



SHRI
DHARMASTHALA
MANJUNATHESHWARA
UNIVERSITY

Ordinance Governing
M. D. Anatomy
Curriculum 2019-20

SHRI DHARMASTHALA MANJUNATHESHWARA UNIVERSITY

(A State Private University established under the Shri Dharmasthala Manjunatheshwara University
Act No 19 of 2018 of Government of Karnataka and Notification No. ED 261 URC-2018 dated 19th December 2018)

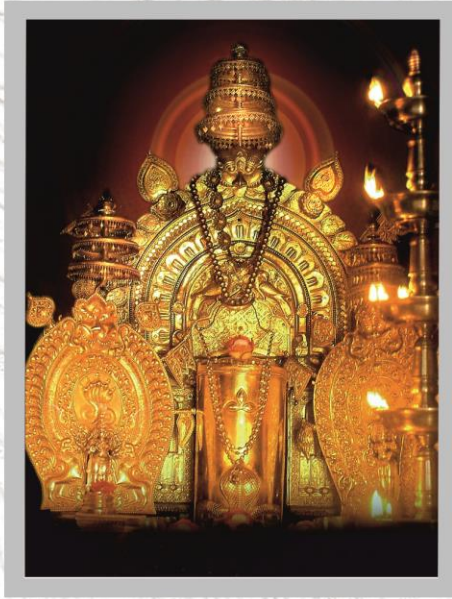
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|| Om Shri Manjunathaya Namaha ||



Shree Kshethra Dharmasthala

Edition Year : 2019-20

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**Published by
Registrar**

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THE LOGO

Poojya Dr D. Veerendra Heggade, Hon'ble Chancellor of the University, while searching for an appropriate Logo for the University, saw a photograph picked from Temple Architecture showing Wings of a Bird, sculpted in Indian style and wanted it to be incorporated in the logo for the University, as the Wings symbolize 'Spreading of Knowledge beyond Boundaries'. Further it was felt that the Central theme of the logo should be 'Rudra' (The Linga) with three wings on each side. In this way, the logo of the University was conceptualized.

Hence:

1. The central part represents **Rudra** who Demolishes Darkness.
2. The Three **horizontal lines on The Linga** stand for Samyak Darshan (Right Belief), Samyak Gyan (Right Knowledge) and Samyak Charitra (Right Conduct).
3. The **Wings** symbolize spreading of Knowledge across the boundaries.
4. Base line **"Truth Liberates"** highlights the Purpose of Education: to liberate oneself unconditionally. It shows that it is not discipline, nor knowledge nor the efforts to freedom that liberate but Truth is what liberates you from all your conditioning and ignorance.

The overall significance of Shri Dharmasthala Manjunatheshwara University's Logo is:

Darkness of ignorance is destroyed by the flow of knowledge to bring Liberty to everyone, by realizing the truth. And, it should spread globally without the boundaries as hindrance.



SHRI
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VISION

Shri Dharmasthala Manjunatheshwara University will set the highest standards of teaching and learning by awakening the intelligence of the students and nurturing the creativity hidden in them by creating an environment where the ancient wisdom blends with modern science, to transform them into whole human beings to face the challenges.

MISSION

- ▶ To ensure that the journey of education is inspiring, pleasant and enjoyable.
- ▶ Attract the best of teachers and students.
- ▶ Achieve high principles of trust, love and spirituality in the students.
- ▶ Create a collaborative, diverse and exclusive community.
- ▶ Transform the student of today to be a leader of tomorrow and a better human being.
- ▶ Produce passionate teachers.
- ▶ Evolve innovative teaching techniques.
- ▶ Create a peaceful environment.
- ▶ Prepare the student to face the social challenges.
- ▶ Create a University of which the Nation is proud of.
- ▶ Be an effective partner in Nation Building.
- ▶ Create an Eco-friendly University.
- ▶ Create a University based on the principles of beauty, love and justice.

||Om Shanti! Om Shanti! Om Shanti||



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SDMU/Notif/28/2019

Date: 24 - 04 - 2019

NOTIFICATION

Regulations and Curricula of Medical Postgraduate Degree Courses in Clinical Subjects - 2019

