



SRI SRI
UNIVERSITY
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Faculty of Health and Wellness

B.Sc. Osteopathy Curriculum

2024-25

Vision of FHW

- To provide **holistic** health and wellness through **education** and research to the society at large.

Mission of FHW

- To develop innovative ecosystem to build competency amongst the healthcare professionals to provide patient centric holistic solution.
- To create the center of excellence with knowledge, attitude and practice across the fields of healthcare.
- To render customized health care services in an atmosphere of respect to the community.
- To increase community health and wellness by promoting positive healthy lifestyle through educational programs and outreach services.
- To implement preventive and therapeutic knowledge of evolving medical trends and respond with quality research and education.

Program Outcomes (POs) for B.Sc. Osteopathy

PO1: To apply the knowledge of basic medical sciences in Osteopathy.

PO2: To undertake advanced and applied research in Osteopathy and Allied Sciences.

PO3: Ability to provide Osteopathy through the application of its principles and practices for prevention of various lifestyles, non-communicable diseases, and psychosomatic disorders.

PO4: To deliver high-quality and safe healthcare system to patients by a drug-free and non-invasive method by a holistic approach.

Program Specific Outcomes (PSOs) for B.Sc. Osteopathy

PSO1: Graduates of the program should have a comprehensive understanding of the theoretical concepts and practical applications of osteopathy. They should have knowledge of human anatomy, physiology, biomechanics, and pathology, as well as the principles of osteopathic diagnosis and treatment.

PSO2: Graduates should be able to demonstrate proficiency in the hands-on skills required for the practice of osteopathy, including soft tissue techniques, joint mobilization, and manipulation. They should be able to apply these skills to effectively diagnose and treat patients with a wide range of musculoskeletal and other health problems.

PSO3: Graduates should exhibit a high level of professionalism, ethical conduct, and communication skills in their interactions with patients, colleagues, and other healthcare professionals. They should be able to work collaboratively as part of a healthcare team and maintain the confidentiality and privacy of patient information.

PSO4: Graduates should be able to critically evaluate scientific literature and research findings in order to make informed decisions about patient care. They should be able to incorporate the latest evidence-based practices into their clinical work and stay up to date with the latest developments in the field of osteopathy.

PSO5: Graduates should have a commitment to lifelong learning and continuing professional development. They should be able to reflect on their own practice and seek out opportunities for ongoing education and training to enhance their knowledge and skills in the field of osteopathy.

Program Educational Objectives (PEOs) for B.Sc. Osteopathy

PEO1: Graduates of the program should possess the necessary skills and knowledge to provide safe, effective, and evidence-based osteopathic care to patients. They should be able to competently diagnose and treat a wide range of musculoskeletal and other health problems, using a variety of osteopathic techniques and approaches.

PEO2: Graduates should demonstrate a high level of professionalism, ethics, and communication skills in their interactions with patients, colleagues, and other healthcare professionals. They should be able

to work collaboratively as part of a healthcare team and maintain the confidentiality and privacy of patient information.

PEO3: Graduates should have a commitment to lifelong learning and ongoing professional development in order to stay current with the latest developments in the field of osteopathy. They should be able to critically evaluate scientific literature and research findings and incorporate the latest evidence-based practices into their clinical work.

PEO4: Graduates should be prepared to take on leadership roles within their profession and advocate for the value of osteopathic care within the healthcare system. They should be able to effectively communicate the benefits of osteopathy to patients, policymakers, and other stakeholders.

PEO5: Graduates should be able to engage with their communities and contribute to the promotion of health and wellness. They should be able to participate in public health initiatives and collaborate with other healthcare professionals to improve the overall health and wellbeing of their patients and communities.

Semester wise Credits

Semester	Credits	Cumulative Credits	Clinical Practice Hours	Total Marks
Semester 1	27	27	-	675
Semester 2	25	52	-	625
Semester 3	24	76	50	600
Semester 4	24	100	50	600
Semester 5	18	118	100	450
Semester 6	17	135	100	425
Semester 7	17	152	150	425
Semester 8	16	168	150	400
Total	138		600	4200
Internship	6 months (600 Clinical Hours)			

Course Structure					
SEMESTER 1					
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Points
CC-1	Anatomy – 1	BOS101	5	2T/3P	125
CC-2	Physiology – 1	BOS102	5	4T/1P	125
CC-3	Biochemistry	BOS103	4	3T/1P	100
CC-4	Anatomy – 2	BOS104	5	2T/3P	125
CC-5	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 1	BOS105	6	4T/2P	150
	Happiness Connect	SSC101	2	1T/1P	50
Total Credits and Points of Semester 1			27		675
SEMESTER 2					
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Points
CC-6	Anatomy –3	BOS201	6	2T/4P	150
CC-7	Physiology – 2	BOS202	5	4T/1P	125
CC-8	Biomechanics – 1	BOS203	5	4T/1P	125
CC-9	Sociology and Nutrition	BOS204	3	3T/0P	75
CC-10	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 2	BOS205	6	4T/2P	150
Total Credits and Points of Semester 2			25		625
SEMESTER 3					
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Points
CC-11	Anatomy – 4	BOS301	6	2T/4P	150
CC-12	Physiology – 3	BOS302	4	4T/0P	100
CC-13	Biomechanics – 2	BOS303	5	4T/1P	125
CC-14	Pathology -1	BOS304	3	3T/0P	75

CC-15	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 3	BOS305	6	4T/2P	150
	Applied Clinical Osteopathy Technique-1		50 hrs		
Total Credits and Points of Semester 3			24		600
SEMESTER 4					
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Points
CC-16	Neuroanatomy	BOS401	4	2T/4P	150
CC-17	Neurophysiology	BOS402	3	2T/1P	75
AECC-1	Communication Skills	BOS403	4	3T/1P	100
CC-19	Pathology -2	BOS404	3	3T/0P	75
CC-20	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 4	BOS405	6	4T/2P	150
AECC-2	Environmental Science	BOS 406	4	4T/0P	100
	Applied Clinical Osteopathy Technique-2		50 hrs		
Total Credits and Points of Semester 4			24		600
SEMESTER 5					
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Points
CC-21	Orthopaedics and Trauma -1	BOS501	3	3T/0P	75
CC-22	Radiological Diagnosis and Course Clinical Imaging	BOS502	2	2T/0P	50
CC-23	Obstetrics and Gynecology	BOS503	3	3T/0P	75
CC-24	Pharmacology	BOS504	4	4T/0P	100

CC-25	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 5	BOS505	6	4T/2P	150
	Applied Clinical Osteopathic Treatment 3		100 hrs		
Total Credits and Points of Semester 5			18		450
SEMESTER 6					
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Points
CC-26	Orthopedics and Trauma -2	BOS601	3	3T/0P	75
CC-27	Research Methodology and Biostatistics	BOS602	4	4T/0P	100
CC-28	Pediatrics and Osteopathic Care of Children – 1	BOS603	4	4T/0P	100
CC-29	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 6	BOS604	6	4T/2P	150
	Applied Clinical Osteopathic Treatment 4		100 hrs		
Total Credits and Points of Semester 6			17		425
SEMESTER 7					
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Points
CC-30	General Psychology	BOS701	3	2T/1P	75
GE	General Elective GE I -Sports Physiology GE II - Ergonomics GE III -Yoga Practicum	BOS702	4	4T/0P	100

CC-31	Pediatrics and Osteopathic Care of Children – 2	BOS703	4	2T/2P	100
CC-32	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 7	BOS704	6	4T/2P	150
	Applied Clinical Osteopathy Technique-5		150hrs		
Total Credits and Points of Semester 7			17		425
SEMESTER 8					
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Points
CC-33	Thesis	BOS801	6	0T/6P	150
CC-34	Professional Practice Management and Ethics	BOS802	4	4T/0P	100
CC-35	Osteopathic Treatment: Integration	BOS803	6	4T/2P	
	Applied Clinical Osteopathy Technique-6	BOS 805	150hrs		150
Total Credits and Points of Semester 8			16		400
Total Credits and Points			168		4200
INTERNSHIP			6 MONTHS		

1st semester
Course: Anatomy – 1
Course Code: BOS 101
Credit - 5

The goal of this curriculum is for the students to gain a thorough knowledge of the anatomy of the musculoskeletal system, along with the neuro-vasculature of the upper and lower extremities presented in a systemic (and not regional) approach.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Comprehend the normal disposition, inter relationships, gross, functional and applied anatomy of the musculoskeletal system of the upper and lower extremities.
- Integrate the neuro-vasculature with the musculoskeletal system of the extremities.

Skills:

By completion of the subject the students should be capable of:

- Identifying bones, muscles, nerves, and vessels of upper and lower extremities.
- Locating subcutaneous position of large veins.
- Demonstrating surface markings of important structures – bone, muscle, nerve and vasculature.

Course content

Theory

General osteology

- a) Names of the bones of the body and their position.
- b) Classification of the bones with examples.
- c) General features of the bone and normal development.
- d) Microscopic anatomy of bone, general pattern of blood supply.
- e) Ossification of the bones of the limbs for age determination.
- f) X-rays of bones.
- g) Process of repair of bone.

Muscular system of upper and lower extremities

- a) Classification and identification of the muscles of the upper and lower extremities: main attachments, nerve supply and action(s).
- b) Details of attachments of the muscles, and relations.
- c) Surface marking and applied anatomy.

Nerves of upper and lower extremities

- a) Surface marking of the nerve.
- b) Course and relations of the nerve.
- c) Branches and its distribution.
- d) Applied anatomy.

Vasculature of upper extremity and lower extremities

- a) Arteries – surface marking, course and relations, branches and its distribution, applied anatomy.
- b) Veins – surface marking, course and tributaries, applied anatomy.
- c) Lymphatics – lymph nodes, superficial and deep lymphatics of the upper and lower extremities, applied anatomy.

Integration

- a) Upper extremity – surface marking, muscles, neurovasculature of the upper extremity.
- b) Lower extremity – surface marking, muscles, neurovasculature of the lower extremity.

Practical

- a) Upper extremity -study of a prosected upper extremity –muscle, nerve, vasculature.
- b) Lower limb –study of a prosected lower extremity –muscle, nerve, and vasculature.
- c) Study of individual bones of upper extremity and lower extremity in detail.

Recommended literature:

- “Gray’s anatomy (35th british edition)” - H. Gray
- “Clinical anatomy for medical student (6th edition)” - R. Snell
- “Cunningham’s manual of practical anatomy” - G.L. Romanes
- "Surface and radiological anatomy” - A. Halim
- “Histology: a text & atlas” - M. Ross
- “Textbook of human histology” - I. Singh
- “Medical embryology” J. Langman
- “Surface and radiological anatomy” - Halim
- “Atlas of human anatomy” - F. Netter
- “Applied anatomy” - M. Clark

Examination and marks distribution

Total marks - 125

Internal Assessment – 20 marks

- Mid semester examination - 15 marks
- Assignments and others – 5 marks

End of term examination -105 marks

- Theory -30 marks
- Practical – 75 marks

Course: Physiology – 1

Course Code: BOS 102

Credit - 5

The main goal of this curriculum is to provide a strong foundation in the given topics under the discipline of physiology, in the context of education in osteopathy.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Normal physiology at the level of cell, tissues and neuromuscular junction.
- Normal functions of blood as a part of the circulatory system.
- Autonomic nervous system regulation.
- Gastro intestinal physiology – processes of digestion from mouth to stomach.

Skills:

By completion of the subject the students should be capable of:

- Perform experiments to understand the properties of blood and principles of blood transfusion.
- Distinguish between the normal and abnormal data derived as a result of tests performed or observed in the laboratory.
- Identifying the clinical symptoms of gastro intestinal system through history taking, symptomatology and physical examination.

Course content

Theory

General physiology

Must know

- a) Introduction to physiology.
- b) Branches of physiology.
- c) Functional organization of human body.
- d) External and internal environment.
- e) Homeostasis.
- f) Biofeedback mechanisms in homeostasis.
- g) Cell physiology: physicochemical properties of cell membrane, cell membrane permeability and transport.

Nerve-muscle physiology

Must know

- a) Genesis of resting membrane potential.
- b) Action potential.
- c) Properties of nerve fibres.
- d) Functional anatomy of neuromuscular junction.

- e) Neuromuscular transmission.
- f) Excitation - contraction couple.
- g) Contraction kinetics of skeletal muscles.
- h) Smooth muscle.
- i) Injury & repair of nerves and muscles.

Desirable to know

- a) Strength duration curve -chronaxie. Affecting factors.
- b) Nerve conduction affecting factors.
- c) Muscle proteins.
- d) Energetics of nerve and muscle.
- e) Work physiology.

Blood

Must know

- a) Functions of plasma proteins.
- b) Principles of hemopoiesis.
- c) Regulation of erythropoiesis.
- d) Haemoglobin –functions and physiological variations.
- e) Physiological basis of anaemia.
- f) Destruction of red cells: jaundice.
- g) Regulation of wbc production.
- h) Functions of wbc.
- i) Functions of platelets.
- j) Haemostasis.
- k) Blood groups.
- l) Physiological basis of transfusion medicine.
- m) Body fluid compartments. Role of water in body and its distributions. Body fluid compartments. Fluid compositions.
- n) Blood volume. Normal value. Physiological and pathological variations. Blood volume regulation in detail (to be taken at end of lectures on c.v.s, kidney and endocrines).

Desirable to know

- a) Physical properties of blood.
- b) Plasma proteins: plasmapheresis, role of liver in plasma protein synthesis, relationship of diet & plasma protein synthesis.
- c) R.B.C.: advantages of biconcave shape.
- d) Bone marrow structure and cellular elements.
- e) Common haemoglobinopathies (hbs, hbc, thalassaemia)
- f) Polycythemia –effects on haemodynamics.
- g) Thrombocytosis, thrombocytopenic purpura.
- h) Anticoagulants: used in vitro and in vivo.
- i) Classification of haemorrhagic diseases, d.i.c.
- j) Effects of splenectomy.

Autonomic nervous system

Must know

- a) Sympathetic nervous system.
- b) Parasympathetic nervous system.

Gastro intestinal system

Must know

- a) Introduction to g.i physiology: general organization of g.i tract.
- b) Mastication and deglutition.
- c) Gastric secretion.
- d) Regulation of gastric secretion.

Desirable to know

- a) Gastric mucosal barrier.
- b) Inhibitors of gastric secretion.
- c) Pathophysiology of peptic ulcer.
- d) Effects of vagotomy. Abnormal gastric motility vomiting.

Practical

- a) Determination of abo and rh blood groups.
- b) Determination of bleeding time, clotting time and plasma prothrombin time.
- c) Clinical examination of gastro intestinal system.
- d) Identification of charts –anaemia, thrombocytopenic purpura, thalessemia etc.

Recommended literature:

- "Understanding medical physiology" - R.L. Bijlani
- "Review of medical physiology" - W.F. Ganong
- "Textbook of medical physiology" - A.C. Guyton

Examination and marks distribution

Total marks - 125

Internal Assessment – 40 marks

- Mid semester Examination - 30 marks
- Assignments and others – 10 marks

End of term examination – 85 marks

- Theory- 60 marks
- Practical – 25 marks

Course : Biochemistry

Code: BOS 103

Credit - 4

The goal of this curriculum is to give basic foundational knowledge of biochemistry for the students of Osteopathy, for them to understand the biochemical processes in the human body and set the basis for the understanding of the subject 'Physiology'.

Course Objective:

1. Students will be able to understand the fundamentals of cellular function and biomolecules.
2. Students will be able to formulate the link between metabolism of biomolecules and basic biochemical disorders.
3. Students will be able to comprehend the signs and symptoms of biochemical dysfunction.
4. Students will be able to analyse the role of biomolecular metabolism in osteopathic practices
5. Students will be able to synthesize and evaluate signs and symptoms of basic biochemical dysfunction and refer them to other health practitioner as and when needed.

Course outcome:

On completing this course successfully, the student will be able to understand:

1. Structure, function and interrelationship of bio molecules and consequences of deviation from normal.
2. Fundamental and clinical aspects of enzymes and regulation of enzymatic activity.
3. Integration of the various aspects of metabolism, and their regulatory pathways.
4. Analyse and interpret clinical investigative data.

COURSE CONTENT

THEORY

Bio molecules

- a. Function and classification of carbohydrates, lipids, protein and amino acids.
- b. Stereoisomerism and chemistry of monosaccharides, amino acids, and fatty acids.
- c. Haemoglobin-Structure and Mechanism of formation.

Metabolic pathways, their regulation, and metabolic interrelationships

Carbohydrate metabolism

- a. Glucose metabolic pathways: Glycolysis, TCA cycle.
- b. HMP shunt.
- c. Gluconeogenesis.
- d. Glycogenolysis and glycogenesis.
- e. Regulation of glucose metabolism.

Amino acid metabolism

- a. General reactions, transamination, its metabolic and diagnostic significance.
- b. Disposal of amino acid nitrogen and detoxification of urea.
- c. Metabolic state of amino acid carbon skeleton.
- d. Inborn errors (glucose and amino acid metabolism)- Phenylketonuria, Alkaptonuria, Albinism, Glycogen storage disease, galactosemia, Maple syrup urine disease, Fructosuria.

Lipid metabolism

- a. Biosynthesis and degradation of fatty acids, phospholipids and triacylglycerols.
- b. Biosynthesis of cholesterol, chemistry, and metabolism of lipoproteins.
- c. Hyperlipoproteinemias.
- d. Lipid storage disorders.
- e. Ketone bodies- formation and utilization, conditions leading to ketoacidosis, prostaglandin, eicosanoids.

Regulation of the metabolic pathways

- a. Carbohydrate, lipid, and amino acid metabolism.
- b. Interlinks between these pathways.

Enzymes

- a. Nomenclature and classification of enzymes.
- b. Factors affecting enzyme action, enzyme activators and inhibitors.
- c. Regulation of enzyme activity.

PRACTICAL

Test for Carbohydrate

- a. Molisch's Test
- b. Iodine Test
- c. Precipitation Test
- d. Reduction test in Alkaline Medium
- e. Seliwanoff's Test
- f. Hydrolysis Test for Non-reducing Carbohydrate
- g. Oxidation Test

Test for Proteins

- a. Biuret Test
- b. Xanthoproteic test
- c. Adamkiewicz Reaction
- d. Ninhydrin Reaction
- e. Precipitation Reaction
- f. Heat Coagulation of protein

Test for Fats

- a. Emulsification test
- b. Saponification Test

RECOMMENDED LITERATURE

1. Textbook of Biochemistry for medical students (Ed. 8th) DM Vasudevan, Sreekumari S, Kannan Vaidyanathan. Jaypee brothers medical publishers.

2. Fundamentals of Biochemistry. **U. Satyanarayana, U. Chakrapani.** Books & Allied publishers (New Central Book Agency Pvt. Ltd), New Delhi.

REFERENCE LITERATURE

1. Biochemistry Ed. Lubert Stryer. W.H. Freeman and Company, New York.
2. Principles of Biochemistry. Ed. Lehinger, Nelson and Cox. CBS Publishers and distributors.
3. Harper's Biochemistry, Ed. R.K. Murray, D.K. Granner, P.A. Mayes and V.W. Rodwell. Appletonand Lange, Stamford, Connecticut.
4. Textbook of Biochemistry with Clinical Correlations. Ed. Thomas M. Devlin, Wiley-Liss Publishers.
5. Tietz Textbook of Clinical Chemistry. Ed. Burtis andAshwood. W.B. Saunders Company.
6. Biochemistry. Ed. Donald Voet and Judith G. Voet. John Wiley & Sons, Inc.

EXAMINATION AND MARKS DISTRIBUTION

Total marks - 100

Internal assessment – 30 marks

Mid Term exam - 30 marks

End term examination – 70 marks

Theory – 45 marks

Practical – 25 marks

Course: Anatomy 2
Course Code: BOS 104
Credit - 5

The goal of this curriculum is for the students to have a thorough knowledge in the musculoskeletal system of the trunk along with its neuro-vasculature, a thorough knowledge of arthrology, and a fundamental knowledge on general histology, embryology and genetics.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Comprehend the normal disposition, inter relationships, gross, functional and applied anatomy of the musculoskeletal system of the trunk.
- Integrate the neuro-vasculature with the musculoskeletal system of the trunk.
- Basic principles of embryology including genetic inheritance and stages involved in the development of organs and systems from the time of conception till birth.
- Recognise the critical stages of normal development.
- Explain the developmental basis of the occurrence of major variations, abnormalities and congenital anomalies.
- Identify microscopic structures of various tissues, and organs in the human body and correlate the structure with the functions as a prerequisite for understanding the altered state in various disease processes.
- Detailed structure and relations of various types of joints in the body as a prerequisite for understanding the normal biomechanics of the joints.

Skills:

By completion of the subject the students should be capable of:

- Identifying the origin, course and insertion of the muscles, and the course of nerves and vessels of the trunk (thorax, abdomen, pelvis and back).
- Identification of microscopic structure of various tissues of the body.
- Identifying models of various stages of early foetus and different organ development.

Course content
Theory

Muscles of the trunk (thorax, abdomen, pelvis and back)

- a) Classification and identification of the muscles of the trunk: main attachments, nerve supply and action(s)
- b) Details of attachments of the muscles, and relations.
- c) Surface marking and applied anatomy.

Nerves of the trunk (thorax, abdomen, pelvis and back)

- a) Surface marking of the nerve.
- b) Course and relations of the nerve.
- c) Branches and its distribution.
- d) Applied anatomy.

Vasculature of the trunk (thorax, abdomen, pelvis and back)

- a) Arteries – surface marking, course and relations, branches and its distribution, applied anatomy.
- b) Veins – surface marking, course and tributaries, applied anatomy.
- c) Lymphatics – lymph nodes, superficial and deep lymphatics of the trunk, applied anatomy.

General histology

- a. **Cell:** detailed structure of cell and its components and their functional mechanisms.
- b. **Four primary tissues:**
 - i. **Epithelium:** microscopic characteristics, types, functions, distribution, basal lamina, cell junctions, specialisation of the cell surface and their structural details and functions; metaplasia.
 - ii. **Connective tissue:** cells, fibres and their structural features and functions. Intercellular substances, amorphous ground substance, types of connective tissue (loose areolar tissue, dense connective tissue) and their distribution.
Specialised connective tissue: different types of cartilages and their function and distribution.
Bone: cells, bone matrix, structural features of compact and cancellous bone, their distribution and functions, ossification, blood supply of a long bone.
 - iii. **Muscle:** general features, detailed structure of skeletal muscle, and molecular mechanisms of contraction, innervation of skeletal muscle, neuromuscular junction, morphological and histochemical basis of classification into type i and type ii muscle fibers and their significance, structural and functional characteristics of cardiac and smooth muscle; innervation of cardiac and smooth muscle.
 - iv. **Nervous tissue:** structural characteristics of a neuron, axon and dendrites. Different types of neurons and their specific structural and functional features and distribution. Axonal transport, synapse, morphological and functional characteristics of different types of synapses.
neuroglia: types, structure and functions, blood brain barrier.

