REGULATIONS AND CURRICULUM GOVERNING

B.Sc. NEUROSCIENCE TECHNOLOGY PROGRAM

Implemented in Academic Year 2020-21

Revised in 2023

Amended up to 2025

Name of the constituent Unit: Yenepoya School of Allied Health Sciences

RABBI ZIDNI 'ILMA

YENEPOYA

(DEEMED TO BE UNIVERSITY)

Deralakatte, Mangalore, Karnataka

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NOTIFICATION FROM THE UNIVERSITY

Sl. No.	ACM with date	Decisions/Approvals
1.	38th ACM/ 27.04.2020	Starting the BSc course in Neuroscience Technology from the Academic Year 2020 -2021 under the Faculty of Allied & Healthcare Professions
2.	39th ACM/ 27.08.2025	To start Yenepoya Institute of Allied Health Sciences, Reallocation of existing/proposed courses under the respective faculties, Faculty of Allied and Healthcare Professions
3.	44th ACM/ 05.10.2021	Proposal for Introduction of Choice Based Credit System in all the Undergraduate programs offered by the Yenepoya Institute of Allied Health Sciences from the academic year 2021-22.
4.	47th ACM/ 20.06.2022	Approval of starting the MSc. Neurosciences under the Yenepoya School of Allied Health Sciences from the Academic year 2022-2023 onwards
5.	48th ACM/ 05.11.2022	Increase in intake of seats for BSc Neuroscience Technology from 25 to 50 seats.
6.	49th ACM/ 13.12.2022	Curriculum of B.Sc. –M.Sc. Integrated UG –PG programme with NEP regulations has been approved for implementation from the Academic Year 2022-23.
7.	51st ACM/ 16.05.2023	Introduction of New National Credit Framework (NCRF) for all undergraduate programmes under the faculty of Allied & Healthcare Professions from the academic year 2023-24.
		Introduction of Multidisciplinary Elective courses for all Undergraduate programmes.
8.	54th ACM/ 20.11.2023	Increase in intake of seats for BSc Neuroscience Technology from 50 to 70 seats.
9.	61st ACM/ 13.02.2025	The amendment in the syllabus of the course “Pathology & Microbiology II” of the B.Sc. Technology Program was Approved.
10.	64th ACM/ 14.08.2025	Implementing Ability Enhancement Course “English and Communication” in all B.Sc. Technology Programs under the Faculty of Allied & Healthcare Professions was approved.

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1. Preamble

Health care sector has become one of the largest employment generation sectors in India and abroad. Rapidly changing and expanding horizon of the health care sector demands formal training programs in all its allied areas. Advanced complex instrumentation & equipment require technologists not only to operate but also to care & maintain these instruments and equipment. These technologists should possess a strong scientific foundation to be able to perform these tasks at a much higher level than the traditionally trained technicians of the past used to perform. The students who are trained in the technological aspects of medical care with a good scientific foundation will be in a position to competently assist the Physician or Surgeon. Hence to prepare the students to meet the demands of the healthcare sector and in accordance with Ministry of Human Resource Development (HRD), Govt. of India education introduced National higher education quality framework (NHEQF), the program is designed in a way the curriculum is student centric having flexible choice-based credit system with value based holistic multidisciplinary approach.

B.Sc. Neuroscience Technology (Bsc NST) is an undergraduate program in the field of health care concerned with the examination, diagnosis and management of the neurological disorders.

The scope of neuroscience technology is continuously broadening and qualified professionals of the discipline can seek both medical and non-medical career opportunities. Neuro-diagnostic technologists or Neuro-diagnostic technicians make use of science and technology to diagnose and treat neurological diseases and disorders. Neuroscientists or neuroscience technologists also work as researchers within medical institutions and hospitals. In research-specific jobs, neuroscientists design and carry out scientific experiments related to the nervous system and its function.

Several institutes in India, conduct certificate programs, diploma, graduate and post-graduate programs in Neuroscience Technology. These programs are regulated by universities and paramedical boards. Whereas, the certificate and diploma programs offer training at the basic level, both theoretical and practical, the graduate and post-graduate

degrees have advanced training of the students in all aspects of Neuroscience Technology.

2. Definitions

a. **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.

b. **Semester System / Choice Based Credit System:** The semester system accelerates the teaching – learning process. The CBCS provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a cafeteria type approach in which the students can take courses of their choice, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.

An academic year shall consist of two semesters:

Odd Semester 1st, 3rd, 5th& 7th	September/October to February/March
Even semester 2nd, 4th, 6th& 8th	March/April to August/September

c. **Course:** Usually referred to, as "papers" is a component of a programme. The courses shall define learning objectives and learning outcomes. A course shall comprise lectures/ tutorials/ laboratory work/ field work/ outreach activities/ project work/ vocational training/viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these. The courses can be of the following types i.e. Core, Ability Enhancement, Skill enhancement, Value added courses, Multidisciplinary Electives and Internship.

d. **Credits:** Credit defines the quantum of contents/syllabus prescribed for a course and determines the number of hours of instruction required per week. Thus, normally in each of the courses, credits will be assigned on the basis of the number of lectures/tutorial laboratory work and other forms of learning required, to complete the course contents in a 15-20week schedule: One credit =1 hour of lecture per week/ two hours of Laboratory or practical/three hours of clinical rotation, field work/posting. All courses need not carry the same credits.

	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Rotation (CR)
1 Credit	1 Hour	1 Hour	2 Hours	3-5 Hours

Credit Hours for different types of courses: Each course may have only a lecture component or a lecture and tutorial component or a lecture and practicum component or a lecture, tutorial, and practicum component, or only practicum component. For example, a three-credit lecture course in a semester means three one-hour lectures per week with each one-hour lecture counted as one credit. In a semester of 15 weeks duration, a three-credit lecture course is equivalent to 45 hours of teaching.

One credit for tutorial work means one hour of engagement per week. In a semester of 15 weeks duration, a one-credit tutorial in a course is equivalent to 15 hours of engagement.

A one-credit course in practicum or lab work, community engagement and services, and fieldwork in a semester mean two-hour engagement per week. In a semester of 15 weeks duration, a one-credit practicum in a course is equivalent to 30 hours of engagement.

