



YENEPOYA

(DEEMED TO BE UNIVERSITY)
Recognized under Sec 3(A) of the UGC Act 1956
Accredited by NAAC with 'A' Grade

YENEPOYA (DEEMED TO BE UNIVERSITY)

Deralakatte, Mangaluru -575018

REGULATIONS AND CURRICULUM GOVERNING

UNDERGRADUATE PROGRAM

BACHELOR OF NATUROPATHY AND YOGIC SCIENCES (B.N.Y.S.)

(CURRICULUM - EFFECTIVE FROM 2020-21)

ATTESTED

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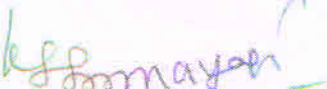
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NOTIFICATION – 43-ACM/2021 dtd.07.07.2021

Sub: Curriculum of Bachelor of Naturopathy and Yogic Sciences (BNYS)

Ref: Resolution of the 43rd Academic Council at its meeting held on 07.07.2021
vide agenda - 10


The curriculum of Bachelor of Naturopathy and Yogic Sciences (BNYS) has been approved at the 43rd meeting of Academic Council held on 07.07.2021 and subsequently by the Board of Management at its 54th meeting held on 08.07.2021.


REGISTRAR
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To:

The Principal, Yenepoya Naturopathy & Yoga Medical College & Hospital

Copy to:

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1. Controller of Examinations
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INTRODUCTION

National Institute of Naturopathy (NIN), Pune, revised the BNYS syllabus, with a view of standardizing BNYS syllabi with uniform durations and course contents across the country in 2012. The present volume is published incorporating the amendments made by the National Institute of Naturopathy, Pune, to the regulations of BNYS course and addition of certain topics to the syllabi. The regulations should be read with the Ordinance Governing BNYS Degree Course and Curriculum of first year– 2020.

First year BNYS is of 1½ year duration, and consists of pre-clinical subjects and subjects describing Yoga and Naturopathy principles, Anatomy, Physiology, Biochemistry, Philosophy of Naturopathy, Principles of Yoga and Sanskrit. Second year BNYS is of 1 year duration, and consists of Para-clinical subjects and subjects describing philosophies of Yoga and Naturopathy clinical subjects, Pathology, Microbiology, Community Medicine, *Yoga* Philosophy, Basic Pharmacology, and Colour therapy and magneto biology. Third year BNYS is of 1 year duration, and consists of Para-clinical subjects and Yoga and Naturopathy clinical subjects, Forensic Medicine and Toxicology, Manipulative Therapies, Acupuncture and Acupressure, *Yoga* and its applications, Nutrition and Medicinal Herbs, Diagnostic Methods (I and II) Naturopathy and Conventional Medicine, Psychology and Basic Psychiatry, and Fasting therapy and Dietetics. Final year BNYS is of 1 year duration, and consists of clinical subjects and Yoga and Naturopathy clinical subjects Obstetrics and Gynecology, *Yoga* therapy, Hydrotherapy and Mud therapy, Physical

Medicine and Rehabilitation, First Aid and Emergency Medicine, Clinical Naturopathy and Research Methodology and Recent Advances.

In Section I, goals of BNYS course are given. Section II gives general objectives. Section III gives duration of the course, recommendations regarding attendance, internal assessment, distribution of marks for various subjects in professional examinations and criteria for pass. The course contents of subjects are elaborated in Section IV. Section V deals with topics recommended for teaching of medical ethics.

SECTION I

1 Goals of BNYS Course

- 1.1 Recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy;
- 1.2 Develop the skills in most of the competencies, and training that are required to deliver the Naturopathy and Yoga health care system;
- 1.3 Become aware of the contemporary advances and developments in the discipline concerned;
- 1.4 Acquire a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology;
- 1.5 Become proficient in their profession by developing scientific temper and improve educational experience;
- 1.6 Identify social, economic, environmental, biological and emotional determinants of health in a given case and take them into account while planning therapeutic, rehabilitative, preventive and promotive measures/strategies;
- 1.7 Plan and devise measures in Naturopathy and yoga for the prevention and rehabilitation of patients suffering from disease and disability ;
- 1.8 Demonstrate skills in documentation of individual case details as well as morbidity data relevant to the assigned situation;
- 1.9 Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behavior in accordance with the societal norms and expectations;

- 1.10 Play the assigned role in the implementation of national health programs, effectively and responsibly;
- 1.11 Organize and supervise the chosen/assigned health care services
Demonstrating adequate managerial skills in the clinic/hospital or the field Situation;
- 1.12 Develop skills as a self-directed learner; recognize continuing educational needs, select and use appropriate learning resources;
- 1.13 Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyze relevant published research literature;
- 1.14 To implement all National health policies ;
- 1.15 Work towards realization of ‘_Health for all’, as a national goal through naturopathy and yoga;
- 1.16 To follow the medical ethics and to fulfill the social and professional responsibilities as a Naturopathy and Yoga Physician through drugless therapies;
- 1.17 Be competent in the practice of holistic medicine with expert knowledge and experience in promotive, preventive, curative and rehabilitative aspects of diseases;
- 1.18 Become proficient in their profession by developing scientific temper and improve educational experience;

2 Institutional Goals

After the medical undergraduate program, the students must:

- 2.1 Be able to expertly diagnose and manage common diseases and health problems of individuals as well as community, work with the health team as a fully qualified doctor at primary, secondary or tertiary levels, with his/her clinical experience and skills in history, physical examination and relevant investigations;
- 2.2 Be proficient in promotive, preventive, curative and rehabilitative medicine and therapy for common health issues;
- 2.3 Be adept in different therapeutic modalities and their administration;
- 2.4 Develop a humane attitude towards one's clients and understand economic, environmental, social, psychological and cultural factors that influence health;
- 2.5 Enjoy an urge for self-improvement, directed towards advanced expertise or research in any chosen area of health care;
- 2.6 Have enough knowledge about implementation of National Health Programs and the basic factors required for the same, which are as follows;
 - 2.6.3 Family Welfare and Maternal and Child Health (MCH);
 - 2.6.4 Sanitation and Water Supply;
 - 2.6.5 Prevention and Control of communicable and non-communicable diseases;
 - 2.6.6 Immunization;
 - 2.6.7 Health education;
- 2.7 Possess management skills in human resources, materials and resource management in health care delivery;

- 2.8 Be competent in recognizing community health issues and design, institute curative and preventive measures and evaluate the outcome of these measures, thus working towards resolving these issues;
- 2.9 Be able to work successfully in a variety of health care settings;
- 2.10 Develop integrity, responsibility, reliability, dependability and compassion, which are characteristics required for successful professional life;
- 2.11 Develop leadership and communication skills to work as leading investigator or clinician in health care teams;

SECTION II

1. Objectives of Medical Graduate Training Programme

- 1.1. To effectively integrate the conventional basic sciences (e.g. human physiology) with the traditional medical systems and to enhance the understanding of their effects and therapeutic potential;
- 1.2. To provide state of the art learning facilities (e.g. audio visual aids, interactive learning systems) to conceptualize the ancient medical system;
- 1.3. To run advanced laboratories under each department (basic and clinical sciences) for effective experimental training and research;
- 1.4. To explore the possibilities of promoting effective integrated medical practice at conventional medical facilities attached to the institute;
- 1.5. To provide the best possible clinical setting for clinical training and research;
- 1.6. To prepare every Yoga and Naturopathic physician with an in depth understanding of Basic sciences, superior clinical training and with an outlook for research and development;

SECTION III

1 Course of Study:

The duration of the course shall be 5 ½ years (Five and half years). The course shall include a period of regular study of four and a half (4 ½) years, followed by a compulsory rotatory internship of one year.

The period of regular study shall be divided into four phases – first year of one and half (1½) years, and the Second, Third and Final years of one year each of the B.N.Y.S. Medical Degree Course respectively.

2 Eligibility to take admission in BNYS Colleges:

Pass in 12th standard/PUC with 45% aggregate marks in Physics, Chemistry and Biology.

3 Attendance:

A candidate shall be considered to have satisfied the requirement of attendance for each Part/Phase if he /she attends not less than 80 per cent of the theory and practical classes actually conducted up to the end of the Phase in that subject.

Such a candidate having shortage of attendance shall be required to attend 80 per cent of the theory and practical classes actually held up to the end of the term by repeating that subject of that Part/Phase during a subsequent term.

4 **Teaching Hours:**

The allotment of time (in number of hours) to teach Theory and to conduct

Practical/Clinical and Tutorial /Demonstration, Seminar in each subject shall be:

I YEAR B.N.Y.S. (18 months)

| No. of Subjects | No. of Papers | SUBJECTS | TOTAL HOURS |
|------------------------|----------------------|------------------------------|--------------------|
| I | 01. | Anatomy – I | 550hrs |
| | 02. | Anatomy – II | |
| II | 03. | Physiology – I | 500hrs |
| | 04 | Physiology – II | |
| III | 05. | Biochemistry | 300hrs |
| IV | 06. | Philosophy of Naturopathy | 325hrs |
| V | 07. | Principles of <i>Yoga</i> | 400hrs |
| VI | 08. | Sanskrit | 100hrs |
| | | Total Hours | 2175hrs |

Internship program:

A candidate after passing final B.N.Y.S. Medical Degree Examination shall undergo the compulsory rotatory internship of one year duration, which shall consist of work/duty postings in the following sections/departments for the period specified against them.

| S.No. | Department | Duration |
|--------------|--|------------------|
| 1. | Philosophy of <i>Yoga</i> and Naturopathy | 1 Month |
| 2. | <i>Yoga</i> and Mind-Body Medicine | 1 Month |
| 3. | Pathology and Microbiology | 1 Month |
| 4. | Community Medicine | 1 Month |
| 5. | Energy Medicine | 1 Month |
| 6. | Manipulative Therapies, Physical Medicine & Rehabilitation | 1 Month |
| 7. | Fasting, Dietetics, Nutrition, & Medicinal Herbs | 1 Month |
| 8. | Diagnostic Methods | 1 Month |
| 9. | Obstetrics & Gynecology | 1 Month |
| 10. | Hydrotherapy & Mud Therapy | 1 Month |
| 11. | Naturopathic Medicine | 1 Month |
| 12. | Allied Health Sciences | 1 Month |
| | TOTAL | 12 Months |

5 Scheme of Examination:

The examination/s shall be held as per the date of Examination notified by the University.

There should be one Internal & One External Examiner for all practical & Viva exams for each subject. A candidate shall register for all the subjects of a term/year, when he/she appears for the first time to the examination of that Part.

5.1 Internal Assessment: Scheme of Examination:

There shall be an internal assessment which follows broadly the principles enunciated by the University in each subject for which 20 per cent of the marks are set apart and these will be added in the final grade in the University examinations. There shall be a minimum of two assignments and two periodical tests in every subjects of each year to assess the progress of the candidate.

If a candidate fails in an Examination, his/her internal assessment shall be assessed again as if he/she is a regular student for the second attempt only.

Theory

Minimum of 3 examinations is recommended. The examination preceding the university examination may be similar to the University Examination. Average marks of the better of the two notified internal examinations should be reduced to the marks allotted for internal assessment for each subject and should be sent to the university.

Practical

A minimum of one clinical test may be conducted at the end of each ward postings in all the clinical subjects.

Assistant professor and above or lecturer with five years of teaching experience can conduct internal assessment examination. Average of best two examination marks should be taken into consideration while calculating the marks of internal assessment.

The internal assessment marks of both theory and practical obtained by the candidates should be sent to the University at least 15 days prior to the commencement of the theory examination.