General embryology

- a) Definition of embryology; gestation period: definition of gamete sperm, ovum; gametogenesis, migration of primordial germ cells into gonadal ridge; spermatogenesis; structure of spermatogenesis; structure of ovum; growth of ovarian follicles, ovarian and uterine cycles.
- b) Sperm in the male genital tract; sperm in the female genital tract, activation and capacitation of sperm in the female genital tract.
- c) **First week of development**
 - a. Definition and normal site and process of fertilisation, formation of zygote, cleavage division; formation of morula and blastocyst.
- d) **Second week of development**

- a. Differentiation of embryoblast and trophoblast; changes in the embryoblast formation of bilaminar germ disc; changes in the trophoblast; formation of cytotrophoblast, syncytiotrophoblast, amniotic membrane, yolk sac, extra embryonic mesoderm and extra embryonic coelom and connecting stalk; formation of chorion, amniotic cavity, primary yolk sac cavity appearance of prochordal plate. implantation; formation of decidua, types of implantation and abnormal sites of implantation.
- e) **Third week of development**
 - a. Appearance of primitive streak and primitive node; formation of intraembryonic mesoderm resulting in trilaminar germ disc; gastrulation formation of notochord, buccopharyngeal and cloacal membranes, paraxial, intermediate and lateral plate mesoderm, secondary yolk sac, intraembryonic coelom and allantoic diverticulum; derivatives of ectoderm, mesoderm and endoderm.
- f) **Fourth to eighth week of development (embryonic period)**
 - a. Formation of somites, neural tube, cephalocaudal folding, lateral foldings, body form, stomodeum, proctodeum, gut and vitelline duct; subdivisions of gut into foregut, midgut and hindgut.
- g) **Development from third month to birth (fetal period)**
 - a. maturation of tissues and organs and rapid growth of body.
 - b. estimation of age.
- h) **Placenta**
 - a. Formation of placenta and chorionic villi, decidua basalis; features and functions of placenta; placental circulation; abnormalities; placental barrier; placental membrane, types of placenta.
- i) **Umbilical cord** -formation of umbilical cord; features of umbilical cord.
- j) **Amniotic cavity**
 - i. Amniotic cavity and membrane; amniotic fluid – functions, expansions of amniotic cavity and fusion with chorion; chorion laeve with decidua capsularis; decidua capsularis with parietalis; obliteration of chorionic and uterine cavities; function of fused foetal membranes to dilate cervical canal.
 - ii. Abnormalities; obliteration of chorionic and uterine cavities; abnormalities of chorion.
 - iii. Formation of twins and types of twins.
 - iv. Arrangement of foetal membranes. Conjoined twins.
- k) **Teratology**
 - i. Genetic and environmental factors as causative factors for congenital malformations.
 - ii. mode of actions of teratogens and critical periods.

Elementary genetics

Must know

Cell, cell division, mitosis and meiosis, nucleus, dna, chromosomes, classification, karyotype, chromosomal aberrations (klinefelter, turner and down's syndrome). Prenatal diagnosis for congenital abnormalities, sex determination.

Desirable to know

Pedigree chart, pathogenesis of chromosomal aberrations and their effects, recombinant dna, genetic inheritance, genetic counselling, inborn errors of metabolism.

Arthrology

- a) Definition and classification of joints, general features of different types of joints.
- b) Fibrous and cartilaginous joints.
- c) Structure of a synovial joint.
- d) Temporomandibular joint.
- e) Vertebral and thoracic articulation.
- f) Joints of the upper extremity.
- g) Joints of the lower extremity.
- h) Skull.

Practical

- a) Embryology
 - Models to demonstrate various stages of early foetus and different organ development.
 - Slides of ovary and testis to show follicles and stages of maturation of spermatozoa.
- b) Histology
 - Routine and special slides of all the tissues and organs of the body.
 - Electron micrographs to demonstrate filtration barrier of the kidney, alveolar septum, tight junctions of capillaries and such relevant areas.
- c) Arthrology
 - Trunk
 - Study of a prosected thorax –muscles, nerves, vasculature.
 - Study of a prosected abdomen –muscles, nerves, vasculature.
 - Study of a prosected pelvis –muscles, nerves, vasculature.
 - Study of a prosected back –muscles, nerves, vasculature.

Recommended literature:

- “Gray’s anatomy (35th british edition)” - H. Gray
- “Clinical anatomy for medical student (6th edition)” - R. Snell
- “Cunningham’s manual of practical anatomy” - G.L. Romanes
- "Surface and radiological anatomy" - A. Halim
- “Histology: a text & atlas” - M. Ross
- “Textbook of human histology” - I. Singh
- “Medical embryology” J. Langman
- “Surface and radiological anatomy” - Halim
- “Atlas of human anatomy” - F. Netter
- “Applied anatomy” - M. Clark

Examination and marks distribution

Total marks - 125

Internal Assessment – 20 marks

- Mid semester examination - 15 marks
- Assignments and others – 5 marks

End of term examination – 105 marks

- Theory – 30 marks
- Practical – 75 marks

Course: Osteopathic Treatment: Philosophy, Concepts, Evaluation, and Techniques 1

Course Code: BOS 105

Credit - 6

The subject 'Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques' contains the different elements encompassed in the practice of osteopathy, grounded in the remaining biomedical subjects.

Philosophy: Osteopathy is unique in its approach due to the distinct philosophical pillars and principles in which it stands. An understanding of the history and development of osteopathy as a unique form of health care is stressed along the syllabus. The work of Osteopathy pioneers such as Dr. A.T Still and Dr. W.G Sutherland provides a theoretical framework to the practice that is considered essential in this program.

Concepts: the osteopathic philosophy translates into a view of life, of health and of disease, which form the basis for osteopathic concepts and approaches that apply to specific clinical situations.

Evaluation: this module comprehends the case history taking, the observation, and the assessments through palpation, as well as their synthesis into an osteopathic diagnosis.

Techniques: this module includes the development of osteopathic technical skills with an understanding of their physiological basis. Emphasis is placed in the development of palpation, osteopathic reasoning and intuition as the means for osteopathic treatment.

The four aspects of this subject, when combined, guide the student in developing an osteopathic understanding of the patient, formulating an osteopathic diagnosis, and providing an osteopathic treatment that is safe, comprehensive and effective. The syllabus covers the three main areas of osteopathy -musculoskeletal, visceral and cranial- extensively, with the understanding that a fundamental aspect in osteopathic pedagogy is the continuous integration among them. This integration must be stressed in each osteopathy unit as well as in the supervised clinical practice.

Unit 1 - Introduction to Osteopathy

Course objectives:

- To acquaint the students with the history of osteopathy and the development of its philosophy and principles.
- To introduce the student into the possibilities of palpation as a diagnostic and treatment resource.

- To acquaint the student with the physiological principles and technical principles of mobilisations, functional techniques, muscle energy techniques, and listening techniques.

Learning outcome:

- Understand the context in which osteopathy has been created.
- Understand the possibilities and limitations of osteopathy as a form of health care.
- An experience of the practical possibilities of the hands as a diagnostic and treatment resource in direct, indirect and listening approaches.
- An understanding of the physiology, principles, indications, contraindications, and procedures of mobilisations, functional techniques, muscle energy techniques, and listening techniques.

Module 1 - Brief history and philosophy of osteopathy.

- a) The pioneers: brief biography of Andrew Taylor Still, John Martin Littlejohn, William Garner Sutherland, and Rollin Becker, and their contributions to osteopathy.
- b) The development of osteopathy in the USA and Europe. Current status of osteopathy worldwide.
- c) Osteopathy in the musculoskeletal, visceral and cranial fields. Development of these areas in the past century.

Module 2 – Osteopathic principles.

- a) The principles of osteopathy as postulated by A. T. Still. Interpretations and applications of the principles throughout the history of osteopathy, up to the present.
- b) Osteopathic dysfunction. Models for osteopathic diagnosis.
- c) Approaches to the osteopathic dysfunction: direct, indirect, and listening.

Module 3 – introduction to palpation.

- a) Perceptual experiences to develop sensitivity through the hands.
- b) Palpation of anatomical, physiological and restrictive barriers in joints of the upper and lower limb.
- c) Physiology, principles, indications, contraindications, and procedures of mobilisations, functional techniques, muscle energy techniques, and listening techniques.
- d) Basic applications of mobilisations, functional techniques, muscle energy techniques and listening techniques.

Suggested reading:

- “Autobiography” – A.T Still
- “The philosophy and mechanical principles of osteopathy” – A.T. Still
- “Osteopathy: research and practice” – A.T. Still
- “Contributions of thought” - W.G. Sutherland
- “Osteopathy - models for diagnosis, treatment and practice” - J. Parsons, N. Marcer
- “Greenman’s principles of manual medicine” = L. DeStefano

Unit 2 - General Osteopathic Treatment

Course objectives:

- To effectively and safely practice the general osteopathic treatment.
- To understand the applications of the GOT as a diagnostic and treatment resource.
- To deepen the osteopathic concepts studied in the introductory module in their application to the GOT.

Learning outcome:

- To effectively practice the GOT while understanding its specificities in both its diagnostic and treatment applications.
- To deepen the understanding of the osteopathic principles and concepts in the practice of the GOT.

Module 1 – History of the GOT:

- a) Littlejohn's osteopathic concepts. John Wernham's general osteopathic treatment. The GOT in diagnosis. The GOT as a treatment with its implications in axial biomechanics, peripheral biomechanics and in the circulatory system.

Module 2 – GOT concepts:

- a) Indications and contraindications.
- a) The concepts and applications of rhythm, routine, and rotation.
- b) Understanding of the barriers in the involved joints.

Module 3 – practice of the GOT:

- a) GOT techniques and their sequence.

Suggested reading:

- "The general osteopathic treatment" – F. Hematy-Vasseur.
- "The art and science of osteopathy" – J. Wernham.

Unit 3 - Introduction to the primary respiratory mechanism

Course objectives:

- To understand the context of Sutherland's original model and the different stages of its development.
- To provide a practical experience of the possibilities for diagnosis and treatment through the primary respiratory mechanism in structures of the cranial, thoracic and pelvic spheres.

Learning outcome:

- To become familiar with the expression of the PRM in structures of the pelvis, thorax and cranium.

- An understanding and experience of the importance of the PRM as a diagnostic and treatment tool, based on Sutherland's original model.

Module 1 – Brief history of W.G Sutherland:

- a) Sutherland's discovery of the PRM.
- b) Development of the understanding of the primary respiratory mechanism during Sutherland's life, and the subsequent interpretations and applications of his model.

Module 2 – components of the primary respiratory mechanism:

- a) The five components of the PRM. Implications of their state in health and disease.

Module 3 – practical applications.

- a) Palpation of the in structures of the pelvis, the thorax and the cranium.

Unit 4 - Cranial 1: sphenobasilar synchondrosis

Course objectives:

- To acquaint the student with the osteopathic understanding of the cranial mechanics.
- To provide the palpation skills needed to relate with the physiologic and non-physiologic expressions of the cranial mechanism.
- To understand the principles of treatment in the cranial field and apply them in practice.

Learning outcome:

- To understand the basic principles of osteopathy in the cranial field.
- To be able to diagnose and treat osteopathic dysfunctions in the occiput, the temporal bones, the sphenoid, and the sphenobasilar synchondrosis.
- To be able to diagnose and treat, through the cranial approach, dysfunctions in the sacrum, the ilia, the sacroiliac joint, the tibia and the fibula.
- To be able to osteopathically relate structures from the pelvis and the cranium.

Module 1 – anatomy review:

- a) Anatomy of the sacrum, the occiput, the temporal bones, the sphenoid and the meninges along with their related vascular and nervous structures.

Module 2 – introduction to cranial osteopathy:

- a) The development of osteopathy in the cranial field by Sutherland. Palpation of the cranial rhythms.
- b) Palpation skills for osteopathy in the cranial field.
- c) The role of the meninges.
- d) The role of the cerebrospinal fluid. The core link.

Module 3 – practical:

- a) Diagnosis and treatment of the occiput, the temporal bones, the sphenoid, the sphenobasilar synchondrosis, and the dural tube.
- b) Diagnosis and treatment through the cranial approach of the sacrum, the ilia, the sacroiliac joint, the tibia and the fibula.

Suggested reading:

- “The cranial bowl” – W.G. Sutherland
- “Contributions of thought” – W.G. Sutherland.
- “Osteopathy in the cranial field” - H. Magoun
- “Cranial osteopathy” – T. Liem.

Unit 5 - Diaphragm**Course objectives:**

- To understand and assimilate the importance of the diaphragm as a central structure in the osteopathic approach.
- To diagnose and treat the diaphragm in its different dysfunctions.

Learning outcome:

- To be able to diagnose the different dysfunctions of the diaphragm, by themselves and in relation to the visceral, musculoskeletal, fascial and craniosacral structures osteopathically related to it.

Module 1 – anatomy and biomechanics review:

- a) Anatomy review. Physiology of ventilation. Abdominal and thoracic pressures.
- b) Visceral relations.
- c) A.S. Still remarks on the functional relevance of the diaphragm.

Module 2 – practical:

- a) Diagnostic assessments. Functional technique.
- b) Myofascial technique.
- c) Listening technique.
- d) Recoil technique.
- e) Mobilization techniques.

Suggested reading:

- “Greenman’s principles of manual medicine” = L. DeStefano
- “Atlas of osteopathic techniques” – A.S. Nicholas
- “Collected papers of Viola Frymann” – V. Frymann
- “The philosophy and mechanical principles of osteopathy” – A.T. Still

Examination and marks distribution:**Total marks - 150****Internal Assessment– 40 marks**

- Mid semester examination - 40 marks

End of term examination – 110 marks

- Theory -60 marks
- Practical – 50 marks

SEMESTER 1									
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Examination and Marks Distribution				
					Internal Assessment		End Term Examination		Total Points
					Mid semester Exam	Assignment	Theory	Practical	
CC-1	Anatomy – 1	BOS 101	5	2T/3P	15	5	30	75	125
CC-2	Physiology – 1	BOS 102	5	4T/1P	30	10	60	25	125
CC-3	Biochemistry	BOS 103	4	3T/1P	30		45	25	100
CC-4	Anatomy – 2	BOS 104	5	2T/3P	15	5	30	75	125
CC-5	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 1	BOS 105	6	4T/2P	40		60	50	150
	Happiness Connect I	SSC-101	2	1T/1P			25	25	50
Total Credits of Semester 1			27		Total Points of Semester 1				675

2nd semester

Course: Anatomy 3 Course Code: BOS 201 Credit - 6

The goal of this curriculum is for the students to have a thorough knowledge on the gross anatomical, histological, and embryological processes of the structures of the head and neck, and of the structures of the cardiovascular and respiratory systems.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Comprehend the normal disposition, inter relationships, gross, functional and applied anatomy of the musculoskeletal system of the head and neck including the structural anatomy of the sense organs – eyes, nose, tongue, external and middle ear.
- Integrate neurovasculature with the structures of the head and neck.
- Developmental and microscopic anatomy of the above structures.
- Comprehend the normal disposition; inter relationships, gross, functional and applied anatomy, developmental and microscopic anatomy of the cardiovascular and respiratory systems.
- Integrate the cardiovascular and respiratory systems with the musculoskeletal system and neurovasculature of thorax.

Skills:

By completion of the subject the students should be capable of:

- Identifying the gross anatomical and microscopic features of the head and neck.
- Identifying the gross anatomical and microscopic features of cardiovascular and respiratory systems.

Course Content

Muscles of head and neck

- a) Classification and identification of the muscles of the head and neck: main attachments, nerve supply and action(s).
- b) Details of attachments of the muscles, and relations.
- c) Surface marking and applied anatomy.

Nerves of head and neck

- a) Surface marking of each individual nerve.
- b) Course and relations of the nerve.
- c) Branches and its distribution.
- d) Applied anatomy.

Vasculature of head and neck

- a) Arteries – surface marking, course and relations, branches and its distribution, applied anatomy.

- b) Veins – surface marking, course and tributaries, applied anatomy.
- c) Lymphatics – lymph nodes, superficial and deep lymphatics of head and neck, applied anatomy.

Cardiovascular system

- a) Normal position, external features and parts of the heart.
- b) Internal features of the chambers of heart.
- c) Names of the blood vessels and venous drainage of the organs, structures and body as a whole.
- d) Conducting system of heart, fibroskeleton of heart.
- e) variation(s), developmental anomalies of heart and blood vessels, valvular defects and their effects in pathogenesis of the anomalies.
- f) Review of all the vasculature.
- g) Lymphatic system- location of major group of lymph nodes in the body and their drainage areas. Gross anatomy of major lymphatics especially thoracic duct and its tributaries.
- h) Embryology of heart and circulatory system.
- i) Histology of the heart and circulatory system.

Respiratory system

- a) Position, parts, relations, blood supply of upper and lower respiratory tract.
- b) Pleura, its reflection, nerve supply, pleural recesses and their significance, bronchopulmonary segments, their importance.
- c) Mechanism of respiration.
- d) Embryology of the respiratory system – upper and lower respiratory tract.
- e) Histology of the upper and lower respiratory tract.

Fascia

- a) Introduction to the anatomical and histological characteristics fascia.

Practical

- a) Study of a prosected part of the head and neck – muscles, nerves and vasculature.
- b) Study of superficial and deep parts of the face and neck, orbit, submandibular region, temporal and infra temporal fossa, cranial cavity, naso and oropharyngeal regions, ear, larynx and pharynx in a prosected specimen.
- c) Study of a prosected part of chest wall, mediastinum, heart and its vessels, thoracic duct, lymphatic channels and lymph nodes.
- d) Study of a prosected part of the upper and lower respiratory tract and its relations.
- e) Dissection videos – introduction to the fascia.
- f) Systemic embryology of cardiovascular and respiratory systems.
- g) Systemic histology of cardiovascular and respiratory systems.

Recommended literature:

- “Gray’s anatomy (35th british edition)” - H. Gray
- “Clinical anatomy for medical student (6th edition)” - R. Snell
- “Cunningham’s manual of practical anatomy” - G.L. Romanes
- "Surface and radiological anatomy” - A. Halim

- “Histology: a text & atlas” - M. Ross
- “Textbook of human histology” - I. Singh
- “Medical embryology” J. Langman
- “Surface and radiological anatomy” - Halim
- “Atlas of human anatomy” - F. Netter
- “Applied anatomy” - M. Clark

Examination and marks distribution

Total marks - 150

Internal Assessment – 20 marks

- Mid semester examination - 15 marks
- Assignments and other – 5 marks

End of term examination-130 marks

- Theory – 30 marks
- Practical – 100 marks

Course: Physiology – 2

Course Code: BOS 202

Credit - 5

The main goal of this curriculum is to provide a strong foundation in the gastro intestinal, respiratory and cardiovascular physiology in the context of the education in osteopathy.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Gastrointestinal physiology –physiology of digestion, absorption in the intestines, defecation.
- Heart physiology and its nervous regulation.
- Physiology of respiration and its nervous regulation.

Skills:

By completion of the subject the students should be capable of:

- Identifying the clinical symptoms of cardio vascular and respiratory systems through history taking, and their symptomatology.
- Perform a physical examination for the above mentioned systems.
- Perform experiment of ecg and interpret the results obtained and observed.
- Record the blood pressure and observe the effect of posture and exercise on it.
- Recording of lung volumes -spirometry.
- Recording chest movements with a stethograph and observe their variation during various physiological processes.

Course content

Theory

Gastro intestinal system

Must know

- a) Pancreatic secretion- composition, mechanism and regulation.
- b) Functions of liver and gall bladder including the formation, storage and secretion of bile.
- c) Intestinal secretions -composition and mechanism of secretion of small intestinal juice, regulation of secretion.
- d) Secretion of large intestine: mucous, water, electrolyte.
- e) Motility of small intestine: peristalsis and its neural and hormonal control.
- f) Functions of ileocecal valve.
- g) Colon structure and innervations.
- h) Motility of the colon.
- i) Mixing and mass movements in the colon.
- j) Defecation reflex.
- k) Gastro intestinal hormones (in brief).
- l) Digestion & absorption of carbohydrates, fats and proteins.
- m) Absorption of water, electrolytes and vitamins.

Cardiovascular system

Must know

- a) Introduction to cvs.
- b) Properties of cardiac muscle.
- c) Action potential and spread of impulse in the heart.
- d) E-c coupling in the myocardium.
- e) ECG.
- f) Pressure changes in the heart-cardiac cycle.
- g) Functional basis of heart sounds and murmurs.
- h) Neural regulation of cardiac activity.
- i) Regulation of heart rate.
- j) Intrinsic regulation of heart's action- cardiac output.
- k) Cardiac output: measurement and regulation.
- l) Nutrition and metabolism of heart.
- m) exercise physiology.
- n) General principles of hemodynamics.
- o) Cardiovascular reflexes.
- p) Neural control of circulation.
- q) Special features of cerebral circulation.
- r) Special features of circulation in skeletal muscles and skin.

Desirable to know

- a) ECG – electrical axis of heart, heart blocks, arrhythmias, ischemia, infarctions.
- b) Heart sounds: murmurs & their clinical significance.

Respiratory system

Must know

- a) Introduction to respiratory system.
- b) Lung volumes and capacities.
- c) Mechanics of respiration – i.
- d) Mechanics of respiration – ii.
- e) Composition of respired air.
- f) Exchange of gases in the lungs.
- g) Ventilation – perfusion ratio.
- h) O₂ carriage, o₂-dissociation curve.
- i) Co₂ carriage, co₂-dissociation curve.
- j) Neural regulation of respiration.
- k) Chemical regulation of respiration.
- l) Hypoxia, cyanosis and dyspnoea.
- m) Special features of pulmonary circulation.

Desirable to know

- a) Artificial respiration.
- b) Therapeutic use of oxygen.

Practical

- a) General examination of cvs –palor, icterus, cyanosis, oedema.
- b) Clinical examination of cvs –heart rate, pulse rate, blood pressure.
- c) Recording and analysis of 12 lead electrocardiogram and to measure the mean electrical axis of the heart.
- d) Recording of normal blood pressure.
- e) Determination of the effect of posture on blood pressure.
- f) Determination of effect of moderate exercise on blood pressure.
- g) Determination of various lung volumes and lung capacities. Calculation of maximum voluntary ventilation(mvv) and forced expiratory volume (fev) by spirometry.
- h) Recording of chest movements by a stethograph and to study the effects of speech, swallowing, coughing, breath -holding and hyperventilation.
- i) General examination of respiratory system.
- j) Clinical examination of respiratory system.

Recommended literature:

- "Understanding medical physiology" - R.L. Bijlani
- "Review of medical physiology" - W.F. Ganong.
- "Textbook of medical physiology" - A.C. Guyton.

Examination and marks distribution

Total marks - 125

Internal Assessment– 40 marks

- Mid semester examination - 30 marks
- Assignments and others – 10 marks

End of term examination-85 marks

- Theory – 60 marks
- Practical – 25 marks

Course: Biomechanics – 1

Course Code: BOS 203

Credit - 5

Course objectives:

- Comprehend the biomechanical perspective of structure and function of parts of the musculoskeletal system in relevance to osteopathy.
- Correlate the knowledge gained in understanding the biomechanical aspect of an osteopathic dysfunction and its treatment.

