

SUMANDEEP VIDYAPEETH

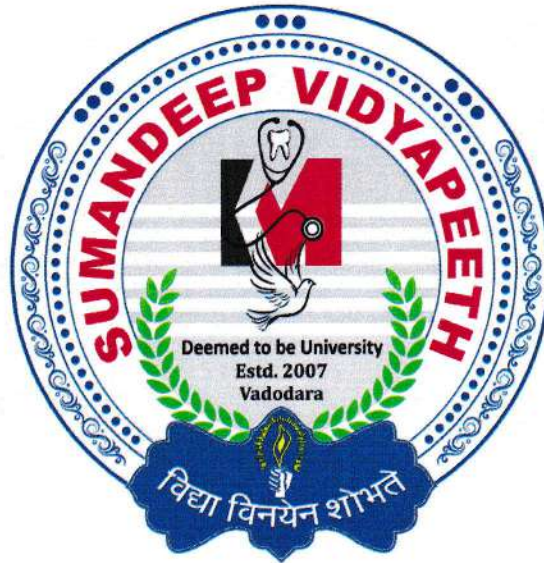
(Declared as Deemed to be University under Section 3 of the UGC Act 1956)

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

At & Post Piparia, Tal: Waghodia 391760 (Gujarat) India.

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CURRICULUM

Bachelor of Science (B.Sc)

NEUROSCIENCE TECHNOLOGY

Attested CTC

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Vice-Chancellor

Sumandeep Vidyapeeth

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INTRODUCTION

Scope

The quality of paramedical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses. Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that paramedical and healthcare professionals are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care.

Learning goals and objectives for paramedical healthcare professionals

The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres.

Program outcomes

1. The student has an in-depth understanding of mechanisms related to neurotransmitter signaling and glial-neuronal interactions in health and disease.
2. The student has an in-depth understanding of the overall organization of the vertebrate nervous system, including prevailing concepts on systems-level organization of the CNS.


Ethics and accountability

Students will understand core concepts of clinical ethics and law so that they may apply these to their practice as healthcare service providers. Program objectives should enable the students to:

- Describe and apply the basic concepts of clinical ethics to actual cases and situations
- Recognize the need to make health care resources available to patients fairly, equitably and without bias, discrimination or undue influence
- Demonstrate an understanding and application of basic legal concepts to the practice
- Employ professional accountability for the initiation, maintenance and termination of patient-provider relationships

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- Demonstrate respect for each patient's individual rights of autonomy, privacy, and confidentiality


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Commitment to professional excellence

The student will execute professionalism to reflect in his/her thought and action a range of attributes and characteristics that include technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare.

Eligibility for admission:

1. He/she has passed the Higher Secondary (10+2) Science or a duly constituted Board with pass marks in Physics, Chemistry, Biology

Duration of the course:

Duration of the course is 4 years including 1-year internship.

Attendance:

A candidate has to secure minimum 80% attendance in overall with at least-

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

Assessment: Assessments should be completed by the academic staff, based on the compilation of the student's theoretical & clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated. Student must attain at least 50% marks in each Theory, Internal assessment and Practical independently / separately for each individual subject.

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COURSE OF INSTRUCTION

| Course Name | Course Code | Theory (In hrs.) (Class and lab) | Practical (In hrs.) (Clinical) | Total (in Hours) |
|--|-------------|----------------------------------|--------------------------------|------------------|
| First Year | | | | |
| Anatomy | BNST101 | 60 | 40 | 100 |
| Physiology | BNST102 | 60 | 40 | 100 |
| Pathology | BNST103 | 30 | 30 | 60 |
| Communication Skills And Personality Development | BNST104 | 40 | - | 40 |
| 2nd Year | | | | |
| Neuro-anatomy | BNST201 | 60 | 40 | 100 |
| Neurophysiology | BNST202 | 60 | 40 | 100 |
| Neuro-Biochemistry | BNST203 | 40 | 30 | 70 |
| Fundamentals of Computer Science | BNST204 | 40 | - | 40 |
| 3rd Year | | | | |
| Basics of EEG | BNST301 | 60 | 40 | 100 |
| Basics of EMG & NCV | BNST302 | 60 | 40 | 100 |
| Patient care management and clinical care | BNST303 | 60 | 40 | 100 |
| Environmental Science | BNST304 | 60 | 40 | 100 |