NOTE:

01.
 - All question papers shall have 2 Sections – namely Section A (10 Marks) & Section –B (70 Marks).
 - Section A will contain 10 Multiple Choice Questions – 1 marks each. No choice provision is allowed in Section A.
 - Section B will contain 2 Parts. Part – 1 will have 2 Long Essays of 10 marks each with provision of 1 choice. Part – 2 will have 10 Short Essays of 5 marks each with provision of 2 choices.
02. There should be one Internal & one External examiner for all, practical & viva exams for each subject.
03. All Theory Papers are for 3 hours duration.

5.3 Eligibility for examination:

A candidate who has passed in all the subjects of First B.N.Y.S. Medical Degree examination shall be eligible to be promoted to Second B.N.Y.S. Medical Degree course.

A candidate is eligible for carry over facility only if he/she has appeared for all the subjects of that particular examination.

First year to Second Year – 3 subjects carry over (Out of 5 subjects)

Second year to Third year - 3 subjects carry over (Out of 7 subjects)

Third Year to Final year – 3 subject carry over (Out of 7 subjects)

Completion of the degree should not go beyond 11 years from the date of admission.

5.4 Criteria for Pass

To be eligible for promotion to the II, III & IV years, the candidate has to complete and pass in all the subjects of I, II & III years with an exemption of one subject in each year. Students have to clear Ist year subjects except 1 subject when appearing for the IInd year exam. (similar for other years). To write the IV year (final year) exam, the candidate has to clear all the subjects in I, II, & III year. The candidate is declared to have been successful provided he/she secures minimum 40% and above in theory, 50% and above in oral/practical/clinical separately each subjects, but should get 50% in aggregate in all.

5.5 Declaration of Class:

A candidate who passes all the subjects of one examination in the first attempt only be eligible for a class.

No class or rank shall be declared for candidate who does not pass any examination in the first attempt, and such a candidate shall be eligible only for a pass class.

The percentage of marks for declaring pass/Second/First Class and First class with

Distinction shall be as follows:

| | |
|--------------|---|
| Distinction | Not less than 75 percent of the Aggregate Marks |
| First class | Not less than 65 percent of the Aggregate Marks |
| Second class | Not less than 50 percent of the Aggregate Marks |
| Pass class | Candidate who passes the examination in more than one attempt |

Note: - A candidate who passes in all the subjects of any Examination only in first attempt shall be eligible for First class with Distinction /First/Second Class

6. **Justification for the Course:**

Naturopathy and Yoga are part of a Complementary and Alternative system of Medicine (CAM)/Indian system of Medicine that mainly emphasize on the concept of holistic health which includes the physical, mental and social aspects of well-being, and not merely an absence of disease as envisioned by World Health Organization (WHO). With the ideal Naturopathy and Yoga techniques, we could establish a harmonious balance between body, mind and spirit, thus bringing a fundamental change in the organism, with an improved quality of life, slowing down of the ageing process, preventing and managing the illnesses. Scientific research across the globe has validated the potential benefits of these therapies on stress, obesity, diabetes mellitus, anxiety, depression, hypertension, coronary heart disease, osteo arthritis, bronchial asthma, tension headache/migraine, chronic back pain, insomnia, dyslipidaemia and other lifestyle/chronic medical conditions. By looking at the current global challenge to tackle mainly Non-Communicable diseases, Naturopathy and Yoga play a significant role in this direction. It is the

need of the hour to train young minds as Medical practitioners in Naturopathy and Yoga to meet this global challenge.

In the year 2014 a separate AYUSH Ministry has been established. After this more importance has been given to uplift the AYUSH systems including Yoga and Naturopathy at the national and international level. BNYS (Bachelors in Naturopathy & Yogic Sciences) is one of the 5 Medical Courses under AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha & Homeopathy). The subjects taught are a perfect blend of Naturopathy & Yoga subjects and modern medical subjects. In this direction, starting a BNYS (Bachelor of Naturopathy and Yogic Sciences) Medical College provides a holistic health care education to the students and the clinical services with an attached teaching Hospital to the people suffering from various medical conditions.

Recognition across the globe:

BNYS has been recognized by **World Naturopathy Federation** and accepted worldwide as a Medical system, and the BNYS degree is on par with Canadian, American, European, New Zealand Naturopathic Medicine regulation, and Educational Standards.

7. Employability:

The completed BNYS graduates have been placed in various capacities as

- Academicians in BNYS Institutes and Universities
- Scientists
- Medical Officers in Government & Private Hospital settings
- Health Spa Managers in 5 & 7-star hotels and resorts
- Wellness consultants in foreign countries and India etc.

SECTION IV

SUBJECTS & COURSE CONTENT

1. ANATOMY

1.1 Goals and Objectives

1.1.1 Goal

It aims at giving inclusive knowledge of the gross and microscopic structure and development of human body to provide a basis for assessing the correlation of organs and structures and anatomical basis for disease presentations.

1.1.2 Objectives

1.1.2.1 Knowledge:

After completion of the program, the student must be able to:

- 1.1.2.1.1 Understand normal human anatomy clinically important inter-relationship and functional anatomy of bodily structures;
- 1.1.2.1.2 Comprehend histological structures of various tissues and organs and co- relate structure and function in order to understand diseased states;
- 1.1.2.1.3 Recognize basic structure and connections of the central nervous system, understand the regulation and integration of various organs and systems and be skilled in locating lesion sites according to deficits in diseased states;
- 1.1.2.1.4 Explain developmental basis of variations and abnormalities with respect to sequential development of organs and systems, teratogens, genetic mutations and environmental hazards.

1.1.2.2 Skills

After completion of the program, the student must be able to:

- 1.1.2.2.1 Locate and identify body structures including topography of living body;
- 1.1.2.2.2 Histologically, identify tissues and organs;
- 1.1.2.2.3 Identify gross congenital anomalies and be familiar with the principles of karyotyping;
- 1.1.2.2.4 Interpret new imaging techniques such as CT, Sonogram, MRI etc after understanding their basic principles;
- 1.1.2.2.5 Understand clinical basis of some common clinical procedures i.e., intramuscular and intravenous injection, lumbar puncture and kidney biopsy etc..

1.1.2.3 Integration

Student shall be capable of understanding the regulation and integration of the functions of the organs and systems in the body and interpret the anatomical basis of disease process using the combined teaching of other basic sciences.

1.2 Human Anatomy – I (Duration: 18 months)

Total hours: 500 (Theory: 300 Practical: 200)

1.2.1 Introduction to Anatomy

1.2.1.1 Nomenclature

1.2.1.2 Anatomical positions

1.2.1.3 Axes and planes

1.2.1.4 Tissues

1.2.1.5 Movements

1.2.2 General Histology

1.2.2.1 Detailed structure of cell and its components and their functional mechanisms

1.2.3 Osteology (Including ossification)

1.2.3.1 Types of bones

1.2.3.2 Classification of bones

1.2.3.3 Description of various bones

1.2.3.3.1 Upper limb

1.2.3.3.2 Thorax

1.2.3.3.3 Abdomen and pelvis

1.2.3.3.4 Vertebral column

1.2.4 Arthrology

1.2.4.1 Classification of joints

1.2.4.2 Construction of joints

1.2.4.3 Description of various joints of:

1.2.4.3.1 Upper limb

1.2.4.3.2 Thorax

1.2.4.3.3 Vertebral column

1.2.5 Myology

1.2.5.1 Types of muscles

1.2.5.2 Muscles of upper limb, thorax, abdomen and pelvis

1.2.5.3 Origin, insertion, blood supply, nerve supply, applied anatomy and actions of these muscles

1.2.6 Respiratory System

1.2.6.1 Upper respiratory tract – Nose, Pharynx, Larynx

1.2.6.2 Trachea & Bronchial tree

1.2.6.3 Lungs

1.2.6.4 Pleura

1.2.6.5 Mediastinum

1.2.7 Cardiovascular System

1.2.7.1 Heart – Position, Surface anatomy and its description

1.2.7.2 Great vessels – Aorta, Pulmonary trunk, superior vena cava, inferior vena cava and their branches

1.2.7.3 Arteries and Veins – Structure of arteries and veins, important arteries and veins of the body

1.2.8 Digestive System

1.2.8.1 Oral cavity

1.2.8.2 Teeth

1.2.8.3 Hard palate

1.2.8.4 Soft palate

1.2.8.5 Esophagus

1.2.8.6 Stomach

1.2.8.7 Small intestine

1.2.8.8 Large intestine

1.2.8.9 Anal canal

1.2.8.10 Liver

1.2.8.11 Gall bladder

1.2.8.12 Bile duct

1.2.8.13 Pancreas

1.2.8.14 Spleen

1.2.8.15 Peritoneum

1.2.9 Mesentery and position of the above organs in the abdominal quadrants.

1.2.9.1 Urinary System

1.2.9.2 Kidney

1.2.9.3 Ureter

1.2.9.4 Urinary bladder

1.2.9.5 Male urethra

1.2.9.6 Female urethra

1.2.10 Lymphatic System

1.2.10.1 Lymph, lymph glands, lymph duct, thoracic duct, cisterna chyli

1.2.10.2 Location of major groups of lymph nodes in the body and their drainage areas

NOTE: The concerned colleges have to make necessary arrangements for providing human cadavers in the anatomy department for teaching.

1.3 Human Anatomy – II (Duration: 18 Months)

1.3.1 Osteology (Including ossification)

Description of various bones of

1.3.1.1 Lower limb

1.3.1.2 Skull as a whole

1.3.1.3 Individual cranial bones of skull

1.3.2 Arthrology

Description of various joints of

1.3.2.1 Lower limb

1.3.2.2 Skull as a whole

1.3.2.3 Skull and vertebral column

1.3.3 Myology

Description of various muscles of

1.3.4 Lower limb

1.3.5 Head

1.3.6 Neck

(Origin, insertion, blood supply, nerve supply, applied anatomy and actions of these muscles)

1.3.7 Reproductive System

1.3.7.1 Male reproductive organs

Penis, Testes, Vas Deferens, Spermatic Cord, Epididymis, Seminal Vesicles, Ejaculatory Duct Prostate Gland Etc.

1.3.7.2 Female reproductive organs

1.3.7.2.1 External genital organs

Vulva, Clitoris, Vagina

1.3.7.2.2 Inguinal Region perineum

1.3.7.2.3 Internal genital organs

Uterus, Cervix, Fallopian tubes, Ovaries, Ligaments of uterus and ovaries

1.3.7.2.4 Mammary glands

1.3.8 Endocrine System

Description of Pituitary, Pineal, Thyroid, Parathyroid, Thymus, Spleen, Pancreas, Suprarenal, Ovaries and Testes

1.3.9 Nervous System

Division of nervous system, central nervous system, peripheral nervous system, cerebral hemispheres, midbrain, pons, medulla oblongata, cerebellum, spinal cord, autonomic nervous system.

