

SUMANDEEP VIDYAPEETH

(Declared as Deemed to be University under Section 3 of the UGC Act 1956)

Accredited by NAAC with a CGPA of 3.53 out of four-point scale at 'A' Grade

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CURRICULUM

Doctor of Medicine (M.D.) ANATOMY

Attested CTC

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15/2/2021

Vice-Chancellor

Sumandeep Vidyapeeth

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2015



DEPARTMENT OF ANATOMY

SBKS MEDICAL INSTITUTE & RESEARCH CENTER

Postgraduate Courses in M.D. in Anatomy

- Objectives
- Knowledge
- Course Contents Theory
- Practical
- Teaching/ Learning Activities:
- Monitoring Learning Progress:
- Log Book

Programme outcome : MD

The purpose of MD education is to create specialists who would provide high quality health care and advance the cause of science through research & training. The goal of postgraduate medical education shall be to produce competent specialists and/or Medical teachers.

Programme specific outcome : MD

POS 1. Scholars 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.

POS 2. Scholars shall have acquired the basic skills in teaching of the medical and paramedical professionals.

POS 3. Practice the specialty concerned ethically and in step with the principles of primary health care.

POS 4. Demonstrate sufficient knowledge of the basic sciences relevant to the concerned specialty.

POS 5. Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.

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MD ANATOMY

COURSE OUTCOME (CO): After completing the three year course in MD Anatomy the student shall achieved competence in the following:

1. Acquire basic knowledge in gross and surface anatomy, neuroanatomy, embryology, genetics, histology, radiological anatomy, applied aspects and recent advances of the above mentioned branches of anatomy to clinical practice. These are given in detail in subsequent sections.
2. Acquire skills in dissection skills, embalming, tissue preparation, staining and museum preparation.
3. Acquire skills in teaching, research methodology, epidemiology & basic information technology.
4. Acquire knowledge in the basic aspects of Biostatistics and research methodology.
5. Has knowledge to plan the protocol of a thesis, carry out review of literature, execution of research project and preparation of report.
6. Has ability to use computer applications Microsoft office (Microsoft word, excel, power point), Internet, Searching scientific databases (e.g. PubMed, Medline, Cochrane reviews).
7. Acquire skills in paper & poster preparation, writing research papers and Thesis.
8. Develop honest work ethics and empathetic behavior with students and colleagues.
9. Acquire capacity of not letting his/her personal beliefs, prejudices, and limitations come in the way of duty.
10. Acquire attitude and communication skills to interact with colleagues, teachers and students.
11. Practicing different methods of teaching-learning. Making presentations of the subject topics and research outputs.
12. Demonstrate the ability to identify applied implications of the knowledge of anatomy and discuss information relevant to the problem, using consultation, texts, archival literature and electronic media. Demonstrate the ability to correlate the clinical conditions to the anatomical /embryological /hereditary factors.
13. Demonstrate the ability to evaluate scientific/clinical information and critically analyze conflicting data and hypothesis.

Goals

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All post graduates after enrollment will be exposed to organized evidence searching skills along with teaching of biostatistics and research methodology.

- To have comprehensive knowledge about the History of Anatomy

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- To prepare the postgraduate student to become an exemplary Teacher and a research scientist par excellence. To achieve this goal, the postgraduate student should be given an overall exposure to the subject, teaching methodologies and a sound knowledge in research technologies.

Learning Objectives To achieve this goal, the following objectives must be fulfilled:

I. Cognitive domain: At the end of three years of postgraduate the student should be able to-

- Describe gross anatomy of the human body and correlate the knowledge of structure and function.
- Describe the micro-anatomy including cytology of various structures of the human body and compare the knowledge of microstructure with function and interpret it accordingly.
- To interpret the anatomical basis of signs and symptoms of various clinical conditions, diagnostic procedures and treatment modalities.
- Describe the developmental aspects of human body and interpret the developmental basis of various congenital anomalies.
- Describe the Neuroanatomical in its entirety and interpret the neuroanatomical basis of various clinical conditions.
- Explain various aspects of genetics and describe the genetic basis of various disorders and principles of genetic counseling.
- Explain and interpret radiological anatomy and sectional anatomy of the human body as studied by various imaging techniques.
- Comprehend surface and living anatomy of the human body.
- To relate forensic anatomy to the study with medico legal aspects of bone in particular.
- Describe the basics of comparative anatomy, to explain certain embryological events where ontogeny repeats phylogeny.
- Explain the processes and techniques of embalming.
- Comprehend ethical aspects of biomedical research.
- Comprehend the basis of disposal of biomedical waste.
- Comprehend horizontal integration of various subdivisions of anatomy with relevant physiology and biochemistry.