- Ref:**
- Minutes of the Board of Studies - Medical PG held on 16-03-2019 (SDMU/BOS PG: 01/2019 dated 16-03-2019)
 - Minutes of the 1st Joint Faculty Meeting held on 19-03-2019 (Letter No: SDMU/JF/M-01/85/2019; Dated: 19-03-2019)
 - Minutes of the 1st Meeting of Academic Council held on 20-03-2019 (Letter No: SDMU/AC/M-01/93/2019; Dated: 21-03-2019)
 - Minutes of the 2nd Meeting of BoM held on 22-03-2019 (Letter No: SDMU/BoM/M-02/94/2019; Dated: 23-03-2019)

Ordinance: In exercise of the powers conferred under Statutes 1.1 (Powers - Section xii), 1.2 (Powers and Functions - Section vii), 1.4 (Powers and Functions - Sections ix & x), 1.5b (Powers and Functions - Sections b & c) of Shri Dharmasthala Manjunatheshwara University, the BoM is pleased to approve and notify the Ordinance governing Regulations and Curricula of the following Medical Postgraduate Degree/ Diploma Courses in Clinical Subjects - 2019:

Sl No	Course	Sl No	Course
1	M. D. (General Medicine)	7	M. D. (Hospital Administration)
2	M. D. (Pediatrics)	8	M. S. (General Surgery)
3	M. D. (Dermatology)	9	M. S. (Ophthalmology)
4	M. D. (Psychiatry)	10	M. S. (Orthopedics)
5	M. D. (Anaesthesiology)	11	M. S. (Otorhinolaryngology)
6	M. D. (Radio-Diagnosis)	12	M. S. (Obstetrics & Gynecology)

Diploma

- Diploma in Public Health

The ordinance shall be effective for the students joining the courses during 2019-20 and onwards.

By Order

REGISTRAR

- To:**
- The Principal, SDM College of Medical Sciences & Hospital.
 - Members of BoG, BoM & Academic Council, Shri Dharmasthala Manjunatheshwara University

- Copy to:**
- The Vice-Chancellor, Shri Dharmasthala Manjunatheshwara University
 - The Controller of Examinations, Shri Dharmasthala Manjunatheshwara University

M. D. ANATOMY

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

- II. **Objectives:** At the end of the course, a Postgraduate in Anatomy shall be able to
 1. Demonstrate comprehensive knowledge and understanding of gross and microscopic structure of the human body and skills to demonstrate special dissection and histological and histochemical techniques.
 2. Comprehend normal disposition, interrelationships, functional and applied anatomy of the various structures of the body.
 3. Describe the development of human body to provide an anatomical basis for understanding the structure and correlate with functions both in health and in disease presentations.
 4. Demonstrate knowledge of basic and systemic embryology including genetic inheritance and sequential developments of organs and systems.
 5. Recognize critical stages of development and the effects of common teratogens, genetic mutations and environmental hazards.
 6. Explain developmental basis of major variations and abnormalities.
 7. Aware of contemporary advances and developments in anatomy and related bio-medical field.
 8. Demonstrate competence in basic concepts of research and acquire a spirit of enquiry in research.
 9. Critically evaluate published research literature.
 10. Recognize continuing educational needs and develop skills as a self-directed learner.
 11. Select and use appropriate learning resources and teaching techniques as applicable for teaching and evaluation of medical and allied health sciences students.
 12. Carryout professional obligations ethically and in keeping with objectives of National Health Policy.

13. Function as an effective member in healthcare, research and training.
14. Exhibit interpersonal behavior in accordance with social norms and expectations.
15. Acquire knowledge relating to the latest non-invasive techniques like X-rays, CT scan, MRI, Ultrasound and their interpretation in health and disease conditions.
16. Describe the methodology, techniques of embalming, preservation of cadavers and museum techniques and perform the procedures.
17. Describe & interpret Anatomy Act as in existence.
18. To incorporate PBL training under different sections during PG training. One such example is Museum setting.
19. To undergo training in evaluation and preparation of blueprint for question paper setting.
20. Preferably attend a PGMET (P.G. Medical Educational Technology) course.