SCHEME OF EXAMINATION

| First Year | | | | |
|--------------------|--|---------------------|-------|-------|
| SUBJECT CODE | SUBJECTS | EXAMINATION PATTERN | | |
| | | Internal | Final | TOTAL |
| BNST101 | Anatomy | 20 | 80 | 100 |
| BNST102 | Physiology | 20 | 80 | 100 |
| BNST103 | Pathology | 20 | 80 | 100 |
| BNST104 | Communication Skills And Personality Development | 20 | 80 | 100 |
| Second Year | | | | |
| BNST201 | Neuro-anatomy | 20 | 80 | 100 |
| BNST202 | Neurophysiology | 20 | 80 | 100 |
| BNST203 | Neuro-Biochemistry | 20 | 80 | 100 |
| Attested CTC | Fundamentals of Computer Science | 20 | 80 | 100 |

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| Third year | | | | |
|------------|---|----|----|-----|
| BNST301 | Basics of EEG | 20 | 80 | 100 |
| BNST302 | Basics of EMG & NCV | 20 | 80 | 100 |
| BNST303 | Patient care management and clinical care | 20 | 80 | 100 |
| BNST304 | Environmental Science | 20 | 80 | 100 |

FIRST YEAR B.SC IN NEURO SCIENCE TECHNOLOGY

| BNST101-ANATOMY | | 60 HOURS | |
|-----------------|---|----------------|-------------------|
| S. No. | Topics to be covered | Teaching Hours | Domain |
| Unit-1 | <ul style="list-style-type: none"> Basic anatomy Basics of nervous system | 5 | Must know |
| | <ul style="list-style-type: none"> Subdivisions of nervous system Central Peripheral Autonomic Living anatomy of head and neck | 2 | Desirable to know |
| | <ul style="list-style-type: none"> Living anatomy of head and neck | 1 | Nice to know |
| Unit-2 | Thalamus | | |
| | <ul style="list-style-type: none"> Introduction Division of diencephalon External features parts of thalamus | 5 | Must know |
| | <ul style="list-style-type: none"> Nuclei of thalamus Connections of thalamic nuclei | 2 | Desirable to know |
| | <ul style="list-style-type: none"> Uses/functions | 1 | Nice to know |

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| | | | |
|--------|--|---|-------------------|
| Unit-3 | Hypothalamus | 5 | Must know |
| | <ul style="list-style-type: none"> • Introduction • Division and boundaries of hypothalamus • Hypothalamic nuclei | 3 | Desirable to know |
| | <ul style="list-style-type: none"> • Connections of hypothalamic • Functions/uses | 1 | Nice to know |
| Unit-4 | Ventricular system | 5 | Must know |
| | <ul style="list-style-type: none"> • Introduction • Review of skull | 2 | Desirable to know |
| | <ul style="list-style-type: none"> • Classification • Functions | 2 | Nice to know |

| | | | |
|--------|--|---|-------------------|
| Unit-5 | Cerebrospinal fluid | 2 | Must know |
| | <ul style="list-style-type: none"> • Introduction • Production • Circulation and absorption • Function | 3 | Desirable to know |
| Unit-6 | Skull | 3 | Must know |
| | <ul style="list-style-type: none"> • Introduction • Bones of the skull • Joints of the skull | 2 | Desirable to know |
| | <ul style="list-style-type: none"> • Anatomical position of skull • Features of the skull- exterior and interior | 4 | Nice to know |
| Unit-7 | Cerebellum | 3 | Must know |
| | <ul style="list-style-type: none"> • Introduction • Arterial supply of the cerebellum • External features | | |