A one-credit of Seminar or Internship or Studio activities or Field practice/projects or Community engagement and service means two-hour engagements per week. Accordingly, in a semester of 15 weeks duration, one credit in these courses is equivalent to 30 hours of engagement.

A course can have a combination of lecture credits, tutorial credits, and practicum credits. For example, a 4–credit course with three credits assigned for lectures and one credit for practicum shall have three 1-hour lectures per week and one 2-hour duration field-based learning/project or lab work, or workshop activities. In a semester of 15 weeks duration, a 4-credit course is equivalent to 45 hours of lectures and 30 hours of practicum. Similarly, a 4 –credit course with 3- credits assigned for lectures and one credit for tutorial shall have three 1-hour lectures per week and one 1-hour tutorial per week. In a semester of 15 weeks duration, a four-credit course is equivalent to 45 hours of lectures and 15 hours of tutorials.

Experiential learning credit is equal to 3-hour duration per week. For example, 1 credit for experiential learning will mean 45 hours of learning. The credits assigned to the course is indicated as L:T:P format. For example, for a 4credit course format could be: 4:0:0 or 1:2:1 or 3:1:0 or 0:0:4etc.

e. **Programme:** An educational program leading to award of a degree, diploma or certificate. The following types of courses/activities constitute the programmes of study. Each of them will require a specific number of hours of teaching/guidance and laboratory/studio/workshop activities, field-based learning/projects, internships, and community engagement and service.

a. **Lecture courses:** Courses involving lectures relating to a field or discipline by an expert or qualified personnel in a field of learning, work/vocation, or professional practice.

b. **Tutorial courses:** Courses involving problem-solving and discussions relating to a field or discipline under the guidance of qualified personnel in a field of learning, work/vocation, or professional practice.

c. **Practicum or Laboratory work:** A course requiring students to participate in a project or practical or lab activity that applies previously learned/studied principles/theory related to the chosen field of learning, work/vocation, or professional practice under the supervision of an expert or qualified individual in the field of learning, work/vocation or professional practice.

d. **Seminar:** A course requiring students to participate in structured discussion/conversation or debate focused on assigned tasks/readings, current or historical events, or shared experiences guided or led by an expert or qualified personnel in a field of learning, work/vocation, or professional practice.

e. **Internship:** A course requiring students to participate in a professional activity or work experience, or cooperative education activity with an entity external to the education institution, normally under the supervision of an expert of the given external

entity. A key aspect of the internship is induction into actual work situations. Internships involve working with local industry, government or private organizations, business organizations, artists, crafts persons, and similar entities to provide opportunities for students to actively engage in on-site experiential learning.

f. **Studio activities:** Studio activities involve the engagement of students in creative or artistic activities. Every student is engaged in performing a creative activity to obtain a specific outcome. Studio-based activities involve visual- or aesthetic focused experiential work.

g. **Field practice/projects:** Courses requiring students to participate in field-based learning/projects generally under the supervision of an expert of the given external entity.

h. **Community engagement and service:** Courses requiring students to participate in field-based learning/projects generally under the supervision of an expert of the given external entity. The curricular component of 'community engagement and service' will involve activities that would expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems.

i. **Experiential learning activities:** Field project work / Day out learning activities etc are considered as experiential activities.

f. **Grade Point:** It is a numerical weight allotted to each letter grade on a 10-point scale.

g. **Credit Point:** It is the product of grade point and number of credits for a course.

h. **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters: O, A+, A, B+, B, C, P, F, AB.

i. **Cumulative Grade Point Average (CGPA):** It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

j. **Semester Grade Point Average (SGPA):** It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

k. **Transcript or Grade Card or Certificate:** Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester.

l. **Academic Bank Account:** Means an individual account with the Academic Bank of Credits opened and operated by a student, to which all academic credits earned by the student from course(s) of study are deposited, recognized, maintained, accumulated, transferred, validated or redeemed for the purposes of the award of degree/diploma/certificates etc. by an awarding institution.

m. **Academic Bank of Credits:** Means the provision for innovative and interchangeable curricular structures to enable creative combinations of Courses or Programmes in Disciplines of study leading to Degree or Diploma or Post Graduate Diploma or Certificate of Study offering multiple entry and multiple exit facilities, while removing rigid curricular boundaries and creating new possibilities of life-long learning.

n. **Credit Accumulation:** Means the facility created by Academic Bank of Credits in the Academic Bank Account opened by students in order to transfer and consolidate the credits earned by them by undergoing Courses.

o. **Credit Redemption:** Means the process of commuting the accrued credits in the Academic Bank Account of the students maintained in ABC for the purpose of fulfilling the credits requirements for the award of Degrees or Diplomas or Certificates or Course work for Ph.D. programme etc., by the registered degree-awarding Higher Educational Institutions.

p. **Credit Transfer:** Means the mechanism by which the Registered Higher Educational Institutions are able to receive or provide prescribed credits to individual Academic Bank Accounts in adherence to the University Grants Commission credit norms for the 'course/s' undertaken by students enrolled in any Registered Higher Education Institution within India.

q. Curricular components of the B.Sc. Neuroscience Technology Programme:

Courses in the programme may be of the following types:

a. Core Course
b. Skill Enhancement Courses (SEC)
c. Ability Enhancement Courses (AEC)
d. Value Added Courses (VAC)
e. Multidisciplinary Elective (ME)
f. Internship

a. **Core Course (CC):**A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. This is the course which is the major disciple/subject having main focus and degree will be awarded in this discipline. This core course provides opportunity for our student to pursue in depth study of a particular subject or discipline hence, it is compulsorily studied by a student as a core requirement to complete the program of study in a said discipline.Every Core course shall be restricted to a minimum of 4 credits.

b. **Skill Enhancement Course (SEC):** SEC courses are aimed at imparting practical skills, hands- on training, competencies etc to enhance the skill-based knowledge and thus the employability of the students.

c. **Ability Enhancement Courses (AEC):** These are the courses which aim to provide the students the competency in a modern Indian language (MIL) and in the English language with special emphasis on language and the communication skills. The courses aim at enabling the students to acquire and demonstrate the core linguistic skills, including critical reading and expository and academic skills, that helps students articulate their arguments and present their thinking clearly and coherently and recognize the importance of language as a mediator of knowledge and identity. The courses will also emphasize the development and enhancement of skills such a communication, and the ability to participate/ conduct discussion and debate.