Learning outcomes:

- Explaining the basic principles of biomechanics in terms of kinetics and kinematics.
- Understanding the biomechanical properties of connective tissue.
- Understanding, analyzing and implementing in osteopathic practice the biomechanical concepts of the pelvis, the spine and the temporomandibular joint.

Module 1: Basic biomechanics

a. Introduction to biomechanics:

Meaning, definition, perspective, branches of biomechanics, significance of biomechanics in osteopathy.

b. Kinematics:

Types of motion (accessory and joint play of axial and peripheral skeletal), location of motion (instantaneous axis of movement, shifting axis of movement), magnitude of motion (factors determining it), direction of motion, angular motion and its various parameters, linear motion and its various parameters, projectile motions.

c. Kinetics:

Definition of forces, force vectors (composition, resolution, magnitude), naming of the force (gravity and anti-gravity force, JFR), force of gravity and CoG, stability, reaction forces, equilibrium and balance, linear forces system, friction and its various parameters, parallel force systems, concurrent force systems, work power and energy, momentum of force and its application, force components, equilibrium of force.

d. Mechanical energy, work and power:

Definitions, positive and negative work of muscles, muscle mechanical power, causes of inefficient movement, co-contractions, Isometric contraction against gravity jerky movement, energy generation at one joint and absorption at another, energy flow and energy system used by the body, energy storage.

Module 2: Biomechanics of connective tissues

a. Biomechanics of fascia, ligament and tendon:

Structure and composition, mechanical properties and physiological properties, cross sectional area measurements, properties of tendo, temperature sensitivity, changes in physical and mechanical properties due to ageing, exercise and immobilisation, position mechanoreceptors, distribution of mechanoreceptors in the joint, structure and function, clinical applications.

b. Biomechanics of muscle:

Structure and composition of muscle, muscle function, mechanical properties of various muscles, changes in mechanical and physiological properties because of ageing, exercise, immobilisation, and injury.

c. Biomechanics of bone growth and development:

Structure and function in bones, bone growth and development, pathomechanics of the bone, clinical applications.

d. Biomechanics of skeletal articulations:

Joint design, joint categories, joint function (arthrokinematics, osteokinematics, kinematic chains), joint forces, equilibrium and distribution of these forces, degenerative changes in weight bearing joints and compensatory actions, joint stability and flexibility, clinical applications.

Module 3: Biomechanics of pelvis

Structure and function of the pelvic region. True and false pelvis. Biomechanics of the sacrum and the pelvic bones. Sacroiliac joint. Lumbosacral joint. Pubic symphysis.

Module 4: Biomechanics of Axial skeleton

General structure and function of axial skeleton. Structure and function of the cervical region. biomechanics of the cervical spine. Structure and function of the thoracic region. Biomechanics of the thoracic spine. Structure and function of the lumbar region. Biomechanics of lumbar spine

Module 5: Biomechanics of Temporomandibular Joint

Joint structure and function. Kinetic and kinematics of temporomandibular joint. Relationship with the cervical spine and posture.

Module 6: Practical

Joint axis and planes. Degrees of Freedom. Osteokinematics and arthrokinematics of joints. Qualitative analysis of the joint's active and passive range of motion. Joint play movements. Close packed position. Open packed position. Capsular pattern. Joint end feel evaluation. Biomechanical analysis of pelvis, spine and temporomandibular Joint.

Recommended literature:

- “Joint structure and function – a comprehensive analysis (3rd edition)” P. Levangie
- “Clinical kinesiology (5th edition)” - Brainstorm
- “Clinical kinesiology for physical therapist assistants” - S. Lippert
- “The physiology of joints” I. Kapandji

Examination and marks distribution**Total marks - 125****Theory:****• Internal Assessment – 40 marks**

Mid Semester examination - 30 marks

Assignment - 10 marks

• End of term examination - 85 marks

Theory - 60 marks

Practical – 25 marks

Course: Sociology and nutrition

Course Code: BOS 204

Credit - 3

Objectives

The main goal of this curriculum is to provide the students of osteopathy with the basics of sociology in the context of health care, as well as to set a basic understanding on the environmental and nutritional factors to health, disease and well-being. The subject is not meant to equip the students with the knowledge to give nutritional advice, since this is out of the scope of osteopathy, but to help them understand the role of imbalances of nutritional origin in their diagnostic process.

Knowledge

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Basic sociological aspects of health.
- What is health according to traditional and modern schools of medicine.
- The impact on health of the individual's physical environment- home, workplace the community.
- Basic concepts on nutrition, nutritional deficiencies, nutritional diseases, and the means for an adequate nutrition.
- Basic classification of biotypes according to ayurveda and their role in an individualized nutrition.
- Understand the sources of water, and how to evaluate the safety and quality of it.
- Criteria for safe water as defined by the who and the ministry of health of india, along with water borne diseases and the measurements to prevent them.
- Understand the common environmental hazards and basic means to neutralize or reduce them.

Skills

By completion of the subject the students should be capable of:

- Suggesting ways to improve the physical environment at the home in the context of environmental hazards.
- Suggesting appropriate methods to make water at home safe.
- Identify common nutritional problems, and possible socio-economical environments that facilitate them.
- Identify nutritional diseases for referral.

Course content

Theory

Sociology and health

- a) Importance of the social, cultural and economic aspects in the understanding of health.
- b) Definitions of health according to allopathic medicine, ayurveda and osteopathy.
- c) Geographical variations in diet and health (including the different regions of India).
- d) Cultural variations in diet and health (including the different regions of India).

Nutrition and health

- a) History of Indian traditional medicines.
- b) Concepts of nourishment.

- c) Classification of foods.
- d) Sources of nutrients.
- e) Bio availability of nutrients.
- f) Nutritive values -raw and cooked.
- g) Role of seasonal produce.
- h) Dairy and animal foods –basic perspectives according to allopathy and ayurveda.
- i) Variations in the property of dairy products according to their origin.
- j) The five elements in ayurveda and their role in the understanding of nutrition.
- k) Classification of biotypes in ayurveda.
- l) Balanced diet –general concepts independently of the biotype.
- m) Appropriate diet for each biotype –general concepts.
- n) Food combination practices in ayurveda.
- o) Introduction to nutritional diseases.
- p) Adulteration and refinement processes of food.
- q) Basic assessment of nutritional status.

Water

- a) Water –introductory concepts.
- b) Sources of water –well, pump, tap.
- c) Safe water according to the WHO and the Indian ministry of health.
- d) Factors involved in the quality of water for human nutrition.
- e) Hydration –importance and variations according to the body type.
- f) Water borne diseases.
- g) Purification of water –means and limitations.

Environment and health

- a) Waste disposal.
- b) Air pollution: causes and measurements of control.
- c) Genetic modified organisms.
- d) Natural disinfection agents.
- e) Enzymes.
- f) Vaccination.

Recommended literature

- “Text book of preventive and social medicine” - K. Park
- “Ayurvedic healing” - D. Frawley
- “Charak samhita” - Vaidya Bhagwan Dash
- “Ayurveda – the science of self-healing” - V. Lad
- “The China study” - T. Colin Campbell

Examination and marks distribution

Total marks - 75

Internal Assessment – 30 marks

Mid semester examination - 30 marks

End of term examination – 45 marks

Theory- 45 marks

Course: Osteopathic treatment: philosophy, concepts, evaluation, and techniques 2

Course Code: BOS 205

Credit - 6

Unit 1 - PRINCIPLES OF STRAIN-COUNTERSTRAIN AND TRIGGER POINTS

Course objectives:

- To acquaint the student with an understanding of the development of the techniques of strain-counter strain and trigger points.
- To acquaint the student with their mechanism of action, scope of application, limitations, and contraindications.
- To provide the student with an introductory experience of some techniques under each of these categories, that will then be developed under later musculoskeletal units.

Learning outcome:

- An in-depth understanding of the development, scope, limitations and contraindications of strain-counter strain and trigger point techniques.
- An understanding of the physiology, mechanism of action, and process for each of these families of techniques.
- A practical familiarization in palpation for each of these techniques, that will be further developed in the following musculoskeletal units.

Module 1 - Strain-counter strain:

- a) Origin and development.
- f) Physiology and mode of action.
- g) Applications.
- h) Contraindications.
- i) Practice.

Module 2 - Trigger points:

- a) Origin and development.
- n) Physiology and mode of action.
- o) Applications.
- p) Contraindications.
- q) Practice.

Suggested reading:

- "Greenman's principles of manual medicine" – L.A. DeStefano.
- "Atlas of osteopathic techniques" – A.S. Nicholas.
- "Positional release techniques" - L. Chaitow

Unit 2 - Pelvis

Course objectives:

- To diagnose and treat musculoskeletal dysfunctions in the pelvis, based on the osteopathic understanding of its relations.

Learning outcome:

- To understand the normal and abnormal mechanics in the pelvis through the osteopathic perspective.
- To diagnose and treat musculoskeletal dysfunctions in the pelvic structures.

Module 1 – anatomy and biomechanics review:

- Anatomy review.
- Biomechanics of the sacroiliac joint and the pubic symphysis.
- Mechanics of dysfunction.

Module 2 – osteopathic approach:

- Osteopathic concepts for the diagnosis and treatment of the structures of the pelvis.
- Osteopathic relations.

Module 3 – practice:

- Diagnostic concepts and tests.
- Muscle energy techniques.
- Mobilization techniques.
- Myofascial techniques.
- Listening approaches.

Suggested reading:

- “Greenman’s principles of manual medicine” – L. Destefano
- “Atlas of osteopathic techniques” – A.S. Nicholas
- “Muscle energy techniques” – L. Chaitow
- “Collected papers of Viola Frymann” – V. Frymann
- “Applied anatomy” – M. Clark

Unit 3 - Lumbar Spine

Course objectives:

- To understand the normal and dysfunctional mechanics of the lumbar spine.
- To acquaint the student with the osteopathic understanding of the lumbar spine in the context of its musculoskeletal, visceral, and craniosacral relations.
- To effectively diagnose and treat dysfunctions in the lumbar spine.

Learning outcome:

- To successfully understand the lumbar spine dysfunctions in relation with the musculoskeletal, visceral and craniosacral context.
- To diagnose and treat lumbar spine dysfunctions adequately.

Module 1 – anatomy review and biomechanics:

- Anatomy review of the structures of the lumbar spine.

- b) Biomechanics of the lumbar spine.
- c) Development of the spine in the embryo and infant.

Module 2 – osteopathic approach:

- a) Fryette mechanics.
- b) Postural considerations.
- c) Osteopathic concepts on the lumbar spine.
- d) Musculoskeletal relations.
- e) Visceral relations.
- f) Cranial relations.
- g) Fascial relations.
- h) Osteopathic dysfunctions of the lumbar structures.
- i) Osteopathic approaches for the treatment of lumbar spine dysfunctions.

Module 3 – practice:

- a) Diagnosis of lumbar spine dysfunctions.
- b) Treatment of lumbar spine dysfunctions through mobilization techniques, muscle energy techniques, myofascial techniques and listening techniques.

Suggested reading:

- “Greenman’s principles of manual medicine” – L. Destefano
- “Atlas of osteopathic techniques” – A.S. Nicholas
- “Muscle energy techniques” – L. Chaitow
- “Collected papers of Viola Frymann” – V. Frymann
- “Applied anatomy” – M. Clark

Unit 4 - Cranial 2: reciprocal tension membranes

Course objectives:

- To deepen the understanding of the role of the cranial membranes in the function and dysfunction of the cranial mechanism.
- To introduce the concept of cranial lesions, understand their aetiology, characteristics, and symptomatology, and recognise them in the patient.

Learning outcome:

- To widen the concept of the cranial mechanics by gaining a deeper understanding of the role of the meninges in the mechanism.
- To understand the role of the cranial membranes in cranial dysfunctions, being able to diagnose them in the patient.
- To effectively treat the cranial dysfunctions of flexion, extension, compression, torsion, sidebending rotation, vertical and lateral strains.

Module 1 – reciprocal tension membranes:

- a) Anatomical review of the meninges.
- b) Sutherland’s concept of cranial membranes.

- c) The influence in the cranial mechanism.
- d) The structure-function relationship of the meninges in the skull.
- e) The reciprocal tension membranes and the cerebrospinal fluid fluctuation.

Module 2 – cranial dysfunctions:

- a) The sphenobasilar synchondrosis.
- b) Cranial dysfunctions classification.
- c) Aetiology, pathomechanics, characteristics and symptomatology of flexion dysfunction, extension dysfunction, torsion dysfunction, sidebending rotation dysfunction, compression dysfunction, superior and inferior vertical strain dysfunctions, and lateral strain dysfunction.

Module 3 – practice:

- a) Observation of the facial features in cranial lesions.
- b) Diagnosis through the four quadrants.
- c) Diagnosis through the classical hold.
- d) Flexion lesion treatment. Extension lesion treatment.
- e) Compression lesion treatment.
- f) Torsion lesion treatment.
- g) Sidebending rotation lesion treatment.
- h) Vertical strains treatment. Lateral strains treatment.

Suggested reading:

- “The cranial bowl” – W.G. Sutherland
- “Contributions of thought” – W.G. Sutherland.
- “Osteopathy in the cranial field” - H. Magoun
- “Cranial osteopathy” – T. Liem.
- “Manual of cranial osteopathy” R.H. Lippincott

Unit 5 - Visceral 1: introduction to visceral osteopathy

Course objectives :

- a) To acquaint the student with the history of visceral osteopathy.
- b) To acquaint the student with the scope and applications of osteopathic treatment in the viscera.
- c) To offer an understanding of the circulatory model applied to the treatment of the viscera, along with a set of circulatory techniques.
- d) To offer a practical experience for the palpation of the involuntary motion of most of the organs, that will then be trained and developed along the program.

Learning outcome:

- a) An understanding of the development of visceral osteopathy from a.t. still until our days.
- b) An understanding and experience of circulatory techniques in the context of visceral osteopathy.
- a) An initial understanding of the possibilities of osteopathic treatment applied to organs and glands, coupled with a practical experience in palpation.

Module 1 - introduction to visceral osteopathy:

- a) Brief history of osteopathy in the treatment of the viscera, from the pioneers until present.

- b) Scope and applications of osteopathy in the treatment of organs and glands.
- c) Osteopathic dysfunctions of the organs.
- d) Possible approaches for diagnosis and treatment.
- e) The osteopathic connections of the viscera with the musculoskeletal system and the craniosacral system.

Module 2 - circulatory techniques:

- a) Basic techniques in support of the lymphatic system and the cardiovascular system, in the context of visceral osteopathy.
- b) Applications and contraindications. Practice.

Module 3 - palpation of organs:

- a) Review of the embryological development of the different organs and its application in osteopathic palpation.
- b) Understanding of the primary respiratory motion in visceral osteopathy.
- c) Practical experience of the palpation of the motility of the liver, stomach, jejunum, ileum, uterus, ovaries, spleen, kidneys, lungs. Mobility of the liver and the stomach.

Suggested reading:

- “Osteopathy research and practice” - A.T. Still
- “The philosophy and mechanical principles of osteopathy” - A.T. Still
- “Visceral manipulation in osteopathy” – E. Hebben.
- “Visceral manipulation” – J.P. Barral.
- “Visceral manipulation 2” – J.P. Barral.
- “Trauma and osteopathic approach” - J.P. Barral.
- “Understanding the message of your body” - J.P. Barral

Examination and marks distribution:

Total marks – 150

Internal Assessment - 40 marks

Mid semestral examination – **40 marks**

End of term examination-110 marks

- Theory– 60 marks
- Practical – 50 marks

SEMESTER 2									
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Examination and Marks Distribution				
					Internal Assessment		End Term Examination		Total Points
					Mid semester Exam	Assignment	Theory	Practical	
CC-6	Anatomy –3	BOS201	6	2T/4P	15	5	30	100	150
CC-7	Physiology – 2	BOS202	5	4T/1P	30	10	60	25	125
CC-8	Biomechanics – 1	BOS203	5	4T/1P	30	10	60	25	125
CC-9	Sociology and Nutrition	BOS204	3	3T/0P	30		45		75
CC-10	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 2	BOS205	6	4T/2P	40		60	50	150
Total Credits of Semester 2			25	Total Points of Semester 2			625		

3rd semester

Course: Anatomy – 4
Course Code: BOS 301
Credit - 6

The goal of this curriculum is for the students to have a thorough knowledge on the gross anatomy, microscopic anatomy, and developmental processes pertaining the gastro intestinal, renal, reproductive, endocrine and autonomic nervous systems.

Objectives

Knowledge: at the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Comprehend the normal disposition; inter relationships, gross, functional, developmental, histological and applied anatomy of the abdominal viscera.
- Endocrine system and autonomic nervous system.

Skills: by completion of the subject the students should be capable of:

- Identifying the position, relationships, neurovasculature of the abdominal viscera.
- Identifying the histological structure of the above mentioned systems.

Course content

Theory

Gastro intestinal system

- a) Position, extent, parts, relations, blood supply, nerve supply, lymphatic drainage and sphincters of the gastrointestinal system.
- a) Sphincteric action including functional implications.
- b) Histological features and their variation along the gastro intestinal tract – mouth to anus.
- c) Developmental anatomy of the individual organs of the gastro intestinal system in detail.

Excretory system

- a) Parts, position, relations, blood supply, nerve supply and lymphatic drainage of the kidneys, ureter, urethra and urinary bladder.
- b) Innervation of urinary bladder in detail.
- c) Histological features and their variation along the urinary tract including kidney.
- d) Developmental anatomy of the individual organs of the excretory system in detail.

Reproductive system

- a) Parts, position, relations, blood supply, nerve supply and lymphatic drainage of the uterus, cervix, vagina, ovary, ovarian duct, testes, epididymis, seminal vesicle, ductus deferens, prostate, scrotum and penis.
- b) Histological features and their variation along the male and female genital tracts.
- c) Developmental anatomy of the individual organs of the reproductive system in detail.

Endocrine system

- a) Various endocrine glands, their location, relations, blood supply, nerve supply and lymphatic drainage.
- b) Clinical manifestations of common endocrine disorders.
- c) Histological features and their variation among various endocrine glands.
- d) Developmental anatomy of the individual endocrine glands in detail.

Autonomic nervous system

- a) Sympathetic nervous system –preganglionic and postganglionic sympathetic fibres, sympathetic chain of ganglia.
- b) Parasympathetic nervous system –preganglionic and postganglionic fibres parasympathetic fibres, parasympathetic ganglia.
- c) Developmental anatomy of the autonomic nervous system.

Practicals

- a) Gastro intestinal system - study of a prosected digestive tract from the mouth to anus, liver, pancreas, spleen along with their relations and neurovasculature.
Observation of histological features of gastro intestinal tract.
- b) Excretory system -study of a prosected urinary tract which includes kidneys, ureters, urinary bladder and urethra along with their relations and neurovasculature. Observation of histological features of urinary tract.
- c) Reproductive system –study of male and female reproductive structures along with their relations and neurovasculature. Observation of histological features of reproductive tract.
- d) Endocrine system –study of prosected parts of endocrine glands along with histology.
- e) Autonomic nervous system –study of a prosected part of spinal column with sympathetic chain of ganglia, white and grey rami, sacral plexus, visceral plexus.

Recommended literature:

- “Gray’s anatomy (35th british edition)” - H. Gray
- “Clinical anatomy for medical student (6th edition)” - R. Snell
- “Cunningham’s manual of practical anatomy” - G.L. Romanes
- "Surface and radiological anatomy” - A. Halim
- “Histology: a text & atlas” - M. Ross
- “Textbook of human histology” - I. Singh
- “Medical embryology” J. Langman
- “Surface and radiological anatomy” - Halim
- “Atlas of human anatomy” - F. Netter
- “Applied anatomy” - M. Clark

Examination and marks distribution

Total marks - 150

Internal Assessment – 20 marks

- Mid semester examination - 15 marks
- Assignments and other – 5 marks

End of term examination

- Theory– 30 marks
- Practical – 100 marks

Course: Physiology – 3

Course Code: BOS 302

Credit - 4

The main goal of this curriculum is to provide a strong foundation in understanding the regulation of water and electrolytes through the kidney and skin, hormonal regulation in the body and reproductive physiology. This semester also introduces the students to neurophysiology.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Renal physiology –process of urine formation and micturition with its nervous regulation.
- Functions of skin as an excretory organ and synthesis of melanin.
- Endocrinal physiology.
- Physiology of reproduction – male and female.
- Introduction to neurophysiology.

Skills:

By completion of the subject the students should be capable of:

- Perform tests to elicit human reflexes.
- identify symptoms and signs of hormonal imbalances.

Course content

Theory

Renal physiology and skin

Must know

- a) Renal hemodynamics and glomerular filtration.
- b) Renal tubular function – i.
- c) Renal tubular function – ii.
- d) Regulation of renal function.
- e) Physiological basis of renal function tests.
- f) Micturition.
- g) Functions of the integumentary system.
- h) Melanin synthesis and functions.

Endocrinology

Must know

- a) Introduction.
- b) Endocrine functions of hypothalamus – releasing of hormones and mechanisms of their actions.
- c) Anterior pituitary hormones: functions, regulation, disorders.
- d) Posterior pituitary hormones (adh, oxytocin): functions, regulation, disorders.
- e) Thyroid hormone: synthesis, fate, functions, regulation, disorders.
- f) Parathyroid hormone: synthesis, functions, regulation, disorders –tetany.

- g) Hormones of the adrenal cortex and medulla: secretion, functions, regulation, disorders.
- h) Pancreatic hormones: secretion, functions, regulation, disorders.

Desirable to know

- a) Radio-immuno assays.

Body temperature regulation

Must know

- a) Homoeothermia –internal regulation of body temperature.

Desirable to know

- a) Hyperthermia and hypothermia.

Reproduction

Must know

- a) Introduction to the reproductive system.
- b) Male reproductive physiology.
- c) Female reproductive physiology.
- d) Hypothalamic–pituitary–gonadal axis.
- e) Puberty.
- f) Pregnancy.
- g) Parturition and lactation.
- h) Reproductive ageing.
- i) Contraception.

Desirable to know

- a) Sex chromosomes: barr bodies.
- b) Development of genitals & gonads
- c) Precocious & delayed puberty.

Introduction to neurophysiology

- a) Introduction to neurophysiology i – organization of the nervous system, receptors.
- b) Introduction to neurophysiology ii – reflexes (definition, classification, reflex arc & its components, properties). Stretch reflex and inverse stretch reflex. Polysynaptic reflexes: withdrawal reflex.
- c) Cerebrospinal fluid.
- d) Synaptic transmission.
- e) Properties of synaptic transmission.
- f) Neuro-transmitters.

Practicals

- a) Elicitation of superficial and deep tendon reflexes.
- b) Identify symptoms of hormonal imbalance in charts.

Recommended literature:

- "Understanding medical physiology" - R.L. Bijlani
- "Review of medical physiology" - W.F. Ganong.
- "Textbook of medical physiology" - A.C. Guyton.