I. Outline of Course Contents:

A. Theory

1. History of Anatomy.
2. General Anatomy.
3. Basics of Research Methodology.
4. Elements of Anatomy.
5. Gross Human Anatomy including Cross-sectional Anatomy and Applied Anatomy.
6. Principles of Microscopy and Histological techniques.
7. General and systemic Histology.
8. General and systemic Embryology including growth, development and Teratology.
9. Neuroanatomy.
10. Surface Anatomy.
11. Radiological Anatomy including principles of newer techniques.
12. Human Genetics.
13. Museum techniques, embalming techniques including medico-legal aspects, and knowledge of Anatomy Act.
14. Medical ethics.
15. Recent advances in Anatomy.
16. To incorporate PBL training under different sections during PG training.

B. Practical Schedule

1. During the course, the PG students should dissect the entire human cadaver.
2. They should embalm and maintain the record of embalming work done.
3. They should prepare and mount at least 10 museum specimens.
4. **In Histology Section –**
 - Collections of tissues.
 - fixing, block making, section cutting.
 - Use of different types of microscopes and preparation of general and systemic slides.

Haemotoxylin & Eosin Stains

- Preparation of stains, staining techniques.
- Knowledge of special staining techniques like Silver Nitrate, PAS staining, Osmium Tetroxide, Van Gieson, etc.
- Knowledge of light microscope and electron microscope.
- Detailed microscopic study of all the tissues. (General and systemic slides)

II. Method of Training:

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

Sr. No.	Department	Duration
1	General Surgery	1 week
2	Orthopedics	1 week
3	Radio diagnosis	1 week
4	Pediatric surgery	1 week
5	Pathology	2 weeks
6	Forensic Medicine	1 week
7	Genetics / Pediatrics	2 weeks

Learning Objectives:

i) General Surgery

Laparoscopic and Endoscopic visualization of viscera.

ii) Orthopedics

Arthroscopic visualization of structures, nerve injury cases etc.

iii) Radio Diagnosis

Principles and recent advances in the following:

CT, MRI, USG, Plain & Contrast Radiography.

iv) Genetics / Pediatric Surgery

Syndromes, Karyotyping and Counseling.

At the end of the posting, a certificate has to be obtained from the concerned Heads of the Departments for satisfactory learning.

During three years of the course, the Postgraduate students shall take-part in teaching undergraduate students in Gross Anatomy, Histology, tutorials, group discussions and seminars.

v) Pathology

- a. Special staining techniques, at least one hands on experience.
- b. Principle of Frozen Microtomy or Cryostat, Electron microscopy.

vi) Forensic Medicine

- a. Anthropometry and age estimation.
- b. Any other topics relevant to Anatomy.

III. Seminars & Journals Review Meetings

The Postgraduate students should actively participate in Departmental seminar and journal reviews. A record showing the involvement of the student shall be maintained. A diary should be maintained. Seminars and journal reviews are suggested to be conducted alternatively once in every 15 days.

IV. Maintenance of Record of Work Done

- i) A diary showing each day/s work has to be maintained by the candidate, which shall be submitted to the head of the Department for scrutiny on the first working day of each month.
- ii) 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.
- iii) A list of the seminars and journal clubs that have been attended and participated by the student has to be maintained which should be scrutinized by the Head of the Department.
- iv) Two presentations in conference/s to be made mandatory, during PG course.

V. Periodical Assessment and Progress Report

Postgraduate students have to be assessed periodically by conducting written, practical and viva-voce examination at the end of each year. The assessment should also be based on participation in seminars, journal reviews, and performance in teaching by use of teaching aids & progress in dissertation work. The assessment will be done by all the recognized P. G. teachers of the Dept. and the progress record should be maintained by the Head of the Department.

VI. Dissertation work

During the course of study every candidate has to prepare a dissertation individually, on a selected topic under the direct guidance & supervision of a recognized postgraduate teacher as per MCI guidelines.

The suggested time schedule for dissertation work is:

- i) Preparation work for dissertation synopsis including pilot study and submission of the synopsis to the University is within 6 months from the commencement of the Course or as per the dates notified by the University from time to time.
- ii) Data collection for the dissertation work and writing the dissertation.
- iii) The candidates shall report the progress of the dissertation work to the concerned guide periodically and obtain clearance for the continuation of the dissertation work.
- iv) Submission of the dissertation six months prior to the final examination or as per the dates notified by the University from time to time.