d. **Value Added Courses (VAC):** These are the courses relating to understanding India, environmental science/ education, Health and Wellness etc..

i. **Constitution of India:** The course aims at enabling the students at acquire and demonstrate the knowledge and understanding of contemporary India with its historical perspective, the basic framework of the goals and policies of National development, and the constitutional obligations with special emphasis on constitutional values and fundamental rights and duties.

ii. **Environmental Studies:** The course aims to equip the students with the ability to apply the acquired knowledge, skills, attitudes, and values require to take appropriate actions for mitigating the effects of environmental degradation, climate change, and pollution, effective waste management, conservation of biological diversity, management of biological resources, forest and wild life conservation, and sustainable development and living.

iii. **Human Rights & Gender equity:** The Course emphasis understanding social justice issues and roles of human rights in promoting equitable society including international, national perspective, contemporary issues with this holistic coverage and relevance to today's world.

iv. **Medical Ethics:** The course deals with ethics involving fundamental and moral issues related to decision making while performing professional practice. It guides the students in systematic and rational way of working through dilemmas and to determine the best course of action in their field of practice.

e. **Multidisciplinary Electives (ME):** These courses are intended to broaden the intellectual experience and form part of liberal arts and science education. Students are not allowed to choose or repeat courses already undergone at the higher secondary level (Twelfth class). The courses relating to any of the broad discipline given below will come under this category.

i. **Natural and Physical Sciences:** Students can choose basic courses from disciplines such as natural science, for example, Biology, Botany, Zoology, Biotechnology, Biochemistry, Chemistry, Physics, Biophysics, Astronomy and Astrophysics, Earth and Environmental sciences, etc.

ii. **Mathematics, Statistics and computer applications:** Courses under this category will facilitate the students to use and apply tools and techniques in their major and minor disciplines. The course may include training in programming software like python among others and application software like STATA, SPSS, TALLY, etc. Basic courses under this category will be helpful; for science and social science in data analysis and the application of quantitative tools.

iii. **Library, Information, and Media Sciences:** Courses from this category will help the students to understand the recent developments in information and media science (journalism, Mass Media, and Communication)

iv. **Commerce and Management:** Courses include business management, accountancy, financial institutions, Fintech, etc.,

v. **Humanities and Social Sciences:** The courses relating to Social sciences,

for example, Anthropology, Communication and Media, Economics, History, Linguistics, Political science, Psychology, Social work, Sociology, etc. will enable students to understand the individuals and their social behavior, society and nation. Students be introduced to survey methodology and available large – scale databases for India. The courses under humanities include for example, Archeology, History, Comparative Literature, Arts and Creative Expressions, Creative writing and literature, language(s), philosophy etc., and interdisciplinary courses relating to humanities. The list of courses that can include interdisciplinary subjects such as cognitive science, environmental science, gender studies, global environment and health, international relations, political economy and development, sustainable development, Women's and gender studies, etc. will be useful to understand society.

The Multidisciplinary elective offered by Yenepoya (Deemed to be) University includes:

i. **First Aid and Basic Life Support (BLS):** This Course deals with training the students to be a first responder when there are medical or traumatic emergencies.

ii. **Yoga:** The course develop a comprehensive understanding of yoga, including its history, various schools, practices, and their application in daily life, while also recognizing its potential for personal well-being, professional growth, and promoting positive health.

iii. **Vermi-technology:** This category of course will help students to gain skills in using worms to convert decomposing food waste into nutrient-rich fertilizer in simple, inexpensive and energy efficient way.

iv. **Positive Psychology:** The course will enable students to enrich themselves to thrive on the belief that people want to lead meaningful and fulfilling lives, cultivate what is best within them, and enhance their experiences of love, work, and play.

v. **National Service Scheme (NSS):** Students can choose NSS to understand the basic concept of NSS, to identify the needs and problems of the community in which they work and to gain skills in mobilizing community participation.

vi. **Lifestyle Management:** This course will help students to learn to achieve health goals through lifestyle and behavior adjustments by creating healthy habits as well as stress management.

vii. **Youth Red Cross:** The course deals with providing knowledge on Youth Red Cross volunteer ship and identifying the role of youth in humanitarian service. It also enables youth to promote national and international understanding by using international link of the movement.

viii. **Jeevan Kaushal:** University grant commission identified 4 modules on life skills (Jeevan Kaushal), the skills that required through our life. Jeevan Kaushal courses such as Communication skills, Professional Skills, Leadership and Management skills and Universal Human Values which will help students in developing personal competencies that helps to deal with challenges of life effectively thereby realizing his/her infinite potential as a human being.

ix. **Self – learning course:** In accordance with the UGC (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2021, New Delhi, dated 25th March 2021, and reference No.F.1-100/2016 (MOOCs/e-content), students are encouraged to augment their learning experience by opting for Massive Open Online Courses (MOOCs), Study Webs of Active Learning for Young Aspiring Minds (SWAYAM), and Coursera courses as part of the multidisciplinary elective.

Yenepoya (Deemed to be University) will adhere to UGC regulations governing MOOCs/SWAYAM/ Coursera courses, incorporating amendments as communicated by UGC over time. To facilitate the seamless completion of chosen courses, the department will appoint a designated course coordinator. The coordinator will guide and support students throughout the duration of the selected online courses.

The evaluation process will adhere to predefined norms and parameters, which will be communicated in the course overview at the time of offering.

In COURSERA, the assessment are multifaceted and include quizzes or tests at the conclusion of each module, assignments or projects demonstrating the practical application of concepts, active participation in discussion forums, and peer-reviewed assessments. The culmination of each course involves final quizzes or capstone projects tailored to the course's content. Upon successful completion, students receive an online certificate, Yenepoya (Deemed to be University) will integrate the acquired credits into the student's official marks sheet.