Examination and marks distribution

Total marks - 100

Internal assessment – 40 marks

- Mid semester examination - 30 marks
- Assignments and others – 10 marks

End of term examination – 60 marks

Theory – 60 marks

Course: Biomechanics – 2

Course Code: BOS 303

Credit - 5

Course objectives:

- Comprehend the biomechanical perspective of structure and function of parts of the musculoskeletal system in relevance to osteopathy.
- Correlate the knowledge gained in understanding the biomechanical aspect of an osteopathic dysfunction and its treatment.

Learning outcomes:

- Understanding, analyzing and implementing in osteopathic practice the biomechanical concepts of the lower extremity, the upper extremity and the thoracic cage in osteopathic practice.
- Gaining and implementing the knowledge on posture and gait in the osteopathic diagnosis and treatment.

Module 1: Biomechanics of the lower extremity

Hip Complex. Knee Complex. Ankle and foot complex.

Module 2: Biomechanics of the upper extremity

Shoulder complex. Sternoclavicular joint. acromioclavicular joint. Coracoclavicular joint. Scapulothoracic joint. Glenohumeral joint. Elbow complex. Wrist and hand complex.

Module 3: Biomechanics of the thoracic cage

General Structure and function. Arthrokinematics and osteokinematics of the thoracic cage. Structures involved in respiration. Mechanics of respiration. Phases of respiration. Diaphragmatic and thoracic breathing. Muscles of respiration. Diaphragm: structure, function and biomechanical analysis.

Module 4: Gait

Normal gait and its determinants. Gait parameters: Kinetic, kinematics, and time-space. Pathological gait. Limb length discrepancy.

Module 5: Posture

Postural development. Factors affecting posture. Kinetics and kinematics of posture. Analysis of posture: standing, forward flexion, sitting, supine lying, and prone lying. Effects of age, gender, occupation, pregnancy and recreation on posture.

Module 6: Practical

Biomechanical analysis of the lower extremity, the upper extremity and the thoracic cage.
Examination and analysis of posture. Examination and analysis of gait.

Recommended literature:

- “Joint structure and function – a comprehensive analysis” - P. Levangie
- “Clinical kinesiology (5th edition)” - Brainstorm
- “Clinical kinesiology for physical therapist assistants” - S. Lippert
- “The physiology of joints” I. Kapandji
- “Clinical biomechanics of the spine” - A. White
- “Biomechanics - principles and practices” - D. Peterson
- “Basic biomechanics” - S. Hall
- “Kinesiology: the mechanics and pathomechanics of human movement” – C. Oatis

Examination and marks distribution**Total marks - 125****Theory:****• Internal Assessment – 40 marks**

Mid Semester examination - 30 marks

Assignment - 10 marks

• End of term examination - 85 marks

Theory - 60 marks

Practical – 25 marks

Course: Pathology – 1

Course code : BOS 304

Credit: 3

The goal of this curriculum is for the students to understand the general pathological processes that take place in the course of the disease. This subject focuses on important disease processes of the cardiovascular, respiratory and excretory systems.

OBJECTIVES

Knowledge: At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

1. Concept of cell injury and changes produced thereby in different tissues and organs.
2. Concept of cell repair -body's capacity of healing.
3. Normal homeostatic mechanisms, the derangement of these mechanisms and the effects on human systems.
4. Etiopathogenesis, pathological effects and clinico-pathological correlation of common infectious and non- infectious diseases.
5. Concept of neoplasia, neoplastic changes in the body in order to appreciate need for early diagnosis and refer for further management of neoplasia.
6. Common immunological disorders and their resultant effects on the human body.
7. Correlate normal and altered morphology (gross and microscopic) of different organ systems (cardiovascular, respiratory and excretory) studied in the current semester in different diseases to the extent needed for understanding of disease processes and their clinical significance.

Skills:

1. Identify through the clinical signs those conditions in which Osteopathy will not be the main treatment.
2. Identify those clinical cases in which the referral to another stream of medicine is imperative.
3. Identify and interpret the gross features of common disorders.

COURSE CONTENT

THEORY

General pathology

Cell injury

- a. Cell injury: causes and mechanism: ischemic, toxic.
- b. Reversible cell injury: types, morphology: Swelling, vacuolation, hyaline, fatty changes.
- c. Irreversible cell injury: types of necrosis.
- d. Apoptosis and its relevance.

Amyloidosis and calcification

- a. Calcification: dystrophic and metastatic.
- b. Amyloidosis: classification, pathogenesis, morphology.

Inflammation and repair

- a. Acute inflammation: features, causes, vascular and cellular events.
- b. Morphologic variants of acute inflammation.
- c. Inflammatory cells and mediators.
- d. Chronic inflammation: causes, types, nonspecific and granulomatous with examples.
- e. Wound healing by primary and secondary union, factors promoting and delaying the process.
- f. Healing at specific sites including bone healing.

Circulatory disturbances

- a. Edema: pathogenesis and types.
- b. Chronic venous congestion: pathogenesis and changes in lung, liver, spleen.
- c. Thrombosis and embolism: formation, fate and effects.
- d. Infarction: types, common sites, gangrene.
- e. Shock: pathogenesis, types, morphologic changes.
- f. Derangements of fluid and electrolyte imbalance.

Growth disturbances and neoplasia

- a. Atrophy, hypertrophy, hyperplasia, hypoplasia, metaplasia, malformation, agenesis, dysplasia.
- b. Neoplasia: classification, histogenesis, biologic behaviour: benign and malignant; carcinoma and sarcoma.
- c. Malignant neoplasia: grades and stages, local and distant spread.
- d. Carcinogenesis: environmental carcinogens, chemical, viral, occupational, heredity and cellular oncogenes.
- e. Tumour and host interactions: systemic effects including paraneoplastic syndromes, tumour immunology.
- f. Laboratory diagnosis: cytology, biopsy, tumour markers.

Immunopathology

- a. Immune system: organisation, cells, antibodies and regulation of immune responses.
- b. Hypersensitivity: types and examples, antibody and cell mediated tissue injury with examples.
- c. Primary immunodeficiency.
- d. Secondary immunodeficiency including HIV Infection.
- e. Auto-immune disorders like systemic lupus erythematosus; organ specific and non-organ specific such as polyarteritis nodosa, Hashimoto's disease.
- f. Tumour immunity.
- g. Organ transplantation: immunologic basis of rejection and graft versus host reaction.

Infectious diseases

- a. Mycobacterial diseases: tuberculosis and leprosy.
- b. Bacterial diseases: pyogenic, typhoid, diphtheria, gram negative infection, bacillary dysentery, syphilis.
- c. Viral: polio, herpes, rabies, measles; rickettsia, chlamydial infection.
- d. Fungal diseases and opportunistic infections.
- e. Parasitic Diseases: malaria, filaria, amebiasis, kala-azar, cysticercosis, hydatid.
- f. AIDS: aetiology, modes of transmission, diagnostic procedures and handling of infected material and health education.

Miscellaneous disorders

- a. Autosomal and sex-linked disorders with examples.
- b. Metabolic disorders.
- c. Protein energy malnutrition and vitamin deficiency disorders.
- d. Radiation injury.
- e. Disorders of pigment and mineral metabolism such as bilirubin, melanin, hemosiderin.

Systemic pathology

Cardiovascular pathology

- a. Rheumatic fever and Rheumatic heart disease: pathogenesis, morphology and effects.
- b. Infective endocarditis: causes, pathogenesis and morphology.
- c. Atherosclerosis and ischemic heart disease; myocardial Infarction.
- d. Diseases of blood vessels other than atherosclerosis.
- e. Hypertension and hypertensive heart disease.
- f. Congenital heart disease: ASD, VSD, Fallot's bicuspid aortic valve, PDA.
- g. Pericarditis and other pericardial diseases.
- h. Cardiomyopathy.

Respiratory pathology

- a. Structure of bronchial tree and alveolar walls, normal and altered lung function; concept of obstructive and restrictive lung disorders.
- b. Inflammatory diseases of bronchi: chronic bronchitis, bronchial asthma, bronchiectasis, chronic obstructive lung disease.
- c. Pneumonias: lobar, broncho, interstitial.
- d. Pulmonary suppuration including lung abscess: etiopathogenesis and morphology.
- e. Pulmonary tuberculosis: primary and secondary, morphologic types including pleuritis.
- f. Emphysema: types, pathogenesis.
- g. Atelectasis and hyaline membrane disease.
- h. Tumors: benign; carcinoid, malignant; squamous cell, oat cell, adeno, etiopathogenesis.
- i. Occupational lung disorders: anthracosis, silicosis, asbestosis, mesothelioma.

Urinary tract pathology

- a. Renal structure, basis of impaired function, urine analysis.
- b. Glomerulonephritis: classification, primary proliferative and non proliferative.
- c. Secondary glomerulonephritis: SLE, purpura, polyarteritis, amyloidosis, diabetes.
- d. Nephrotic syndrome.
- e. Acute renal failure: acute tubular and cortical necrosis.
- f. Progressive renal failure and end stage renal disease.
- g. Pyelonephritis, reflux nephropathy, interstitial nephritis.
- h. Renal tumours: renal cell carcinoma, nephroblastoma.
- i. Renal vascular disorders, kidney changes in hypertension.
- j. Urinary bladder: cystitis, carcinoma.
- k. Urinary tract tuberculosis.

1. Urolithiasis and obstructive uropathy.
- m. Renal malformations: polycystic kidneys.

Suggested reading:

1. Pathologic Basis of Diseases (7th edition). Robins and Cotran. Elsevier.
2. Text-Book of Pathology (7th edition). Harsh Mohan.
3. Essential Immunology (8th edition). Ivan Roitt. Blackwell Scientific Publications.
4. General Pathology (7th edition). Walter and Israel. Elsevier.

EXAMINATION AND MARKS DISTRIBUTION

Total marks - 75

Internal Assessment – 30 marks

Mid semester – 20 marks

Assignments and others -10 marks

End of term examination – 45 marks

Theory– 45 marks

Course: Osteopathic treatment: philosophy, concepts, evaluation, and techniques 3

Course Code: BOS 305

Credit - 6

Unit 1 - Lower Limb

Course objectives:

- To diagnose and treat musculoskeletal dysfunctions in the lower limb, based on the osteopathic understanding of its relations.

Learning outcome:

- To understand the normal and abnormal mechanics in the lower limb structures through the osteopathic perspective.
- To diagnose and treat musculoskeletal dysfunctions in the lower limb structures.

Module 1 – Anatomy and Biomechanics review:

- a) Anatomy review.
- b) Review of the biomechanics of the hip joint, knee, ankle and joints of the foot.

Module 2 – Osteopathic approach:

- a) Osteopathic concepts for the diagnosis and treatment of the osseous, muscular, connective tissue and nervous structures of the lower limb.
- b) Osteopathic relations.

Module 3 – Practice:

- a) Diagnostic concepts and assessments.
- b) Muscle energy techniques.
- c) Mobilization techniques.
- d) Myofascial techniques.
- e) Listening treatments.

Suggested reading:

- “Greenman’s principles of manual medicine” – L. Destefano
- “Atlas of osteopathic techniques” – A.S. Nicholas
- “Muscle energy techniques” – L. Chaitow
- “Collected papers of Viola Frymann” – V. Frymann
- “Applied anatomy” – M. Clark

Unit 2 - Cranial 3: ethmoid, frontal, parietal

Course objectives:

- To deepen the understanding of the principles of osteopathy in the cranial field.
- To provide the palpation skills needed to relate with the physiologic and non-physiologic expressions of the cranial mechanism in the frontal bone, the parietal bones, the ethmoid bone, and the connective tissue structures related to them.

Learning outcome:

- A deepened understanding of the dynamics of the primary respiratory movement and its effect on the cranial mechanism.
- To understand the cranial mechanics in physiologic and non-physiologic situations related to the covered structures.

Module 1 – anatomy review:

- a) Anatomy of the covered cranial bones and meninges along with its osteopathically related vascular and nervous structures.

Module 2 – cranial osteopathy theory:

- a) Concept of fulcrum.
- b) Implications of Sutherland's philosophy in cranial osteopathy.

Module 3 – practical:

- a) Diagnosis and treatment of the frontal bone, the parietal bones, the ethmoid bone and their connective tissue related structures.
- b) The occipitomastoid junction, the jugular foramen, diagnosis and treatment.
- c) Diagnosis and treatment through the cranial approach of the clavicle, the scapula, the humerus, the radio and the ulna.

Suggested reading:

- "The cranial bowl" – W.G. Sutherland
- "Contributions of thought" – W.G. Sutherland.
- "Osteopathy in the cranial field" - H. Magoun
- "Cranial osteopathy" – T. Liem.
- "Manual of cranial osteopathy" R.H. Lippincott

Unit 3 - High Velocity Low Amplitude 1: pelvis and lower limb**Course objectives:**

- To acquaint the student with the principles of HVLA techniques
- To acquaint the student with the applications and contraindications of HVLA techniques
- To diagnose and treat osteopathic dysfunctions in the pelvic and lower limb joints through HVLA techniques

Learning outcome:

- To develop an understanding of the scope, limitations and application of HVLA techniques in the pelvis and lower limb.
- To effectively treat osteopathic dysfunctions in the sacroiliac joint, knee joint, talus, navicular, cuboid, and metatarsal bones through HVLA techniques.

Module 1 – introduction:

- a) History of HVLA techniques
- b) Mechanisms of action
- c) Scope and applications of HVLA techniques
- d) Contraindications of HVLA techniques

Module 2 – pelvis and lower limb review:

- a) Review of the biomechanics of the pelvic and lower limb joints
- b) Review of the surface anatomy and palpation of the pelvis and lower limb landmarks
- c) Review of the osteopathic assessment and mobilisations of the pelvis and lower limb

Module 4 – practice:

- a) HLVA techniques for sacroiliac, iliosacral, and pubic dysfunctions
- b) HLVA techniques for proximal tibiofubular and distal tibiofular dysfunctions
- c) HVLA technique for dysfunctions of the talus, navicular, cuboid and metatarsal dysfunctions.

Unit 4 - Thoracic Spine

Course objectives:

- To understand the mechanics of the thoracic spine.
- To acquaint the student with the osteopathic understanding of the thoracic spine in the context of its musculoskeletal, visceral, and craniosacral relations.
- To comprehend, diagnose and treat dysfunctions in the thoracic spine.

Learning outcome:

- To successfully understand the thoracic spine dysfunctions while comprehending its musculoskeletal, visceral and craniosacral connections.
- To effectively diagnose and treat thoracic spine dysfunctions.

Module 1 – anatomy review and biomechanics:

- a) Anatomy review and biomechanics of the thoracic spine.

Module 2 – osteopathic concepts:

- a) Fryette mechanics on the thoracic spine.
- b) Postural considerations. Osteopathic concepts on the thoracic spine.
- c) Musculoskeletal relations of the thoracic spine.
- d) Visceral relations. Cranial relations. Fascial relations.
- e) Osteopathic dysfunctions of the thoracic structures.

Module 3 – practice:

- a) Diagnosis of thoracic spine dysfunctions.
- b) Treatment of thoracic spine dysfunctions through mobilization techniques, muscle energy techniques, myofascial techniques and listening techniques.

Suggested reading:

- “Greenman’s principles of manual medicine” – L. Destefano
- “Atlas of osteopathic techniques” – A.S. Nicholas
- “Muscle energy techniques” – L. Chaitow
- “Collected papers of Viola Frymann” – V. Frymann
- “Applied anatomy” – M. Clark

Unit 5 - Ribs**Course objectives:**

- To understand the mechanics of the ribs and the importance of their function in ventilation.
- To understand the osteopathic relations of the ribs in the musculoskeletal, visceral and craniosacral fields.
- To diagnose and treat rib dysfunctions.

Learning outcome:

- To considerate rib dysfunctions in the context of osteopathic diagnosis, by identifying lesional chains from and to the related musculoskeletal, visceral and fascial structures.
- To effectively diagnose and treat rib dysfunctions.

Module 1 – anatomy review and biomechanics:

- a) Anatomy and biomechanics review of the rib cage.

Module 2 – osteopathic approach:

- a) Visceral connections to the ribs and sternum.
- b) Musculoskeletal connections.
- c) Postural considerations of distortions in the structure of the rib cage.

Module 3 – practice:

- a) Diagnosis of the costovertebral joints, costochondral joints, sternochondral joints.
- b) Chapman neuro lymphatic reflexes.
- c) Mobilization techniques.
- d) Muscle energy techniques.
- e) Listening treatments.
- f) Myofascial techniques.
- g) Practical integration of the ribs with their musculoskeletal and visceral relations.

Suggested reading:

- “Greenman’s principles of manual medicine” – L. Destefano
- “Atlas of osteopathic techniques” – A.S. Nicholas
- “Muscle energy techniques” – L. Chaitow
- “Collected papers of Viola Frymann” – V. Frymann
- “Applied anatomy” – M. Clark

Examination and marks distribution:

Total marks - 150

Internal Assessment – 40 marks

Mid semester examination - 40 marks

End of term examination-110 marks

- Theory – 60 marks
- Practical – 50 marks

Applied clinical osteopathic technique-1 (50 hrs)

SEMESTER 3									
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Examination and Marks Distribution				
					Internal Assessment		End Term Examination		Total Points
					Mid semester Exam	Assignment	Theory	Practical	
CC-11	Anatomy – 4	BOS301	6	2T/4P	15	5	30	100	150
CC-12	Physiology – 3	BOS302	4	4T/0P	30	10	60		100
CC-13	Biomechanics – 2	BOS303	5	4T/1P	30	10	60	25	125
CC-14	Pathology -1	BOS304	3	3T/0P	20	10	45		75
CC-15	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 3	BOS305	6	4T/2P	40		60	50	150
	Applied Clinical Osteopathy Technique -1		50 hrs						
Total Credits of Semester 3			24		Total Points of Semester 3			600	

4th semester

Course: Neuroanatomy

Course Code: BOS 401

Credit - 4

The goal of this curriculum is for the students to have thorough knowledge on the gross, microscopic and developmental anatomy of the central nervous system, sensory organs and cranial nerves.

Objectives

Knowledge:

- At the end of the subject the student should be capable of expressing his/her understanding on the normal disposition, inter relationships, gross, functional, developmental, microscopic and applied anatomy of central nervous system and special senses and cranial nerves.

Skills:

- By completion of the subject the students should be capable of identifying different parts of the brain and the spinal cord, as well as the cranial and spinal nerves.
- Identifying the histological structure of the nervous tissue of the brain, the spinal cord and the cranial and spinal nerves.

Course content

Theory

Central nervous system

Position, relations, blood supply, histology and embryology of the different components of the central nervous system.

- a) Parts of the nervous system, neuron, nerve terminals, neuro glia, myelination, degeneration and regeneration.
- b) Meninges and cerebrospinal fluid.
- c) Spinal cord.
- d) Brain stem.
- e) Cerebellum.
- f) Cortex.
- g) White matter.
- h) Ventricles.
- i) Deep nuclei.
- j) Diencephalon.
- k) Limbic system.
- l) Integration of motor and sensory pathways.

Special senses

- a) Olfaction and olfactory nerve (CN I) – excluding the gross anatomy of nose (covered in anatomy 2).
- b) Gustation – excluding tongue, its musculature, blood supply and lymphatic drainage (covered in anatomy 2).
- c) Vision and optic nerve (CN II) – visual pathway with anatomy of the layers of the eye ball (gross anatomy, relations, neurovasculature, histology and embryology of orbit, extra-ocular muscles are covered in anatomy 2).
- d) Hearing and equilibrium, vestibulocochlear nerve (CN VIII) –including the anatomy of the internal ear (external ear and middle ear are covered in anatomy 2).

Cranial nerves

- a) Cranial nerves – III, IV, VI.
- b) Cranial nerve V.
- c) Cranial nerve VII.
- d) Cranial nerve X.
- e) Cranial nerves IX, XI, XII.

Practicals

- a) Study of the following structures in gross specimens:
 - i. Cerebrum.
 - ii. Cerebellum and brain stem.
 - iii. Meninges and spinal cord.
 - iv. Motor and sensory pathways.
- b) Demonstration of the visual system, the auditory and vestibular pathways, and all the cranial nerve pathways in prosected specimens.
- b) Observation of stained sections of the brain and spinal cord at various levels to demonstrate cranial nerve nuclei, ascending and descending tracts, thalamic nuclei and important functional areas.

Recommended literature:

- “Gray’s anatomy (35th british edition)” - H. Gray
- “The human nervous system”- Murray
- “Neuroanatomy: an illustrated color text” - Crossman
- “Clinical anatomy for medical student (6th edition)” - R. Snell
- “Cunningham’s manual of practical anatomy” - G.L. Romanes
- "Surface and radiological anatomy" - A. Halim
- “Histology: a text & atlas” - M. Ross
- “Textbook of human histology” - I. Singh
- “Medical embryology” J. Langman
- “Surface and radiological anatomy” - Halim
- “Atlas of human anatomy” - F. Netter
- “Applied anatomy” - M. Clark

Examination and marks distribution

Total marks - 100

Internal Assessment– 20 marks

- Mid semester examination - 15 marks
- Assignments and others – 5 marks

End of term examination-80 marks

- Theory – 30 marks
- Practical – 50 marks

Course: Neurophysiology

Course Code: BOS 402

Credit - 3

The main goal of this curriculum is to provide a strong foundation in the discipline of neurophysiology for the students of osteopathy. The contents in this curriculum shall be paired in time with those in neuroanatomy, enabling an integrated learning process.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Physiology of sensory perception and motor coordination through the ascending and descending tracts.
- Physiology of the senses -sight, smell, hearing and taste.

Skills:

By completion of the subject the students should be capable of:

- Demonstrating a general and clinical examination of the nervous system.
- Demonstrating experiments to test the senses and the cranial nerves.

Course content

Theory

Sensory System

Must know

- a) Coding of sensory information.
- b) Functional organization of ascending sensory pathways.
- c) Thalamus.
- d) Sensory cortex.
- e) Perception of sensory stimuli.
- f) Physiology of pain.

Motor System

- a) Characteristics and properties of reflexes.
- b) Functional organization of motor system – i.
- c) Functional organization of motor system – ii.
- d) Brain stem reflexes, stretch reflexes and tendon reflexes.
- e) Basal ganglia.
- f) Cerebellum.
- g) Vestibular neck reflexes: maintenance of equilibrium.
- h) Localizing the level of lesion in neurological disease.

Special Senses

Must know

- a) Functional anatomy of eye.
- b) Pupillary reflexes, accommodation reaction, errors of refraction and their correction.
- c) Retina: function of photoreception.
- d) Retina: function of colour vision.
- e) Central mechanisms of vision and visual perception.
- f) Functional anatomy of ear: impedance matching.
- g) Organ of corti: peripheral auditory mechanism.
- h) Auditory pathway.
- i) Central auditory mechanism and auditory perception.
- j) Olfaction.
- k) Physiology of taste.
- l) Cranial nerves.

Practicals

- a) Examination of nervous system including cranial nerves.
- b) Perimetry: mapping of visual field.
- c) Blind spot in the field of vision.
- d) Demonstration of conduction of sound with tuning fork.
- e) Demonstration of vestibulo-ocular reflex (v.o.r) by caloric stimulation.