1.3.9.1 Meninges: Dura mater and arachnoid mater

1.3.9.2 CSF

1.3.9.3 Ventricular system

1.3.9.4 Cranial nerves

1.3.10 Spinal nerves

1.3.11 Important plexuses: Cervical, Brachial, Lumbar, Sacral and their nerve descriptions.

1.3.12 Organs and Special Senses

1.3.12.1 Tongue

1.3.12.2 Nose

1.3.12.3 Eye and associated structures

1.3.12.4 Ear

1.3.12.5 Integumentary system

1.3.13 Surface Anatomy

1.3.13.1 Projection of the outline of heart, its borders, surface and valves.

1.3.13.2 Lungs – borders, fissures, hila, pleura and diaphragm

1.3.13.3 Liver

1.3.13.4 Kidney

1.3.13.5 Abdominal viscera

1.3.13.6 Pelvic viscera

1.4 Histology

1.4.1 General Histology

1.4.1.1 Microscope

1.4.1.2 Cell

1.4.1.3 Epithelial Tissue I

1.4.1.4 Epithelial Tissue II

1.4.1.5 Connective Tissue – Bones and Cartilages

1.4.1.6 Muscular Tissues

1.4.1.7 Nerve Tissues (TS & LS of peripheral nerve, sensory and sympathetic ganglion, optic nerve)

1.4.1.8 Epithelial glands (serous, mucous and mixed salivary gland)

1.4.1.9 Circulatory system (large artery, medium sized artery, larger vein)

1.4.1.10 Lymphatic system (lymph nodes, thymus, tonsils, spleen)

1.4.1.11 Skin and appendages

1.4.1.12 Placenta and umbilical cord

1.4.2 Systemic Histology

1.4.2.1 Respiratory system(lungs ,trachea)

1.4.2.2 Esophagus and stomach

1.4.2.3 Liver, gall bladder, pancreas

1.4.2.4 Urinary system I (Kidney)

1.4.2.5 Urinary system II (Ureter, bladder)

1.4.2.6 Small and large intestine

1.4.2.7 Reproductive system – Female

1.4.2.8 Reproductive system – Male

1.4.2.9 Upper GIT (tongue)

1.4.2.10 Hypophysis cerebra, thyroid and suprarenal glands

1.4.2.11 Eye – cornea and retina

1.5 Practical

1.5.1 Gross Anatomy (Dissection / Demonstration of following):

1.5.1.1 Upper Limb

1.5.1.1.1 Dissection: Pectoral, scapular, shoulder, arm, forearm (5 weeks)

1.5.1.1.2 Prosected Parts: Joints, Palm and dorsum of hand

1.5.1.2 Thorax

1.5.1.2.1 Dissection: Chest wall, mediastinum, lungs and heart

1.5.1.3 Abdomen

1.5.1.3.1 Dissection: anterior abdominal wall and inguinal region, viscera and posterior abdominal wall

1.5.1.4 Pelvis

1.5.1.4.1 Dissection: Pelvic viscera and blood vessels and nerve sagittal section (M & F) (2 weeks)

1.5.1.4.2 Prosected Parts: Sole of the foot and joints

1.5.1.5 Head and Neck

1.5.1.5.1 Dissection: Scalp, superficial and deep dissection of face and neck (8 – 10 weeks)

1.5.1.5.2 Prosected Parts: Orbit, eyeball, submandibular region, temporal and infra-temporal fossa, cranial cavity, naso and oro-pharyngeal regions, larynx and pharynx. Cross sections at C-4, C-6 levels, sagittal section of head and neck

1.5.1.6 Nervous System

Section of brain and prosected specimens and major functional areas; Gross structure of brain and spinal cord and study of gross sections as mentioned earlier (in brief).

1.5.2 Demonstrations

1.5.2.1 Bones as described in the osteology section

1.5.2.2 Brain and Spinal Cord

1.5.3 Specific Skills

1.5.3.1 To localize important pulsations and the structure against which pressure can be applied in case of bleeding and trauma of particular artery.

1.5.3.2 To elicit superficial and deep reflexes.

1.5.3.3 To demonstrate muscle testing and movements at joints.

1.5.3.4 To locate for: lumbar puncture, sterna puncture, pericardial tapping and liver biopsy.

1.5.3.5 To locate veins for venipuncture.

1.5.3.6 To locate the site for emergency such as tracheostomy.

1.6 Textbooks:

1.6.1 Textbook of Anatomy (III volumes) – BD Chaurasia

1.6.2 Textbook of Anatomy – Hamilton

1.6.3 Practical Anatomy – Cunningham

1.6.4 Human Embryology – Inderbir Singh

1.6.5 Bailey's textbook of histology

1.6.6 Medical Embryology – Langman

1.6.7 Textbook of Clinical Anatomy by Neeta V Kulakarni

1.6.8 Histology text book by Latha V

1.7 Reference Books

1.7.1 Textbook of Anatomy – Gray

1.7.2 Atlas of histology – Diforie

1.7.3 Atlas of histology – Poddar

1.7.4 Textbook of human histology – Veena Bharihoke

1.7.5 A color atlas of human anatomy – McMinn

1.7.6 Grant's method of Anatomy – Grant

1.7.7 Regional and applied Anatomy – RJ Last

1.8 Scheme Of Examination

| S.N | Subject | Theo-ry | Intern-al Assm-t | Viva-Voce | Total | Practi-cals | Inter-nal Assm-t | Total Marks | Grand Total Marks |
|-----|--------------|---------|------------------|-----------|-------|-------------|------------------|-------------|-------------------|
| 01. | Anatomy - I | 80 | 20 | 30 | 130 | 60 | 10 | 70 | 200 |
| 02. | Anatomy – II | 80 | 20 | 30 | 130 | 60 | 10 | 70 | 200 |

2. PHYSIOLOGY

2.1 Goals and Objectives

2.1.1 Goal

The goal of teaching Physiology to undergraduate students is aimed at giving the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate comprehension of the physiological basis of health and disease.

2.1.2 Objectives

2.1.2.1 Knowledge

After completion of the program, the student will be able to:

- 2.1.2.1.1 Explicate the normal functioning of all the organ systems and their interactions for well co-ordinated body function;
- 2.1.2.1.2 Appreciate the relative contribution of each organ system to the homeostasis;
- 2.1.2.1.3 Explain the physiological aspects of normal growth and development;
- 2.1.2.1.4 Illustrate the physiological response and adaptations to environmental stresses;
- 2.1.2.1.5 List physiological principles underlying pathogenesis and disease management.

2.1.2.2 Skills

After completion of the program, the student will be able to:

- 2.1.2.2.1 Conduct experiments designed to study physiological phenomena;
- 2.1.2.2.2 Interpret experimental/investigative data;

- 2.1.2.2.3 Differentiate between normal and abnormal data from results of tests, which he/she has done and observed in the laboratory.

2.1.2.3 Integration

At the end of the integrated course the student shall acquire an integrated knowledge of organ structure and function and regulatory mechanisms.

2.2 Physiology – I (Duration: 18 Months)

Total hours: 500 (Theory: 300 Practical: 200)

2.2.1 General Physiology

- 2.2.1.1 Cell structure and function

- 2.2.1.2 Transport mechanisms across biological membrane

- 2.2.1.3 Body fluids and homeostasis

- 2.2.1.4 Thermoregulation

2.2.2 Blood

2.2.2.1 Plasma proteins

- 2.2.2.1.1 Normal values

- 2.2.2.1.2 Origin, Functions and variations in health and disease

2.2.2.2 Bone marrow

- 2.2.2.2.1 Composition and functions

2.2.2.3 Erythrocytes

- 2.2.2.3.1 Morphology and variations in health and disease

- 2.2.2.3.2 Site and stages of development

- 2.2.2.3.3 Necessary factors

- 2.2.2.3.4 Regulation of development of erythrocytes

- 2.2.2.3.5 Life span and fate of erythrocytes

2.2.2.3.6 Erythrocyte sedimentation rate (ESR)

2.2.2.3.7 Packed cell volume (PCV)

2.2.2.4 Hemoglobin

2.2.2.4.1 Structure, synthesis, function and metabolism

2.2.2.4.2 Types of hemoglobin

2.2.2.5 Anemia – definition and classification

2.2.2.6 Jaundice – definition and classification

2.2.2.7 Spleen- structure and function

2.2.2.8 Leucocytes

2.2.2.8.1 Classification, morphology, development and functions

2.2.2.8.2 Variation in health and disease

2.2.2.9 Thrombocytes

2.2.2.9.1 Development, morphology and functions

2.2.2.9.2 Variation in health and disease

2.2.2.10 Hemostasis

2.2.2.10.1 Mechanism of hemostasis, coagulation of blood

2.2.2.10.2 Fibrinolysis and bleeding disorders

2.2.2.11 Anticoagulants

2.2.2.11.1 Mechanism of action and clinical applications

2.2.2.12 Blood groups

2.2.2.12.1 Classification

2.2.2.12.2 ABO and RH system

2.2.2.12.3 Blood transfusion, indication and hazards

2.2.2.13 Lymph and tissue fluids

2.2.2.13.1 Formation and functions of lymph

2.2.2.13.2 Physiology of reticular system

2.2.2.14 Immune system

Cellular and humoral immunity

2.2.3 Cardiovascular System

2.2.3.1 Heart

2.2.3.1.1 Structure and properties of cardiac muscle

2.2.3.1.2 Innervations of heart, junctional tissue of heart

2.2.3.1.3 Generation and spread of cardiac impulse

2.2.3.2 Electrocardiography

2.2.3.2.1 Einthovan's Law

2.2.3.2.2 ECG leads, normal ECG and its interpretation

2.2.3.3 Cardiac cycle

2.2.3.3.1 Pressure and volume changes (mechanical events)

2.2.3.3.2 Principles of echo-cardiograph

2.2.3.3.3 Jugular venous pulse tracing, radial pulse tracing

2.2.3.3.4 Measurement and regulation of cardiac output

2.2.3.4 Heart sounds

2.2.3.4.1 Description, Causation and relation to other events in cardiac cycle

2.2.3.4.2 Clinical significance of heart sounds

2.2.3.4.3 Stethoscopy

2.2.3.5 Blood pressure

2.2.3.5.1 Definition, regulation and factors influencing BP

2.2.3.5.2 Measurement of blood pressure

2.2.3.5.3 Physiology of hemorrhage and shock

2.2.3.6 Circulations

- 2.2.3.6.1 Blood vessels
- 2.2.3.6.2 Physical principles of blood flow, regulation of blood flow.
- 2.2.3.6.3 Coronary, Splanchnic, cutaneous and capillary, cerebral circulation
- 2.2.3.6.4 Cardiovascular changes in altitude and exercise

2.2.4 Respiratory System

Introduction, internal and external respiration, physiological anatomy of respiratory system

2.2.4.1 Mechanism of Respiration

- 2.2.4.1.1 Inspiration and expiration
- 2.2.4.1.2 Role of respiratory muscles and thoracic cage
- 2.2.4.1.3 Pressure and volume changes during respiration
- 2.2.4.1.4 Work of breathing
- 2.2.4.1.5 lung compliance and its significance in health and disease

2.2.4.2 Lung volumes and capacities

- 2.2.4.2.1 Lung volumes and capacities and their measurements

2.2.4.3 Ventilation

- 2.2.4.3.1 Composition of atmospheric, inspired, alveolar and expired air

2.2.4.4 Pulmonary circulation

- 2.2.4.4.1 Pulmonary circulation, ventilation – perfusion relationship
- 2.2.4.4.2 Diffusion of gases across pulmonary membrane
- 2.2.4.4.3 Oxygen uptake, transport and delivery
- 2.2.4.4.4 Carbon dioxide uptake, transport and delivery

2.2.4.5 Organization of the respiratory centers

- 2.2.4.5.1 Nervous and chemical regulation of respiration
- 2.2.4.5.2 Classification and characteristics of hypoxia, cyanosis, asphyxia, hypercapnea, hypocapnea dyspnea, apnea and orthopnea and periodic breathing
- 2.2.4.5.3 Respiratory changes in high altitude
- 2.2.4.5.4 Physiology of acclimatization and hyperbarism
- 2.2.4.5.5 Respiratory / pulmonary function tests
- 2.2.4.5.6 Non-respiratory functions of lungs
- 2.2.4.5.7 Artificial respiration
- 2.2.4.5.8 Importance of therapeutic administration of oxygen and carbon dioxide
- 2.2.4.5.9 Respiratory changes during exercise

2.2.5 Digestive System

2.2.5.1 Introduction, functional anatomy of digestive system

2.2.5.2 Salivary glands

- 2.2.5.2.1 Composition, functions of saliva
- 2.2.5.2.2 Regulation of secretion of saliva

2.2.5.3 Stomach

- 2.2.5.3.1 Functional anatomy of stomach
- 2.2.5.3.2 Functions of stomach
- 2.2.5.3.3 Composition and functions of gastric juice
- 2.2.5.3.4 Regulation of secretion and mechanism of HCL secretion
- 2.2.5.3.5 Methods of study of gastric function and its supplied aspect