In SWAYAM, Assessment will include formative continuous online assessments and end-of-course proctored exams, all of which are mandatory for successful completion by the student. Yenepoya (Deemed to be University) will integrate the marks or grade achieved by the student, conveyed by the Host Institution through the PI of the SWAYAM course, into the student's official marks sheet. These marks contribute to the final award of the degree conferred by the University.

f. Internship

The internship time period provides the candidate the opportunity to develop confidence and increased skill in simulation and treatment delivery. Candidate will demonstrate competence in basic and intermediate procedures and will observe the advanced and specialized treatment procedures. The candidate will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The candidate is expected to work for minimum 8 hours per day and this may be more depending on the need and the healthcare setting.

3 Eligibility for Admissions:

To be eligible for admission in B. Sc Neuroscience technology, a candidate should have passed two-years Pre-University examination/ Pre-Degree examination/ two years after ten years of schooling or its equivalent as recognized by the Yenepoya (Deemed to be) University with Physics, Chemistry and Biology as principal courses of study.

Candidate needs to secure 40% or above marks in the qualifying examination to be eligible for admission. For SC/ST/OBC candidates minimum marks required in the qualifying exam are 35% marks.

4 Duration of the Program

The duration of the programme shall extend over 8 semesters (three academic years with one year internship) each semester comprising minimum of 15 weeks with the minimum of 90 actual working days of instruction in each semester. The successful completion of the Undergraduate program, along with internship as applicable will lead to Bachelor's degree in Neuroscience Technology (B.Sc. NST).

5 Maximum Period for Completion of Programme:

A candidate shall complete six semesters (Three Years) programme within Six years from the date of admission. Hence, the maximum period for completion of the programme is seven years.

6 Aim of the program

To prepare competent entry-level neuroscience technology professionals with comprehensive scientific knowledge of neurophysiology and neurodiagnostic procedures, capable of safely performing, recording, and assisting in the interpretation of electroencephalography (EEG), nerve conduction studies (NCS), evoked potentials (EPs), and electromyography (EMG) across outpatient, acute, and critical care settings, while demonstrating ethical practice, effective communication, collaborative functioning within multidisciplinary healthcare teams, and a commitment to lifelong learning and community-oriented neurological health care.

7 Outcome of the Program

Upon successful completion of the Programme, students will develop a broad knowledge in the field of evaluation, diagnosis and management of different conditions of the nervous system.

In particular they will:

PO 1. Technically and clinically competent (K,S)

PO 2. Aware of the importance of quality assurance (K)

PO 4. Aware of the theoretical basis for evidence-based practice (K)

PO 5. Prepared to participate in or initiate research into practice (K, S)

PO 6. Understand and learn how to use digital EEG including the appropriate use of montage reformatting. Learn to interpret adult interracial EEGs. Know the clinical significance of inter-ictal EEG. (K, S)

PO 7. In the neurophysiology lab, assist neurologists in Electromyography (EMG) procedures &in Nerve conduction studies (NCV) – procedures to be performed independently and basic interpretation of the findings. (K, S, C)

PO 8. Theoretical, technical and basic knowledge of procedures like Visual Evoked Potential (VEP), Somatosensory Evoked Potential (SSEP), Brainstem Auditory Evoked Response (BAER). (K,S)

PO 9. Conduct the various clinical and technical tests in the autonomic lab. Hands-on training in the sleep lab – patient instructions, clinical interpretations, sleep staging based on Epworth's scale and procedure skills in Polysomnography (PSG) to be acquired. (K, A, C)

Program Structure

	Broad category of course	**Hours / Credits**	**Course (Title)**
1.	**Discipline-Specific Courses**		
a)	Theory	**I Semester**	
		60 Hours / 4 Credits	Human Anatomy & Physiology I
		60 Hours / 4 Credits	Pathology & Microbiology I
		60 Hours / 4 Credits	Biochemistry
		60 Hours / 4 Credits	Introduction to Neuroscience
		II Semester	
		60 Hours / 4 Credits	Human Anatomy & Physiology II
		60 Hours / 4 Credits	Pathology & Microbiology II
		60 Hours / 4 Credits	Introduction to Neuroscience
		III Semester	
		60 Hours / 4 Credits	Neurological Conditions & Disorders I

	Broad category of course	Hours / Credits	Course (Title)
		60 Hours / 4 Credits	Electroencephalography
		60 Hours / 4 Credits	Nerve Conduction Study
		IV Semester	
		60 Hours / 4 Credits	Neurological Conditions & Disorders II
		60 Hours / 4 Credits	Advanced Electroencephalography I
		60 Hours / 4 Credits	Advanced Nerve Conduction Study I
		V Semester	
		60 Hours / 4 Credits	Advanced EEG II
		60 Hours / 4 Credits	Advanced Nerve Conduction Study II
		60 Hours / 4 Credits 60 Hours / 4 Credits	Nerve Conduction Study & IONM Introduction to Electromyography
		VI Semester	
		60 Hours / 4 Credits	Evoked Potentials
		60 Hours / 4 Credits	Polysomnography & Autonomic Lab
		60 Hours / 4 Credits	Advanced EMG
b)	Practical (SEC)*	-	
c)	Clinical (SEC)*	**III Semester**	
		120 Hours / 4 Credits	Clinical NST I
		IV Semester	
		120 Hours / 4 Credits	Clinical NST II
		V Semester	
		120 Hours / 4 Credits	Clinical NST III
		VI Semester	
		120 Hours / 4 Credits	Clinical NST IV
d)	Simulation-based (SEC)*	-	-
2.	**Curriculum Enrichment Courses**		
a)	Field Visit	-	-
b)	Community Posting	-	-

	Broad category of course	Hours / Credits	Course (Title)
c)	Industry / Clinical Internship	**VII Semester**	
		42 Hours/week / 20 Credits	Internship I
		VIII Semester	
		42 Hours/week / 20 Credits	Internship II
d)	Research Project	-	-
3.	**Electives**		
a)	Discipline-Specific Electives	-	-
b)	Interdisciplinary Courses	45 Hours / 3 Credits per year	Coursera/Swayam/NSS/Red cross
c)	Ability Enhancement Courses • *Soft skills development* • *Language and communication skill development* • *Analytical skill development* • *Personality and professional development* • *Employability skill development*	**I Semester**	
		45 Hours / 3 Credits	English and Communication I
		II Semester	
		45 Hours / 3 Credits	English and Communication II
		45 Hours / 3 Credits	Kannada
d)	Value Added Courses	**I Semester**	
		30 Hours / 2 Credits	Constitution of India
		III Semester	
		30 Hours / 2 Credits	Human Rights & Gender Equity

	Broad category of course	Hours / Credits	Course (Title)
		IV Semester	
		30 Hours / 2 Credits	Environmental Science
		V Semester	
		30 Hours / 2 Credits	Biostatistics
		VI Semester	
		30 Hours / 2 Credits	Medical Ethics
	Total	**167 credits**	

8 Attendance:

Each course (theory, practical, clinical etc.) shall be treated as an independent unit for the purpose of attendance. Candidates having minimum 80% attendance in each of the Courses can only qualify to appear for the Semester End Examination. The Candidates with less than 80% of attendance shall be required to repeat that Course by attending the semester.