Recommended literature:

- "Understanding medical physiology" - R.L. Bijlani
- "Review of medical physiology" - W.F. Ganong.
- "Textbook of medical physiology" - A.C. Guyton.

Examination and marks distribution

Total marks – 75 marks

Internal Assessment– 20 marks

- Mid semester examination - 20 marks

End of term examination

- Theory– 30 marks
- Practical – 25 marks

Course : Communication Skills

Course code: BOS 403

Credit: 4

(AECC- I)

Goals: The purpose of this course is to prepare students with basic interpersonal and communication skills needed by the Osteopaths. It will further enable the students to improve quality of Osteopathic practice, education and management.

Learning Outcomes:

After studying all materials and resources presented in the course, the student will be able to:

1. Explain and describe effective and non-effective communication techniques.
2. Differentiate between verbal and non-verbal communication.
3. Identify behaviors that interfere with effective communication.
4. Identify elements of active listening and benefits of professional communication.
5. Perform interview techniques and demonstrate or explain appropriate patient education practices.
6. Identify relationships among various health care professionals and patients of various educational levels.
7. Demonstrate knowledge of various ethnic groups and discuss communication between cultures.
8. Discuss the aspects of electronic communication methods.
9. Demonstrate proper grammar and writing skills.
10. Explain basic psychological principles and developmental stages of life.
11. Demonstrate professionalism of an effective health care provider.

Specific Course Objectives:

After studying all materials and resources presented in the course, the student will be able to:

Chapter 1

1.1. Purpose of communication, 1.2. Definition of communication, 1.3 Types of communication, 1.4 Barriers of Communication, 1.5. Establishment of successful health communication, 1.5.1. Health Infrastructure at Subcentre Level, 1.5.2. Health Infrastructure at of Primary Health Centres, 1.5.3. Health Infrastructure at Community Health Centres, 1.5.4 Health Infrastructure at District/ Regional/Central Hospitals, 1.5.5. Linkages Between Various Components of Health System, 1.5.6. Art of observing and listening to communication.

Chapter 2

2.1 Introduction, 2.1.1. Health education, 2.1.2. Aims and Objectives of Health Education, 2.1.3. Process of Change/ Modification of Health Behaviour, 2.1.4. Changing Nature of Health Education, 2.2. Scope of Health Education, 2.3. Health Education Providers, 2.4. Levels and Approaches of Health Education, 2.5. Principles of health education.

Chapter 3

3.1. Counselling and Guiding, 3.1.2. Definitions, 3.1.3. Characteristics of Counselling, 3.1.3. Objectives of Counselling, 3.1.4. Purposes of Counselling, 3.2 Basic Principles of Counselling, 3.3 Types of Counselling Approach, Role of a Counsellor, 3.5. Qualities of a Counsellor, 3.6 Preparation of Counsellor, 3.7. Phases of Counselling, 3.8. Techniques of Counselling, 3.9 Important points to consider in Counselling, 3.10. Tools in Counselling.

Chapter 4

4.1. Methods of Health Education, 4.2. Types of Media, 4.2.1. Blackboard, 4.2.2. Chart, 4.2.3. Flash Cards, 4.2.4. Flip chart, 4.2.5. Posters, 4.2.6. Bulletin Board, 4.2.7. Cartoon, 4.2.8. Objects, Specimens and Models, 4.2.9. Written handouts, 4.2.10. Slides, 4.2.11. Powerpoint Presentation, 4.2.12. Films, 4.2.13. Brochures and Handouts, 4.2.14. School Health Programme, 4.2.15. Internet Sources of Health Education.

EXAMINATION AND MARKS DISTRIBUTION Total marks - 100

Internal assessment – 40 marks

Mid Term Examination-30 marks

Assignment – 10 marks

End term examination – 60 marks

Theory – 60 marks

Course: Pathology – 2

Course code: BOS 404

Credit: 3

The goal of this curriculum is for the students to understand the general pathological processes that take place in the course of the disease. This subject focuses on important disease processes of the gastrointestinal system, blood, liver, lymphoreticular system, reproductive system, bones, endocrine system, and nervous system.

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

1. Correlate normal and altered morphology (gross and microscopic) of different organ systems (gastro intestinal, hepatobiliary, circulatory, reproductive, endocrine, nervous and bone) to the extent needed for understanding of the disease processes and their clinical significance.
2. Common immunological disorders and their effects on human systems.
3. Common hematological disorders and interpretation of the necessary investigations to diagnose them and determine their prognosis.

Skills:

1. Identify through the clinical signs those conditions in which Osteopathy will not be the main treatment for that clinical case.
2. Identify those clinical cases in which the referral to another stream of medicine is imperative.
3. Identify and interpret the gross features of common disorders.

COURSE CONTENT

THEORY

Systemic pathology

Pathology of the Gastro-Intestinal Tract

- a. Oral pathology: leucoplakia, carcinoma oral cavity and oesophagus.
- b. Salivary gland tumors: mixed, adenoid cystic, Warthin's.
- c. Peptic ulcer: etiopathogenesis and complications, types of gastritis.
- d. Tumors of stomach: benign: polyp, leiomyoma. Malignant: adenocarcinoma, lymphoma.
- e. Inflammatory diseases of small intestine: typhoid, tuberculosis, Crohn's, appendicitis.
- f. Inflammatory diseases of appendix and large intestine: amoebic colitis, acillary dysentery, ulcerative colitis.
- g. Ischemic and pseudomembranous enterocolitis, diverticulosis.
- h. Malabsorption: celiac disease, tropical sprue and other causes.
- i. Tumours and tumour like condition of the large and small intestine: polyps, carcinoid, carcinoma, lymphoma.
- j. Pancreatitis.
- k. Pancreatic tumors: endocrine, exocrine and periampullary.

Hematopathology

- a. Constituents of blood and bone marrow, regulation of haematopoiesis.
- b. Anaemia: classification and clinical features; clinical and laboratory approach to diagnosis.

- c. Nutritional anaemias: iron deficiency anaemia, folic acid / vitamin B12 deficiency anaemia including pernicious anaemia.
- d. Haemolytic anaemias: classification and investigation.
- e. Hereditary hemolytic anaemias: thalassemia, sickle cell anaemia.
- f. Hereditary hemolytic anaemias: hereditary spherocytosis, G-6-PD deficiency.
- g. Acquired hemolytic anaemias.
- h. Hemolytic anaemias: autoimmune, alloimmune, drug induced microangiopathic and malaria.
- i. Aplastic anaemia, PNH and myelodysplastic syndrome.
- j. Haemostatic disorders: platelet deficiency; ITP, drug induced, secondary.
- k. Coagulopathies: coagulation factor deficiency; haemophilia, DIC and anticoagulant control.
- l. Leukocytic disorders: leukocytosis, leukopenia, leukemoid reaction.
- m. Acute and chronic leukemia: classification, diagnosis.
- n. Myeloproliferative disorders: polycythemia, myelofibrosis.
- o. Multiple myeloma and dysproteinemias.
- p. Blood transfusion: grouping and cross matching, untoward reactions, transmissible infections including HIV and hepatitis.

Liver and biliary tract pathology

- a. Jaundice: types, pathogenesis and differentiation.
- b. Hepatitis: acute and chronic, etiology, pathogenesis and pathology.
- c. Cirrhosis: etiology, postnecrotic, alcoholic, metabolic, pathology, morphology (macronodular, micronodular, mixed) and complications.
- d. Portal hypertension: types including non-cirrhotic portal fibrosis and manifestations.
- e. Tumors of liver: hepatocellular and metastatic carcinoma, tumour markers.
- f. Concept of hepatocellular failure.
- g. Diseases of the gall bladder: cholecystitis, cholelithiasis, carcinoma.

Lymphoreticular system

- a. Lymphadenitis: nonspecific, granulomatous.
- b. Hodgkin's and non-Hodgkin's lymphomas: classification, morphology.
- c. Diseases of the spleen: splenomegaly, causes and effects.
- d. Thymus: dysgenesis, atrophy, hyperplasia, neoplasia.

Reproductive system

- a. Diseases of cervix: cervicitis, cervical carcinoma, etiology, types and cytologic diagnosis.
- b. Hormonal influences and histological appearances of different phases of menstrual cycle and the abnormalities associated with it.
- c. Diseases of uterus: endometritis, endometrial hyperplasia and carcinoma, adenomyosis, smooth muscle tumors.
- d. Trophoblastic disease: hydatidiform mole, choriocarcinoma.
- e. Diseases of the breast: mastitis, abscess, fibrocystic disease, neoplastic lesions: fibroadenoma, carcinoma, phyllodes tumor.
- f. Prostate: nodular hyperplasia and carcinoma.
- g. Ovarian and testicular tumors.
- h. Carcinoma of penis.
- i. Pelvic inflammatory diseases including salpingitis.
- j. Genital tuberculosis.

Osteopathology

- a. Bone – general considerations, reactions to injury and healing of fractures.
- b. Osteomyelitis: acute, chronic, tuberculous, mycetoma.
- c. Metabolic diseases: Rickets/osteomalacia, osteoporosis, hyperparathyroidism.
- d. Tumors: primary, osteosarcoma, osteoclastoma, Ewing's sarcoma, chondrosarcoma; metastatic.
- e. Arthritis: Rheumatoid, osteo and tuberculous.

Endocrine pathology

- a. Scope of endocrine control and investigations.
- b. Diabetes mellitus: types, pathogenesis, pathology.
- c. Nonneoplastic lesions of thyroid: Iodine deficiency goitre, autoimmune thyroiditis, thyrotoxicosis, myxedema.
- d. Tumors of thyroid – adenoma, carcinoma: papillary, follicular, medullary, anaplastic.
- e. Adrenal diseases: cortical hyperplasia, atrophy, tuberculosis, tumors of cortex and medulla.
- f. Parathyroid hyperplasia and tumors and hyperparathyroidism.
- g. Pituitary tumors.
- h. Multiple endocrine neoplasia.

Neuropathology

- a. Structural organization, specific cell types and reaction patterns.
- b. Inflammatory disorders: pyogenic and tuberculous meningitis, brain abscess, tuberculoma.
- c. CNS tumors – primary: glioma and meningioma (excluding histopathology) and metastatic.
- d. CSF and its disturbances: cerebral edema, raised intracranial pressure.
- e. Cerebrovascular diseases: atherosclerosis, thrombosis, embolism, aneurysm, hypoxia, infarction and haemorrhage.
- f. Peripheral neuropathies and demyelinating disorders.
- g. Diseases of muscles.
- h. Traumatic lesions of CNS.

Recommended Literature

1. Pathologic Basis of Diseases (7th edition). Robins and Cotran. Elsevier.
2. Text-Book of Pathology (7th edition). Harsh Mohan.
3. Essential Immunology (8th edition). Ivan Roitt. Blackwell Scientific Publications.
4. General Pathology (7th edition). Walter and Israel. Elsevier.

EXAMINATION AND MARKS DISTRIBUTION

Total marks - 75

Internal Assessment – 30 marks

Mid semester – 20 marks

Assignments and others -10 marks

End of term examination(Theory) – 45 marks

Course: Osteopathic treatment: philosophy, concepts, evaluation, and techniques 4

Course Code: BOS 405

Credit - 6

Unit 1 - Cranial 4: the facial complex

Course objectives:

- To acquaint the student with the osteopathic understanding of the bones of the face complex.
- To understand the restrictions that may be present in the facial mechanism by their symptomatology.
- To understand the relation between dysfunctions of the bones of the face and sphenobasilar synchondrosis dysfunctions.
- To diagnose and treat cranial dysfunctions involving the bones of the face.

Learning outcome:

- To integrate the understanding of the dynamics of the bones of the face with the previous knowledge of the cranial mechanism.
- To adequately diagnose and treat cranial dysfunctions in the fascial sphere.

Module 1 – anatomy review:

- a) Anatomy review of the bones of the face and their sutures.

Module 2 – osteopathic considerations:

- a) The maxilla, zygomatic, nasal bone, palatine and vomer dynamics in Sutherland's cranial concept.
- b) Implications of motion and restrictions of their sutures.
- c) The facial mechanism in expression.
- d) The sinuses in relation to the facial bones.

Module 3 – practice:

- a) Diagnosis and treatment of the maxilla, zygomatic, vomer, palatine and nasal bones and their sutures.

Suggested reading:

- "The cranial bowl" – W.G. Sutherland
- "Contributions of thought" – W.G. Sutherland.
- "Osteopathy in the cranial field" - H. Magoun
- "Cranial osteopathy" – T. Liem.
- "Manual of cranial osteopathy" R.H. Lippincott

Unit 2 - Upper Limb

Course objectives:

- To diagnose and treat musculoskeletal dysfunctions in the upper limb, based on the osteopathic understanding of its relations.

Learning outcome:

- To understand the normal and abnormal mechanics in the upper limb structures through the osteopathic perspective.
- To diagnose and treat musculoskeletal dysfunctions in the upper limb structures.

Module 1 – anatomy and biomechanics review:

- a) Anatomy review.
- b) Biomechanics of the sternoclavicular, acromioclavicular joint, scapulothoracic, glenohumeral, elbow, wrist, and hand's complex joints.

Module 2 – osteopathic approach:

- a) Osteopathic concepts for the diagnosis and treatment of the structures of the upper limb.
- b) Osteopathic relations.

Module 3 – practice:

- a) Diagnostic concepts and assessments.
- b) Muscle energy techniques.
- c) Mobilization techniques.
- d) Myofascial techniques.
- e) Listening treatments.

Suggested reading:

- "Greenman's principles of manual medicine" – L. Destefano
- "Atlas of osteopathic techniques" – A.S. Nicholas
- "Muscle energy techniques" – L. Chaitow
- "Collected papers of Viola Frymann" – V. Frymann
- "Applied anatomy" – M. Clark

Unit 3 – Visceral 3: esophagus, stomach and duodenum**Course objectives:**

- To acquaint the student with the principles of osteopathic diagnosis and treatment of the esophagus, stomach and duodenum.
- To integrate these concepts with their musculoskeletal, visceral and craniosacral relations.

Learning outcome:

- To develop an understanding of the involved organs in the osteopathic visceral approach while considering its musculoskeletal, visceral and craniosacral relations.
- To effectively treat esophagus, stomach and duodenum osteopathic dysfunctions.

Module 1 – Anatomy and Physiology review:

- a) Review of the anatomy and physiology of the esophagus, stomach and duodenum.

Module 2 – Osteopathic considerations:

- a) Esophagus, stomach and duodenum osteopathic considerations.
- b) Musculoskeletal, craniosacral and visceral relations.

Module 3 – practice:

- a) Osteopathic dysfunctions of the esophagus, stomach and duodenum.
- b) Mobility and motility of the esophagus, stomach and duodenum.
- c) Diagnostic methods and assessments.
- d) Treatment of the esophagus, stomach and duodenum dysfunctions through recoil technique, mobilization techniques, functional techniques, myofascial techniques and listening techniques.

Suggested reading:

- “Visceral manipulation in osteopathy” – Eric Hebgén
- “Visceral manipulation” – J.P. Barral
- “Visceral manipulation 2” – J.P. Barral

Unit 4 - Cranial 4: temporomandibular Joint

Course objectives:

- To understand the biomechanics of the temporomandibular joint.
- To understand the anatomical and functional relationships of the temporomandibular joint and its importance in postural integrity.
- To diagnose and treat temporomandibular joint dysfunctions.

Learning outcome:

- To recognize the biomechanics of temporomandibular joint and its dysfunction mechanics.
- To understand the connection between temporomandibular dysfunctions and postural imbalances.
- To effectively diagnose and treat temporomandibular joint dysfunctions.

Module 1 – anatomy review and biomechanics.

- a) Review of the anatomy and biomechanics of the temporomandibular joint.

Module 2 – osteopathic considerations of the temporomandibular joint.

- a) Lesional chains. Morphological parallelism with the pelvis.
- b) The temporomandibular joint as a compensational mechanism.
- c) The temporomandibular joint in postural related imbalances.

Module 3 – practice:

- a) Diagnostic method and assessments of the temporomandibular joint.
- b) Treatment of temporomandibular dysfunctions through functional techniques, myofascial techniques, listening techniques, mobilization techniques.

Suggested reading:

- “The cranial bowl” – W.G. Sutherland
- “Contributions of thought” – W.G. Sutherland.
- “Osteopathy in the cranial field” - H. Magoun
- “Cranial osteopathy” – T. Liem.
- “Manual of cranial osteopathy” R.H. Lippincott

Examination and marks distribution:

Total marks - 150

Internal Assessment – 40 marks

Mid semester examination - 40 marks

End of term examination- 110 marks

- Theory– 60 marks
- Practical – 50 marks

Course: Environmental Studies

Course Code : BOS 406

Credit : 4

(AECC- II)

Learning Outcomes:

After completion of this course successfully the students will be able to:

CO1 Know the environment and the role of human beings in shaping the environment

CO2 Understand various components of the environment

CO3 understand the critical environmental concerns of today

Course Contents

Unit I: Environment – Multidisciplinary nature of Environmental Science; Definition and the components – the physical components, the socio-economic and cultural component, Sustainable development; Natural resources – definition and types, renewable and non-renewable resources, resource use and depletion; The atmosphere – structure and composition, physicochemical role of the atmosphere, radiative balance and earth's temperature regime

Unit II: Rocks and minerals, the rock cycle, biogeochemical cycles, soil- structure and types, land resources, and landforms; Water resources, water bodies and water use, issues with water and conservation; Ecosystems – concepts and structure, diversity and stability, concepts of biomes, biodiversity

Unit III: The urban environment and issues – internal migration, waste generation and management, vehicular traffic, air and water pollution, urban heat island, future of cities, urban green space and aesthetics; concept of smart cities, sustainable cities

Unit IV. Environmental issues – local, regional, and global; Concepts of pollution of air, water, and land, urbanization and solid wastes, biodiversity loss, land degradation and desertification, biodiversity loss, ozone layer depletion, climate change

Suggested reading:

William P. Cunningham, Mary Ann Cunningham, Barbara Woodworth Saigo, Environmental Science: A global concern, McGrawHill 2003

William Cunningham, Mary Cunningham, Principles of Environmental Science: Seventh Edition, McGrawHill 2014

Rogers PP, Jalal, KF, Boyd JA, An introduction to sustainable development, Earthscan

Reference books:

Roosa SA, Sustainable Development Handbook, CRC Press 2008

Atkinson G., Dietz S., Neumayer E., Agarwala M, Handbook of Sustainable Development, Edward Elger, 2014

Robbins P., Hintz J., Moore S.A., Environment and Society: A critical introduction, Wiley Blackwel 2014

EXAMINATION AND MARKS DISTRIBUTION**Total marks - 100****Internal Assessment – 40 marks**

Mid semester – 30 marks

Assignments and others -10 marks

End of term examination (Theory)– 60 marks

Applied clinical osteopathic technique-2 (50 hrs)

SEMESTER 4									
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Examination and Marks Distribution				
				Internal Assessment		End Term Examination		Total Points	
				Mid semester Exam	Assignment	Theory	Practical		
CC-16	Neuroanatomy	BOS401	4	2T/4P	15	5	30	50	100
CC-17	Neurophysiology	BOS402	3	2T/1P	20		30	25	75
AECC-1	Communication Skills	BOS403	4	3T/1P	20	10	45	25	100
CC-19	Pathology -2	BOS404	3	3T/0P	20	10	45		75
CC-20	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 4	BOS405	6	4T/2P	40		60	50	150
AECC-2	Environmental Science	BOS406	4	4T/0P	30	10	60		100
	Applied Clinical Osteopathy Technique-2		50 hrs						
Total Credits of Semester 4			24	Total Points of Semester 4				600	

5th Semester

Course: Orthopaedic and trauma 1

Course Code: BOS 501

Credit - 3

The main goal of this curriculum is to acquire the knowledge and skills required to identify problems that fall under the discipline of orthopaedics and trauma, and to understand them in the context of osteopathic diagnosis and treatment.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Pathological conditions including infections, inflammations, cancerous conditions.
- Metabolic bone disorders.
- Orthopaedic related issues, in children and adults.
- Orthopaedic conditions in specific joints, both traumatic and non-traumatic.

Skills:

By completion of the subject the students should:

- Be able to understand an orthopaedic approach to the diagnosis of all major joints, through orthopaedic assessments.
- Be able to identify orthopaedic conditions through radiological images.
- Identification of clinical signs of cases where the patient requires an orthopaedic diagnosis to rule out contraindications, and referral management.
- Identify red flags where osteopathic treatment is inappropriate, and understand the subsequent referral process.

Course Content

Theory

Basic sciences

- a) Development of the skeleton. Formation and mineralization of bone.
- b) Soft tissue anatomy review -histology, physiology, injury and repair: meniscus, articular cartilage, muscle, tendon, ligament, and nerve.
- c) Bone: histology and histopathology, biophysical properties, physiology of fracture healing, delayed and non-union of bones.
- d) Pathological tests for orthopaedic disorders, tissue diagnosis, synovial fluid analysis, molecular diagnostic methods.
- e) Imaging: application of USG, CT scans, MRI, and nuclear medicine in orthopaedics.
- f) Clinical examination: spine, hip, knee, ankle and foot, shoulder, elbow, wrist and hand.
- g) Neurological examination.

Infections

- a) Pyogenic infections –etiology, pathogenesis, clinical features and investigations: osteomyelitis (acute and chronic), septic arthritis, infection in the presence of an implant and prosthesis, necrotizing fasciitis, gas gangrene, toxic shock syndrome, septic arthritis and its sequel.
- b) Tuberculosis –aetiology, pathogenesis, clinical features and investigations: spine, hip, knee and other sites.

Metabolic bone disorders

- a) Basics of calcium, phosphate and vitamin d metabolism.
- a) Rickets, osteomalacia, renal bone disease, hyper-parathyroidism (types, clinical features and investigations for diagnosis).
- b) Scurvy (causes, clinical features and diagnosis).
- c) Paget's disease (aetiopathogenesis, clinical features and investigations).
- d) Osteoporosis (causes, risk factors, clinical presentation, investigations and complications).

Musculoskeletal oncology

- a) Evaluation and staging.
- b) Benign and malignant bone tumours and soft tissue tumours (classification, aetiopathogenesis, common sites of occurrence, and age groups and investigations)
- c) Metastatic bone disease -diagnosis.

Arthritis

Aetiopathogenesis, clinical features and investigations:

- a) Osteoarthritis.
- b) Rheumatoid arthritis.
- c) Ankylosing spondylitis.
- d) Crystal arthropathy. Gout.
- e) Neuropathic arthropathy.

Orthopaedics sports medicine

- a) Clinical examination.
- b) Shoulder instability: acute, recurrent.
- c) Rotator cuff tears.
- d) Knee -ligament and meniscal injuries, diagnosis of anterior and posterior cruciate ligament deficient knee.
- e) Recurrent patellar dislocation.
- f) Shin splints.
- g) Ankle ligament injuries.
- h) Achilles tendon rupture. Quadriceps tendon rupture.
- i) Stress fractures.

Paediatric orthopaedics

- a) Congenital and developmental disorders of upper limb, spine, hip, knee, ankle and foot.
- b) Connective tissue disorders: osteogenesis imperfecta, marfan syndrome.