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| | | | |
|---------------|---|---|-------------------|
| | <ul style="list-style-type: none"> • Divisions of cerebellum • Internal structure (In brief) | 5 | Desirable to know |
| | Boundaries and functions | 2 | Nice to know |
| Unit-8 | Motor and sensory tracts Sensory receptors Sensory and motor pathways Pyramidal system Upper and lower motor neuron | | |

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| BNST102-PHYSIOLOGY | | 60 HOURS | |
|--------------------|---|----------------|-------------------|
| S. No. | Topics to be covered | Teaching Hours | Domain |
| Unit-1 | Nerve muscle physiology <ul style="list-style-type: none"> Functional anatomy, biological activities, electrical and physiological properties of nerve fiber, types of nerve fiber, degeneration and regeneration of neurons. Structure and function of neuromuscular junction, neuromuscular transmission, | 5 | Must know |
| | <ul style="list-style-type: none"> Introduction of skeletal muscle, functional anatomy and organization, process and characteristics of muscle excitability and contractility, characteristics of skeletal muscles in intact body, EMG, and common muscle disorders, source of energy and metabolic phenomenon during muscle contraction | 3 | Desirable to know |
| | <ul style="list-style-type: none"> drugs affecting and disorders of neuromuscular junction factors promoting neuronal growth, | 2 | Nice to know |
| Unit-2 | Cranial nerves <ul style="list-style-type: none"> Introduction, function of cranial nerve, | 4 | Must know |
| | <ul style="list-style-type: none"> Clinical significance | 3 | Desirable to know |
| Unit-3 | Membrane potential <ul style="list-style-type: none"> Introduction, genesis of membrane potential, recording of membrane potential | 3 | Must know |
| | <ul style="list-style-type: none"> -Evolution of patients receiving oxygen therapy | 2 | Desirable to know |
| | <ul style="list-style-type: none"> Hazards of oxygen therapy. | 1 | Nice to know |

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|---------------|--|---|--------------------------|
| Unit-4 | Synapses • Definition and its types, • Chemical synapse, • neurotransmitters | 5 | Must know |
| | | 2 | Desirable know to |
| Unit 5 | Pathways Introduction, Salutatory propagation, plexus and roots, afferent and efferent pathways, • peripheral nerves of limbs | 3 | Must know |
| | | 2 | Desirable know to |
| Unit 6 | Cerebellum Introduction, stimulus, sensors and receptors and its types, sensory cortex and its types, Neural circuits and neuronal activity, functions. | 5 | Must know |
| | | 2 | Desirable know to |
| Unit 7 | Brain stem Introduction, physiological structure, development, blood supply, Clinical significance, functions. | 4 | Must know |
| | | 2 | Desirable know to |

| BNST103-PATHOLOGY | | 60 HOURS | |
|--------------------------|---|-----------------------|--------------------------|
| S. No. | Topics to be covered | Teaching Hours | Domain |
| Unit-1 | Bone- gross and micro • Normal structure of bone and cartilages • Osteomyelitis – pyogenic, acute, chronic and tuberculosis • Osteoporosis, osteomalacia, rickets, scurvy • one Tumor- classification, benign • malignant and • Giant cell (tumor of bone) • Rheumatoid arthritis • Gout & Gouty arthritis • • osteomyelitis osteosarcoma (briefly) | 10 | Must know |
| | | 5 | Desirable know to |
| | | 3 | Nice to know |
| Unit-2 | Muscle- gross and micro • Normal structure of muscle • Myasthenia gravis Myopathies – muscular dystrophies | 8 | Must know |
| | | 5 | Desirable know to |