Registration of dissertation topic

Every candidate shall submit a Synopsis in the prescribed proforma for registration of the dissertation topic by the University after it is scrutinized by the PG Training Cum Research Committee of the concerned Institution. The Synopsis shall be sent within the first 6 months from the commencement of the course or as notified by the University in the calendar of events, to the Office of the Registrar.

Submission of dissertation

The dissertation shall be submitted to the Registrar of the University 6 months prior to the final examination or as notified in the calendar of events. Approval of the dissertation by the panel of examiners is a prerequisite for a candidate to appear for the University examination.

Examination Pattern

A. Theory – 400 Marks

The written examination consists of 4 papers, with maximum marks of 100 for each paper. Each paper will be 3 hours duration.

Each paper shall have 10 short essay questions of 10 marks. (10X10=100)

Paper I

- a) History of Anatomy
- b) General Anatomy and basics of Research Methodology
- c) General & Elements of Anatomy
- d) Gross Anatomy with Applied Aspects

Paper II

General & Systemic Embryology including growth, development and teratology

Paper III

- a) General & Systemic – Histology and Principles of Microscopy
- b) Histological, museum and embalming techniques including legal aspects
- c) Human Genetics

Paper IV

- a) Neuroanatomy
- b) Applied Anatomy, Cross-sectional Anatomy, Radiological Anatomy and newer imaging Techniques
- c) Recent advances in Anatomy

NOTE - Questions on recent advances may be asked in any or all papers.

The topics assigned to the different papers are given as general guidelines. A strict division of the subjects may not be possible. Some overlapping of topics is inevitable. Students should be prepared to answer the overlapping topics.

Preferably one question based on problem based learning in paper IV – Applied anatomy.

At least 50% of the questions in each paper can be application based.

Questions should be structured so that evaluation is better, unbiased and uniform.

B. Practical – 200 marks

(Gross Anatomy – 100 marks, Histology – 100 marks)

a) Gross Anatomy

To dissect in 3 hours and display for discussion the allotted dissection exercise on a human cadaver.

Distribution of Marks

Surface Anatomy = 10

Dissection = 40

Discussion = 50

Total: = 100 marks

b) Histology

1	Identification and discussion on 10 stained sections which includes Neuroanatomy, Embryology and Human Genetics	10X4=40 Marks
2	i) Preparation of a paraffin block ii) Taking serial sections from blocks provided iii) Staining of given section with H & E and discussion	10 marks 10 marks 20 marks
3	Discussion on Histological techniques	20 marks
	Total	100 marks

c) Viva Voce – 100 marks

a. This includes all the components of the syllabus along- with specimens, skiagrams, newer imaging techniques, bones and embryology models including a problem solving exercise and discussion on dissertation topic submitted for the examination (80 Marks).

b. Pedagogy: Demonstration of teaching skill / techniques (20 Marks)

a)

Maximum marks M. D. (Anatomy) Examination.	Theory 400	Practicals 200	Viva-voce 100	Total 700
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Requirement for passing

- Aggregate of 50% overall in theory papers (Viva marks not to be added to theory for passing).
- Similarly a minimum of 50% in viva and 50% in practical.

