apnoea, hyperpnoea, tachypnoea, dyspnoea,

Chyne-stokes breathing and Biot's breathing- definition, features and physiological basis.

- x. Hypoxia, cyanosis, asphyxia
- xi. Role of respiratory system in acid base balance
- xii. Pulmonary function tests
- xiii. Artificial respiration: types, principles, indications, advantages and disadvantages.

7. Environmental Physiology

- i. High altitude physiology: Acclimatization
- ii. Deep sea physiology: Dysbarism
- iii. Space physiology: Positive and negative g forces

8. Cardiovascular physiology

- i. Functional anatomy and innervations of heart
- ii. Properties of cardiac muscle
- iii. Electrical activity of the Heart – origin and spread of cardiac impulse. Electrocardiogram: Definition, waves and their explanations. ECG recording techniques Cardiac arrhythmias and their ECG interpretation
- iv. Heart rate and its regulation
- v. Cardiac cycle – Phases, pressure and volume changes, Heart sounds, JVP, Arterial pulse
- vi. Cardiac output: Definition, normal values and variations, major determinants of cardiac output and regulation, Heart-lung preparation, measurement of cardiac output.
- vii. Haemodynamics: General principles of circulation Blood flow - Laminar and turbulent flow, factors affecting blood flow and resistance, critical closing pressure. Regulation of blood flow
- viii. Arterial Blood Pressure : Definition, normal value, variations, measurement, mean Arterial pressure (MAP) and its determinants. Regulation of blood pressure.
- ix. Regional circulation : Coronary, cerebral, cutaneous, capillary, splanchnic, skeletal muscle and foetal. Normal values, special features and regulation.
- x. Cardiovascular changes during exercise.
- xi. Cardiac failure, circulatory shock.

9. Exercise and sports physiology

- i. Types of exercise
- ii. Acute and chronic cardio respiratory changes during and after exercise
- iii. Physical fitness & its Benefits

10. Endocrinology

- i. General principles of endocrinology; Classification and mechanism of action of hormones Functional anatomy, mechanism and actions of hormones and applied aspects of
- ii. Pituitary gland
- iii. Thyroid Gland
- iv. Parathyroid gland - Physiology of bone, Hormonal Control of Calcium Metabolism
- v. Endocrine Pancreas &. Regulation of blood glucose level
- vi. The Adrenal Medulla & Adrenal Cortex
- vii. Pineal gland, Local hormones

viii. Energy Balance, Metabolism & Nutrition

11. Reproductive system

- i. Sex determination and differentiation, Chromosomal disorders
- ii. Male reproductive system:
 - a. Primary and accessory organs and their functions
 - b. Puberty in males
 - c. Spermatogenesis and its regulation
 - d. Testosterone- secretion, transport, metabolism, mechanism and physiological actions. Control of testicular function
- iii. Female reproductive system:
 - a. Functional anatomy
 - b. Puberty in females
 - c. Ovarian hormones – Estrogen and progesterone, Mechanism and physiological actions, Control of ovarian function
 - d. Physiology of menstrual cycle: Ovarian cycle, Uterine cycle, vaginal and cervical Cycle. Physiology of ovulation and its detection
 - e. Menopause and menstrual abnormalities.
 - f. Physiology of fertilization and implantation.
 - i. Physiology of pregnancy : Endocrine changes, foeto-placental unit, changes in Mother during pregnancy, tests for pregnancy
 - j. Physiology of parturition and lactation
 - k. Contraception
 - l. Infertility and assisted reproduction

12. Central nervous system

- i. Introduction: Organization of the nervous system
- ii. Synapse – electrical activities & properties
- iii. Sensory system – Receptors, ascending tracts, sensory cortex
- iv. Pain and other sensations
- v. Motor system – Spinal cord, Reflexes, Motor cortex and descending tracts
- vi. Spinal cord lesions
- vii. Basal ganglia, Cerebellum and Vestibular apparatus
- viii. Control of voluntary and involuntary movements
- ix. Control of Posture and equilibrium
- x. Thalamus, Hypothalamus and Autonomic nervous system
- xi. Cerebral cortex, Prefrontal lobe and Limbic system – Behavioral physiology
- xii. Cerebrospinal fluid and blood brain barrier
- xiii. Reticular formation, Sleep & EEG
- xiv. Higher cortical functions: Speech, learning and memory