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|---------------|--|----------|--------------------------|
| Unit-3 | Nerve- gross and micro | 8 | Must know |
| | <ul style="list-style-type: none"> • Normal structure of nerve • Hydrocephalus • Infections – meningitis, acute, chronic, pyogenic, tuberculosis meningitis | | |
| | <ul style="list-style-type: none"> • HIV encephalopathy (AIDS - dementia complex) • Brain hemorrhage • Trauma to the CNS(head injury) • Peripheral nervous system (Normal structure) | 4 | Desirable to know |
| | <ul style="list-style-type: none"> • Peripheral neuropathy • Wallerian degeneration | 3 | Nice to know |

| BNST104-COMMUNICATION SKILL AND PERSONALITY DEVELOPMENT | | | |
|--|--|--|-----------------------|
| TOTAL HOURS: 40 | | | |
| SI. No | TOPICS TO BE COVERED | Domain | Teaching Hours |
| Unit-I | Listening Comprehension <ul style="list-style-type: none"> • Speeches • Interviews • audio-video clippings followed by exercises • Introduction to Communication • Importance of Communication • Barriers to Communication and ways to overcome them | Desirable to know Must Know Nice to know | 10 hours |
| Unit-II | Conversation Skills <ul style="list-style-type: none"> • Greetings and Introducing oneself • Framing questions and answers • Role-play • Buying: asking detailed • Word formations strategies • Vocabulary building: Antonyms, Synonyms, Affixation, Suffixation, One words substitution | Must Know Desirable to know | 5 Hours |

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|-----------------|--|-----------|----------|
| Unit-III | <p>Reading Comprehension</p> <ul style="list-style-type: none"> • Simple narration and Stories • Newspaper and articles clippings • Sentence types • Note Making • Paragraph Writing • Comprehension • Report Writing: types, characteristics | Must Know | 8 Hours |
| Unit-IV | <p>Pronunciation</p> <ul style="list-style-type: none"> • Pronunciation • Syllable and Stress • Intonation and Modulation | Must Know | 10 Hours |
| Unit-V | <p>Writing Comprehension</p> <ul style="list-style-type: none"> • Letters: types, format, style • Précis Writing • Paragraph: Order, Topic sentence, consistency, coherence • Report and Proposal • Project Writing: Features, Structure | Must Know | 15 Hours |

SECOND YEAR B.SC IN NEURO SCIENCE TECHNOLOGY

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|------------------------------|-----------------------------|-----------------------|---------------|
| BNST201-Neuro Anatomy | | 60 hours | |
| S. No. | Topics to be covered | Teaching Hours | Domain |

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|---------------|---|---|--------------------------|
| Unit-1 | Spinal cord | 5 | Must know |
| | <ul style="list-style-type: none"> • Introduction • Blood supply • External features | 2 | Desirable know to |
| | <ul style="list-style-type: none"> • Fissures and sulci • Attachment of spinal nerve roots • Internal structure <p>Enlargement of spinal cord Spinal nerves Formation of plexus</p> | 1 | Nice to know |
| Unit-2 | Cranial nerves | 5 | Must know |
| | <ul style="list-style-type: none"> • Introduction • Types – Motor, special sensory, mixed cranial nerves <p>Functions</p> | 2 | Desirable know to |
| Unit-3 | Autonomic nervous system | 5 | Must know |
| | <ul style="list-style-type: none"> • Organization of nervous system • Anatomy of autonomic motor pathway | 2 | Desirable know to |
| | <ul style="list-style-type: none"> • Structure of sympathetic and parasympathetic divisions • Neuro transmitters and receptors <p>Functions</p> | 1 | Nice to know |
| Unit-4 | Brain vascular supply | 5 | Must know |
| | <ul style="list-style-type: none"> • Introduction • Blood brain barrier <ul style="list-style-type: none"> • Characteristics of artery and veins Supply in different areas in brain <p>Muscles</p> <ul style="list-style-type: none"> • Origin • Insertion nerve supply | 1 | Desirable know to |
| Unit 5 | Cerebrum | 3 | Must know |
| | <ul style="list-style-type: none"> • Introduction and structure of cerebrum • Cerebral cortex • Gyri, sulci, cortical areas -demonstration • Lobes of the cerebellum • Association commissural areas • Basal nuclei | | |