2.2.5.4 Pancreas

- 2.2.5.4.1 Functional anatomy of pancreas
- 2.2.5.4.2 Composition and functions of pancreatic juice
- 2.2.5.4.3 Regulation of pancreatic secretion
- 2.2.5.4.4 Methods of study of pancreatic secretion

2.2.5.5 Liver and Gall Bladder

- 2.2.5.5.1 Functional anatomy of liver and biliary system
- 2.2.5.5.2 Functions of liver and gall bladder
- 2.2.5.5.3 Formation, storage and secretion of bile
- 2.2.5.5.4 Composition, function and regulation of release of bile
- 2.2.5.5.5 Entero-hepatic circulation
- 2.2.5.5.6 Tests for liver function

2.2.5.6 Small intestine

- 2.2.5.6.1 Functional anatomy and functions of small intestine
- 2.2.5.6.2 Composition, function and mechanism of secretions of Succus entericus

2.2.5.7 Large intestine

- 2.2.5.7.1 Functional anatomy and functions of large intestine

2.2.5.8 Gastro-intestinal hormones

- 2.2.5.8.1 Release and functions

2.2.5.9 Gastro-intestinal movements

- 2.2.5.9.1 Mastication, deglutition and vomiting
- 2.2.5.9.2 Movements of stomach, filling and emptying of stomach
- 2.2.5.9.3 Movements of small intestines
- 2.2.5.9.4 Movements of large intestine and defecation
- 2.2.5.9.5 Regulation of movement

2.2.5.10 Digestion and absorption of carbohydrates, fats, proteins and vitamins, minerals and water

2.2.6 Excretory System

2.2.6.1 General introduction, organs of excretion with special emphasis on evolution of excretory mechanisms

2.2.6.2 Functional anatomy of renal glands and renal circulation

2.2.6.3 Nephron -

2.2.6.3.1 Mechanism of urine formation

2.2.6.3.2 Concentration and acidification of urine

2.2.6.3.3 Renal function tests

2.2.6.4 Non-excretory functions of kidney

2.2.6.4.1 Physiology of micturition and its abnormalities

2.2.6.5 Skin – structure and functions

2.3 **Physiology-II (Duration: 18 Months)**

2.3.1 **Endocrine System**

2.3.1.1 **Introduction** - evolutionary background and organization of endocrine control systems

2.3.1.2 **Hormones**

2.3.1.2.1 Classification of hormones and mechanism of hormone action

2.3.1.2.2 Regulation of hormone secretion and feedback system

2.3.1.3 Hypothalamo-hypophyseal system – hormones released

2.3.1.4 **Endocrine glands**

2.3.1.4.1 Pituitary glands –functional anatomy of anterior and posterior pituitary glands. source, chemical nature, actions, regulation and applied aspect of anterior and posterior pituitary hormones

2.3.1.4.2 Thyroid gland – functional anatomy , hormones ,applied aspect

2.3.1.4.3 Parathyroid gland – functional anatomy, hormones, applied aspect

2.3.1.4.4 Adrenal gland – Functional anatomy of adrenal cortex and medulla, hormones and applied physiology of adrenal cortex and medulla

2.3.1.4.5 Islets of langerhans – Functional anatomy, hormones ,applied aspect

2.3.1.4.6 Other hormones – prostaglandins, thromboxanes, acetylcholine ,serotonin, histamine, bradykinin, leptin, prostacyclin, leukotrienes, atrial natriuretic peptide, brain natri uretic peptide,melatonin

2.3.2 Reproductive System

2.3.2.1 Physiology of reproduction

2.3.2.1.1 Introduction to physiology of reproduction

2.3.2.1.2 Sex determination, sex differentiation and chromosomal study

2.3.2.2 Male Reproductive System

2.3.2.2.1 Development and structure of testes

2.3.2.2.2 Functions of testes

2.3.2.2.3 Gonadotropins and gonadal hormones

2.3.2.2.4 Composition of semen and structure of human sperm

2.3.2.3 Female Reproductive System

2.3.2.3.1 Functional anatomy of female reproductive system

2.3.2.3.2 Functional anatomy and functions of ovary

2.3.2.3.3 Gonadotropins and ovarian hormones

2.3.2.3.4 Physiology of menstrual cycle

2.3.2.3.5 physiology of ovulation and pregnancy

2.3.2.3.6 Physiology of placenta, gestation and parturition

2.3.2.3.7 Physiological basis of tests for ovulation and pregnancy

2.3.2.3.8 Physiology of lactation

2.3.3 Nerve and Muscle Physiology

2.3.3.1 Neuron

- 2.3.3.1.1 Morphology of neuron and Classification of neuron and nerve fibres
- 2.3.3.1.2 Properties of nerve fibres and measure of excitability
- 2.3.3.1.3 Degeneration and regeneration of nerve fibres

2.3.3.2 Muscle

- 2.3.3.2.1 Classification of muscle
- 2.3.3.2.2 Skeletal muscle – structure , properties and functions
- 2.3.3.2.3 Excitation -contraction coupling
- 2.3.3.2.4 Neuromuscular junction
- 2.3.3.2.5 Smooth muscle – structure, types, properties, functions
- 2.3.3.2.6 Cardiac muscle – structure, properties, functions
- 2.3.3.2.7 Myasthenia gravis
- 2.3.3.2.8 Starling's law and its applications

2.3.4 Central Nervous System

2.3.4.1 Structural and functional organization of central nervous system

2.3.4.2 Neuroglia

2.3.4.3 Sensory physiology

- 2.3.4.3.1 Classification and general properties of receptors

2.3.4.4 Synapse

- 2.3.4.4.1 Types of synapse and their structure
- 2.3.4.4.2 Functions and properties of synapse
- 2.3.4.4.3 Classification and actions of neuro -transmitters

2.3.4.5 Reflexes

- 2.3.4.5.1 Classification of Reflexes
- 2.3.4.5.2 General properties of reflexes (with examples)
- 2.3.4.5.3 Reciprocal inhibition and reciprocal innervation

2.3.4.6 Spinal cord

- 2.3.4.6.1 Functional anatomy of spinal cord
- 2.3.4.6.2 Ascending tracts – situation, origin, course, termination and functions
- 2.3.4.6.3 Physiology of pain, different pathways of pain sensation
- 2.3.4.6.4 Physiology of referred pain,
- 2.3.4.6.5 Gate control theory, analgesia system
- 2.3.4.6.6 Descending tracts – situation, origin, course, termination and functions
- 2.3.4.6.7 Extrapyramidal tracts – situation, origin, course, termination and functions
- 2.3.4.6.8 Upper and lower motor neurons and their lesions
- 2.3.4.6.9 Brown Sequard syndrome, Syringomyelias

2.3.4.7 Functional anatomy and functions of brain stem

2.3.4.8 Thalamus

- 2.3.4.8.1 Functional anatomy, connections and functions
- 2.3.4.8.2 Effects of lesions

2.3.4.9 Internal capsule – situation, divisions, effect of lesions

2.3.4.10 Hypothalamus

- 2.3.4.10.1 Functional anatomy, connections and functions
- 2.3.4.10.2 Effect of lesions

2.3.4.11 Cerebellum

2.3.4.11.1 Functional anatomy, connections and functions

2.3.4.11.2 Effects of lesions and tests for cerebellar function

2.3.4.12 Basal ganglia

2.3.4.12.1 Functional anatomy, connections and functions

2.3.4.12.2 Diseases of basal ganglia and its clinical evaluation

2.3.4.13 Cerebral cortex

2.3.4.13.1 Functional anatomy of cerebral cortex

2.3.4.13.2 Functional areas and its functions of frontal lobe, parietal lobe, temporal lobe, occipital lobe

2.3.4.13.3 Methods of study of cortical connections and functions

2.3.4.14 Limbic System

2.3.4.14.1 Functional anatomy, connections and functions

2.3.4.15 Reticular formation

2.3.4.15.1 Functional anatomy, connections and functions of reticular formation

2.3.4.15.2 EEG, physiology of sleep and wakefulness

2.3.4.16 Vestibular apparatus

2.3.4.16.1 Functional anatomy, connections and functions

2.3.4.16.2 Effects of lesions and their assessment

2.3.4.16.3 Physiology of maintenance and regulation of muscle tone, posture and equilibrium

2.3.4.16.4 Decerebrated rigidity and righting reflexes

2.3.4.17 Higher functions

2.3.4.17.1 Learning, speech, memory, behavior and emotions

2.3.4.18 Cerebro-spinal fluids

- 2.3.4.18.1 Formation, circulation, functions of CSF
- 2.3.4.18.2 Properties and composition of CSF
- 2.3.4.18.3 Method of collection of CSF and its clinical significance
- 2.3.4.18.4 Blood – brain barrier

2.3.4.19 Autonomic Nervous System

- 2.3.4.19.1 Sympathetic nervous system and its functions
- 2.3.4.19.2 Parasympathetic nervous system and its functions

2.3.5 Special Senses

2.3.5.1 Smell

- 2.3.5.1.1 Structure of olfactory receptors,
- 2.3.5.1.2 Physiology of olfaction and olfactory discrimination
- 2.3.5.1.3 Olfactory pathway and defects of olfaction

2.3.5.2 Taste structure of taste receptor, primary taste sensation and taste pathway and applied aspects

2.3.5.3 Vision

- 2.3.5.3.1 Functional anatomy of eye
- 2.3.5.3.2 Structure of visual receptors
- 2.3.5.3.3 Neural, chemical, electrical basis of visual process
- 2.3.5.3.4 Visual acuity ,field of vision, tests for visual acuity and field of vision
- 2.3.5.3.5 Visual pathways and effects of lesions in visual pathways
- 2.3.5.3.6 Pupillary reflexes
- 2.3.5.3.7 Color vision, color blindness and tests for color blindness
- 2.3.5.3.8 Errors of refraction and its correction,

- 2.3.5.3.9 Physiology of aqueous humor
- 2.3.5.3.10 Dark and light adaptation
- 2.3.5.3.11 Lacrimal glands ,Formation and circulation of tears

2.3.5.4 Hearing

- 2.3.5.4.1 Functional anatomy and functions of external,middle and internal ear
- 2.3.5.4.2 Impedance matching and tympanic reflex
- 2.3.5.4.3 Auditory pathways and auditory cortex
- 2.3.5.4.4 Mechanism of hearing
- 2.3.5.4.5 Frequency analysis, sound localization,
- 2.3.5.4.6 Defects of hearing
- 2.3.5.4.7 Audiometry, other tests for hearing defects

2.4 Physiology Practical

2.4.1 Blood

- 2.4.1.1 Preparation and examination of peripheral blood smear and determination of differential leucocyte count
- 2.4.1.2 Determination of total red blood cell count
- 2.4.1.3 Determination of total leucocyte count
- 2.4.1.4 Determination of platelet count
- 2.4.1.5 Determination of osmotic fragility of erythrocytes
- 2.4.1.6 Determination of erythrocyte sedimentation rate, packed cell volume
- 2.4.1.7 Determination of hemoglobin concentration of blood
- 2.4.1.8 Determination of ABO and Rh blood groups
- 2.4.1.9 Determination of bleeding time, clotting time

2.4.2 Cardiovascular system

- 2.4.2.1 Determination of the effect of posture on blood pressure
- 2.4.2.2 Clinical examination of the human cardiovascular system (CVS)

2.4.3 Respiration

- 2.4.3.1 Spirometry (demonstration)
- 2.4.3.2 Examination of human respiratory system

2.4.4 Neurophysiology

- 2.4.4.1 Examination of motor and sensory system
- 2.4.4.2 Examination of cranial nerves

2.4.5 Special senses

- 2.4.5.1 Determination of visual acuity
- 2.4.5.2 Clinical assessment of color vision (Demonstration)
- 2.4.5.3 Perimetry: Mapping of visual field

2.5 Textbooks

- 2.5.1 Textbook of Medical Physiology – AC Guyton and Hall
- 2.5.2 Review of Medical Physiology – WF Ganong's
- 2.5.3 Concise Textbook of Medical Physiology – SK Chaudhury
- 2.5.4 Understanding Medical Physiology – RL Bijlani
- 2.5.5 Essentials of Medical Physiology – K Sembulingam

2.6 Reference Books

- 2.6.1 Best and Taylor's Physiological basis of medical practice
- 2.6.2 Berne and Levy Physiology
- 2.6.3 Practical Physiology – C L Ghai
- 2.6.4 Practical Physiology – Dr. V. G.Ranade

2.7 Scheme Of Examination

| S.No | Subject | Theo-ry | Intern-al Assmt | Viva-Voce | Total | Practi-cals | Inter-nal Assmt | Total Marks | Grand Total Marks |
|------|-----------------|---------|-----------------|-----------|-------|-------------|-----------------|-------------|-------------------|
| 03. | Physiology - I | 80 | 20 | 30 | 130 | 60 | 10 | 70 | 200 |
| 04. | Physiology – II | 80 | 20 | 30 | 130 | 60 | 10 | 70 | 200 |

3. BIOCHEMISTRY

3.1 Goals and Objectives

3.1.1 Goals:

The goals of introducing biochemistry to the undergraduate students is to make them understand the scientific basis of the life processes at the molecular level and to orient them towards the application of the knowledge in solving clinical problems.