13. Special senses

- i. Vision: Functional anatomy, aqueous humor, IOP, Optics of vision, errors of refraction
Photochemistry of vision, Light and dark adaptation
Neurophysiology of vision: Visual pathway and visual cortex
Color vision and applied aspects
Movements of eyeball and squint
- ii. Hearing: Functional anatomy, Auditory pathway and auditory cortex

- Mechanism of hearing
- Deafness, Test for hearing, Audiometry
- iii. Olfaction: Physiology of olfaction and its disorders
- iv. Gustation: Physiology of gustation and its disorders

14. Chronophysiology

- i. Foetal physiology
- ii. Physiology of growth and development and its disorders
- iii. Physiology of Aging

15. Yoga and meditation

- i. Physiological changes to yoga and meditation

Paper wise distribution of course contents

Paper-I: General physiology, membrane potential, transport across membrane, genetics, biophysical principles, comparative physiology and history of medicine with special reference to physiology.

Paper-II: Systemic physiology including applied aspects of blood, respiratory physiology cardiovascular physiology, environmental physiology, exercise & sports physiology

Paper -III: Systemic physiology including applied aspects of Gastrointestinal system, Excretory system, Endocrines, Reproductive physiology and chronophysiology

Paper-IV: Systemic physiology including applied aspects of Nerve and muscle physiology, central nervous system, special senses, yoga & meditation.

*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.

WEIGHTAGE OF MARKS IN EACH PAPER

| | Topics | Marks |
|-----------------|--------------------------------|--------------|
| Paper I | Homeostasis | 20 |
| | Cell physiology & Body fluids | 10 |
| | Transport across cell membrane | 20 |
| | Membrane potentials | 20 |
| | Biophysical principles | 10 |
| | Genetics | 10 |
| | Comparative physiology | 05 |
| | History – Scientists | 05 |
| Paper II | Blood | 25 |
| | Respiratory system | 25 |
| | Cardiovascular system | 30 |
| | Environmental physiology | 10 |
| | Exercise and sports physiology | 10 |

| | | |
|------------------|-------------------------|----|
| Paper III | Gastrointestinal system | 20 |
| | Excretory system | 20 |
| | Endocrines | 30 |
| | Reproductive system | 20 |
| | Chronophysiology | 10 |
| Paper IV | Nerve muscle physiology | 25 |
| | Central nervous system | 40 |
| | Special senses | 25 |
| | Yoga and Meditation | 10 |

B. Practical Training :

1. Haematology:

- a. Study of Haemocytometer
- b. Determination of RBC count
- c. Estimation of Haemoglobin
- d. Reticulocyte count
- e. ESR and PCV
- f. Osmotic fragility of Red blood cells
- g. Specific gravity of blood
- h. Total leucocyte count
- i. Differential count of WBC and Arneth count
- j. Absolute eosinophil count.
- k. Platelet count
- l. Determination of bleeding time and clotting time
- m. Determination of Blood groups

2. Clinical Physiology:

- a. Elementary principles of clinical examination
- b. General examination
 1. Cardiovascular system
 - i. Examination of arterial pulses and measurements of blood pressure.
 - ii. Examination of heart
 2. Respiratory System
 - i. Examination of respiratory system
 3. Gastro-intestinal system
 - i. Examination of abdomen.
 4. Nervous System
 - i. Examination of higher mental functions.
 - ii. Sensory system
 - iii. Motor functions
 - iv. Examination of cranial nerves.
 - v. Cerebellar function tests

3. Human Experiments:

- a. Cardio vascular system:
 - i. Measurement of arterial blood pressure and effect of posture & exercise on BP.
 - ii. Electrocardiography — ECG & its interpretation.
 - iii. Heart Rate Variability (HRV)

- iv. Treadmill Test
 - v. Cardiovascular autonomic function tests
 - vi. Measurement of blood flow
- b. Respiratory System:
- i. Recording of lung function tests by computerized or electronic spirometer
 - ii. Stethography
 - iii. Endurance test – VO_2 max measurement
 - iv. Respiratory gas analysis
 - v. Measurement of BMR
 - vi. Artificial respiration
- c. Reproductive System:
- i. Methods to determine ovulation time – Basal body temperature chart
 - ii. Cervical smear
 - iii. Pregnancy diagnostic test - immunological test
 - iv. Sperm count
- d. Gastro Intestinal System:
- i. Endoscopy
- e. Muscle Physiology:
- i. Ergography
 - ii. Recording of EMG
- f. Neurophysiology
- i. Nerve conduction study
 - ii. EEG
 - vii. Evoked potentials
- g. Measurements of body composition