There shall be no provision for condonation of shortage of attendance.

For SWAYAM/MOOC/NPTEL it shall be as per the regulations governing the courses of implementing authority.

The HOD/Course Coordinator through the Dean of Faculties shall announce the names of the candidates who will not be eligible to take the Semester End- Examinations (SEE) in the various courses and send a copy of the same to the Controller of Examinations (COE) Office. Registrations of such candidates for those courses shall be treated as cancelled

9 Teaching Learning Method

Teaching–Learning Method	Courses
Experiential learning	Electroencephalography Nerve Conduction Study Advanced Electroencephalography I Advanced Electroencephalography II Advanced Nerve Conduction Study I Advanced Nerve Conduction Study II Introduction to Electromyography

Teaching–Learning Method	Courses
	Advanced EMG Evoked Potentials Polysomnography & Autonomic Lab Nerve Conduction Study & IONM
Integrated / Interdisciplinary learning	Neurological Conditions & Disorders I Neurological Conditions & Disorders II Electroencephalography Nerve Conduction Study
Participatory learning	Neurological Conditions & Disorders I Electroencephalography Nerve Conduction Study Evoked Potentials
Problem-solving methodologies	Advanced EEG I & II Advanced Nerve Conduction Study I & II Advanced EMG Nerve Conduction Study & IONM
Self-directed learning	Neurological Conditions & Disorders I Neurological Conditions & Disorders II Introduction to Electromyography
Patient-centric learning	Electroencephalography Nerve Conduction Study Introduction to Electromyography Advanced EMG Polysomnography & Autonomic Lab
Evidence-based learning	Advanced Electroencephalography I & II Advanced Nerve Conduction Study I & II Evoked Potentials
Project-based learning	Advanced EEG II Advanced EMG Nerve Conduction Study & IONM
Role-play	Patient Preparation & Consent (EEG / NCS / EMG)
Team-work	Polysomnography & Autonomic Lab Advanced EEG II Nerve Conduction Study & IONM

Teaching–Learning Method	Courses
Reflective writing	Clinical postings in EEG / NCS / EMG
Any other (Simulation-based learning)	EEG Recording Simulation NCS & EMG Procedure Simulation IONM Scenario Simulation

10 Scheme of Examination

Evaluation of a course shall be done based on continuous internal assessment (CIA) mode followed by Semester End University Examination (SEE) for each core, SEC, AEC & VAC. The evaluation of Multidisciplinary elective offered by Yenepoya (Deemed to be) University shall be done based on formative assessment.

The components of CIA (Continuous Internal Assessment) may include sessional tests, Seminar, Assignment/ Social involvement and other activities as determined by the respective specialty.

There shall be examinations at the end of each semester ordinarily during February/March for odd semesters and during August/September for even semesters.

The SEE duration shall be 60 minutes for 25 marks paper and 120 minutes for 50 mark paper.

The various Formative assessment methods include Assignments, reports, quizzes…

a. Examination structure:

The Examination structure shall vary depending on the course, however, broadly divided as follows:

Examination/Assessment	Core/SEC/AEC(English)	AEC Kannada) /VAC
Continuous Internal Assessment	50 Marks	25 Marks
Semester End Examination	50 Marks	25 Marks
Total	100 Marks	50 Marks

b. Multidisciplinary Elective

Multidisciplinary elective will be assessed through continuous and comprehensive assessment throughout the Semester (50 Marks)

i. Evaluation and Certification of online courses:

Evaluation will be based on predefined norms and parameters and announced in the overview of the Course at the time of offering the course. Formative continuous online assessments and end of course proctored exams shall be completed by the student.

The certificate obtained shall be submitted to the college office which will be communicated to the office of the Controller of Examinations of Yenepoya (Deemed to be University).

The Yenepoya (Deemed to be) University will give the equivalent credit weightage to the students for the credits earned through online learning courses through MOOCS/Coursera as per the credit plan of the program.

ii. Credit Mobility of Online Courses:

The Yenepoya (Deemed to be University) will give the equivalent credit weightage to the students for the credits earned through online learning courses as per the credit plan of the program.

In case a student fails to complete the online course he/ she may be allowed to complete the course requirements by registering for another online course in subsequent semester or opt for a course offered at this Yenepoya (Deemed to be University).

The elective course offered by the Yenepoya (Deemed to be University) shall be restricted to a maximum of 3 credits.

A candidate shall compulsorily complete total 9 Credits of Multidisciplinary courses.

These courses shall be selected either from the Generic Electives offered by the Yenepoya (Deemed to be) university or from the SWAYAM/Coursera courses. A Candidate shall have freedom to choose the courses of once own choice and learn at their own pace but, require to complete minimum 3 credits before second semester, 6 credits before fourth semester and 9

credits before sixth semester end examination.