VII. Recommended Textbooks, Reference books and journals

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

Text books/ Reference books

Gross Anatomy, Clinical Anatomy, Osteology

1. Susan Standring. Gray's Anatomy: the anatomical basis of clinical practice – 41st Edition, Elseiver 2016.
2. Drake, Richard L, Vogli, Wayne A, Mitchell, Adam W. M. Gray's anatomy for students, 3rd edition, 2015.
3. B. D. Chaurasia's Hand book of general anatomy- 2016.
4. Asimkumar Dutta. Essentials of human anatomy: thorax and abdomen, volume 1, 9th edition, 2010.
5. Asimkumar Dutta. Essentials of human anatomy: head & neck, volume 2, 5th edition, 2017.
6. Asimkumar Dutta. Essentials of human anatomy: superior & inferior extremities, volume 3, 5th edition, 2017.
7. Asimkumar Dutta. Essentials of human Osteology, 2nd edition, 2005.
8. DUPLESSIS and Gadecker LEE Mcgregor's, Synopsis of Surgical Anatomy 12th Edition. K. M Varghese company, 1986.
9. Snell. S. Richard, Clinical Anatomyby regions– 9th edition, 2012.
10. Kulkarni Neeta V. Clinical Anatomy; a problem-solving approach' 2nd edition, 2012.
11. Hansen, John T. Netter's clinical anatomy, 3rd edition, 2014.
12. Moore, Keith L, Dolley, Agur, Anne MR, Arthur F. Moore clinically oriented anatomy, 7th edition, 2014.
13. Faruqui Nafis Ahmed. Handbook of Osteology, 2nd edition, 2012.

Histology

1. Le Gross Clark, Tissues of the Body – 6th Edition, 1980 Oxford University Press.
2. Drury R. A. B. Willington E. A. Carlton's Histological Technique-5th Edition, Oxford University, Preces, 1980.
3. Cullings, Histological Technique – 3rd Edition 1994, Butterworths.☒
4. John D Bancroft, Manual of Histological Technique-1st Edition -1984, Chruchill Livingstone.
5. Ross, Michael H, Pawlina, Wojciech. Histology: a text and atlas with correlated cell and molecular biology, 7th edition, 2016.
6. Di Fiore, Mariano S.S. Di Fiore's Atlas of histology with functional correlations, 12th edition, 2013.
7. Junquiera, Luiz Carlos, Carneiro Joe. Junqueira's basic histology; text and atlas, 14th edition, 2016.
8. Gartner, Leslie P, Hiatt Janes. Color atlas and text of histology, 6th edition, 2014.
9. Wheater, pawl R, Heath, John W, Young Barbara. Wheater's functional histology; a text and colour atlas, 6th edition, 2014.

Embryology

1. Moore, Keith L, Persaud T. V. N., Torchia, Mark. Developing human- clinically oriented embryology, 9th edition, 2013.
2. Larsen, William J. Larsen's human embryology, 5th edition, 2015.
3. Asimkumar Dutta. Essentials of human embryology, general embryology, special embryology, and human genetics, 6th edition, 2010.
4. Langman, Jan. Langman's medical embryology, 13th edition, 2015.

Neuroanatomy

1. Asimkumar Dutta. Essentials of human Neuroanatomy, volume 4, 4th edition 2013.
2. Snell. S. Richard, Neuroanatomy– 9th edition , 2012

Human Genetics / Medical Genetics

1. Gangane S. D. Human genetics- 4th edition, 2012.

Embalming Techniques

1. Tompsett R. H. Anatomical Techniques.
2. Edwards J. J Medical Museum Techniques - Oxford University Press.

Radiological & cross sectional anatomy

1. Weir, Jamie et al. Imaging atlas of human anatomy, 4th edition, 2011
2. Modden, Michael E. Introduction to sectional anatomy, 3rd edition, 2013.
3. Halim A., Surface and radiological anatomy, 3rd edition, 2011.

Atlases of anatomy

1. Grant, John C. B. Grant's, atlas of human anatomy, 14th edition, 2017.
2. Netter, Frank H. Atlas of human anatomy, 6th edition, 2014.

Practical Manuals

1. Cunningham's manual practical anatomy, 1st volume, 16th edition, 2017.

Journals

1. Journal of Anatomical Society of India
2. Anatomica Karnataka
3. Journal of Anatomy
4. Acta Anatomica
5. American Journal of Anatomy
6. American Journal of Physical Anthropology
7. Journal of Morphology, Embryology
8. Anatomical Record
9. American Journal of Medical Genetics
10. Annual Review of Genetics
11. Clinical anatomy- SOCA



SDM College of Medical Sciences & Hospital



SDM College of Dental Sciences & Hospital



SDM College of Physiotherapy &
SDM Institute of Nursing Sciences



Shri Dharmasthala Manjunatheshwara University



SDM Research Institute for Biomedical Sciences



Panoramic View of Campus