3.1.2 Objectives

3.1.2.1 Knowledge

After completion of the course, the student shall be able to:

- 3.1.2.1.1 Elucidate the molecular and functional organization of a cell and list its sub cellular components;
- 3.1.2.1.2 Outline structure, function and inter-relationships of bio molecules and consequences of deviation from normal;
- 3.1.2.1.3 Review the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered;
- 3.1.2.1.4 Illustrate digestion and assimilation of nutrients and consequences of malnutrition;
- 3.1.2.1.5 Integrate the various aspects of metabolism and their regulatory pathways;
- 3.1.2.1.6 Explain biochemical basis of inherited disorders with their associated sequelae;
- 3.1.2.1.7 Describe mechanisms involved in maintenance of body fluid and pH homeostasis;

- 3.1.2.1.8 Delineate the molecular mechanisms of gene expression and regulation, the principles of genetic engineering and their application in medicine;
- 3.1.2.1.9 Summarize the molecular concept of body defenses and their application in medicine;
- 3.1.2.1.10 Outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis;
- 3.1.2.1.11 Familiarize with principles of various conventional and specialized laboratory investigations and instrumentation analysis and interpretation of a given data;
- 3.1.2.1.12 Suggest experiments to support theoretical concepts and clinical diagnosis;

3.1.2.2 Skills

At the end of the course, the student will be able to:

- 3.1.2.2.1 Perform conventional techniques/instruments to perform biochemical analysis relevant to clinical screening and diagnosis;
- 3.1.2.2.2 Analyse and interpret investigative data;
- 3.1.2.2.3 Demonstrate the skills of solving scientific and clinical problems and decision making

3.1.2.3 Integration

The integrated knowledge of biochemistry will help the students to integrate molecular events with the structure and function of the human body in health and disease.

3.2 Theory (Duration: 18 months; Hours: 200+100)

3.2.1 Biomolecules & biochemical perspective of a cell

3.2.2 Cell structure

3.2.3 Subcellular organelles

3.2.4 Cell membrane

3.2.5 Transport mechanisms

3.2.6 Chemistry of Carbohydrates

3.2.6.1 Definition, classification and biological importance of carbohydrates

3.2.6.2 Monosaccharides; Classification, Isomerism and properties of monosaccharides, modified monosaccharides

3.2.6.3 Disaccharides

3.2.6.4 Polysaccharides

3.2.7 Chemistry of Lipids

3.2.7.1 Definition, classification and biological importance of Lipids

3.2.7.2 Simple lipids: Composition of Triacyl glycerol & Waxes.

3.2.7.3 Compound lipids: Composition & functions of Phospholipids, glycolipids & lipoproteins

3.2.7.4 Derived lipids: Fatty acids - Classification & Properties fatty acids, Steroids & sterols

3.2.7.5 Micelle, Liposomes

3.2.8 Chemistry of Proteins

3.2.8.1 Definition, classification & properties of amino acids

3.2.8.2 Definition, classification & properties of proteins

3.2.8.3 Structural organization of proteins

3.2.8.4 Biological significance of amino acids & proteins

3.2.8.5 Plasma proteins, their functions and clinical significance

3.2.9 Enzymes

3.2.9.1 Definition, classification,

3.2.9.2 Kinetics, mechanism of enzymatic catalysis.

3.2.9.3 Factors influencing enzymatic catalyses, enzyme activators and inhibitors.

3.2.9.4 Regulation of enzyme activity,

3.2.9.5 Iso-enzymes & clinical enzymology

3.2.10 Vitamins

3.2.10.1 Definition and classification of vitamins

3.2.10.2 Brief account of chemistry, source, RDA, biochemical functions, deficiency diseases, Vitamin antagonists and hypervitaminosis of each vitamin

3.2.11 Mineral metabolism

3.2.11.1 Classification of minerals

3.2.11.2 Brief account of chemistry, source, RDA, biochemical functions, deficiency diseases of each mineral

3.2.12 Digestion and absorption

3.2.12.1 Digestion and absorption of carbohydrates

3.2.12.2 Digestion and absorption of lipids

3.2.12.3 Digestion and absorption of proteins.

3.2.13 Carbohydrate Metabolism

3.2.13.1 Major metabolic pathways: Glycolysis, pyruvate oxidation, Citric acid cycle, Gluconeogenesis, HMP Shunt pathway & glycogen metabolism

3.2.13.2 Minor metabolic pathways: Metabolism of Fructose and Galactose,

3.2.13.3 Regulation of blood sugar, glucose tolerance test, Diabetes mellitus & other disorders of carbohydrate metabolism.

3.2.14 Biologic Oxidation

3.2.14.1 Redox potential

3.2.14.2 High energy compounds

3.2.14.3 Oxidative Phosphorylation

3.2.14.4 Electron transport chain

3.2.15 Lipid metabolism

3.2.15.1 Biosynthesis and degradation of fatty acids

3.2.15.2 Metabolism of cholesterol

3.2.15.3 Ketone bodies: their synthesis, utilization and conditions leading to ketoacidosis

3.2.15.4 Chemistry and metabolism of lipoproteins, hyper lipoproteinemias

3.2.15.5 Prostaglandins

3.2.15.6 Fatty liver, Obesity & other lipid storage disease.

3.2.16 Protein metabolism

3.2.16.1 Overview of protein metabolism

3.2.16.2 Nitrogen balance

3.2.16.3 Formation and disposal of ammonia

3.2.16.4 General metabolism of amino acids

3.2.16.5 Inborn errors of amino acid metabolism

3.2.17 Molecular biology

3.2.17.1 Chemistry of Nucleic acids: Definition, classification, composition of nucleic acids; Structure and function of DNA ; Types, structure & functions of RNA

3.2.17.2 Metabolism of Nucleic acids : Synthesis and breakdown of purines; Synthesis and breakdown of pyrimidine

3.2.17.3 DNA Replication, Inhibitors of DNA replication

3.2.17.4 DNA Transcription & Post-transcriptional processing.

3.2.17.5 Genetic code

3.2.17.6 Protein synthesis, inhibitors of protein synthesis & Post-translational processing

3.2.18 Integration of metabolism

3.2.18.1 Metabolic effects of insulin & glucagon

3.2.18.2 The feed/fast cycle

3.2.18.3 Biochemistry of starvation

3.2.19 Biochemistry of blood

3.2.19.1 Porphyrins, Synthesis and degradation of heme; Porphyria; Jaundice

3.2.19.2 Structure & functions of hemoglobin

3.2.19.3 Abnormal hemoglobins & hemoglobinopathies

3.2.19.4 Plasma Proteins

3.2.19.5 Immunoglobulins

3.2.19.6 Blood pH & its regulation

3.2.19.7 Role of kidney and lungs in maintaining pH of blood

3.2.19.8 Acidosis and Alkalosis

3.2.20 Energy metabolism and Nutrition

3.2.20.1 Calorific value of foods

3.2.20.2 Basal metabolic rate and its importance

3.2.20.3 Specific dynamic action

3.2.20.4 Energy requirements for physical activity

3.2.20.5 Balanced diet; Role of carbohydrates, proteins & lipids

3.2.20.6 Nutritive value of proteins, protein-energy malnutrition (PEM)

3.2.21 Clinical biochemistry

3.2.21.1 Tools of biochemistry

3.2.21.2 Liver function tests

3.2.21.3 Renal function tests

3.2.22 Environmental biochemistry

3.2.22.1 Environmental pollutants

3.2.22.2 Xenobiotics, interaction with biomolecules, effects & metabolism

3.2.22.3 Biochemical characteristics of cancer and carcinogenesis

3.3 **Practicals**

3.3.1 **Qualitative Experiments**

3.3.1.1 General reactions Carbohydrates

3.3.1.1.1 Reactions of monosaccharides - glucose and fructose

3.3.1.1.2 Reactions of disaccharides - lactose, maltose and sucrose

3.3.1.1.3 Reactions of polysaccharides - starch and dextrin

3.3.1.2 General reactions of proteins (albumin, casein and gelatin)

3.3.1.2.1 Colour reactions of proteins

3.3.1.2.2 Precipitation & coagulation reactions of proteins

3.3.1.3 General reactions of non-protein-nitrogen compounds (N P N) - Urea, Uric acid and creatinine

3.3.1.4 Analysis of Urine.

3.3.1.4.1 Analysis of normal urine.

3.3.1.4.2 Analysis of abnormal urine.

3.3.2 Quantitative Experiments

3.3.2.1 Blood Sugar estimation by Glucose Oxidase method

3.3.3 Demonstrative Experiments

3.3.3.1 Colorimetry and colorimeter

3.3.3.1.1 Estimation of concentration of serum Cholesterol

3.3.3.1.2 Estimation of concentration of serum Urea

3.3.3.1.3 Estimation of concentration of serum Uric acid

3.3.3.1.4 Estimation of concentration of serum triglycerides

3.3.3.1.5 Estimation of concentration of serum calcium

3.3.3.2 Paper chromatography

3.3.3.3 Electrophoresis

3.3.3.4 Glucose tolerance test (GTT)

3.4 **Text Books**

3.4.1 **Recommended text books for Biochemistry**

- 3.4.1.1 Text book of Biochemistry - by U. Sathyanarayana, U Chakrapani
- 3.4.1.2 Text book of Biochemistry – by DM Vasudevan, Sreekumari S
- 3.4.1.3 Lippincott's Illustrated Reviews- Biochemistry by Pamela C Champe,
Richard A Harvey
- 3.4.1.4 Textbook of Medical Laboratory Technology by Praful B Godkar, Darshan
P Godkar
- 3.4.1.5 Essentials of Biochemistry by PankajNaik

3.4.2 **Reference Books for Biochemistry**

- 3.4.2.1 Harper's Illustrated Biochemistry, Robert K. Murray, Daryl K. Granner,
and Victor W. Rodwell.
- 3.4.2.2 Biochemistry. Lubert Stryer. W.H. Freeman and Company, New York.
- 3.4.2.3 Principles of Biochemistry. Ed. Lehinger, Nelson and Cox. CBS
Publishers and distributors.
- 3.4.2.4 Textbook of Biochemistry with Clinical Correlations. Ed. Thomas M.
Devlin, Wiley-Liss Publishers.
- 3.4.2.5 Tietz Textbook of Clinical Chemistry. Ed. Burtis and Ashwood. W.B.
Saunders Company.
- 3.4.2.6 Biochemistry. Ed. Donald Voet and Judith G. Voet. John Wiley & Sons,
Inc
- 3.4.2.7 Text book of Biochemistry - by West and Todd.
- 3.4.2.8 Laboratory Manual of Biochemistry by Pattabhirama and Acharya.