II. Psychomotor domain:

- Dissect and demonstrate various parts of adult human body.
- Demonstrate surface land marks, surface projections of various organs and living anatomy pertaining to muscle power, testing of nerves and palpation of vessels.
- Dissect and demonstrate various fetal organs.
- Prepare tissue blocks, perform H&E staining and is able to explain the principles of the following special stains- Silver nitrate, Periodic acid Schiff, Masson trichrome, Osmic acid, Verhoff and Van Gieson.
- To prepare museum specimens both dry and wet.
- Prepare and deliver lectures, present seminars on various topics of anatomy using audio-visual aids.
- Operate computers so as to prepare documents, tables, charts and projection slides.
- Identify research topics, carry out research and prepare a dissertation on a topic.

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- Prepare papers / posters in conferences.
- Set undergraduate theory papers, conduct viva voce, evaluate students and be able to compute results including internal assessment marks;

III. Affective domain: At the end of the training the student should be able

- To co-operate, react and respond in a cordial manner in his / her interaction with peers, superiors and subordinates.
- Project a cheerful persona to the students
- Inspire the students to reach greater heights.
- Arouse an element of curiosity and wonder in the minds of students.
- To be sensitive towards receipt of cadavers and interaction with the relatives of the deceased.
- To maintain log book.
- To develop a healthy personality and a liking and respect for the subject.
- Upon completion of the evidence based education, the trainee should be able to:
- Demonstrate significance of Evidence Based Anatomy
- Demonstrate anatomical basis of congenital abnormalities through research and systematic reviews of research evidence.
- Demonstrate anatomical basis of various clinical entities through research and systematic reviews of research evidence.

Course Description

- **Eligibility:** As per the guidelines of Medical Council of India and affiliated university.
- **Duration:** 3 years
- **Desirable qualities:** The student should have an aptitude for teaching and reasonable command over spoken and written English language
- **Details of Training:** The P.G. student would be a resident in the department for 3 years. The time-plan of curriculum will be on the following lines.

First Year Residency

Orientation programme

- Institutional and departmental orientation including duties and responsibilities of postgraduate students

Time Management:

- **Attested CTC** should be conducted within 3-6 month.

Stress Management

- Should be conducted within 3-6 month.

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Gross anatomy

- Dissection of one whole human body and study of gross anatomy and acquisition of embalming skills.

Microanatomy

- Basic techniques in tissue processing, preparation of blocks, microtome sections and H & E and principles of the following special stains -Van Gieson stain, Periodic acid Schiff, Masson's trichrome and Verhoff stain.
- To present the topic for dissertation and the research design in front of a dissertation committee comprising of all senior and PG teachers in the department within first six months of registration. Thereafter periodic assessment of the progress of the dissertation (every 6 monthly) will be done by the concerned PG teacher..
- Get trained to use computer for teaching and use the internet.
- **Scan Anatomy journals and periodicals to find the evidence for various staining practices.**

Optional yet Desirable

- To attend all the orations/seminars/workshops held for the subject in the city colleges, attend general orations held in the institution and attend regional/national conferences.

Teaching

- 70 hours of small group teaching with at least 1/3 of these under supervision by a senior teacher.

Microteaching Sessions

- Mandatory before small group teaching for each and every session.
- Should be exposed to evaluation techniques
- Exposure to Medical Education Technology Workshops
- Presentation in Journal club.
- Presentation in Seminars and symposia.
- Should complete gross and microanatomy and embryology journals.

Research

- Basic techniques like review of literature for a given topic and collection of data.
- Exposure to computer for various applications.

At the end of first year residency the trainee should be able to present –

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- Seminars which will have evidence embedded in the presentation and all references related to the subject matter will be incorporated. At the end of the seminar all the references will be listed and the seminar will be assessed by the facilitator.