A candidate who is desirous to add more credits shall be permitted to do so during the academic duration. Extra credits earned by a candidate shall be included in the marks card on submission of course completion certificate. However, it shall not be considered for awarding the Grade in the UG programme.

c. Parameters for Continuous Internal Assesment CIA

Internal Assessment Components	Core/SEC/AEC(English)	AEC(Kannada) /VAC
Internal Assessment tests	20	10
Assignment	10	05
Continuous and Comprehensive assessment	20	10
Total Marks	**50**	**25**

10.4 Assessment Methods

1	Quiz	6	Role Play
2	Group Discussion	7	Peer to Peer assessment
3	Open Book Exam	8	Mind Mapping
4	Think-Pair-Share	9	Minute paper
5	Presentations	10	Case Study

10.5Question Paper Pattern for Core course (Internal Assessment & Semester End Examination)

	MAXIMUM MARKS = 50				**Duration**
Type of question	**Number of questions**	**To be Answered**	**Marks for each question**	**Total**	120 minutes
LONG ESSAY TYPE	02	01	10	10	
SHORT ESSAY TYPE	07	05	04	20	
SHORT ANSWERS	12	10	02	20	
			Total	**50**	

	MAXIMUM MARKS = 50				**Duration**
PART A					
Type of question	**Number of questions**	**To be Answered**	**Marks for each question**	**Total**	120 Minutes
LONG ESSAY TYPE	02	01	10	10	
SHORT ESSAY TYPE	02	01	05	05	
SHORT ANSWERS	06	05	2	10	
PART B					
LONG ESSAY TYPE	02	01	10	10	
SHORT ESSAY TYPE	02	01	05	05	
SHORT ANSWERS	06	05	2	10	
			Total	**50**	

10.6Question Paper Pattern for Ability Enhancement Compulsory (AEC) Course

	MAXIMUM MARKS = 25				Duration
Type of question	**Number of questions**	**To be Answered**	**Marks for each question**	**Total**	60 minutes
ESSAY	05	03	05	15	
SHORT ANSWERS	07	05	02	10	
			Total	**25**	

10.7Question Paper Pattern for Value Added (VAC) Course

	SUBJECTS HAVING MAXIMUM MARKS = 25				Duration
Type of question	**Number of questions**	**To be Answered**	**Marks for each question**	**Total**	60 minutes
ESSAY	05	03	05	15	
SHORT ANSWERS	07	05	02	10	
			Total	**25**	

10.8 Practical examination (SEC)

SI.NO	Components	Marks
1	Spotters	10
2	Case scenario/Stations	20
3	Viva Voice	20
Total Marks		50

PARTICULARS OF PRACTICAL, VIVA-VOCE

Practical examination will be aimed at examination of clinical skills and competence of the candidates for undertaking independent work as a specialist.

Viva- Voce examination shall aim at assessing depth of knowledge, logical reasoning, confidence &oral communication skills.

OSCE/OSPE- shall have minimum of 4 stations.

11 Eligibility to appear for University Examination

Each course (theory, practical, clinical etc.) shall be treated as an independent unit for the purpose of attendance. Candidates having minimum 80% attendance in each of the Courses can only qualify to appear for the Semester End Examination. The Candidates with less than 80% of attendance shall be required to repeat that Course by attending the semester.

There shall be no provision for condonation of shortage of attendance.

Evaluation of a course shall be done based on continuous internal assessment (CIA) mode followed by Semester End University Examination (SEE) for each core, SEC, AEC & VAC. The evaluation of Multidisciplinary elective offered by Yenepoya (Deemed to be) University shall be done based on formative assessment.

The components of CIA (Continuous Internal Assessment) may include sessional tests, Seminar, Assignment/ Social involvement and other activities as determined by the respective speciality.

The marks for CIA shall be 50% and SEE shall be 50%.

The minimum marks for CIA shall be 40% and SEE shall be 40% for a pass, but the minimum marks for pass per course shall be 50% CIA and SEE added together.

The HOD/Programme Coordinator through the Dean of Faculties shall announce the names of the candidates who will not be eligible to take the Semester End- Examinations (SEE) in the various courses and send a copy of the same to the Controller of Examinations (COE) Office. Registrations of such candidates for those courses shall be treated as cancelled.

12 Criteria for Passing

The marks for CIA shall be 50% and SEE shall be 50%.

The minimum marks for CIA shall be 40% and SEE shall be 40% for a pass, but the minimum marks for pass per course shall be 50% CIA and SEE added together.

A candidate shall be declared to have passed the UG programme if he/she secures at least CGPA of 5.0 (Course Alpha-Sign Grade P) in the aggregate of both Internal Continuous Assessment and Semester End Examination.

The results of the candidates who have passed the sixth semester examination but not passed the lower semester examinations shall be declared as NCL (Not Completed Lower semester examinations). Such candidates shall be eligible for the degree only after completion of all the lower semester examinations.

13 Grading and Classifications

The results of successful candidates at the end of each semester shall be declared in terms of Grade Point Average (GPA) and Alpha-Sign Grade. The results at the end of the sixth semester shall be classified on the basis of the Cumulative Grade Point Average (CGPA) obtained in all the six semesters and the corresponding overall alpha sign grade.

a. Letter Grades and Grade Points:

i. The Deemed to be University would be following the absolute grading system, where the marks are compounded to grades based on pre-determined class intervals.

ii. The UGC recommended 10-point grading system with the following letter grades are given below:

Letter Grade	Marks	Grade Point
O (Outstanding)	90-100	10
A+ (Excellent)	80-89	9
A (Very Good)	70-79	8
B+ (Good)	60-69	7
B(Above Average)	55-59	6
P (Pass)	50-55	5
F (Fail)/ RA (Reappear)	Below 50	0

Ab (Absent)		0

*The Marks with 0.5 shall be rounded up to the next whole number.

iii. A student obtaining Grade RA/ Ab shall be considered failed and will be required to reappear in the end semester examination.

b. The Semester Grade Point Average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester.

For example, if a student takes five (Theory/Practical) in a semester with credits C1, C2, C3, C4 and C5 and the student's grade points in these courses are G1, G2, G3, G4 and G5, respectively, and then students' SGPA is equal to:

$$SGPA = \frac{C1G1 + C2G2 + C3G3 + C4G4 + C5G5}{C1 + C2 + C3 + C4 + C5}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and ABS grade awarded in that semester. For example if a student has a F or ABS grade in program 4, the SGPA shall then be computed as:

$$SGPA = \frac{C1G1 + C2G2 + C3G3 + C4 * ZERO + C5G5}{C1 + C2 + C3 + C4 + C5}$$

c. Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the VI semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VI semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s)

is/are passed. When the program(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$\text{CGPA} = \frac{C1S1+C2S2+C3S3+C4S4+C5S5+C6S6}{C1+C2+C3+C4+C5+C6}$$

where C1, C2, C3,…. is the total number of credits for semester I,II,III,…. and S1, S2, S3….is the SGPA of semester I,II,III,…..