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|--------|--|---|-------------------|
| | <ul style="list-style-type: none"> • Limbic system Functions • Dissection hall | 2 | Desirable to know |
| Unit-6 | Meninges <ul style="list-style-type: none"> • Introduction • Meninges of brain | 3 | Must know |
| | Subdural and Subarachnoid Space | 2 | Desirable to know |
| Unit-7 | Brain stem <ul style="list-style-type: none"> • Introduction • External features • Structure • Arterial supply | 4 | Must know |
| | <ul style="list-style-type: none"> • Development of functional column and nuclei Reticular formation | 2 | Desirable to know |
| | Medulla <ul style="list-style-type: none"> • Introduction • External features • Structure • Arterial supply | 3 | Must know |
| | Function | 1 | Desirable to know |
| | <ul style="list-style-type: none"> • Limbic system Functions • Dissection hall | 2 | Desirable to know |
| Unit-6 | Meninges <ul style="list-style-type: none"> • Introduction • Meninges of brain | 3 | Must know |
| | Subdural and Subarachnoid Space | 2 | Desirable to know |
| Unit-7 | Brain stem <ul style="list-style-type: none"> • Introduction • External features • Structure • Arterial supply | 4 | Must know |

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|--|--|---|-------------------|
| | <ul style="list-style-type: none"> Development of functional column and nuclei | 2 | Desirable know to |
| | Reticular formation Medulla <ul style="list-style-type: none"> Introduction External features Structure Arterial supply | 3 | Must know |
| | Function | 1 | Desirable to know |

| BNST202-NEUROPHYSIOLOGY | | 40 HOURS | |
|-------------------------|--|----------------|-------------------|
| S. No. | Topics to be covered | Teaching Hours | Domain |
| Unit-1 | Nervous system Physiological structure of human brain, properties and function | 5 | Must know |
| | | 3 | Desirable know to |
| Unit-2 | Cerebrum Introduction, physiological anatomy, cerebral cortex, cerebral hemisphere, functions | 5 | Must know |
| | | 2 | Desirable know to |
| Unit-3 | Reflexes : Introduction, types, reflexes Involving Cranial nerves. Functions of cranial nerves | 5 | Must know |
| | | 2 | Desirable know to |
| | | 1 | Nice to know |

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|---------------|---|---------------------|---|
| Unit-4 | Motor system : Introduction , types of motor system functions and application areas | 5 2 | Must know Desirable know to |
| Unit-5 | Sensory system: Introduction, stimulus, sensors and receptors and its types, sensory cortex and its types | 5 2 1 | Must know Desirable know to Nice to know |
| Unit-6 | Basic neurological examination: Introduction, absence and presence of disease in nervous system, aspects of neurological examination | 5 1 | Must know Desirable know to |
| Unit 7 | Basics of NCV and EMG : • Introduction, block diagram, • Basic instrumentation of NCV &EMG equipments | 4 2 | Must know Desirable know to |

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| BNST203-NEURO BIOCHEMISTRY | | 40 HOURS | |
|----------------------------|---|----------------|-------------------|
| S. No. | Topics to be covered | Teaching Hours | Domain |
| Unit-1 | Introduction to Cell <ul style="list-style-type: none"> • Definition of the cell • Difference between prokaryotic & eukaryotic cell | 8 | Must know |
| | <ul style="list-style-type: none"> • Structure of cell • Structure of cell membrane • Structure of various cell organelles i.e. nucleus, mitochondria, Golgi body, lysosomes, ribosomes, endoplasmic reticulum, centrioles etc | 5 | Desirable to know |
| | Detailed function of above mentioned cell organelles | 3 | Nice to know |
| Unit-2 | Chemistry of Proteins <ul style="list-style-type: none"> • Definition of the proteins & amino acids • Structure & function of proteins and amino acids • Classification of proteins & amino acids | 8 | Must know |
| | <ul style="list-style-type: none"> • Biologically important peptides & amino acids • Amino acids & peptides which act as neurotransmitters • Organization of protein structure Denaturation | 5 | Desirable to know |
| Unit-3 | Protein Metabolism <ul style="list-style-type: none"> • Transamination • Deamination • Oxidative deamination • Decarboxylation • Synthesis, transport, disposal and toxicity of ammonia | 5 | Must know |
| | <ul style="list-style-type: none"> • Urea cycle and its disorders • Metabolism of individual amino acids specifically related to nervous tissue | 3 | Desirable to know |
| | <ul style="list-style-type: none"> • Specialized products formed from amino acids | 2 | Nice to know |
| | Inborn errors of amino acid metabolism | | |