Second Year Residency

Special Posting

- Interaction with other pre, para and clinical specialties so as to prime the mind of the P.G. students in Anatomy to the growing needs of application of anatomical knowledge to other branches of medicine. This will be achieved through horizontal and vertical integration.
- Horizontal Integration
- Selected topics should be taken as PG lectures by the concerned departments Physiology and Biochemistry.
- Vertical integration
- Lectures to be arranged by the various departments for PG students like Radiology, Surgery, Orthopedics, Medicine, Obstetrics and Gynecology Genetic Laboratory, Pathology, Microbiology and Forensic Medicine.
- Posting in pathology – to gain knowledge about Frozen-section, use of cryostat, special immune-histochemical techniques and immunological techniques and morbid and medico legal anatomy from post-mortem
- During the second year of residency the PG student will be performing rotation postings in other departments for orientation of applied aspects/clinical / practical training as per the following schedule:

1. Biochemistry	2 weeks
2. Physiology	2 weeks
3. Pathology	4 weeks
4. Medicine	4 weeks
5. Radiology	2 weeks
6. Medical education department	1 week
7. Surgery	1 week
8. Orthopedics	1 week
9. OBG	2 weeks
10. Ophthalmology	1 week
11. ENT	1 week

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Research

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- Starting the work on thesis by the beginning of second year of residency with the aim to complete the data collection & analysis by the end of second year.

Teaching

- From middle of second year, the P.G. students in Anatomy should be capable of giving lectures for the entire batch of students.
- Start teaching Embryology and Genetics in small group after microteaching sessions.
- Should be conversant with the use of various audiovisual aids
- Presentation in Journal Club
- Presentation in Seminar/ Symposia at the departmental and institutions level.

Fetal Dissection

- Should have dissected at least one fetus.

At the end of second year residency the trainee should be able to present –

- Journal clubs on a prescribed Evidence Based format with emphasis on critical appraisal. A designated teacher/facilitator will assess every post graduate student for each Journal club presentation.

Third Year Residency

Research

- Completion of dissertation
- Presentation of paper in conference
- Writing articles for publication

Teaching:

- Full-fledged lectures,
- Lecture demonstrations and
- Small group teaching.

Dissection:

- Window dissection of various regions of the body
 - At the end of third year residency the trainee should be able to take evidence based lectures

Subject Curriculum

History of Anatomy

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Comparative Anatomy and Evolution

1. Skull and vertebral column

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2. Larynx
3. Central nervous system
4. Lung
5. Heart
6. Gastrointestinal tract
7. Pectoral girdle
8. Pelvic girdle
9. Locomotion
10. Erect posture
11. Fossils and carbon dating
12. Kidney

General Anatomy

1. Tissues of the body, organs and organ system, function and applied
2. Bones-types blood supply, nerve supply and lymphatics, ossification, function and applied
3. Cartilage types and distribution function and applied
4. Muscle-types function, blood and nerve supply, function and applied
5. Joint-classification, structure, distribution and function of each type, function and applied
6. Blood vessels-type of vessels, anastomosis, collateral circulation, arterio-venous anastomosis.
7. Lymphatic system-lymph nodes, lymphatics, circulation of lymph and functions of lymphatic system.
8. Nervous system-division, central nervous system-brain, spinal cord and meninges. Peripheral nervous system-cranial and nerves, sensory receptors and motor nerve endings autonomic nervous system, neurophysiology

Histology

General Histology

- a. Cell- structure, function and electron microscopic structure.
- b. Tissues of the body; epithelium connective tissue, muscle, bone, cartilage glands and nervous tissues, structure, function and electron microscopic structure
- c. Blood vessels and lymphatic tissue, function and electron microscopic structure

Systemic Histology

- a. Gastrointestinal, respiratory, cardiovascular, urinary, reproductive system-male and female.
- b. Special senses.
- c. Endocrine and exocrine glands.

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Gross Anatomy

Regional anatomy

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- Superior extremity, inferior extremity, thorax, abdomen, pelvis head and neck, recent advances and sectional Anatomy
- Neuroanatomy.
 - Evolution, centralization, encephalisation, development, neural tube derivatives, neural crest derivatives, applied with special reference to recent advances.
- Radiological anatomy and special imaging techniques (general principles)
- Forensic Anatomy (age determination and sexing of bones)
- Surface anatomy and living anatomy
- Comparative Anatomy.
 - Basics of comparative Anatomy, to explain certain embryological events where ontogeny repeats phylogeny and comparative study of various organ systems.
- Applied and clinical anatomy.

Embryology

Introduction

- Male and female genital tracts. Spermatogenesis. Oogenesis. Fertilization, cleavage, implantation, placenta, embryonic stage, formation of systems of the body, Twins, Common fetal malformations.

Organization

- Development of organs and systems of the body; alimentary, circulatory, respiration, Urogenital, nervous system, endocrine, special senses, integumentary system etc. Congenital anomalies.
- Family planning and National programme maternal child health.