3.5 Scheme Of Examination

| S.N o | Subject | Theo-ry | Intern-al Assm-t | Viva-Voce | Total | Practi-cals | Inter-nal Assm-t | Total Marks | Gran-d Total Marks |
|----------|--------------|---------|------------------|-----------|-------|-------------|------------------|-------------|--------------------|
| 01. | Biochemistry | 80 | 20 | 30 | 130 | 60 | 10 | 70 | 200 |

4. **PHILOSOPHY OF NATUROPATHY**

4.1 **Goals and Objectives**

4.1.1 **Goals:**

The goals of introducing philosophy of Naturopathy to the undergraduate students is to make them understand philosophical basis of the system of Naturopathy, including concepts of health, causes and pathogenesis of disease and brief introduction to the various therapeutic modalities used in Naturopathy.

4.1.2 **Objectives**

4.1.2.1 **Knowledge**

After completion of the course, the student shall be able to:

- 4.1.2.1.1 Elucidate the history of Naturopathy including major contributors to the field and their work;
- 4.1.2.1.2 Understand the evolution and composition of the human body according to different schools of medicine such as Naturopathy, *Yoga, Ayurveda*, Homeopathy, Modern Medicine, etc.
- 4.1.2.1.3 Firmly establish his/her diagnostic and therapeutic thought processes in the fundamental principles of Naturopathy:
- 4.1.2.1.4 Laws of nature according to Henry Lindlahr
- 4.1.2.1.5 Concepts of health and disease according to Naturopathy
- 4.1.2.1.6 Ten basic principles of Naturopathy
- 4.1.2.1.7 Concept of *Panchamahabhuthas* and Naturopathy
- 4.1.2.1.8 Foreign matter, toxin accumulation, theory of Toxemia, Unity of disease and Unity of Cure
- 4.1.2.1.9 Concept of vitality

- 4.1.2.1.10 *Panchatantras, Shareera Dharmas*
- 4.1.2.1.11 Holistic approach of Naturopathy
- 4.1.2.1.12 Modern perspectives of Naturopathy
- 4.1.2.1.13 Natural rejuvenation
- 4.1.2.1.14 Understand naturopathic viewpoints of concepts like hygiene, vaccination, family planning, personal life and prevention of diseases, geriatrics, etc, and implement them in his/her practice
- 4.1.2.1.15 Understand Principles behind using the diagnostic procedures of Naturopathy, like spinal diagnosis, facial diagnosis, iris diagnosis, and chromo diagnosis.
- 4.1.2.1.16 Demonstrate knowledge of recent advances and research in Naturopathy principles/theories.

4.1.2.2 Skills

At the end of the course, the student will be able to:

- 4.1.2.2.1 Demonstrate basic knowledge of the various therapeutic modalities utilised in Naturopathy;
- 4.1.2.2.2 Describe the various principles of Naturopathy with respect to the body, health, disease and therapy.

4.1.2.3 Integration

The integrated knowledge of philosophy of Naturopathy will help the students to integrate concepts of human body in health and disease with respect to Naturopathy in terms of diagnosis and management.

4.2 **Theory (Duration: 18 months)**

Total hours: 500 (Theory: 300 Practical: 200)

- 4.2.1 The Medical Profession & Medical Evolution- an Introduction
- 4.2.2 Concept of Health & Disease through the ages
- 4.2.3 The Human Body
 - 4.2.3.1 The evolution of human body
 - 4.2.3.2 Philosophy of the body, mind, soul, life, spirit and spiritual body with reference to various cultures, philosophies, Vedas and Modern view
 - 4.2.3.3 Composition of the human body, according to *Ayurveda*, Naturopathy, *Yoga*, Modern Medicine, Homeopathy
- 4.2.4 An Introduction to Nature Cure or Naturopathy- Definitions, concepts & theories of various pioneers in the field
- 4.2.5 History of Naturopathy & Philosophy of Naturopaths
 - 4.2.5.1 Chronological highlights of Naturopathy
 - 4.2.5.2 Philosophy of Indian Naturopaths.
 - 4.2.5.2.1 Vegiraju Krishnamaraju
 - 4.2.5.2.2 Vinoba Bhave
 - 4.2.5.2.3 Mahatma Gandhi.
 - 4.2.5.2.4 Dr. S. J. Singh
 - 4.2.5.2.5 Dr. J. M. Jussawala
 - 4.2.5.3 Philosophy of Foreign Naturopaths.
 - 4.2.5.3.1 Aesculapius
 - 4.2.5.3.2 Hippocrates
 - 4.2.5.3.3 The School of Salerno
 - 4.2.5.3.4 Paracelsus.

- 4.2.5.3.5 Vincent Priessnitz
- 4.2.5.3.6 Sebastian Kneipp
- 4.2.5.3.7 Arnold Rickli
- 4.2.5.3.8 Louis Kuhne
- 4.2.5.3.9 Adolf Just
- 4.2.5.3.10 John H Tilden
- 4.2.5.3.11 Sigmund Freud
- 4.2.5.3.12 Henry Lindlahr

4.2.6 Fundamental principles, concepts & theories of Naturopathy.

4.2.6.1 Laws of Nature according to Henry Lindlahr

4.2.6.2 Catechism of Nature Cure according to Henry Lindlahr

4.2.6.3 Concepts of Health according to Naturopathy

4.2.6.4 Concepts of Disease according to Naturopathy

4.2.6.5 The 10 basic principles of Naturopathy

4.2.6.6 Principles of Natural Medicine in the West

4.2.6.6.1 The Healing Power of Nature (*Vis Medicatrix Naturae*)

4.2.6.6.2 Identify and Treat the Causes (*Tolle Causam*)

4.2.6.6.3 First Do No Harm (*Primum Non Nocere*)

4.2.6.6.4 Doctor as Teacher (*Docere*)

4.2.6.6.5 Treat the Whole Person

4.2.6.6.6 Prevention

4.2.6.6.7 Herring's law of cure

4.2.6.7 Concept of *Panchamahabhootas* & Naturopathy

4.2.6.8 Foreign matter and toxins accumulation in the body and its importance in elimination through different ways or channels.

- 4.2.6.9 Unity of disease, Unity of cure and way of treatment.
- 4.2.6.10 Theory of Toxemia- Toxins and anti-toxins, their generation, mitigation in nature cure way
- 4.2.6.11 Concept of Vitality & Vital economy
- 4.2.6.12 How Nature Cures- The Natural healing mechanisms
- 4.2.6.13 *Arogya Rakshak Panchatantras* and their importance in maintenance of good health prevention of diseases and treatment of diseases through lifestyle modification.
- 4.2.6.14 *Shareera Dharmas – Ahara, Nidra Bhaya, Maithuna*
- 4.2.6.15 Natural Immunity & how to acquire natural immunity in diseases.
- 4.2.6.16 Inflammation- Naturopathic perspective.
- 4.2.6.17 Naturopathy: a blend of Drugless Therapies
- 4.2.6.18 Holistic approach of Naturopathy
- 4.2.6.19 Modern perspectives of Naturopathic Medicine
 - 4.2.6.19.1 Understanding Homeostasis
 - 4.2.6.19.2 Metabolism of Xenobiotics
 - 4.2.6.19.3 Aging, Free Radicals and Antioxidants
- 4.2.6.20 Hygiene & importance of physical and mental hygiene in health and disease
- 4.2.6.21 Vaccinations and inoculation – The Naturopathic view.
- 4.2.6.22 Family planning by Natural therapeutics.
- 4.2.7 Introduction to The Diagnostic procedures in Naturopathy
 - 4.2.7.1 Spinal Analysis
 - 4.2.7.2 Facial Diagnosis
 - 4.2.7.3 Iris Diagnosis

- 4.2.7.4 Chromo Diagnosis
- 4.2.8 Natural rejuvenation
- 4.2.9 Personal life and prevention of diseases
- 4.2.10 Geriatrics and Naturopathy
- 4.2.11 Introduction to various systems of Medicine
 - 4.2.11.1 Modern Medicine
 - 4.2.11.2 *Ayurveda*
 - 4.2.11.2.1 Introduction
 - 4.2.11.2.2 Definition of *Prakriti* and its categories.
 - 4.2.11.2.3 *Swastha Vrittam*
 - 4.2.11.2.3.1 *Dinacharya*
 - 4.2.11.2.3.2 *Ratricharya*
 - 4.2.11.2.3.3 *Ritucharya*
 - 4.2.11.2.3.4 *Vegadharanam*
 - 4.2.11.3 Homeopathy
 - 4.2.11.4 *Unani*
 - 4.2.11.5 *Siddha*
- 4.2.12 Comparative study of Naturopathy with other systems of Medicine
- 4.2.13 Basic essentials of a Naturopathy practitioner - an introduction to qualities of a Naturopathy & *Yoga* Practitioner, Approach to the Patient with a Naturopathy view, Ethical considerations, Understanding the Scope & Limitations
- 4.2.14 Recent Advances in Naturopathy & *Yoga*
 - 4.2.14.1 Introduction to Psychosomatic Diseases & Psychoneuroimmunology
 - 4.2.14.2 Introduction to Mind-Body Medicine
 - 4.2.14.3 Lifestyle & psychosocial behavior

4.2.14.4 Introduction to Integrative Medicine

4.2.15 An introduction to Research & its importance in Naturopathy

4.3 **Practical**

Students should be introduced to various treatment procedures used in Naturopathy. Brief outlines of the following therapies in naturopathy including understanding the basic classification & procedure through observation and demonstration:

4.3.1 Fasting

4.3.2 Exercises

4.3.3 Rest and relaxation

4.3.4 Regular habits like sun bath, barefoot walking on grass

4.3.5 Hydrotherapy

4.3.5.1 Baths

4.3.5.1.1 Hip-bath

4.3.5.1.2 Spinal bath

4.3.5.1.3 Steam bath

4.3.5.1.4 Foot bath

4.3.5.1.5 Full Immersion bath

4.3.5.2 Packs

4.3.5.2.1 Chest pack

4.3.5.2.2 Abdominal pack

4.3.5.2.3 Gastro-Hepatic pack

4.3.5.2.4 Kidney Pack

4.3.5.2.5 Full wet-sheet pack

4.3.6 Internal Application of Water

4.3.6.1 Enema

4.3.6.2 Colon Hydrotherapy

4.3.6.3 Water Drinking

4.3.7 Mud Therapy

4.3.8 Balneotherapy

4.3.9 Heliotherapy & Chromo therapy

4.3.10 Massage Therapy

4.3.11 Magneto therapy

4.3.12 Chiropractic

4.3.13 Osteopathy

4.3.14 Physiotherapy

4.3.15 Nutrition & Dietetics with special emphasis on Natural Diet

4.3.16 Acupuncture, Acupressure & Reflexology

4.3.17 Aromatherapy

4.3.18 Bio feed back

A Practical Record book should be maintained to document the above observations.