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|---------------|---|----------|------------------|
| Unit-4 | Nervous Tissue <ul style="list-style-type: none"> • Introduction, Types and functions of neurotransmitters | 5 | Must know |
|---------------|---|----------|------------------|

| BNST204-FUNDAMENTALS OF COMPUTER SCIENCE HOURS: 40 HOURS | | | |
|---|--|-------------------|--------------|
| S.no | Topic | Domain | Hours |
| 1 | Introduction about computers What are Computers? Its various characteristics, applications and limitations. Functional Block Diagram of computer Computer Architecture: Classification of computer on basis of Purpose, signal and size and portability. | Must know | 8 |
| | Evolution of computer from 1 st generation to fourth generation. Some description about fifth generation. | Desirable to know | 4 |
| | Data representation in memory. | Nice to know | 1 |
| 2 | Hardware: To study the various input devices used: Keyboard, mouse, OMR, OCR, MICR, BCR, Scanner etc. To study the internal structure of CPU: Registers, ALU, Motherboard, H D , Memory, Cache, and Virtual Memory. TO study the various Secondary storage devices: Magnetic Disk, Optical Disk, Flash memory To cover what are Monitor, Its types, Printer: Dot matrix, Daisy wheel. Line printer, Laser printer, Thermal Printer, Ink Jet printers etc. | Must know | 8 |

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| 3 | To cover the types of Software, Languages and their types (High level and low level language.) To cover the definition of operating system, its types and what are the various functions and types of operating system. Basic introduction about Interfaces: its types character user and graphical user interface (DOS and Windows) | Must know | 8 |
|---|--|-----------|---|

| THIRD YEAR B.SC IN NEURO SCIENCE TECHNOLOGY | | | |
|--|---|-----------------------|--------------------------|
| BNST301-BASICS OF EEG | | 60 HOURS | |
| S. No. | Topics to be covered | Teaching Hours | Domain |
| Unit-1 | Anatomical and physiological structure of Human brain. | 5 | Must know |
| | Division Clinical significance | 4 | Desirable to know |
| Unit-2 | Electroencephalography : brain waves, frequency , 10-20 electrode placement system, montage, | 5 | Must know |
| | amplitude, source of EEG | 4 | Desirable to know |
| Unit-3 | Review of EEG machine: basic components (designing and working), block diagram of EEG machine | 5 | Must know |
| | Functioning of each component | 4 | Nice to know |
| Unit-4 | Amplifiers, preamplifiers, noise and its types, | 5 | Must know |
| | Basic of filters. | 4 | Desirable to know |
| Unit 5 | Neonatal EEG: Introduction, Frequency, Amplitude | 5 | Must know |
| | EEG in different age groups Normal and | 4 | Desirable to know |

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|--|--------------|--|--|
| | abnormal EEG | | |
|--|--------------|--|--|

| BNST302-BASICS OF EMG & NCV | | 60 HOURS | |
|-----------------------------|---|----------------|-------------------|
| S. No. | Topics to be covered | Teaching Hours | Domain |
| Unit-1 | Anatomical and physiological structure of human nervous system Lymphatic system Upper and lower limbs | 8 | Must know |
| | Sensory and motor nerves | 5 | Desirable to know |
| Unit-2 | Electromyography (working principle) Nerve conduction velocity Nerve muscle stimulator | 8 | Must know |
| | Electrode placement Stimulator applications | 4 | Desirable to know |
| Unit-3 | Review of EMG machine: basic components (designing and working), block diagram of EMG machine | 8 | Must know |
| | Advancement in EMG machine design | 4 | Nice to know |
| Unit-4 | Amplifiers Preamplifiers, noise and its types, | 5 | Must know |
| | Basics of filters. | 4 | Desirable to know |