- c) Genetic disorders: neurofibromatosis, skeletal dysplasias.
- d) Neuromuscular disorders: myopathy, muscular dystrophy, cerebral palsy, myelomeningocele, post-polio residual deformity.
- e) Perthes disease, slipped capital femoral epiphysis and osteochondritis (aetiopathology, clinical features and investigations).
- f) Genu varum and genu valgum deformities.
- g) Juvenile rheumatoid arthritis.
- h) Hemophilic-arthropathy.

Non-traumatic disorders

- a) Tendinitis, bursitis and displacement of tendons.
- b) Shoulder impingement. Shoulder peri-arthritis.
- c) Elbow injuries. Lateral and medial epicondylitis.
- d) Supraspinatus tendinitis.
- e) Avascular necrosis of the femoral head: aetiopathogenesis, classification and diagnosis.

Recommended literature:

- “Textbook of orthopaedics and trauma” - G. Kulkarni
- “Netter’s orthopaedic clinical examination” - J. Cleland
- “Dutton’s orthopaedic: examination, evaluation and intervention” - M. Dutton
- “ Essential orthopaedics - including clinical methods” - J. Maheshwari

Examination and marks distribution

Total marks -75

Internal Assessment– 30 marks

- Mid Semester examination - 20 marks
- Assignments and others – 10 marks

End of term examination – 45 marks

- Theory – 45 marks

Course: Radiological diagnosis and paper clinical imaging

Course Code: BOS 502

Credit - 2

Objectives:

- To acquaint the student with the various sub-specialities of radiology.
- To enable the student to interpret diagnostic imaging of structures of the musculoskeletal system, the nervous system, the gastrointestinal tract, the respiratory system, the urogenital system, and the circulatory system.

Skills:

- Interpreting MRI, CT scan, USG, and X ray imaging in the context of an osteopathic diagnosis.

Course Content

Unit 1: Physics of radiology - X ray, CT scan, USG and MRI

- A. Principles: image acquisition, image characteristics, knobology in ultrasound.
- B. Biological effects of radiation.
- C. Radiation protection: occupational exposures, control of radiation.
- D. Key modalities comparison – X-ray, USGk, CT, MRI, PET CT. Advantages and limitations of each.

Unit 2: Diagnostic Imaging

- A. Musculoskeletal system: Imaging of bones and joints in trauma. Imaging of soft tissue and muscular pathologies. Including paediatrics.
- E. Respiratory system: Chest X ray. Normal anatomy and interpretation of pathology. Role of X ray and CT in evaluation of pulmonary pathologies.
- F. Gastrointestinal tract: evaluation of X ray of the abdomen: normal anatomy and interpretation of pathologies.
- G. Central nervous system imaging including spine. Overview of neuro-imaging. Anatomy – CT/MRI. Imaging of strokes. Imaging in trauma. Imaging of the spine.
- H. Urogenital system imaging.
- I. Imaging of the head and neck. Anatomy and evaluation of pathologies on different imaging modalities.
- J. Radiology of obstetrics and gynaecology. Imaging in obstetrics. Ultrasound according to weeks. PCPNDT Act.
- K. Role of interventional radiology in diagnosis and treatment.

Unit 3: Miscellaneous

- L. Mammography.
- M. Basics of different X ray procedures and their clinical importance.
- N. Imaging of trauma in the entire body. Imaging features on X-Ray and CT scan.
- O. Role of radiology in emergencies, in the entire body. Imaging features on X-RAY, CT scan and MRI.
- P. Effective communication with radiologists. Common radiology terminology, managing patients with equivocal imaging results and need of further investigations.

Recommended literature:

1. "Chest roentgenology" – F. Benjamin
2. "Christensen's physics of diagnostic radiology" – T.S. Curry
3. "Textbook of radiology and imaging" – D. Sutton
4. "Diagnostic radiology" – Graninger
5. "Diagnostic ultrasound" = R. Carol
6. "Ultrasound in obstetrics and gynaecology" – P. Callen
7. "Diagnostic neuroradiology" – A. Osborn
8. "Cranial MRI and CT" – L. Howard

Examination and marks distribution**Total marks-50****Internal Assessment – 20 marks**

- Mid Semester examination - 20 marks

End of term examination- 30 marks

- Theory - 30 marks

Course: Obstetrics and Gynaecology

Course Code: BOS 503

Credit - 3

The main goal of this curriculum is to acquire the knowledge and skills required to identify common problems in the discipline of obstetrics and gynaecology, and to relate it with the possibilities of an osteopathic treatment.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Female reproductive system –anatomy, physiology, pathology.
- Pregnancy in detail – physiology of pregnancy, process of delivery, abnormal delivery.
- Pre natal and post natal care of a pregnant women.
- Medical termination of pregnancy.
- Ethics and code of conduct in the field of obstetrics and gynaecology.

Skills:

By completion of the subject the students should:

- Be capable of include the relevant aspects of obstetrics and gynaecology in their osteopathic practice, both in the history taking and in the clinical examination of the patient.
- Be capable of effectively communicating with obstetricians and gynaecologists where the patient is receiving both treatments.
- Referral cases management. Identification of clinical signs of cases where the patient requires a gynaecological diagnosis to rule out contraindications.
- Observations in gynaecology and obstetrics OPD, ward, operation theatres, labor room.
- Observation of normal deliveries, forceps and ventouse assisted deliveries, caesarean section.
- Observation of abdominal and vaginal hysterectomy.
- Analyse and interpret investigative data.

Course Content

Theory

Basic sciences

- a) Normal and abnormal development, structure and function of female and male genital tract and female breast. Embryology review.
- b) Applied anatomy of genitourinary system, abdomen, pelvis, pelvic floor, anterior abdominal wall, upper thigh.
- c) Physiology of spermatogenesis.
- d) Endocrinology related to male and female reproduction.
- e) Anatomy review of fetus, fetal growth and development, fetal physiology and fetal circulation.
- f) Physiological and neuro-endocrinal changes during puberty disorders, adolescence, menstruation, ovulation, fertilization, climacteric and menopause.
- g) Gametogenesis, fertilization, implantation and early development of embryo.
- h) Normal pregnancy, physiological changes during pregnancy, labour and puerperium.

- i) Immunology of pregnancy.
- j) Lactation.
- k) Biochemical and endocrinal changes during pregnancy, including systemic changes in cardiovascular, haematological, renal, hepatic and other systems.
- l) Biophysical and biochemical changes in uterus and cervix during pregnancy & labour.
- m) Pharmacology of identified drugs used in pregnancy, labour, post partum period with reference to the mechanism of action, absorption, distribution, excretion, metabolism, transfer of the drugs across the placenta, effect of the drugs on the fetus, their excretion through breast milk.
- n) Role of hormones in obstetrics and gynaecology.
- o) Markers in obstetric and gynaecology -non neoplastic and neoplastic diseases.
- p) Pathophysiology of ovaries, fallopian tubes, uterus, cervix, vagina and external genitalia in healthy and diseased individuals.
- q) Normal and abnormal pathology of placenta, umbilical cord, amniotic fluid and fetus.
- r) Normal and abnormal microbiology of the genital tract -bacterial, viral and parasitic infections responsible for maternal, fetal and gynaecological disorders.
- s) Humoral and cellular immunology in obstetrics and gynaecology.

Obstetrics

- a) Physiology of normal pregnancy, diagnosis of pregnancy, routine antenatal care, management of common symptoms in pregnancy, investigations to be carried out in pregnancy.
- b) Drugs during pregnancy and lactation.
- c) Hypertensive disorders in pregnancy.
- d) Anaemia in pregnancy: heart disease in pregnancy.
- e) Antepartum haemorrhage.
- f) Intrauterine growth restriction.
- g) Antenatal fetal surveillance.
- h) Rhesus negative pregnancy.
- i) Disorders of liver and kidneys in pregnancy.
- j) Multiple pregnancy.
- k) Puerperium and its complication.

Gynaecology

- a) Anatomy review of the female genital tract, and its variations, supports of uterus, developmental anomalies of uterus.
- b) Ectopic pregnancy: epidemiology, early diagnosis and management.
- c) Physiology of menstruation.
- d) Common menstrual problems.
- e) Disorders of growth. Amenorrhoea.
- f) Fibroid uterus.
- g) Prolapsed uterus.
- h) Vaginal discharge.
- i) Sexually transmitted diseases.
- j) Precancerous lesions of female genital tract (cervix, vagina, and vulva).
- k) Carcinoma cervix, epidemiology, staging diagnostic procedure, treatment.
- l) Carcinoma endometrium.

- m) Carcinoma ovary.
- n) Carcinoma vulva.
- o) Gestational trophoblastic disease.
- p) Temporary and permanent methods of contraception.
- q) Menopause and related problems.
- r) Endometriosis.
- s) Genital tract fistulae.
- t) Adolescence, pubertal changes, disorders of puberty.

Contraception and neonatology

- a) Contraception, male and female.
- b) Knowledge of medical termination of pregnancy and safe abortion services. Complications of unsafe abortion techniques.
- c) Neonatal sepsis -prevention, detection and management.
- d) Neonatal hyper-bilirubinaemia –investigation and management including NICU care.

Recommended literature

- “Textbook of obstetrics for undergraduates” - V.L. Bhargava
- "Manual of practical obstetrics” - Holland & Brews
- “Shaw’s text book of gynaecology” - Howkins & bourne
- “Textbook of gynaecology” - V.L. Bhargava

Examination and marks distribution

Total marks -75

Internal Assessment – 30 marks

- Mid semester examination - 20 marks
- Assignments and others – 10 marks

End of term examination – 45 marks

- Theory – 45 marks

Course: Pharmacology

Course Code: BOS 504

Credit - 4

Objectives

Knowledge: at the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Pharmacokinetic and pharmacodynamic principles involved in the use of drugs.
- Factors affecting the action of drugs.
- Routes of drug administration: advantages and disadvantages.
- Adverse drug reactions.
- Mechanism of drug action.
- Knowledge of common drugs and their doses used for different ailments.

Course content

Theory

General pharmacology

- a) Absorption, distribution, metabolism and elimination of drugs, routes of drug administration.
- b) Basic principles of drug action.
- c) Factors modifying drug response.
- d) Elementary knowledge of drug toxicity, drug allergy, drug resistance, drug potency, efficacy and drug antagonism.

Autonomic nervous system and peripheral nervous system

- a) Neurohumoral transmission.
- b) Sympathetic nervous system - sympathomimetics, sympatholytics.
- c) Parasympathetic - cholinergics, anticholinergics, ganglion stimulants and blockers.
- d) Skeletal muscle relaxants.
- e) Local anaesthetics.

Central nervous system

- a) General principles - neurotransmitters, definition and common transmitters.
- b) Drug therapy of various CNS disorders like epilepsy, depression, Parkinson's disease etc.
- c) Pharmacotherapy of pain.
- d) General anaesthetics.
- e) Drugs for arthritis and gout.

Autacoids

- a) Histamine and anti-histaminics.
- b) Prostaglandins, leukotrienes, thromboxane and PAF.
- c) Substance P, bradykinin.

Cardiovascular system

- a) Drug therapy of hypertension, shock, angina, cardiac arrhythmias.
- b) Renin angiotensin system.
- c) Diuretics.
- d) Coagulants and anticoagulants, antiplatelet drugs.
- e) Hypo-lipidemics.

Gastrointestinal and respiratory system

- a) Emetics and antiemetics.
- b) Drugs for constipation and diarrhoea.
- c) Drug treatment of peptic ulcer.
- d) Drug therapy of bronchial asthma.
- e) Pharmacotherapy of cough.

Hormones

- a) Reproductive hormones - testosterone, estrogen, progesterone, and contraceptives.
- b) Drug therapy of diabetes.
- c) Thyroid hormones pharmacology.
- d) Pituitary-hypothalamic axis.
- e) Corticosteroids.
- f) Oxytocin and drugs acting on uterus.
- g) Drugs affecting calcium balance.

Chemotherapy

- a) General principles of antimicrobial chemotherapy, rational use of antibiotics.
- b) Chemotherapeutic agents - penicillins, cephalosporins, fluoroquinolones, macrolides, aminoglycoside, tetracyclines, chloramphenicol and polypeptide antibiotics etc.

Recommended literature:

- "Pharmacological basis of therapeutics" - L. Brunton
- "Basic and clinical pharmacology" - B. Katzung
- "Clinical pharmacology" - Lawrence
- "Essentials of medical pharmacology" - K Tripathi
- "Pharmacology and pharmacotherapeutics" - R. Satoskar
- "Fundamentals of experimental pharmacology" - M. Ghosh

Examination and marks distribution

Total marks - 100

Internal Assessment – 40 marks

Mid semester examination - 30 marks

Assignments and others – 10 marks

End of term examination - 60 marks

Theory- 60 marks

Unit 1 - Cranial 5: venous sinuses and brain ventricles

Course objectives:

- To acquaint the student with the osteopathic concept of the brain ventricles and their importance in nervous function.
- To understand the dynamics of the venous sinuses in theory and through their osteopathic treatment.
- To integrate the above mentioned elements in the approach to the treatment of the cranial sphere.

Learning outcome:

- To integrate the osteopathic concept of the cerebrospinal fluid fluctuation, the brain ventricles and the venous sinuses with the previously acquired knowledge of the cranial mechanism.
- To practically stimulate the function of the ventricles and cerebrospinal fluid fluctuation in the context of the treatment of the cranial mechanism.
- To effectively enhance the function of the venous sinuses in the cranial sphere.

Module 1 – Anatomy review:

- a) Anatomy review of the brain ventricles, the venous sinuses,
- b) Physiology of the cerebrospinal fluid fluctuation.

Module 2 – Osteopathic considerations:

- a) Sutherland's concept of the cerebrospinal fluid.
- b) The cerebrospinal fluid in contemporary cranial osteopathy.
- c) The ventricles in Sutherland's cranial concept.
- d) Venous sinuses in the cranial concept.

Module 3 – Practice:

- a) Treatments to enhance the function of the venous sinuses and the fluctuation of the cerebrospinal fluid.

Suggested reading:

- "The cranial bowl" – W.G. Sutherland
- "Contributions of thought" – W.G. Sutherland.
- "Collected papers of Viola Frymann" – V. Frymann
- "Osteopathy in the cranial field" - H. Magoun
- "Cranial osteopathy" – T. Liem.
- "Manual of cranial osteopathy" R.H. Lippincott

Unit 2 – Lower cervical spine

Course objectives:

- To understand the mechanics of the lower cervical spine, c3 to c7.
- To acquaint the student with the osteopathic understanding of the cervical spine in the context of its musculoskeletal, visceral, and craniosacral relationships.
- To diagnose and treat dysfunctions in the cervical spine.

Learning outcome:

- To understand lower cervical spine dysfunctions in their relation with the musculoskeletal, visceral and craniosacral fields.
- To effectively diagnose and treat lower cervical spine dysfunctions.

Module 1 – Anatomy review and biomechanics:

- a) Anatomy and biomechanics review.

Module 2 – Osteopathic concepts:

- a) Fryette mechanics on the lower cervical spine.
- b) Postural considerations.
- c) Osteopathic concepts on the cervical spine.
- d) Musculoskeletal relations of the cervical spine. Visceral relations. Fascial relations.

Module 3 – Practice:

- a) Diagnosis of lower cervical spine dysfunctions.
- b) Treatment of lower cervical spine dysfunctions through mobilization techniques, muscle energy techniques, functional techniques, myofascial techniques and listening techniques.

Suggested reading:

- “Greenman’s principles of manual medicine” – L. Destefano
- “Atlas of osteopathic techniques” – A.S. Nicholas
- “Muscle energy techniques” – L. Chaitow
- “Collected papers of Viola Frymann” – V. Frymann
- “Applied anatomy” – M. Clark

Unit 3 - Upper cervical spine and hyoid bone

Course objectives:

- To acquaint the student with the mechanics of the upper cervical spine.
- To understand the musculoskeletal, visceral and craniosacral relations of the atlas, the axis, and the hyoid bone.
- To acquaint the student with the osteopathic concepts of these structures.
- To diagnose and treat C0-C1, C1-C2 and hyoid bone dysfunctions.

Learning outcome:

- To be able to, based on the osteopathic considerations and the understanding of the musculoskeletal, craniosacral and visceral connections, trace chains of dysfunction and successfully treat C0-C1, atlas, axis and hyoid bone dysfunctions.

Module 1 – Anatomy review and biomechanics:

- a) Anatomy review of the atlas, axis, and hyoid bone.
- b) Biomechanics of the occipito-atlantoid joint, the atlanto-axis joint, and the hyoid bone.

Module 2 – osteopathic considerations:

- a) Osteopathic concepts on the hyoid bone.
- b) Postural considerations on the hyoid bone.
- c) The floor of the mouth.
- d) C0-C1 and C1-C2 relevance in posture, mobility of the cervical spine, passage of nervous and vascular structures.
- e) Musculoskeletal and craniosacral relations.

Module 3 –Practice:

- a) Diagnosis and treatment of c0-c1, c1-c2 and hyoid bone dysfunctions through myofascial techniques, listening techniques, functional techniques, and fascial release techniques.

Suggested reading:

- “Greenman’s principles of manual medicine” – L. Destefano
- “Atlas of osteopathic techniques” – A.S. Nicholas
- “Muscle energy techniques” – L. Chaitow
- “Collected papers of Viola Frymann” – V. Frymann
- “Applied anatomy” – M. Clark

Unit 4 - Visceral 5: liver, gallbladder, pancreas, and spleen

Course objectives:

- To acquaint the student with the principles of osteopathic diagnosis and treatment of the liver, gallbladder, pancreas and spleen.
- To provide diagnostic assessments and techniques to enhance the mobility and motility of the liver, gallbladder, pancreas and spleen in their context with the related musculoskeletal, visceral and craniosacral structures.

Learning outcome:

- To understand the osteopathic relations in dysfunctions of the liver, gallbladder, pancreas and spleen.
- To effectively enhance the function of these organs through osteopathic treatment.

Module 1 – anatomy and physiology review:

- a) Review of the anatomy and physiology of the liver, gallbladder, pancreas and spleen.

Module 2 – osteopathic considerations:

- a) Liver, gallbladder, pancreas and spleen osteopathic considerations.
- b) Musculoskeletal, craniosacral and visceral relations.

Module 3 – practice:

- a) Osteopathic dysfunctions of the liver, gallbladder, pancreas and spleen.
- b) Mobility and motility of the liver, gallbladder, pancreas and spleen.
- c) Diagnostic methods and assessments.
- d) Treatment of the liver, gallbladder, pancreas and spleen dysfunctions through mobilization techniques, functional techniques, fascial techniques and listening techniques.

Unit 5 - High Velocity Low Amplitude 2: lumbar spine, thoracic spine and ribs**Course objectives:**

- To acquaint the student with the principles of HVLA techniques in the spine and ribcage
- To acquaint the student with the applications and contraindications of HVLA techniques in the spine and ribcage
- To diagnose and treat osteopathic dysfunctions in the lumbar spine, thoracic spine and joints of the thorax through HVLA techniques.

Learning outcome:

- To develop an understanding of the scope, limitations and application of HVLA techniques in the lumbar spine, thoracic spine and ribs.
- To effectively treat osteopathic dysfunctions in the lumbar vertebrae, thoracic vertebrae and ribs.

Module 1 – introduction:

- a) Mechanisms of action
- b) Scope and applications
- c) Contraindications

Module 2 – review of the spine and ribs mechanics:

- a) Review of the biomechanics of the joints of the lumbar spine and thorax
- b) Review of the surface anatomy and palpation
- c) Review of the osteopathic assessment and mobilisations of the lumbar spine, thoracic spine and ribs

Module 4 – practice:

- a) HVLA techniques for lumbar spine dysfunction
- b) HVLA techniques for thoracic spine dysfunction
- c) HVLA technique for rib dysfunction.

Suggested reading:

- “Visceral manipulation in osteopathy” – Eric Hebben

- “Visceral manipulation” – J.P. Barral
- “Visceral manipulation 2” – J.P. Barral

Examination and marks distribution:

Total marks - 150

Internal Assessment– 40 marks

Mid semester examination - 40 marks

End of term examination – 110 marks

- Theory – 60 marks
- Practical – 50 marks

Applied clinical osteopathic treatment 3-100 hours

SEMESTER 5									
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Examination and Marks Distribution				
					Internal Assessment		End Term Examination		Total Points
					Mid semester Exam	Assignment	Theory	Practical	
CC-21	Orthopaedics and Trauma -1	BOS501	3	3T/0P	20	10	45		75
CC-22	Radiological Diagnosis and Course Clinical Imaging	BOS502	2	2T/0P	20		30		50
CC-23	Obstetrics and Gynecology	BOS503	3	3T/0P	20	10	45		75
CC-24	Pharmacology	BOS504	4	4T/0P	30	10	60		100
CC-25	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques	BOS505	6	4T/2P	40		60	50	150

	- 5									
	Applied Clinical Osteopathic Treatment 3		100 hrs							
Total Credits of Semester 5			18		Total Points of Semester 5				450	

6th semester

Course: Orthopaedics and Trauma 2

Course Code: BOS 601

Credit - 3

The main goal of this curriculum is to acquire the knowledge and skills required to identify problems that fall under the discipline of orthopaedics and trauma, and to understand them in the context of osteopathic diagnosis and treatment.

Objectives

Knowledge:

At the end of the subject the student should be capable of expressing his/her understanding on the following topics:

- Pathological conditions including infections, inflammations, and cancerous conditions.
- Metabolic bone disorders.
- Orthopaedic related issues, in children and adults.
- Orthopaedic conditions in specific joints, both traumatic and non-traumatic.

Skills:

By completion of the subject the students should:

- Be able to understand an orthopaedic approach to the diagnosis of all major joints, through orthopaedic assessments.
- Be able to identify orthopaedic conditions through radiological images.
- Identification of clinical signs of cases where the patient requires an orthopaedic diagnosis to rule out contraindications, and referral management.
- Identify red flags where osteopathic treatment is inappropriate, and understand the subsequent referral process.

Course Content

Theory

Traumatology

- a) Polytrauma and multiple injured patient care.
- b) Basic splintage and transportation techniques, advance trauma life support (atls).
- a) Complications of the fracture: especially compartment syndrome, fat embolism, crush syndrome, neurovascular injury, myositis ossificans, and reflex sympathetic dystrophy.
- c) Basic principles of fracture management.
- d) Pathological fractures.
- e) Indications for amputation and post effects of amputation.
- f) Fractures and dislocations in children:
 - Physeal injuries. Calcaneal apophysitis. Sever's disease.
 - Fractures around the elbow: supracondylar, medial and lateral condyles, capitellum. Pulled elbow.
 - Forearm and distal radius fractures.
 - Fracture of the femur -neck, shaft and distal femur.
 - Fracture of proximal and distal tibial physes.

- h) Fractures in adults:
- Fracture clavicle,
 - Fractures of the proximal humerus, humeral shaft and distal humerus, Monteggia and Galeazzi fractures, radial head, forearm, distal radius, and scaphoid.
 - Fracture of neck of femur, inter-trochanteric, sub-trochanteric, shaft and distal femur, fracture of the patella.
 - Fracture of tibial plateau, shaft and pilon.
 - Fracture of rib cage and sternum.
 - Pelvic, acetabular and sacral fractures.
- i) Chronic unreduced and recurred dislocations.