4. Animal 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 experiments (Simulated experiments)

- i. Preload and after load
- ii. Effect of continuous repeated stimulation (study of phenomena of fatigue)
- iii. Length tension diagram.
- iv. Properties of cardiac muscle: long refractory period, all or none law.
- v. Extrasystole and compensatory pause, beneficial effect

- vi. Regulation of heart, dissection of vagus nerve and effect of vagal stimulation.
- vii. Actions of acetylcholine, adrenaline and nicotine on heart (Langley's)
- viii. Perfusion of isolated frogs heart — role of Na⁺ K⁺ , Ca⁺
- ix. Decerebrate and spinal frog.

b. Mammalian: (Simulated experiments)

General management of mammalian experiments

- i. Rat/guinea pig ileum : intestinal movement recording
- ii. Isolated rabbit heart perfusion

5. Tests for physical fitness

- a. Harvard step test
- b. Bicycle ergometry
- c. Treadmill protocols

6. Clinical Biochemistry:

- a. Examination of normal and abnormal constituents of urine
- b. Other kidney function tests
- c. Estimation of blood sugar
- d. Liver function tests
- e. Glucose tolerance test
- f. Blood gas analysis

IV. TEACHING LEARNING ACTIVITIES

1. Didactic lectures

-Attend UG theory classes during first year

2. Teaching sessions

| | ACTIVITY | FREQUENCY | MODERATOR |
|----|-----------------|------------------|------------------|
| 1. | PRACTICALS | Twice a week | Faculty |
| 2. | SEMINAR | Once in a week | Faculty |
| 3. | JOURNAL CLUB | Once in a week | Faculty |
| 4. | REVIEW ARTICLE | Once in 3 months | Faculty |

The post graduate students should actively participate in departmental seminars and journal club. A record showing the involvement of the student shall be maintained and also in the PG diary.

3. Undergraduate teaching

- Postgraduate students shall participate in teaching undergraduate students in practical, tutorials and group discussions.
- The student shall participate in generating teaching resource material for UG and develop problem solving modules.

4. Clinical postings

The candidates shall attend all the undergraduate theory and practical classes regularly during the first year of course. During the second year of the course, they shall attend the clinical and para-clinical subjects postings in co-ordination with

concerned departments, only in the forenoon sessions as follows:

1. General Medicine – 30 days
 - Clinical examination of patients
 - Investigation procedures
 - Drawing of blood and storage.
 - Lumbar puncture.
 - Interpretation of X - Ray, ECG, biopsy report, biochemical results.
 - Endocrinology postings, clinical examination of patient, radioimmuno assay techniques
2. Cardiology — 15 days
 - Learn to operate ECG apparatus, Echo, Doppler, Cardiac monitor,
 - Learn the methodology of cardiac catheterisation. resuscitation technique
3. Neurology — 15 days
 - Clinical Examination of neurology patient
 - Principles of EEG, EMG, ENMG, Evoked potential
 - Interpretation of EEG, EMG, ENMG, Evoked potential
 - Nerve conduction studies
4. Medical gastroenterology — 15 days.
 - Clinical examination of patients.
 - Observe endoscopic techniques.
5. Pulmonology – 15 days
 - Clinical Examination of respiratory system
 - Pulmonary function tests and interpretation of results.
6. Clinical biochemistry — 15 days.
To understand the principles of clinical biochemical tests and interpretation of data:
 - Blood glucose estimation
 - Liver function tests.
 - Renal function tests.
 - Serum electrolytes
 - Lipid profile
7. Haematology Department — 15 days
 - To learn various investigations
 - Sperm count
8. Blood bank – 15 days
 - To learn blood grouping and cross matching, collection, storage and transfusion of blood.
9. Obstetrics and Gynecology postings – 15 days.
 - Methods to determine ovulation time
 - Clinical examination during pregnancy including antenatal checkup and investigations
10. Ophthalmology – 15 days
 - Tests for vision
 - Fundoscopy

- Measurement of intraocular pressure

11. ENT – 15 days

- Tests for hearing
- Audiometry

Total six 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.

5. Attending Workshops, CME's and Conferences

- The postgraduate student should attend any two of the above every year
- A postgraduate student should present one poster, one oral paper at a national/state conference and one research paper should be published/accepted for publication/sent for publication during the period so as to make student eligible to appear for postgraduate degree examination.