4.4 Text Books

| | | |
|--------|---------------------------------------|---|
| 4.4.1 | Philosophy of Nature Cure | Henry Lindlahr |
| 4.4.2 | Practice of Nature Cure | Henry Lindlahr |
| 4.4.3 | Human Culture and Cure | Dr. E.D. Babbitt |
| 4.4.4 | Practical Nature Cure | K. Laxman Sharma |
| 4.4.5 | History and Philosophy of Nature Cure | S.J. Singh |
| 4.4.6 | My Nature Cure | M.K. Gandhi |
| 4.4.7 | Natural Health Care – A to Z | Belinda Gran |
| 4.4.8 | Introduction to Natural Hygiene | Herbert.M.Shelton |
| 4.4.9 | Text book of Natural Medicine | Joseph E. Pizzorno & Michael T. Murray |
| 4.4.10 | Nature Cure treatments | Jindal |
| 4.4.11 | Complete handbook of Nature cure | H. K. Bakhru |
| 4.4.12 | Toxemia | J. H. Tilden |
| 4.4.13 | Return to Nature | Adolf Just |

4.5 Reference Books

| | | |
|-------|--|--------------|
| 4.5.1 | My Nature Cure or Practical Naturopathy | S.J. Singh |
| 4.5.2 | The Science of Facial Expression | Louis Kuhne |
| 4.5.3 | The Story of My Experiments With Truth | M.K Gandhi |
| 4.5.4 | <i>Ayurveda</i> for health and long life | Dr.R.K.Garde |
| 4.5.5 | Fundamentals of <i>Ayurveda</i> | K. N. Udupa |
| 4.5.6 | Siddha Medicine | Ram Murthy |
| 4.5.7 | Homeopathic Philosophy | Kent |

- 4.5.8 Everybody's Guide to Nature Cure Harry Benjamin
- 4.5.9 Prayer M.K.Gandhi
- 4.5.10 Diet and Diet Reforms M.K.Gandhi
- 4.5.11 Panchatantra Venkat Rao
- 4.5.12 Nature Cure J.N. Jussawalla
- 4.5.13 The Encyclopedia of Natural Medicine Joseph E. Pizzorno & Michael T. Murray

4.6 **Scheme Of Examination**

| S.N o | Subject | Theo -ry | Intern -al Assm t | Viva- Voce | Total | Practi -cals | Inter- nal Assm t | Total Mark s | Gran d Total Mark s |
|----------|------------------------------|-------------|----------------------------|---------------|-------|-----------------|----------------------------|--------------------|---------------------------------|
| 01. | Philosophy of Naturopathy | 80 | 20 | 30 | 130 | 60 | 10 | 70 | 200 |

5. **PRINCIPLES OF YOGA**

5.1 Goals and Objectives

5.1.1 **Goal:**

The goal of teaching *Yoga* to undergraduate students is to familiarize them with basic principles of *Yoga* with respect to history, definitions, philosophy and practices of *Yoga*, with emphasis of *AshtangaYoga*.

5.1.2 **Objectives:**

5.1.2.1 **Knowledge:**

After the completion of the course, the student shall be able to:

- 5.1.2.1.1 Explain the various definitions of *Yoga*, history of *Yoga* and branches of *Yoga* ;
- 5.1.2.1.2 Describe kinds of *Yogasanas*, its importance, methods, rules, regulations and limitations;
- 5.1.2.1.3 Illustrate the various limbs of *Ashtanga Yoga*;
- 5.1.2.1.4 Demonstrate knowledge of *pranayamas*, *prana* and lifestyle, breathing and lifespan.

5.1.2.2 **Skills:**

After the completion of the course, the student shall be able to:

- 5.1.2.2.1 Demonstrate various types of *Yogasanas* in their correct method of performance;
- 5.1.2.2.2 Demonstrate different *pranayamas*.
- 5.1.2.2.3 Explain about the definitions, origin, branches of *Yoga*.

5.1.2.3 **Integration**

At the completion of training, the student should be able to comprehend the basic principles of *Yoga*.

5.2 **Theory (Duration: 12 months)**

Total hours: 450 (Theory: 250 Practical: 200)

- 5.2.1 What is *Yoga* and various definitions of *Yoga*.
- 5.2.2 History of *Yoga* (Relative chronology, *Yoga* before the time of *Patanjali*, Indus Valley Civilization).
- 5.2.3 Outlines on branches of *Yoga* – *Raja, Hatha, Jnana, Karma, Bhakti, Mantra, Kundalini and Laya*.
- 5.2.4 Introduction to *Yogasanas*
 - 5.2.4.1 Definition of *Yogasanas*
 - 5.2.4.2 *Yogasanas* and *Prana*
 - 5.2.4.3 *Yogasanas* and *Kundalini*
 - 5.2.4.4 *Yogasanas* and the mind-body connection
 - 5.2.4.5 *Yogasanas* and Exercises
- 5.2.5 Classifications of *Yogasanas* – Beginners group, Intermediate group, Advanced group, dynamic and static *Yogasanas*.
- 5.2.6 Introduction to *Pranayama*
 - 5.2.6.1 Definition
 - 5.2.6.2 *Prana* and lifestyle
 - 5.2.6.3 Breath, health and *Pranayama*
 - 5.2.6.4 Breathing and Lifespan
 - 5.2.6.5 *Pranayama* and spiritual aspiration
- 5.2.7 Introduction to *AshtangaYoga*
 - 5.2.7.1 *Yama*
 - 5.2.7.2 *Niyama*
 - 5.2.7.3 *Asana*

5.2.7.4 *Pranayama*

5.2.7.5 *Pratyahara*

5.2.7.6 *Dharana*

5.2.7.7 *Dhyana*

5.2.7.8 *Samadhi*

(Concept only – as orientation/introduction)

5.2.8 *Asanas* – their importance, methods, rules, regulations and limitations.

5.2.9 Meditative postures

5.2.9.1 *Padmasana*

5.2.9.2 *Siddhasana*

5.2.9.3 *Vajrasana*

5.2.9.4 *Sukhasana*

5.2.10 Cultural postures

5.2.10.1 *Halasana*

5.2.10.2 *Dhanurasana*

5.2.10.3 *Sarvangasana*

5.2.10.4 *Paschimottanasana*

5.2.10.5 *Trikonasana*

5.2.11 Relaxation postures

5.2.11.1 *Shavasana*

5.2.11.2 *Makarasana*

5.2.11.3 *Sitali Dandasana*

5.2.11.4 *Sitali Tadasana*

5.2.12 *Suryanamaskara*

5.3 **Practical**

5.3.1 Joint movements

5.3.2 Loosening exercises

5.3.3 *Sukshma Vyayama*

5.3.4 Stretchings

5.3.5 Breathing exercises

5.3.6 *Suryanamaskara*

5.3.7 *Asanas*

5.3.7.1 Standing

5.3.7.1.1 *Tadasana*

5.3.7.1.2 *Ardha Kati Chakrasana*

5.3.7.1.3 *Kati Chakrasana*

5.3.7.1.4 *Trikonasana*

5.3.7.1.5 *Vrikshasana*

5.3.7.1.6 *Utthita Trikonasana*

5.3.7.1.7 *Veerabhadrasana*

5.3.7.1.8 *Parsvottanasana*

5.3.7.1.9 *Parighasana*

5.3.7.2 Supine

5.3.7.2.1 *Shavasana*

5.3.7.2.2 *Matsyasana*

5.3.7.2.3 *Sarvangasana*

5.3.7.2.4 *Halasana*

5.3.7.2.5 *Chakrasana*

5.3.7.2.6 *Pawanamuktasana*

- 5.3.7.2.7 *Setubandhasana*
- 5.3.7.2.8 *Parvottanasana*
- 5.3.7.2.9 *Vipareetakarani*
- 5.3.7.2.10 *Karnapeedasana*
- 5.3.7.2.11 *Suptakonasana*

5.3.7.3 Prone

- 5.3.7.3.1 *Makarasana*
- 5.3.7.3.2 *Bhujangasana – 1 and 2*
- 5.3.7.3.3 *Ardha Shalabhasana*
- 5.3.7.3.4 *Shalabhasana – 1*
- 5.3.7.3.5 *Dhanurasana*
- 5.3.7.3.6 *Adho mukha svanasana*

5.3.7.4 Sitting

- 5.3.7.4.1 *Vakrasana*
- 5.3.7.4.2 *Ardhamatsyendrasana*
- 5.3.7.4.3 *Paschimottanasana*
- 5.3.7.4.4 *Ushtrasana*
- 5.3.7.4.5 *Vajrasana*
- 5.3.7.4.6 *Padmasana*
- 5.3.7.4.7 *Baddha Padmasana*
- 5.3.7.4.8 *Supta Vajrasana*
- 5.3.7.4.9 *Ardha Navasana*
- 5.3.7.4.10 *Gomukhasana*
- 5.3.7.4.11 *Veerasana*
- 5.3.7.4.12 *Baddha Konasana*

5.3.7.4.13 *Janusirshasana*

5.3.7.4.14 *Upavista Konasana*

5.3.7.4.15 *Shashankasana*

5.3.8 *Pranayama*

5.3.8.1 *Bhastrika*

5.3.8.2 *Sheetkari*

5.3.8.3 *Sheetali*

5.3.8.4 *Anuloma Viloma*

5.3.8.5 *Ujjayi*

5.3.8.6 *Bhramari*

5.3.9 *Kriya*

5.3.9.1 *Jala neti*

5.3.9.2 *Sutra neti*

5.3.9.3 *Vamana dhauti*

5.4 Textbooks

5.4.1 Basis and definitions of *Yoga* – Vivekananda Kendra

5.4.2 *Asanas* – Swami Kuvalyananda

5.4.3 The gospel of Buddha – Parul Caruso

5.4.4 The Gospel of Shri Ramakrishna – Mahendranatha Gupta

5.4.5 Complete works of Shri Aurobindo

5.4.6 *Asanas, Pranayama, Bandhas, Mudras* – Swami Satyananda Saraswati

5.4.7 *Hatha YogaPradipika* – Swami Svatmarama

5.4.8 *Raja, Hatha, Jnana, BhaktiYoga* – Swami Vivekananda

5.5 Scheme Of Examination

| S.N | Subject | Theo-ry | Intern-al Assm-t | Viva-Voce | Total | Practi-cals | Inter-nal Assm-t | Total Marks | Grand Total Marks |
|-----|---------------------------|---------|------------------|-----------|-------|-------------|------------------|-------------|-------------------|
| 01. | Principles of <i>Yoga</i> | 60 | 15 | 30 | 105 | 60 | 10 | 70 | 175 |

6. SANSKRIT

6.1 Goals and Objectives

6.1.1 **Goal:**

The goal of teaching *Sanskrit* to undergraduate students is to provide a comprehensive knowledge of *Sanskrit* in order to be able to study, understand, comprehend and utilise the knowledge contained in Indian traditional texts in their professional practice, **especially in the field of Yoga.**

6.1.2 **Objectives:**

6.1.2.1 **Knowledge:**

After the completion of the course, the student shall be able to:

- 6.1.2.1.1 Demonstrate knowledge of complete *Sanskrit* script;
- 6.1.2.1.2 Describe kinds of nouns, verbs, pronouns, etc, with examples;
- 6.1.2.1.3 Illustrate kinds of gender, number, and declensions employed in *Sanskrit*;
- 6.1.2.1.4 Demonstrate skill in pronunciation of different kinds of *Sanskrit* words, phrases and sentences.

6.1.2.2 **Skills:**

After the completion of the course, the student shall be able to:

- 6.1.2.2.1 Read and understand *Sanskrit* with respect to script and basic grammar.
- 6.1.2.2.2 Familiarize themselves with various texts and compositions such as *Madhurashtakam*, *Vaidyakeeyasubhashitasahityam*, etc;

6.1.2.2.3 Speak fluently in *Sanskrit* after having learnt the various peculiar pronunciations.

6.1.2.3 Integration

At the completion of training, the student should be able to comprehend the nuances of *Sanskrit* language and employ it for understanding the traditional texts of *Yoga*.

6.2 Theory (Duration: 18 months)

Total hours: 100

6.2.1 Basic Orientation (15 hours)

Knowledge of Devanagari script - alphabet, i.e. vowels, consonant vowel combination, two consonant combinations, special conjunct consonants and their pronunciation associated with their articulation.