Spine

- a) Fractures and dislocations of the spine (mechanism of injury, clinical features, investigations and first aid).
- b) Care of bowel and bladder, and exercises for a paraplegia patient.
- c) Scoliosis: infantile, juvenile, adolescent, neuromuscular (aetiopathogenesis, clinical features and investigations).
- d) Kyphosis of spine (types, aetiopathogenesis, clinical features and investigations).
- e) Low back pain, prolapsed inter-vertebral disc, spondylolisthesis (aetiopathogenesis, clinical features and investigations).
- f) Degenerative disorders of cervical and lumbar spine (clinical features and investigations).
- g) Tumours of the spine -primary and metastatic (aetiopathogenesis, clinical features and investigations).

Hand

- a) Diagnosis of peripheral nerve injuries.
- b) Volkmann ischemic contracture (aetiopathogenesis, clinical features and investigations).
- c) Dupuytren's contracture (aetiology, clinical features).
- d) Carpal tunnel syndrome (aetiopathogenesis, clinical features and investigations).
- e) Tenosynovitis, De Quervain disease, trigger finger.
- f) Congenital hand anomalies.

Foot and ankle

- a) Congenital talipes equinovarus -CTEV- (aetiopathogenesis, clinical features and investigations).
- b) Flat foot, tarsal coalition and pes cavus (aetiopathogenesis, clinical features and investigations).
- c) Hallux valgus.
- d) Claw toe, hammer toe, mallet toe, bunion, bunionette, ingrown toe nail.
- e) Diabetic foot and other neuropathic foot disorders.
- f) Calcaneal spurs, plantar fasciitis.

Head and neck

- a) Head injuries - whiplash injury, concussion.
- b) Neck - cervical spondylitis, cervical stenosis, torticollis.

Recommended literature:

- “Textbook of orthopaedics and trauma” - G. Kulkarni
- “Netter’s orthopaedic clinical examination” - J. Cleland
- “Dutton’s orthopaedic: examination, evaluation and intervention” - M. Dutton
- “ Essential orthopaedics - including clinical methods” - J. Maheshwari

Examination and marks distribution

Total marks -75

Internal Assessment – 30 marks

- Mid semester examination - 20 marks
- Assignments and others – 10 marks

End of term examination – 45 marks

- Theory – 45 marks

Course : Research methodology and Biostatistics

Course Code: BOS 602

Credit - 4

Course objectives:

- To assist the students to acquire an understanding of the research methodology and biostatistical methods as a basis for identifying a research problem, and planning and implementing a research plan.
- To further enable the students to evaluate research studies and utilise research findings to improve the quality of their osteopathic practice, education and management.

Learning outcome:

- Understanding of basic research and biostatistical concepts and approaches.
- Acquiring and utilising the knowledge of literature review of various sources.
- Developing the skill of preparing a research proposal, conduct a research study, communicate research findings, critically evaluate research studies, and writing a scientific paper for publication.

Part I: Research Methodology

Module 1 - Introduction to research methodology:

Meaning of research. Definition of Research and its characteristics. Evidence based practice. Objectives of research. Motivation in Research. Types of Research. Descriptive vs. analytical. Applied vs. fundamental. Quantitative vs. qualitative. Conceptual vs. empirical. Other types of research. Research Approaches. Significance of Research. Research methods versus methodology. Research and scientific method. Importance of knowing how research is done. Research process. Formulating the research problem. Extensive literature survey. Development of working hypothesis. Preparing the research design. Determining sample design. Collecting the data. Execution of the project. Analysis of data. Hypothesis testing. Generalisations and interpretations. Preparation of report or thesis. Developing research ideas. Criteria for good research. Problems encountered by researchers in India.

Module 2 - Research problem:

Meaning of research problem. Selecting the problem. Necessity of defining the problem. Technique Involved in defining a problem.

Module 3 - Review of literature:

Importance, purposes, processes, sources, criteria for selection of resources and steps in reviewing literature.

Module 4 - Research approaches and designs:

Meaning of research designs. Significance of research designs. Features of good research design. Important concept relating to research design. Variables and its types. Confounded relationship. Research hypothesis, definition, formulation and types. Experimental and non-experimental hypothesis testing research. Experimental and control groups. Treatments. Experiment. Experimental units. Types of Research design: 1. Qualitative and Quantitative research designs. 2. Experimental design. Quasi experimental research, advantages and disadvantages of quasi experiments. Non experimental design. Controlled trials. Parallel or concurrent controls. Randomized. Non randomized. Sequential controls.

Self controlled. Crossover. External controls. Studies with no controls. 3. Observational study design. Descriptive or case series. Case control studies (retrospective). Cross sectional studies, surveys. Cohort studies (prospective). Historical Cohort studies. 4. Meta analyses.

Module 5 - Sampling design:

Definition of Population and sample. Steps in sample design. Criteria of selecting sampling technique. Characteristics of good sampling design. Types of sampling designs: a. Non-probability sampling, convenience sampling, quota sampling, purposive sampling, snowball sampling. Advantages and disadvantages of non probability sampling. b. Probability sampling. Simple random sampling, stratified random sampling, cluster sampling, systematic sampling, advantages and disadvantages of probability sampling. f. Sample size determination, probability and sampling error.

Module 6 - Tools and methods of data collection:

Concepts of data collection / measurement. Measurement scales: nominal, ordinal, interval, ratio, sources of errors in measurement, tests of measurement, tests of validity, tests of reliability, tests of practicality, scaling, meaning, scale classification bases, scaling techniques. Methods of data collection: primary data & secondary data, observation method, interview method, questionnaires and schedules, case study method, criteria for selection of appropriate method for data collection.

Module 7 - Analysis and interpretation of data:

Plan for data analysis: quantitative and qualitative. Statistical analysis. Interpretation of data. Conclusion and generalisations. Summary and discussion.

Module 8 - Research writing process:

Communication of research results, oral and written. Writing research report. Methods and style of reference - Vancouver, American Psychology Association (APA), Campbell, etc. Writing scientific articles for publication.

Module 9 - Research ethics and plagiarism:

Importance of ethics in research, ethical issues in human subjects research, ethical principles that govern research with human subjects. Components of an ethically valid informed consent for research. Plagiarism and its guidelines.

Module 10 - Research proposal:

Title, abstract, research question. Introduction (need of the study, aims and objectives of the study, hypothesis, operational definitions). Literature Review. Methodology (study design, sample size, sampling technique, source of subjects, inclusion & exclusion criteria, procedure, outcome measures, dependent & independent variables, tools & instrumentation. Pilot study. Data analysis. Research funding.

Module 11 - Critical analysis of a research article:

Critically analysing, interpreting and exploring the ways to implement the results of published indexed research articles in osteopathic practice.

Part II: Biostatistics

Module 12 - Basic biostatistics:

Introduction: meaning, definition, characteristics of statistics. Importance of the study of statistics, branches of statistics, statistics and health science. Data: definition, types, presentation, collection methods, various types of graphs, obtaining graphs using statistical software like excel, SPSS. Measures of central value. a. arithmetic mean, median, mode, relationship between them b. partitioned values- quartiles, deciles, percentiles. c. Graphical determination. 4. Measures of dispersion: range, mean deviation, standard deviation, normal distribution curve, properties of normal distribution, standard normal distribution, transformation of normal random variables, inverse transformation, normal approximation of binomial distribution. 6. Correlation analysis: bivariate distribution, scatter diagram, coefficient of correlation, calculation & interpretation of correlation coefficient, T-test, Z-test, P-value. 7. Regression analysis: lines of regression, calculation of regression coefficient. 8. Sampling: methods of sampling, sampling distribution, standard error, types I & II error. 9. Probability (in brief): probability and sampling, probability as a mathematical system, population and samples, sampling distribution, sampling methods, point and interval estimation for proportion mean, hypothesis testing, simple test of significance, inferential technique: normal. 10. Hypothesis testing: null hypothesis, alternative hypothesis, acceptance & rejection of null hypothesis, level of significance. 11. Parametric & non parametric tests: chi square test, Mann-Whitney U test, Wilcoxon signed test, Kruskal-Wallis test, Friedman test, T-test/student T test g. analysis of variance, standard errors of differences.

Suggested Reading:

- " Research Methodology" - C.R. Kothari
- " Practical Research: A Guide for Therapists" - S. French
- " Research methodology and medical statistics for students" - S. Dornala

Examination and marks distribution

Total marks -100 marks

Internal Assessment – 40 marks

- Mid semester examination : 30 marks.
- Critical analysis & interpretation of a indexed research article: 10 marks.

End of term examination – 60 marks

- Theory – 60 marks

Course: Paediatrics and osteopathic care of children-1

Course Code: BOS 603

Credit – 4 (4T/0P)

1. Birth process and the newborn

The foetal body at term
The maternal pelvis
The birth process
Fetal presentations
The first breath

2. Etiologies of dysfunction

Ossification of the cranium and pelvis
Fetal period
Birth process
Childhood and adolescence

3. Prematurity and complications

Pre-term delivery
Associated complications

4. Development of the cranium

Embryological development of the neurocranium
Embryological development of the viscerocranium
Post-natal development of the cranial base, calvaria and viscerocranium

5. Neurosensory development

Development of the nervous system
Development of vision
Development of touch
Development of hearing
Development of smell
Osteopathic considerations in neurosensory development

6. Psychomotor development

Psychomotor development
Phases of locomotion
Developmental milestones

7. Digestive system development

Embryological development of the digestive system
Post-natal development of the digestive system
Osteopathic support of the developing digestive system

8. Neuro-endocrine development

Embryological development of the endocrine system
Post-natal development of the endocrine system
Osteopathic support of the endocrine system

9. Immunity in the new born, child and adolescent

Immune system development

Osteopathic considerations

10. Nutrition

Macronutrients and micronutrients requirements in the mother, baby, child and adolescent.
Malnutrition. Causes, consequences, basic clinical signs and assessment.
Interdisciplinary cooperation.

11. Interdisciplinary cooperation

Safety guidelines in the treatment of the baby, child and adolescent
Principles of cooperation with other health professionals
Principles of referral.

Examination and marks distribution

Total - 100 marks

Internal Assessment - 40 marks.

Mid semester examination - 40 marks

End of Term Examination - 60 marks

Theory - 60 marks.

Course: Osteopathic treatment: philosophy, concepts, evaluation, and techniques- 6

Course Code: BOS 604

Credit - 6

Unit 1– Fascia: osteopathic approaches

Course objectives:

- To acquaint the student with the current research on the field of the fasciae and its practical applications in osteopathy.
- To understand anatomical and histological features of the fascia relevant to the practice of osteopathy.
- To understand the practical dynamics of the fascia and apply them in the diagnosis and treatment of musculoskeletal dysfunctions.

Learning outcome:

- To integrate the ongoing body of research in the field of fasciae with the practical possibilities in osteopathic diagnosis and treatment.
- To approach musculoskeletal dysfunctions through fascial treatments.

Module 1 – Anatomy and physiology:

- a) Anatomy of the fascial system according to Stecco.
- b) Physiological principles of the fasciae.

Module 2 – Functions and applications:

- a) Classification of the fascia. Functions of the fascia.
- b) Proprioceptive considerations.
- c) Energy storage in the superficial fascia and practical applications.
- d) Implications of the immune function of the fasciae.

Module 3 – Practice:

- a) Introduction to the palpation of the fasciae and treatment approaches.
- b) Inductive and non-inductive treatments for the fascia of all major joints.
- c) Treatment of the fascial chains.

Suggested reading:

- “Fascia: the tensional network of the human body” – R. Schleip
- “Functional atlas of the human fascial system” – C. Stecco
- “Collected papers of Viola Frymann” – V. Frymann
- “Contributions of thought” – W.G. Sutherland

Unit 2 - Foot

Course objectives:

- To diagnose and treat musculoskeletal dysfunctions in the foot, based on the osteopathic understanding of its relations.

Learning outcome:

- To understand the normal and abnormal mechanics in the foot complex through the osteopathic perspective.
- To diagnose and treat musculoskeletal dysfunctions in the structures contained in the foot, while considering the connections and implications to the whole musculoskeletal system.

Module 1 – anatomy and biomechanics review:

- a) Review of the anatomy and biomechanics of the structures of the foot complex.

Module 2 – osteopathic approach:

- a) Osteopathic concepts for the diagnosis and treatment of the structures of the foot.
- b) Osteopathic relations.

Module 3 – Practice:

- a) Diagnostic concepts and assessments.
- b) Muscle energy techniques.
- c) Mobilization techniques.
- d) Myofascial techniques.
- e) Listening treatments.

Suggested reading:

- “Greenman’s principles of manual medicine” – L. Destefano
- “Atlas of osteopathic techniques” – A.S. Nicholas
- “Muscle energy techniques” – L. Chaitow
- “Collected papers of Viola Frymann” – V. Frymann
- “Applied anatomy” – M. Clark

Unit 3: Visceral 6 - colon and small intestines**Course objectives:**

- To acquaint the student with the principles of visceral osteopathy.
- To integrate the visceral field with the musculoskeletal and craniosacral fields.
- To diagnose and treat colon and small intestine osteopathic dysfunctions.

Learning outcome:

- To understand the principles of visceral osteopathy and apply them in the diagnosis and treatment of colon and small intestine osteopathic dysfunctions.
- To integrate the visceral field with the musculoskeletal and craniosacral fields in diagnosis and treatment.

Module 1 – Visceral Osteopathy introduction:

- a) History of visceral osteopathy.
- b) The musculoskeletal, craniosacral and visceral triad in diagnosis and treatment.
- c) Barral’s contributions.
- d) Contemporary osteopathy contributions.

Module 2 – Anatomy and physiology review.

- a) Review of the anatomy and physiology of the colon and small intestine.

Module 3 – Practice.

- a) Osteopathic dysfunctions of the colon and small intestine.
- b) Mobility and motility of the colon and small intestine.
- c) Diagnostic methods and assessments.
- d) Treatment of the colon and small intestine dysfunctions through recoil technique, mobilization techniques, functional techniques, myofascial techniques and listening techniques.
- e) Lymphatic techniques.
- f) Lymphatics protocol.

Suggested reading:

- “Visceral manipulation in osteopathy” – Eric Hebgén
- “Visceral manipulation” – J.P. Barral
- “Visceral manipulation 2” – J.P. Barral

Examination and marks distribution:

Total marks - 150

Internal Assessment – 40 marks

Mid semester examination - 40 marks

End of term examination-110 marks

- Theory – 60 marks
- Practical – 50 marks

Applied clinical osteopathic treatment -3 (100 hrs)

SEMESTER 6									
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Examination and Marks Distribution				
					Internal Assessment		End Term Examination		Total Points
					Mid semester Exam	Assignment	Theory	Practical	
CC-26	Orthopaedics and Trauma -2	BOS601	3	3T/0P	20	10	45		75
CC-27	Research Methodology and Biostatistics	BOS602	4	4T/0P	30	10	60		100
CC-28	Paediatrics and Osteopathic Care of Children – 1	BOS603	4	3T/2P	40			60	100
CC-29	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 6	BOS604	6	4T/2P	40		60	50	150
	Applied Clinical Osteopathic Treatment 4		100 hrs						
Total Credits of Semester 6			17		Total Points of Semester 6				425

7th semester

Course: General Psychology

Course Code: BOS 701

Credit - 3

Learning Objectives:

1. Understanding the biological basis of behavior: Osteopathy students can benefit from learning about the structure and function of the brain and nervous system, which are essential to understanding how psychological processes impact physical health.
2. Understanding perception and sensation: Perception and sensation play a significant role in how people experience pain and other physical sensations. By understanding these processes, osteopathy students can better assess and treat their patients.
3. Understanding motivation and emotion: Osteopathy students can benefit from learning about the different factors that motivate behavior and how emotions impact overall health.
4. Understanding learning and memory: Learning and memory are essential for osteopathy students to understand as they will encounter patients with different health conditions that affect their memory and cognitive function.
5. Understanding social psychology: Understanding how people interact with one another and the social factors that influence behavior is crucial for osteopathy students as they will work with patients from diverse backgrounds.

Learning Outcomes:

1. Improved understanding of the mind-body connection: Osteopathy students can develop a better understanding of the link between physical health and psychological factors such as stress, emotions, and behaviors.
2. Enhanced assessment and treatment skills: By learning about the different factors that impact physical health, osteopathy students can improve their ability to assess and treat patients with various health conditions.
3. Increased understanding of patient behavior: General psychology can provide osteopathy students with a better understanding of patient behavior and how psychological factors may influence their experience of pain or discomfort.
4. Improved communication with patients: By learning about social psychology and how people interact with one another, osteopathy students can develop better communication skills to effectively communicate with patients from diverse backgrounds.
5. Enhanced critical thinking and problem-solving skills: General psychology can help osteopathy students develop critical thinking and problem-solving skills, which can be applied in their clinical practice.
6. Improved patient outcomes: By developing a better understanding of the psychological factors that impact physical health, osteopathy students can provide more effective and holistic treatment plans, which can lead to better patient outcomes.

Course Content

1. Introduction to Psychology, Fields of application of Psychology, influence of heredity and environment on the individual.
2. Learning – theories and principles of learning, Learning disabilities.
3. Memory – types, theories of memory and forgetting, methods to improve memory.
4. Thinking – process of thinking, problem solving, decision making and creative thinking.
5. Motivation - theories and types of Motivation.
6. Emotions - theories of emotions and stress, Emotional and behavioral disorders of childhood and adolescence, Disorders of under and over controlled behavior, Eating disorders.
7. Attitudes – theories, attitudes and behavior, factors in attitude change.
8. Intelligence - theories of intelligence, I.Q., general intelligence and special intelligence, intelligence tests and their uses.
9. Personality, theories of personality, factors influencing personality, Personality Disorders.
10. Conflict and frustration - Common defensive mechanism: Identification, regression, repression, projection, sublimation and rationalization.
11. Attention and Perception: Nature of attention, factors determining attention, nature of perception, principle of perceptual grouping; illusions and Hallucination.
12. Counselling - Aims and principles.
13. Development and growth of behavior in infancy and childhood, adolescence, adulthood, and old age, normal and abnormal.
14. Psychotherapy – introduction to paradigms in psychopathology and therapy.
15. Mental deficiency -
 - a) Mental retardation,
 - b) Autistic behavior
 - c) Learning disabilities.

Examination and marks distribution

Total marks -75

Internal Assessment– 30 marks

- Mid semester examination - 20 marks
- Assignment – 10 marks

End of term examination – 45 marks

Theory – 45 marks

Course: Fundamentals of Exercise and Sports Physiology

Course Code: BOS 702

Credit 4

(GE - I)

Course Objectives:

1. Students will be able to understand the fundamentals of exercise and sports physiology
2. Students will be able to formulate the link of the principles of sports training and its protocols
3. Students will be able to comprehend the signs and symptoms of sports related injuries
4. Students will be able to analyze the role of exercise physiology in osteopathic practices
5. Students will be able to synthesize and evaluate signs and symptoms of basic sports injury and its management

Course outcomes:

On completing this course successfully, the student will be able to:

1. Understand the basic system physiology in sports
2. Study the effect of exercise in detail and in application perspective
3. Measure the changes and interpret them in the context of sports
4. Apply the system concepts behind sports performance.

Unit 1

Physiology of Training: Overview, Types of Exercise and limiting factors, Exercise intensity and duration, Adaptations to Endurance Training and HIIT, Adaptations to Strength Training and Resistance Training, Energy Expenditure and Nutritional Considerations for Exercise, Fatigue and Fatigue Management, Physiology of Overtraining, Training load and Recovery Process, Factors regulating physiological performance, various principles involved in fitness training.

Unit 2

Principles of Sports Training - Overload, Specificity, Progression and Reversibility; Meaning and concept of Training load; Adaptation and Recovery, Super Compensation, Training Structure - Volume, Intensity, Frequency, Peaking, Errors in Training, Adaptations to Resistance Training, Adaptations to Aerobic and Anaerobic Training.

Test Order: Equations used to estimate aerobic power from TM protocols, Equations used to estimate aerobic power from Cycle ergometer protocols (arm and leg), Calculations used to estimate aerobic power from other variables, Test protocols used for measuring the health and skill-related components of fitness, VO₂max testing, Norm tables, Maximal versus submaximal tests.

Unit 3

Concept of Overloading, Overtraining, Fatigue and Staleness, Symptoms and Causes of Fatigue, Types of Fatigue, Theories associated with Fatigue, Definition, Types, Symptoms, Findings, Underlying Mechanisms and Frequency of Overtraining and Overtraining Syndrome, Oxygen Debt Theory, Recovery Oxygen Uptake or Excess Post-exercise Oxygen Consumption (EPOC), Implications of EPOC for Exercise and Recovery, Optimal Recovery From Steady-Rate Exercise and Non-Steady-Rate Exercise, Intermittent Exercise and Recovery

Unit 4

Sports Injury- Meaning, Classification, Causes, Types, General guidelines for their Prevention, Recovery Time, Introduction and Management of common Sports Injuries (Fracture, Dislocation, Laceration, Abrasion, Sprain and Strain), How to avoid Sports Injuries, Role of Warm-up and Cool Down.

Suggested reading:

- Exercise Physiology: Nutrition, Energy and Human Performance by William D. McArdle, Frank I. Katch and Victor L Katch
- Biomechanics and Kinesiology of Exercise – 2013 by Michael Yessis.
- Brunnstrom - Clinical Kinesiology, F.A. Davis.
- Shaw, Dhanonjoy, Kinsiology and Biomechanics of Human Motion, Khel Sahitya Kendra, 1998.
- Luttgens K., Hamilton N.: Kinesiology – Scientific Basis of Human Motion 9th Edi.

EXAMINATION AND MARKS DISTRIBUTION

Total marks - 100

Internal assessment – 40 marks

Mid Term exam-20 marks

Field visit Report – 20 marks

End term examination – 60 marks

Theory – 60 marks

Course : Ergonomics
Course Code: BOS 702
Credit- 4
(GE – II)

Number of Credits: 4

Subject Objective:

1. Provide you with an in depth investigate the field of ergonomics
2. Learn about the factors that can contribute to: Physiology of work; Environmental Factor; Occupational Diseases; Musculoskeletal disorders; Accidents and injuries; Psychosocial stress
3. Provide you with knowledge to help you identify basic hazards that can lead to injury in workplaces using several systems for assessing injury risk.
4. Learn about human anthropometry and how this can help with the specifications of tools and equipment to fit employees better to improve safety.
5. Increased productivity, quality, health etc.

Course outcome:

1. On completing this course successfully, the student will be able to:
2. Apply ergonomic principles to the creation of safer, healthier, and more efficient and effective activities in the workplace.
3. Conduct ergonomic risk assessments.
4. Develop appropriate control measures for ergonomic risk factors; describe work-related causes of musculoskeletal disorders.
5. Design a workplace according to good ergonomic principles; assess ergonomic aspects of the working environment and work organization.