Genetics

- Fundamentals of human genetics.
- Cell division-mitosis and meiosis.
- Human chromosomes, structure and abnormally, Klinefelter's, syndrome, Turner's Syndrome, Down's syndrome etc
- Sex chromosomes, sex linked genes, sex chromatin.
- Chromosomal abnormalities.
- Cytogenetic, Molecular genetics, Eugenetics, Clinical applications of principles of Heredity, Population genetics, Twinning, Metabolic disorders controlled by genes, Genetic Engineering and Recombinant DNA Technology.
- Dermatoglyphics, Pedigree Charting, Karyotyping, Autosomal, X Y linked inheritance and polygenic inheritance.
- Prenatal and postnatal diagnosis, Genome analysis, Molecular diagnosis and Gene therapy.

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Reproductive Biology

- Reproductive organs male and female

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- Ovulation, corpus luteum, ovarian cycle.
- Transport of sperm, fertilization.
- Viability of ovum and sperm, safe period.
- Cleavage, transport of ovum.
- Uterine cycle, menstrual cycle.
- Embedding of blastocyst.
- Formation of embryo.
- Form of embryo at various stages.
- Membrane and placenta.
- Artificial Reproductive Technology

Practical

1 Anatomy

- Dissection of one entire cadaver: of dissected soft parts and organs supplemented by study of museum specimens, models and charts.
- Study of human bones and joints.
- Determination of age and sex from the bones.

2 Histology

- Study of light microscope.
- Common objects seen under the microscope.
- Appearance of objects in section.
- Demonstration of tissue processing, section cutting and staining section.
- Study of prepared histological slides of normal mammalian tissue and organs of the body.

3 Embryology

- Demonstration of embryology models.
- Sections of developing chick embryo.
- Specimens of congenital anomalies.

4 Radiological Anatomy

- Demonstration of normal ski grams of various parts and organs of the body.
- Ski grams of special investigations of various systems of the body.
- Ski grams showing ossification of bones and determination of age.
- Ski grams of pregnant uterus showing fetus of various ages.

5 Surface Anatomy

- Surface marking of various organs and structure:
- On the living body.

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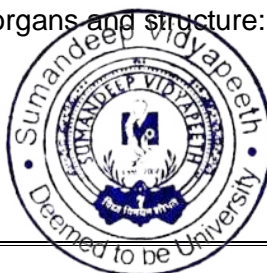
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- (b) On the cadaver.
- 6 Ossification of bones, diaphysis, union and age determination.
- 7 Embalming Techniques

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EXAMINATION PATTERN

Internal evaluation of P.G. student's performance during three years

A) FORMATIVE

Internal assessment will be based on the following:

- Teaching
- Dissection
- Log Book
- Journals of Microanatomy, Gross anatomy and Embryology
- Examinations:

(a) Theory:

- **At the end of first year** 2 papers on general anatomy, gross anatomy and micro anatomy of the upper half of the body: (Head and neck, Upper limb, Thorax and General anatomy). Lower half of the body: (Diaphragm, Abdomen and Pelvis, Lower Limb and General micro anatomy).
- **ii) At the end of Second year** two papers on Embryology (complete), Systemic micro anatomy, Neuroanatomy, Genetics and Applied anatomy.
- 30% of the paper will be multiple choice questions of following types:
 - Single best response
 - Multiple true false
 - Multiple completions
 - Assertion reason.
- **At the end of Third year**, Preliminary Examination as per university pattern.

(b) Practical and Viva

- **At the end of First year**
 - Prepare a tissue Block, cutting and staining.
 - Identification of 10 microanatomy spots.
 - Window dissection.
 - Osteology and soft parts.
- **At the end of Second year**
 - Course covered at the end of first year
 - Embryology models
 - Nervous system
 - Micro-teaching

Attested New histology slides

- **At the end of Third year**, Preliminary Examination as per university pattern.

B) SUMMATIVE

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- By points system- The following point scale will be strictly adhere to
 - 0 (Zero): Very Poor
 - 1(One): Poor
 - 2 (Two): Below average
 - 3 (Three): Average
 - 4 (Four): Good
 - 5 (Five): Very Good
 - 6 (Six): Out Standing

Scheme of Examination

Theory	400 Marks
Clinical / Practical Examination	450 Marks
Viva- Voce Examination	150 Marks

Candidates will be allowed to appear for examination only if attendance (minimum 80%) and internal assessment are satisfactory and dissertation is accepted. As standard, one has to have scored 50% marks independently in theory and practical [to follow MCI guidelines].

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