6.2.2 Chapter 1 (10 hours)

Verb roots, nine forms for three persons and three numbers; practice all the verb roots and their forms for correct pronunciation; usage of prefixes and how they change the meaning of the verb root and how to find them in the dictionary.

6.2.3 Chapter 2 (10 hours)

Noun, masculine and neuter genders; 8 cases and their possible meanings; 24 forms of a noun and its declensions; practice of other similar declensions and usage of the 24 forms of a noun. Introduction to write a sentence; syntax, prepositions and their definite requirements of cases;

rule how ra/sha changes dental n to cerebral N and its exceptions for this rule; repeat declensions for pronunciation.

6.2.4 Chapter 3 (10 hours)

Noun- feminine gender; both ā ending and i-ending and practice of similar declensions. Practice of writing sentences with words mainly in feminine gender; exercises mainly for the feminine gender illustration; special declensions where dental n changes to cerebral N; repeat all feminine noun declensions.

1.1.1 Chapter 4 (10 hours)

Madhurashtakam illustrating all the three genders of nouns and study of the adjectives, having all the three genders and changing according to the gender of different qualified nouns; Midterm examination.

1.1.2 Chapter 5 (10 hours)

Ex 32-38 ; models of declensions; how to recognize a gender or find the gender using the dictionary and write declensions of new words according to their models of declensions, while applying the rule changing dental n to cerebral N; making simple sentences for all the words given there; repeat vowel-ending model declensions.

1.1.3 Chapter 6 (10 hours)

Exercises for appropriate use of the cases; irregular verbs; absence of verb root -to have in Sanskrit; where to omit root AS (to be), use of certain special verbs; repeat model declensions.

1.1.4 Chapter 7 (10 hours)

Pronouns: Introduction to pronouns; declensions of pronouns; corresponding translations of pronouns into English; forming sentences with pronouns; Different aspects of pronouns being used as demonstrative pronouns and as interrogative pronouns and details of distance specification.

1.1.5 Chapter 8 (15 hours)

1.1.5.1 *Sandhi* explanation; three major kinds of Sandhi: Vowel-Sandhi, Visarga-Sandhi and Consonant-Sandhi, and fifteen exercises.

1.1.5.2 *Parasmaipadi* (P) and *Atmanepadi* (A) forms of verbs; Verb and ten *Ganas*; how to find the *Gana* using the *Apte* Samskrta -English Dictionary

1.1.5.3 Verb and ten *Lakaras*; mastering five *Lakāras* of both *Parasmaipadi* and *Atmanepadi* and doing the pertaining exercises for that.

1.1.6 Chapter 9(10 hours)

Vaidhyakeeyasubhashitasahityam:

1.1.6.1 *Ragarogya vijnanam*

1.1.6.2 *Vyayama vijnanam*

1.1.6.3 *Pranayama vijnanam*

1.1.6.4 *Madhyagunadosha vijnanam*

1.2 Text Books:

1.2.1 Dr. Sarasvati Mohan, Samskrta Level-2, Samskrta Academy

1.2.2 Dr. Sarasvati Mohan, Samskrta-English-Samskrta Dictionary,
SamskrtaAcademy.

1.2.3 Dr. Sarasvati Mohan, Samskrta Level-3, Samskrta Academy

1.2.4 Vaman Sivaram Apte, Samskrta-English Dictionary, Samskrta Academy

1.3 Reference Books:

1.3.1 Samskrtabhasadipika, Sri Surasaraswati Sabha (R) Sringeri, Bangalore, 2003.

1.4 Scheme Of Examination

| S.N | Subject | Theo-ry | Intern-al Assm-t | Viva-Voce | Total | Practi-cals | Inter-nal Assm-t | Total Marks | Grand Total Marks |
|-----|-----------------|---------|------------------|-----------|-------|-------------|------------------|-------------|-------------------|
| 01. | <i>Sanskrit</i> | 20 | 5 | - | - | - | - | - | 25 |

SECTION V

TEACHING OF MEDICAL ETHICS IN BNYS COURSE

1. Introduction

Medical ethics is a systematic effort to work within the ethos of medicine, which has traditionally been service to sick.

There is now a shift from the traditional individual patient doctor relationship of medical care. With the advances in science and technology and the needs of patients, their families and the community, there is an increased concern with the health of the society. There is a shift to greater accountability to the society. Doctors and other health professionals are confronted with many ethical problems. It is, therefore, necessary to be prepared to deal with these problems.

In keeping with its goal to improve quality of education, Rajiv Gandhi University of Health Sciences recommends introduction of medical ethics in the regular teaching of BNYS course beginning from first year and continuing till the end of internship.

2. Objectives

The objectives of teaching medical ethics should be to enable the students develop the students to develop the ability to:

1. Identify underlying ethical issues and problems in medical practice
2. Consider the alternatives under the given circumstances, and
3. Make decisions based on acceptable moral concepts and also traditions and practices

3. Course contents (Syllabus)

- a. Introduction to medical ethics
 - What are Ethics
 - What are values and norms
 - Relationship between being ethical and human fulfillment
 - How to form a value system in one's personal and professional life
 - **Heteronomous Ethics and Autonomous Ethics**
 - Freedom and Personal Responsibility
- b. Definition of Medical Ethics
 - Difference between medical ethics and bioethics

- Major principles of Medical Ethics:
- Beneficence = Fraternity
- Justice = Equality
- Self-determination (autonomy) = Liberty

c. Perspectives of Medical Ethics

- The Hippocratic Oath
- The Declaration of Helsinki
- The WHO Declaration of Geneva
- International Code of Medical Ethics (1983)
- Medical Council of India Code of Ethics

d. Ethics of the Individual

- Patient as a person
- Right to be respected
- Truth and confidentiality
- Autonomy of decision
- Concept of disease, health and healing
- Right to health
- Ethics of behavior modification
- Physician-patient relationship
- Organ donation

e. Ethics of Human Life

- What is human life?
- Criteria for distinguishing human and non-human
- Reasons for respecting human life
- Beginning of human life
- Conception, contraception

- Abortion
- Prenatal sex-determination
- In vitro Fertilization (IVF)
- Artificial Insemination by Husband (AIH)
- Artificial Insemination by Donor (AID)
- Surrogate motherhood
- Semen Intra fallopian Transfer (SIFT)
- Gamete Intra fallopian Transfer (GIFT)
- Zygote Intra fallopian Transfer (ZIFT)
- Genetic Engineering

f. Family and Society in Medical Ethics

- Ethics of human sexuality
- Family planning perspectives
- Prolongation of life
- Advanced life directives – The Living Will
- Euthanasia
- Cancer and Terminal Care

g. Death and Dying

- Use of life-support systems
- Death awareness
- The moment of death
- Prolongation of life
- Ordinary and extraordinary life support
- Advanced life directives
- Euthanasia – passive and active
- Suicide – the ethical outlook

- The right to die with dignity
- h. Professional Ethics
 - Code of conduct
 - Contract and confidentiality
 - Charging of fees, Fee-splitting
 - Prescription of drugs
 - Over-investigating the patient
 - Low-cost drugs, vitamins and tonics
 - Allocation of resources in health care
- i. Research Ethics
 - Animal and experimental research/humanness
 - Human experimentation
 - Human volunteer research – Informed
 - Consent Drug Trials
- j. Ethical Work-up of Cases
 - Gathering all scientific factors
 - Gathering all human factors
 - Gathering all value factors
 - Identifying areas of value – conflict
 - Setting of priorities
 - Working out criteria towards decisions

4. Teaching/Learning Experience

Classroom teaching would focus on professional relationship, patient-doctor relationship, issues at the beginning and end of life, reproductive technologies, resource allocation and health policy. It will also deal with values, ethical concepts and principles. Clinical ethics must be taught as part of bedside teaching. Group discussions, case studies, problem analyzing and problem solving exercises may also be employed.

The teacher involved in teaching ethics should show how the ethical principles are applied on a day-to-day and patient to patient basis by demonstrating by example, how to identify and resolve a particular problem, increasing the awareness and knowledge of students of students the value dimensions of interactions with patients, colleagues, relations and public.

Fostering the development of skills of analysis, decision making and judgment. Making the students aware of the need to respect the rights of the patient as also duties and responsibilities of the doctor

5. Evaluation

All major subjects should have at least one short answer question on Medical Ethics appropriate for the subject introduced in the University question paper, and a few questions may be asked in the viva voce examination, eg., basic principles of informed consent, confidentiality, etc.

6. Recommended Reading

- a. Francis CM, Medical Ethics, II Ed, 2004, Jaypee Brothers, New Delhi, Rs. 150/-
- b. Ethical Guidelines for Biomedical Research on Human Subjects, Indian Council of Medical Research, New Delhi. 2000.

DIFFERENT METHODS RECOMMENDED FOR INTERNAL ASSESSMENT

National Institute of Naturopathy (NIN), Pune, has given some examples of methods of Internal assessment of students, which may be followed by the colleges. They are:

1. Credit for preparation and presentation of seminars by students
2. Preparation of clinical case for presentation
3. Clinical case study/problem solving exercises
4. Participation in project for health care in the community
5. Proficiency in conduction a small research project or assignment
6. Multiple choice questions (MCQ) test after completion of a chapter/system

Each time shall be objectively assessed and recorded. Some of the items can be assigned as home work/vacation work.

A COMPREHENSIVE LIST OF SKILLS RECOMMENDED AS DESIRABLE FOR BACHELOR OF NATUROPATHY AND YOGIC SCIENCES (BNYS) GRADUATE

1. Clinical evaluation
 - a. To be able to take a proper and detailed history
 - b. To perform a complete and thorough physical examination and elicit clinical signs
 - c. To be able to properly use the stethoscope, blood pressure apparatus, otoscope, thermometer, nasal speculum, etc
 - d. To be able to perform internal examination-per rectum (PR), per-vaginum (PV), etc.
 - e. To arrive at a proper clinical diagnosis
2. Bedside diagnostic tests
 - a. To do and interpret hemoglobin (Hb), total count (TC), erythrocyte sedimentation rate (ESR), blood smear for parasites, urine examination/albumin/sugar/ketones/microscopy;
 - b. Stool exam for ova and cysts;
 - c. To do gram's stain and Ziehl-Neelsen stain for AFB;
 - d. To do skin smear for leprae bacilli;
 - e. To do and examine a wet film vaginal smear for Trichomonas;
 - f. To do a skin scraping and potassium hydroxide (KOH) stain for fungal infections;
 - g. To perform and read Mantoux test.
3. Ability to carry out procedures
 - a. To conduct CPR (Cardiopulmonary resuscitation) and First Aid in newborns, children and adults
 - b. To administer enema
4. Paediatrics
 - a. To assess newborns and recognize abnormalities and IU retardation
 - b. To teach infant feeding to mothers

- c. To monitor growth by the use of ‘_road to health chart’ and to recognize development retardation
- d. To assess dehydration and prepare and administer Oral Rehydration Therapy (ORT)
- e. To recognize ARI clinically

5. Community Health

- a. To be able to supervise and motivate community and para-professionals for corporate efforts for health care
- b. To be able to carry on managerial responsibilities, e.g., Management of stores, indenting, stock keeping and accounting
- c. Planning and management of health camps
- d. Implementation of national health programmes
- e. To effect proper sanitation measures in the community, e.g., disposal of infected garbage, chlorination of drinking water
- f. To identify and institute control measures for epidemics including its proper data collecting and reporting

6. Management of emergencies

- a. To manage acute anaphylactic shock
- b. To manage peripheral vascular failure and shock
- c. To manage acute pulmonary edema and LVF
- d. Emergency management of drowning, poisoning and seizures
- e. Emergency management of bronchial asthma and status asthmaticus
- f. Emergency management of hyperpyrexia
- g. Emergency management of comatose patients regarding airways, positioning prevention of aspiration and injuries
- h. Assess and administer emergency management of burns