VI. MONITORING LEARNING PROGRESS

Maintenance of Log book and Practical record

1. A diary showing each day's work has to be maintained by the candidate, which shall be scrutinized by the Head of the Department every month.
2. A list of the seminars and journal reviews that have been attended and participated by the student has to be maintained which should be scrutinized by the Head of the Department.
3. A practical record has to be maintained by every candidate and duly scrutinized and certified by the head of the department and to be submitted to the external examiner during the final examination.

VII. ASSESSMENT OF LEARNING PROCESS

A) FORMATIVE ASSESSMENT

Formative assessment will be done continually to assess medical knowledge, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

- Periodic Internal Assessment will be conducted frequently covering all domains of learning and feedback will be provided for improvement of the student.

B) SUMMATIVE ASSESSMENT

1. Dissertation Work

During the course of study every candidate has to prepare a dissertation individually on selected topic under the direct guidance and supervision of a recognised post graduate teacher. The suggested time schedule for dissertation work is:

- Identification and selection of topic for dissertation - in first 4 weeks.
- Preparatory work for dissertation /synopsis including pilot study if necessary and submission of the synopsis to the Deemed to be University within first 6 months from the beginning of course or as per the dates notified by the Deemed to be University.
- Data collection for dissertation. Writing the dissertation in the following 1½ years.
- Submission of the dissertation six months prior to the final examination or as per the dates notified by the Deemed to be University.

Registration of dissertation topic

Every candidate shall submit a synopsis in the prescribed proforma of the Deemed to be University for registration of dissertation topic. Subject of dissertation will be scrutinised by the PG training cum research committee and ethical committee of the institution. The synopsis shall be sent within first 6 months from the commencement of course as notified in the Deemed to be University calendar of events, to the Registrar (Academic).

Submission of dissertation

The dissertation shall be submitted to the Registrar (Evaluation) of the Deemed to be University six months before final examination or as per the dates notified by the Deemed to be University. Approval of the dissertation by the panel of examiners is a pre-requisite for a candidate to appear in the Deemed to be University examination.

2. SCHEME OF Deemed to be University EXAMINATION

Theory Examinations:

Each theory paper will consist of:

Long Essay type questions - 2 X 20 marks= 40

Short Essay type questions - 3 X 10 marks= 30,

Short answer type questions - 6 X 05 marks= 30

Paper-I: General physiology, comparative physiology and history of physiology.

Paper-II: Systemic physiology-I including applied aspects with recent advance

Paper -III: Systemic physiology -II including applied aspects with recent advance

Paper-IV: Systemic physiology -III including applied aspects with recent advance

Paper wise distribution of course contents

Paper-I: General physiology, membrane potential, transport across membrane, genetics, biophysical principles, comparative physiology and history of medicine with special reference to physiology.

Paper-II: Systemic physiology I including applied aspects of blood, respiratory physiology cardiovascular physiology, environmental physiology, exercise & sports physiology

Paper -III: Systemic physiology II including applied aspects of Gastrointestinal system, Excretory system, Endocrines, Reproductive physiology and chronophysiology

Paper-IV: Systemic physiology III including applied aspects of Nerve and muscle physiology, central nervous system, special senses, yoga & meditation.

***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.**

WEIGHTAGE OF MARKS IN EACH PAPER

| | Topics | Marks |
|--|---------------|--------------|
|--|---------------|--------------|

| | | |
|------------------|--------------------------------|----|
| Paper I | Homeostasis | 20 |
| | Cell physiology & Body fluids | 10 |
| | Transport across cell membrane | 20 |
| | Membrane potentials | 20 |
| | Biophysical principles | 10 |
| | Genetics | 10 |
| | Comparative physiology | 05 |
| | History – Scientists | 05 |
| Paper II | Blood | 25 |
| | Respiratory system | 25 |
| | Cardiovascular system | 30 |
| | Environmental physiology | 10 |
| | Exercise and sports physiology | 10 |
| Paper III | Gastrointestinal system | 20 |
| | Excretory system | 20 |
| | Endocrines | 30 |
| | Reproductive system | 20 |
| | Chronophysiology | 10 |
| Paper IV | Nerve muscle physiology | 25 |
| | Central nervous system | 40 |
| | Special senses | 25 |
| | Yoga and Meditation | 10 |

Practical Examinations 200 marks

| | |
|---|-----------------|
| i) Haematology | 30 marks |
| ii) Human experiments | 50 marks |
| iii) Clinical Physiology with problem solving exercises | 50 marks |
| iv) Amphibian/Rabbit /Rat/Guinea pigs* | 20 marks |
| v) Histology | 10 marks |
| vi) Biochemistry | 20 marks |
| vii) OSPE/OSCE | 20 marks |