Calculation of GPA & CGPA: An example (1st semester)

Program Code	Course	Credits (a)	Grade Obtained	Credit Value (b)	Grade Points (axb)
	Course 1	4	B	8	32
	Course 2	4	B	8	32
	Course 3	4	O	10	40
	Course 4	2	C	7	14
	Course 5	2	A	9	18
	Total	**16**	**-**	**-**	**136**

1st Semester GPA = Total Grade Points / Total Credits = 136 / 16 = 8.5

2nd Semester GPA = 7 with respect to 18 Credits

Then 1st Year CGPA = (8.5 x 16) + (7 x 18) / 16 + 18 = 7.7

14 Journals

a. *Neurology India*. Official journal of the Neurological Society of India; covers EEG, EMG, NCS, epilepsy, neuromuscular disorders, and central nervous system disorders.
b. *Annals of Indian Academy of Neurology*. Focuses on clinical neurophysiology, neurological disorders, and evidence-based neurological practice.
c. *Indian Journal of Neurotrauma*. Publishes work related to neuro-monitoring, evoked potentials, and intraoperative neurophysiology.
d. *Journal of Neuroanaesthesiology and Critical Care*. Covers intraoperative neurophysiological monitoring, EEG monitoring, and neurocritical care applications.

15 Any other information (Progression Criteria, Re-entry after break of the study, Evaluation of Answer Scripts, Internship)

15.1 Progression Criteria

The students are allowed to carry over any number of courses till sixth semester. But student is eligible to appear for the End semester exam of sixth semester if he/she has cleared all the Courses both Core, AEC, SEC & VAC of first, second, third & fourth semesters. If student has any pending course of first to fourth semesters, he/she is not eligible to appear for the end semester exam of the sixth semester. However, Fifth semester courses are allowed to club with sixth semester end examination. But, all the Core, AEC, SEC & VAC of first to fourth semester should be completed to be eligible for sixth semester End Semester Examination.

Candidate should clear all Courses (Core, AEC, SEC, VAC & ME) of all the semester, to be eligible to start the one year of mandatory internship.

A fail in any one Course will mean the candidate has to reappear for the exam in that Course only.

A candidate who passes the semester examinations in parts is eligible for only CGPA and letter grade but not for award/medal from the University.

15.2 Re-Entry after Break of the study:

Candidates admitted to a program abstaining for more than 3 months must seek readmission into the appropriate semester.

The candidate shall follow the syllabus in vogue (currently approved/is being followed) for the program.

All re-admissions of candidates are subject to the approval of the University.

15.3 Evaluation of Answer Scripts

Each theory examination shall have single evaluation. There shall be provision for re-evaluation on a payment of a fee. An external examiner shall value the paper, if the difference is more than 15% of previous marks the answer script shall be sent for third evaluation. In

such an event, the average of the best two out of the three scores will be taken as the final score.

Practical examination shall be jointly conducted and evaluated by one internal examiner and one external examiner.

Internship

A candidate has to mandatorily complete 1 year (2 semesters) of internship. The total credit per semester is 20 and for two semesters it is 40.

Eligibility: A candidate should have passed in all the courses (Core, AEC, VAC and Multidisciplinary Electives) amounting to 131 number of credits before entering in to internship.

Internship guidelines: Each semester of Internship shall be minimum of 20 credits. The credits are calculated based on 1 credit = 3 to 5 hours of practical training. There shall be an exit exam at the end of the each semester at the college level.

Components of Exit Exam

Sl.No.	Components	Marks
1	Spotters	30
2	Case scenario/Stations	30
3	Viva Voice	40
Total Marks		100

16. Syllabus

SEMESTER I

HUMAN ANATOMY & PHYSIOLOGY I

Course: Core

Credits: 04 **Number of hours: 60**

PART A- HUMAN ANATOMY

- **Course Outcomes:**

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

CO1: To identify and locate each of the body systems to apply anatomical knowledge to perform minor technical procedural skills.

CO2: To know the normal disposition of the structures in the body while clinically examining a patient and while conducting clinical procedures.

CO3: To know the anatomical basis of disease and injury

CO4: To discuss the interrelationship of systems in maintaining homeostasis.

CO5: To describe the structure of each body system

- **COURSE CONTENT:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPES OF QUESTION
Unit I	4hrs	Introduction: Human body as a whole 1.1 Definition of anatomy and its divisions 1.2Terms of location, positions, and planes 1.3 Cell and its organelles. 1.4Epithelium: definition, classification, describe with examples, function. 1.5 Glands: classification, describe serous & mucous glands with examples. 1.6 Basic tissues: classification with examples 1.7Demonstration: Histology of types of epithelium. Histology of serous, mucous & mixed salivary gland.	√			10%	SE & SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPES OF QUESTION
Unit II	5hrs	Locomotion and support 2.1Bone: classification, names of bone cells, parts of long bone, microscopy of compact bone, names of all bones, vertebral column, inter-vertebral disc, fontanelles of fetal skull. 2.2 Joints: classification of joints with examples, synovial joint (in detail for radiology). 2.3Muscular system: classification of muscular tissue & histology, names of muscles of the body. 2.4 Demonstration: Bones & joints. Histology of compact bone (TS & LS). Demonstration of all muscles of the body. Histology of skeletal, smooth &cardiac muscle (TS & LS). Histology of the 3 types of cartilage. Demo of all bones showing parts, radiographs of normal.	√			15%	LE, SE, SA
Unit III	5hrs	Cardiovascular system 3.1Heart: size, location, chambers, exterior & interior, blood supply of heart 3.2 Systemic &pulmonary circulation, branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery, peripheral pulse, inferior vena cava, portal vein, Porto-systemic anastomosis, great saphenous vein, Dural venous sinuses. 3.3 Lymphatic system: cisterna chyli & thoracic duct, histology of lymphatic tissues, names of regional lymphatics, axillary and inguinal lymph nodes in brief. 3.4Demonstration of heart and vessels in the body. Histology of large artery, medium sized artery & vein, large vein. Histology of lymph node, spleen,	√			25%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPES OF QUESTION
		tonsil & thymus. Normal chest radiograph showing heart shadows.					
Unit IV	10hrs	Gastro-intestinal system 4.1 Parts of GIT, oral cavity, lip, tongue, dentition, pharynx, oesophagus, stomach, small and large intestine,liver,gall bladder, pancreas. 4.2 Tonsil, salivary glands extrahepatic biliary apparatus,Waldeyer's ring 4.3Demonstration of parts of gastro intestinal system. Normal radiographs of gastro intestinal system. Histology of gastro intestinal system.	√			30%	LE, SE, SA
Unit V	4hrs	Respiratory system 5.1 Parts of RS, nose, nasal cavity, larynx, trachea, lungs, broncho-pulmonary segments, histology of trachea, lung and pleura, names of paranasal air sinuses. 5.2 Demonstration of parts of respiratory System Normal radiographs of chest. -Histology of lung and trachea.	√			15%	LE, SE, SA
Unit VI	2hrs	Embryology 6.1Spermatogenesis & oogenesis. Ovulation, fertilization. Fetal circulation. Placenta, Demonstration of models.		√		5%	SE, SA