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| BNST303-PATIENT CARE MANAGEMENT AND CLINICAL CARE- 60 HOURS | | | |
|--|---|-----------------------|--------------------------|
| S. No. | Topics to be covered | Teaching Hours | Domain |
| Unit-1 | Maintain patient, ward record. Proper labeling of patient investigation. History taking | 8 | Must know |
| | Investigations. | 3 | Desirable know to |
| Unit-2 | Patient preparation for procedure. Pre procedure | 8 | Must know |
| | Neurology procedure. Post procedure care. | 4 | Desirable know to |
| Unit-3 | Observation Examination, Physical examination, Nursing care, Ward management, Patient care during seizures | 8 | Must know |
| | Differential provisional diagnosis, Medication | 3 | Nice to know |
| Unit-4 | Factual report writing | 8 | Must know |
| | Receiving patient in procedure room (EEG and EMG room), Decision for treatment/ admission | 4 | Desirable know to |

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| BNST304-ENVIRONMENTAL SCIENCE | | 60 HOURS | |
|-------------------------------|--|----------------|--------------|
| S.No. | Topic | Teaching Hours | Domain |
| 1. | The Multidisciplinary nature of environmental studies | 2hr. | Must know |
| 2. | <ul style="list-style-type: none"> • Definition, scope and importance. • Need for public awareness | 2hr. | Must Know |
| 3. | Natural Resources Renewable and non-renewable resources: Natural resources and associated problems | 2 hr. | Must Know |
| 4. | Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. | 2 hr. | Must Know |
| 5. | Water resources: Use and over-utilization of surface and Ground water, floods, drought, conflicts over water, dam's benefits and problems. | 2 hr. | Must Know |
| 6. | Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case Studies. | 2 hr. | Nice to Know |
| 7. | Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. | 2hr. | Must Know |
| 8. | Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. | 2 hr. | Must Know |
| 9. | Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. | 2 hr. | Good to Know |
| 10. | Unit 2: Ecosystems Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. | 2 hr. | Must Know |
| 11. | Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. | 2 hr. | Good to Know |

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| | | | |
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| 12. | Biodiversity and its conservation Hot-spots of biodiversity. Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity | 2hr. | Must Know |
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| 13. | Unit 3: Environmental Pollution Definition, causes, effects and control measures of:- | 2hr. | Must Know |
| 14. | a. Air pollution | 2hr. | Must Know |
| 15. | b. Water pollution | 1hr. | Must Know |
| 16. | c. Soil pollution | 1hr. | Good to Know |
| 17. | d. Marine pollution | 1hr. | Good to Know |
| 18. | e. Noise pollution | 1hr. | Must Know |
| 19. | f. Thermal pollution | 1hr. | Nice to Know |
| 20. | g. Nuclear hazards | 1hr. | Nice to Know |
| 21. | Solid waste Management: Causes, effects and control measures of urban and industrial wastes. | 1hr. | Must Know |
| 22. | Fireworks, their impacts and hazards | 2hr. | Must Know |
| 23. | Pollution case studies. | 2hr. | Good to Know |
| 24. | Disaster management: floods, earthquake, cyclone | 1hr. | Good to Know |
| 25. | Unit 4 : Social Issues and the Environment From Unsustainable to Sustainable development | 1 hr. | Must Know |
| 26. | Urban problems related to energy Water conservation, rain water harvesting, watershed management | 1hr. | Must Know |
| 27. | Resettlement and rehabilitation of people; its problems and concerns. Case studies. | 1hr. | Nice to Know |
| 28. | Environmental ethics: Issues and possible solutions. Consumerism and waste products. Environmental Legislation (Acts and Laws) | 1hr. | Good to Know |
| 29. | Issues involved in enforcement of environmental legislation Human Population and the Environment | 1hr. | Nice to Know |
| 30. | Population growth, variation among nations, with case studies Population explosion – Family Welfare Programmes and Family Planning Programmes | 21hr. | Must Know |

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| 31. | Human Rights. Value Education. Women and Child Welfare. | 1 hr. | Good to know |
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