* Interpretation of pre-recorded graphs or use of Simulation experiments

Viva- voce – 100 marks

- a) The Viva-Voce would be on all components of syllabus including discussion on dissertation - **80 marks**
- b) Pedagogy/Microteaching - **20 marks**

| Maximum marks for | Theory | Practicals | Viva-voce | Total |
|----------------------------|--------|------------|-----------|-------|
| M D Physiology Examination | 400 | 200 | 100 | 700 |

Recommended Text, Reference books and Journals (latest edition)

1. Guyton, Text Book of Medical Physiology, 12th edition (2011), Elsevier publication.
2. Ganong, Review of Medical Physiology, 23rd edition (2010), Mc Graw hill publications.

3. Berne and Levy, Principles of Physiology, 6th edition (2012), Mosby co publications.
4. Boron & Boulpaep, Medical physiology, 2nd edition (2009), Saunder's, Elsevier , Philadelphia.
5. Keele, Samson & Wright's, Applied Physiology, 13th edition (2006), ELBS, Oxford University Press.
6. Prof Dr G K Pal, Text book of medical physiology, 2nd edition (2015), Ahuja publications.
7. Indu khurana, Medical physiology, 1st edition (2012), Elsevier publications.
8. JB West, Best & Taylor, Physiological basis of Medical Practice, 12th edition (1990), Williams & Wilkins publications.
9. John Bullock, Joseph Boyle, III Michacel B. Wang, NMS, Physiology 4th edition (2001), B.I. Waverly publications.
10. Sir John V Dacie SM Lewos, Practical Hematology, 11th edition (2011), Churchill Livingstone publications.
11. Vernon B Mount Castle, Medical Physiology, 14th edition (1980), vol. I & vol. 2, CV Mosby Company publications.
12. Williams, Text book of Endocrinology, 10th edition (2002), W.B. Saunders publications.
13. Peters dort, Adams, Braunwald, Issel Bacher, Matir, Wilson, Harrison's Principles of Internal Medicine, 19th edition (2015), Mc Graw hill publications.
14. Harper, Biochemistry, 30th edition (2015), McGraw-Hill publications.
15. Wintrobe, Clinical hematology, 12th edition (2008), Lea Febiger publications.
16. Kathryn L Mc. Cance Sue E Huether, Text Book of Pathophysiology, 3rd edition (2004) Mosby publications.

Journals:

1. Indian Journal of Physiology and Pharmacology, by APPI.
2. Physiological Reviews, By American Physiological Society
3. Annual review of Physiology, By American Physiological Society
4. Journal of Applied Physiology, By American Physiological Society
5. Advances in Physiology Education, By American Physiological Society
6. Recent advances in Physiology, By American Physiological Society
7. Journal of Physiology, British Publication
8. Indian Journal of Medical Research
9. Biomedicine, by Indian Association of Bio-medical Scientist.
10. News in Physiological Sciences
11. New England Journal Medicine
12. British Medical Journal
13. Nature
14. Lancet

ADDITIONAL READING (Latest edition)

1. Compendium of recommendations of various committees on Health and Development (1943. 1975). DGHS, 1985 Central Bureau of Health Intelligence, Directorate General of Health Services, min of Health and Family Welfare, Govt. of India, Nirman Bhawan, New Delhi.
2. National Health Policy, Min. of Health & Family Welfare, Nirman Bhawan, New Delhi, updated
3. Santosh Kumar, The elements of Research, writing and editing, Dept. of Urology, JIPMER, Pondicherry

4. Srinivasa D K et al, Medical Education Principles and Practice, National Teachers Training Centre, JIPMER, Pondicherry
5. Indian Council of Medical Research, "Policy Statement of Ethical considerations involved in Research on Human Subjects", I.C.M.R, New Delhi.
6. Code of Medical Ethics framed under section 33 of the Indian Medical Council Act, 1956. Medical Council of India, Kotla Road, New Delhi.
7. Francis C M, Medical Ethics, Jr P Publications, Bangalore
8. Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi.
9. Kirkwood B R, Essentials of Medical Statistics, Oxford: Blackwell Scientific Publications
10. Mahajan B K, Methods in Bio statistics for medical students, New Delhi, Jaypee The Brothers Medical Publishers
11. Raveendran, B Gitanjali, A Practical approach to PG dissertation, New Delhi, J P Publications



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