Unit-I. Introduction and Principles of Ergonomics

Historical background, development of ergonomics, Definition, and scope of ergonomics, Aims, objectives and benefits of ergonomics. Man as a system component, Job / Task analysis, Methods of job/task analysis, Human error

Unit-II. Occupational and Work Environment

Working environment for industrial workers - Work space and ergonomics; Use of color; Illumination; Light and Glare; Noise and vibration; Temperature, Humidity and Ventilation; Visual environment and landscaping.

Unit-III. Musculoskeletal Disorders

Work Related Upper Limb Disorders (WRULD), Work Related Upper Extremity Musculo Skeletal Disorders (WRUEMSD), Cumulative Trauma Disorder (CTD); Repetitive Stress Injuries (RSI); Manual material handling, lifting, and carrying loads; Biomechanics of the sitting posture

Unit-IV. Human-Work Cognition

Cognitive Ergonomics - information processing, memory, situation awareness, attention; Occupational Stress - causes, effects, and preventive measures; Mental fatigue and loading, Virtual environments; Human visual, auditory, tactile, and vestibular sense organs and sensory perception.

Unit-V. Ergonomics for Prevention of accidents, Safety and Productivity:

Case Studies; Field Visit; Presentation

Text Books

1. R.S.Bridger, 2003. Introduction to Ergonomics, Taylor &Francis
2. Wilson & Corlett, 2005. Evaluation of Human Work, Taylor &Francis

Reference Books

1. Kroemer & Grandjean, 1997. Fitting the Task to the Human –a text book of Occupational Ergonomics, Taylor & Francis

EXAMINATION AND MARKS DISTRIBUTION

Total marks - 100

Internal assessment – 40 marks

Mid Term exam-30 marks

Assignments – 10 marks

End term examination – 60 marks

Theory – 60 marks

Course: Yoga Practicum

Course Code: BOS 702

Credit - 4

(GE –III)

Course Objectives: After completion of the course, learners shall be able to understand the benefits, contraindications and procedure of different yogic techniques and demonstrate each practice with confidence and skill.

Learning Outcomes:

On completion of this course, the students will be able to:

- a. rate themselves by analyzing their strengths and weaknesses; and improve themselves.
- b. attain stability by developing flexibility throughout the body.
- c. enhance vitality with the regular practice of pranayamas and demonstrate the skill of using humour to attain total wellbeing.

Key Words: Surya Namaskar, Asana and Pranayama.

Unit-1: Suryanamaskar

Suryanamaskar must be practiced traditionally and the variation in Suryanamaskar may be taken into consideration based on the convenience of patients.

Unit-2: Asnas (yoga postures)

Standing Postures

Ardhakati chakrasana, Hastapadasana, Ardhashakrasana, Trikonasana, Parivritta trikonasana, Parsvakonasana, Veersana,

Sitting postures

Paschimottanasana, Suptavajrasana, Ardhamatsyendrasana, Vakrasana, Marichasana, Malasana, Badhakonasana, Merudandasana, Akarna dhanurasana, Gumukhasana,

Prone postures

Bhujangasana, Salabhasana, Dhanurasana, Urdhvamukhosvsnasana, Makarasana,

Supine postures

Halasana, Chakrasana, Sarvangasana, Matsyasana, Shavasana, Setubandhasana,

Balancing postures

Vrikshasana, Garudasana, Namaskarasana, Tittibhasana, Natrajasana

Unit-3: Pranayama

Breath awareness, Sectional breathing, Nadishuddhi, Bhastrika, Ujjai, Cooling pranayama (Sitali, Sitkari and Sadanta), Bhramari

TEXT BOOK

- Yoga for Promotion of Positive Health, by Dr R Nagarathna, Dr H R Nagendra Published by SVYP, 2002

REFERENCE BOOKS:

- Swami Satyananda Saraswati: Asana, Pranayama, Mudra, Bandha, Bihar Yoga Bharati, Mungher, Bihar, India.
- B.K.S Iyenger: Light on Pranayama, Aquarian/Thorsons, 1992

EXAMINATION AND MARKS DISTRIBUTION:

Total marks - 100

Internal Assessment (Practical) – 40 marks

Mid semester examination - 40 marks

End of term examination – 60 marks

Practical– 60 marks

Course - Pediatrics and osteopathic care of children-2

Course Code: BOS 703

Credit – 4 (2T/0P)

1. Axial skeleton

- Torticollis
- Plagiocephaly
- Scoliosis
- Kyphosis and lordosis
- Pectus excavatum and carinatum
- Vertebral somatic dysfunction

2. Upper extremity

- Fractures of the clavicle
- Brachial plexus injury
- Shoulder dysplasia
- Nursemaid's elbow

3. Lower extremity

- Dysfunctions of the feet
- Dysfunctions of the legs
- Dysfunctions of the hips
- Gait disorders

4. Ears, nose and throat

- Otitis media
- Rhinitis
- Sinusitis
- Pharyngitis
- Tonsillitis

5. Respiratory dysfunctions

- Mouth breathing
- Sleep apnea
- Bronchiolitis
- Asthma

6. Digestive tract dysfunctions

- Sucking and swallowing dysfunctions
- Regurgitation and gastroesophageal reflux
- Colic
- Constipation

EXAMINATION AND MARKS DISTRIBUTION:

Total marks - 100

Internal Assessment- 20 marks.

Mid semester examination - 20 marks

End of Term Examination

Theory- 30 marks

Practical - 50 marks

Course: Osteopathic treatment: philosophy, concepts, evaluation, and techniques- 7

Course Code: BOS 704

Credit - 6

Unit 1 - Cranial 8: fluidic approaches

Course objectives:

- To acquaint the students with Sutherland's late life cranial approach as well as with contemporary approaches to cranial osteopathy.
- To provide the theoretical and practical knowledge for the treatment of the eyes.

Learning outcome:

- To understand the development of osteopathy in the cranial field from its initial stages until our time, by following the trail of the work of Sutherland, Becker and Jealous.
- To effectively diagnose and treat osteopathic dysfunctions in the orbit and eye.

Module 1 – History and philosophy of cranial osteopathy.

- a) Sutherland's, Becker's, and Jealous's contributions to osteopathy.
- b) Contemporary approaches in biodynamic cranial osteopathy.

Module 2 – Practice.

- a) The middle tide.
- b) The long tide.
- c) Diagnosis and treatment of the orbit.
- d) Diagnosis and treatment of the eye.

Suggested reading:

- "Osteopathy in the cranial field" - H. Magoun.
- "The cranial bowl" – W.G. Sutherland.
- "Contributions of thought" – W.G. Sutherland.
- "Cranial osteopathy" – T. Liem.
- "Collected papers of Viola Frymann" – V. Frymann
- "Life in motion" – R. Becker
- "An osteopathic odyssey" - J. Jealous

Unit 2 –Visceral 6: respiratory system and heart

Course objectives:

- To acquaint the student with the principles of osteopathic diagnosis and treatment of the lungs and respiratory tract.
- To understand the osteopathic perspective on heart dysfunctions and its links with other structurally and functionally related structures.
- To integrate these concepts with their musculoskeletal, visceral and craniosacral relations.

Learning outcome:

- To develop an understanding of the respiratory system in the osteopathic visceral approach while considering its musculoskeletal, visceral and craniosacral relations.

- To effectively treat respiratory tract osteopathic dysfunctions or improve its function for further purposes.
- To incorporate the osteopathic perspective on heart and integrate it with the previous knowledge in the craniosacral and musculoskeletal fields.
- To improve heart and circulatory function through osteopathic local and distal treatment.

Module 1 – anatomy and physiology review:

- a) Review of the anatomy and physiology of the respiratory system and heart.

Module 2 – osteopathic concepts:

- a) Related osteopathic dysfunctions.
- b) Osteopathic concepts. Musculoskeletal, visceral and craniosacral relations.

Module 3 – Practice:

- a) Osteopathic dysfunctions of the lungs.
- b) Mobility and motility of the lungs.
- c) Diagnostic methods and assessments.
- d) Treatment of the lungs and respiratory tract osteopathic dysfunctions through mobilisation techniques, listening techniques, rebound techniques, and recoil technique.
- e) Osteopathic dysfunctions of the hearth. Mobility and motility of the hearth. Diagnostic methods and assessments.
- f) Treatment of the hearth dysfunctions through myofascial techniques and listening techniques.
- g) Motility and mobility of the thyroid gland.

Suggested reading:

- “Visceral manipulation in osteopathy” – Eric Hebggen
- “Visceral manipulation” – J.P. Barral
- “Visceral manipulation 2” – J.P. Barral
- “Collected papers of Viola Frymann” - V. Frymann
- “The thorax” - J.P. Barral

Unit 3 - Visceral 7: kidneys and urinary system

Course objectives:

- To acquaint the student with the principles of osteopathic diagnosis and treatment of the kidneys and urinary system.
- To integrate these concepts with their musculoskeletal, visceral and craniosacral relations.

Learning outcome:

- To develop an understanding of the kidneys and respiratory system osteopathic visceral approach while considering its musculoskeletal, visceral and craniosacral relations.

- To effectively treat kidneys and bladder osteopathic dysfunctions or improve its function for further purposes.

Module 1 – anatomy and physiology review:

- a) Review of the anatomy and physiology of the kidneys and urinary system.

Module 2 – osteopathic approach:

- a) Related osteopathic dysfunctions.
- b) Osteopathic concepts. Musculoskeletal, visceral and craniosacral relations.

Module 3 – practice:

- a) Osteopathic dysfunctions of the kidneys and bladder.
- b) Mobility and motility of the kidneys and bladder.
- c) Diagnostic methods and assessments.
- d) Treatment of the kidneys and urinary system dysfunctions through fascial techniques and listening techniques.

Suggested reading:

- “Visceral manipulation in osteopathy” – Eric Hebgén
- “Visceral manipulation” – J.P. Barral
- “Visceral manipulation 2” – J.P. Barral
- “Collected papers of Viola Frymann” - V. Frymann

Unit 4 - Visceral 8: Reproductive system

Course objectives:

To acquaint the student with the principles of visceral osteopathy.

To acquaint the student with the various aspects of dysfunction in the uterus, ovaries and prostate.

To provide diagnostic assessments and treatment tools to enhance the mobility and motility of these organs in their context with the related musculoskeletal, visceral and craniosacral structures.

Learning outcome:

To develop an understanding of the uterus, ovaries, and prostate in the osteopathic visceral approach while considering its musculoskeletal, visceral and craniosacral relations.

To effectively treat osteopathic dysfunctions in the uterus, ovaries and prostate.

Module 1 – visceral osteopathy introduction:

History of visceral osteopathy. The musculoskeletal, craniosacral and visceral triad in diagnosis and treatment. Barral’s contributions. Contemporary osteopathy contributions.

Module 2 – anatomy and physiology review:

Anatomy and physiology review of the uterus, ovaries and prostate.

Module 3 – osteopathic considerations:

Uterus, ovaries and prostate osteopathic considerations.

Musculoskeletal, craniosacral and visceral relations.

Module 4 – practice:

Physiologic mobility and motility of the uterus, ovaries and prostate.

Osteopathic dysfunctions of the uterus, ovaries and prostate.

Diagnostic methods and assessments.

Treatment of the uterus, ovaries and prostate dysfunctions through functional techniques, fascial techniques and listening techniques.

Suggested reading:

“Visceral manipulation in osteopathy” – Eric Hebgren

“Visceral manipulation” – J.P. Barral

“Visceral manipulation 2” – J.P. Barral

“Urogenital manipulation” - J.P. Barral

Unit 5 - High Velocity Low Amplitude 3: cervical spine and upper limb

Course objectives:

- To acquaint the student with the principles of HVLA techniques in the cervical spine and upper limb
- To acquaint the student with the applications and contraindications of HVLA techniques in the cervical spine and upper limb
- To diagnose and treat osteopathic dysfunctions in the cervical spine and upper limb.

Learning outcome:

- To develop an understanding of the scope, limitations and application of HVLA techniques in the cervical spine and joints of the upper limb.
- To effectively treat osteopathic dysfunctions in the cervical vertebrae, sternoclavicular joint, radial head, and wrist joint.

Module 1 – introduction:

- a) Mechanisms of action
- b) Scope and applications
- c) Contraindications

Module 2 – review of the spine and ribs mechanics:

- a) Review of the biomechanics of the joints of the cervical spine and upper limb
- b) Review of the surface anatomy and palpation

- c) Review of the osteopathic assessment and mobilisations of the cervical spine, sternoclavicular joint, elbow complex and wrist joint

Module 4 – practice:

- a) HLVA techniques for cervical spine dysfunction
 b) HLVA techniques for sternoclavicular dysfunction
 c) HVLA technique for radial head dysfunction.
 d) HVLA technique for wrist joint dysfunction

Examination and marks distribution:

Total marks - 150

Internal Assessment – 40 marks

Mid semester examination - 40 marks

End of term examination-110 marks

- Theory – 60 marks
- Practical – 50 marks

Applied clinical osteopathic treatment -5 (150 hrs)

SEMESTER 7									
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Examination and Marks Distribution				
					Internal Assessment		End Term Examination		Total Points
					Mid semester Exam	Assignment	Theory	Practical	
CC-30	General Psychology	BOS701	3	2T/1P	20		30	25	75
GE	General Elective GE I -Sports Physiology GE II - Ergonomics GE III -Yoga Practicum	BOS702	4	4T/0P	30	10	60		100
CC-31	Paediatrics and Osteopathic Care of	BOS703	5	3T/2P	20		30	50	100

	Children – 2								
CC-32	Osteopathic Treatment: Philosophy, Concepts, Evaluation and Techniques – 7	BOS704	6	4T/2P	40		60	50	150
	Applied Clinical Osteopathy Technique-5		150hrs						
Total Credits of Semester 7			18		Total Points of Semester 7				425

8th semester

Course: Thesis
Course Code: BOS 801
Credit - 6

Course objectives:

- To practically implement the knowledge gained through research methodology and biostatistics in the osteopathic research process.
- To gain deeper insights into current research and developments in the field of osteopathy.

Learning outcomes:

- To independently conduct a research in their respective area of interest in the field of osteopathy.
- Formulating research questions and hypotheses, and operationalise them. Being able to create and implement a research plan adequate to the research question.
- Gaining advanced research skills encompassing construction of research tools and conducting experiments, which allow for solving complex problems in the field of osteopathy.
- To acquire oral presentation skills, and can prepare a presentation in the form of a research report or conference poster.

Guidelines:

- A. Every candidate pursuing B.Sc. Osteopathy degree course is required to present a thesis to the evaluation panel.
- B. The thesis work is aimed to train a graduate student in the practice of fundamental research methods and techniques, including the identification of a problem, formulation of an hypothesis, the search and review of literature, the design of a research study, collection of data, critical analysis, the comparison of results and drawing a conclusion.
- C. The candidate shall start their research work immediately after getting approval through the internal evaluation by the research committee.
- D. The results of such work shall be submitted in the form of thesis as per the guidelines issued by the university. The thesis will be sent to all the examiners appointed by the university and evaluation shall be conducted during the presentation of the thesis.
- E. As a result of the thesis presentation, the student will be awarded with the marks and will be graded as approved, or approved with modification(s), or not approved.
- F. If the thesis work is graded as approved with modification(s), the candidate has to submit the modified thesis work on or before the date notified by the university.
- G. After successful presentation and evaluation of their research work, every candidate shall submit three copies of thesis thus prepared as per the university prescribed standard format, before the dates notified by the university.
- H. If the thesis is not approved or rejected by the majority of the examiners, the result shall be withheld till the resubmitted thesis work is approved.
- I. If the candidates fail in the written/practical examination, but his/her thesis approved, the approval of the thesis shall be carried over to the subsequent examinations.

Examination and marks distribution

Total marks:150

Internal examination - *Research proposal presentation: 50 marks*

End semester examination - *thesis submission and presentation: 100 marks*

Course: Professional practice management and Ethics

Course Code: BOS 802

Credit - (4)

Course Objectives:

This course involves a description of ethical code of professional practice, as well as its moral & legal aspects. At the end of the course the student will acquire the knowledge of the basics in Managerial & Management skills with Ethics.

Course Outcomes:

This course is aimed to enable the candidate to acquire the knowledge of ethical code of Professional practice, as well as its moral & legal aspects.

Unit-I : Organization and Planning:

Introduction to Health management, principles of health management -Planning, implementation, Steps of Planning Cycle - Organization and Organizational behavior - Leadership in Health management - health governance - Project management - Strategic management.

Unit- II: Resource Management:

Logistic, human resource, time management in Health - Types of Budgets - Introduction to MIS and HMIS - Health system reform - Human Resource in Health - Current status of HRH in India, Rural health statistics - recruitment planning - job analysis - Health care quality and performance management in Osteopathy.

Unit-III : Modern management techniques:

Modern management techniques - network analysis - PERT - fish bone technique - Management by Objectives - Health care marketing - health management during disasters and pandemics.

Unit-IV : Morals and Practice:

Conflict of Interest - Occupational ethics - Major ethical principles applied to moral issues in health care - Relationship with patient - Provision of services and advertising - Confidentiality and responsibility

Unit-V : Osteopathy Ethics:

History of Osteopathy - Philosophy of Osteopathy - Rules of professional conduct & scope of practice - Relationship with the profession - Professional and government licensing accreditation and education standards - Laws and legal concepts - Protection from malpractice claim.

EXAMINATION AND MARKS DISTRIBUTION

Total marks - 100

Internal Assessment – 40 marks

Mid semester examination - 30 marks

Assignment - 10 marks

End of term examination-60 marks

· Theory – 60 marks

Course: Osteopathic treatment: integration

Course Code: BOS 803

Credit - 6

Unit 1 - Musculoskeletal, visceral and cranial integration

Course objectives:

- To review the anatomical, physiological and osteopathic relations of all the structures learned along the program.
- To explore the different possibilities in osteopathy of connecting the structures studied under the musculoskeletal, visceral and cranial papers.
- To provide a platform where students can understand in a practical way the implications of these connections in diagnosis and treatment.
- To broaden the understanding of the osteopathic principles and philosophy in the light of the practice.

Learning outcome:

- A holistic vision of health, disease and osteopathic treatment supported by a practical understanding of the interdependence between the various systems and anatomical structures studied along the program.

Module 1 – Anatomical, physiological and osteopathic connections:

- a) Review of the anatomical, physiological and osteopathic relations of the different structures.

Module 2 – Osteopathic models:

- a) Osteopathic models as possible frameworks for integration.

Module 3 – Practice:

- a) Diagnosis through global approaches, differentiation tests, inhibition tests, and osteopathic differential diagnosis.
- b) Global to specific and specific to global transitions.

Unit 2 - Integration of the three diaphragms

Course objectives:

- To review the osteopathic concept of the three diaphragms.
- To provide a practical experience of the importance of the balance in tension of the three diaphragms in posture, fluid dynamics, muscular and fascial tension, and in relation with the primary respiratory mechanism.
- To diagnose and treat restrictions in the three diaphragms in an integrated approach.

Learning outcome:

- To practically understand the importance of the balance in tension of the three diaphragms and the distortions that develop after their imbalance.
- To diagnose and treat restrictions in the three diaphragms.

Module 1 – Anatomy review:

- a) Anatomy review of the floor of the pelvis, the respiratory diaphragm and the cranial duramater.

Module 2 – Osteopathic considerations:

- a) The dynamics of the cranial, respiratory and pelvic diaphragm.
- b) Dysfunctions, related dysfunctional chains, symptomatology.
- c) Integration of the three diaphragms and its importance in fluid dynamics, postural integrity and fascial tensions.

Module 3 – practice:

- a) Diagnosis and treatment of dysfunctions related to the pelvic, respiratory and cranial diaphragms.

Unit 3 - Case presentations

Course objectives:

- To provide the students with a platform where they can train their communication skills by presenting in front of their pairs.
- A space for the students to exercise osteopathic reasoning while synthesising their experience in clinic, expressing their understanding and debating with faculty and other students.

Learning outcome:

- An increased capacity of expressing the process behind the practice of osteopathy.
- An enhanced understanding of osteopathic principles, philosophy, diagnosis and treatment through the discussions and debates.

Module 1 - case presentations:

- a) Presentation and discussion of clinical cases.

Suggested reading:

- “The philosophy and mechanical principles of osteopathy” – A.T. Still
- “Osteopathy: research and practice” – A.T. Still
- “Contributions of thought” - W.G. Sutherland
- “Osteopathy - models for diagnosis, treatment and practice” - J. Parsons, N. Marcer
- “Greenman’s principles of manual medicine” = L. Destefano
- “Collected papers of Viola Frymann” – V. Frymann

Examination and marks distribution:

Total marks - 150

Internal Assessment – 40 marks

Mid semester examination - 40 marks

End of term examination-110 marks

- Theory – 60 marks
- Practical – 50 marks

Value Added Course: Accessory osteopathic techniques

Course Code: BOS 804

Credit - 2

Course objectives:

- To acquaint the student with an understanding of the development of the techniques strain-counterstrain, deep transverse massage and trigger points.
- To acquaint the student with the physiology behind these families of techniques, their scope of application, limitations and contraindications.
- To provide the student with an introductory experience of some techniques under each of these categories, that will then be developed under the other musculoskeletal units.

Learning outcome:

- An in depth understanding of the development, scope, limitations and contraindications of high velocity low amplitude, strain-counterstrain, deep transverse massage, and trigger point techniques.
- An understanding of the physiology, mechanism of action, and process for each of these families of techniques.
- A practical familiarisation in palpation for each of these techniques, that will be further developed in the following musculoskeletal units.

Module 1 - High velocity low amplitude:

Origin and development. Physiology and mode of action. Applications. Limitations. Contraindications. Practice.

Module 1 - Strain-counterstrain:

Origin and development. Physiology and mode of action. Applications. Limitations. Contraindications. Practice.

Module 1 - Deep transverse massage:

Origin and development. Physiology and mode of action. Applications. Limitations. Contraindications. Practice.

Module 1 - Trigger points:

Origin and development. Physiology and mode of action. Applications. Limitations. Contraindications. Practice.

Suggested reading:

- “Greenman’s principles of manual medicine” – L.A. DeStefano.

- “Atlas of osteopathic techniques” – A.S. Nicholas.
- “Textbook of orthopaedic medicine” - J. Cyriax
- “Positional release techniques” - L. Chaitow

Applied clinical osteopathic treatment -6 (150 hrs)

SEMESTER 8									
Nature of the Course	Course/Subject	Course Code	Total Credits	Credits	Examination and Marks Distribution				
					Internal Assessment		End Term Examination		Total Points
					Mid semester Exam	Assignment	Theory	Practical	
CC-33	Thesis	BOS801	6	0T/6P	50			100	150
CC-34	Professional Practice Management and Ethics	BOS802	4	4T/0P	30	10	60		100
CC-35	Osteopathic Treatment: Integration	BOS803	6	4T/2P	40		60	50	150
AEC C-3	Accessory osteopathic techniques	BOS804	2	2T	20		30		50
	Applied Clinical Osteopathy Technique-6	BOS805	150hrs						
Total Credits of Semester 8			18		Total Points of Semester 8			450	
Internship					6 months – 600 clinical hours				