- **Recommended books:**

1. Priya Ranganath, LeelavathyN,Basics in Human Anatomy for BSc Paramedical Courses,Revised and updated edition, The Health
2. Chaurasia BD. Human anatomy. CBS Publisher; 2004.
3. Vishram Singh, Textbook of Anatomy, Revised and updated edition, Elsevier

4. Waugh A, Grant A. , Ross &Wilson Anatomy and physiology in health and illness E-book.Elsevier Health Sciences; 2014 Jun 25.
5. Inderbir S. Textbook of human histology with color atlas. New Delhi: Jaypee BrothersMedical Publishers. 2006.

PART B- PHYSIOLOGY

- **Course Outcomes:**

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

CO1: To demonstrate the understanding of physiological structure of Renal system, endocrine system, Nervous system and special senses.

CO2: To broadly identify the clinical abnormalities of organs and its clinical physiological implications

- **COURSE CONTENT:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
Unit I	2hrs	**General Physiology** 1.1 Introduction to physiology 1.2 Homeostasis: Definition, Positive feedback, negative feedback. PH 1.3 Body Fluid Compartments	√	√		15%	SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
Unit II	5hrs	**Muscle Nerve physiology** 2.1.1Introduction, Classification and structureof muscle, sarcomere 2.2Neuromuscular junction, Transmission across neuromuscular junction. 2.3 Excitation contraction coupling. Mechanism of muscle contraction, rigor mortis.	√	√		15%	LE, SE, SA
Unit III	7hrs	**Blood** 3.1 Introduction: composition and function of blood. 3.2 Blood Cells: types, Normal Count 3.3 Red blood cells: function. Erythropoiesis: Definition, Stages, Factors affecting 3.4 Hemoglobin: Function, concentration Physiological variation of RBC Count and Hb 3.5 White blood cells: different types, functions, normal count, differential count 3.6 Platelets: origin, normal count, functions. 3.7 Haemostasis: definition, steps, clotting factors, mechanism of clotting, disorders of clotting 3.8 Blood groups: ABO	√	√		20%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
		system, Rh system: Rh factor, Rh incompatibility. 3.9 Blood grouping & typing, cross matching. 3.10 Blood transfusion: indication, universal donor and recipient concept. Selection criteria of a blood donor, transfusion reactions. 3.11 Anaemias: definition, Symptoms and signs (brief). 3.12 Blood indices: colour index, MCH, MCV, MCHC (def and Normal Values). 3.13 ESR and PCV: normal values, definition, determination (methods). 3.14Plasma proteins: types and concentration, functions of albumin, globulin, fibrinogen, prothrombin. 3.15 Blood volume: normal value, determination of blood volume					
Unit IV	8hrs	**Cardiovascular system** 4.1 Heart: physiological anatomy, nerve supply. 4.2Properties of cardiac muscle PH 4.3Cardiac cycle: definition, systole, diastole, phases, JVP(brief) 4.4Cardiac output, stroke	√	√		20%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
		volume, EDV (only definitions). 4.5 Heart sounds, normal heart sounds, mechanism and features, areas of auscultation. 4.6 Blood pressure: definition, normal value, clinical measurement of blood pressure, hypotension, hypertension 4.7Heart rate: Physiological variations, regulation (brief), radial pulse 4.8Electrocardiogram (ECG): Definition, Normal ECG, Causes of ECG waves, Uses of ECG. 4.9Cardiac shock: Definition, Types (brief), Triple response.					
Unit V	6hrs	**Respiratory system** 5.1Introduction: Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract 5.2Respiratory organs: lungs, alveoli, respiratory membrane 5.3Mechanism of breathing: Inspiration and Expiration, muscles involved, Mechanism. 5.4Surfactant: Composition, Function, 5.5Transport of oxygen: forms	√	√		20%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
		of transport, Oxygen Hemoglobin Curve. 5.6Lung volumes and capacities: Spirogram, Definitions and normal Volumes. 5.7Regulation of respiration: Nervous and chemical regulation, respiratory centre, Herring Breur reflexes. 5.8Hypoxia: Def, Classification, Description (in brief). 5.9 Cyanosis, Asphyxia, Dyspnea, Dysbarism, Artificial Respiration, Apnoea.(Definition Only)					

- **Recommended Books**

1. Guyton (Arthur): Text Book of Physiology. Latest Ed. Prism publishers.
2. Ganong William F: Review of Medical Physiology. Latest Ed. Tata McGraw Hill
3. Chatterjee CC: Human Physiology Latest Ed. Vol-1, Medical Allied Agency.Choudhary Sujith K: Concise Medical Physiology Latest Ed. New CentralBook

PATHOLOGY & MICROBIOLOGY-I

Course: Core

Credits: 4 **No of Hours: 60 Hours**

PART A- PATHOLOGY

- **Course Outcome:**

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

CO1: Explain the blood cells structure, functions & its formation.

CO2: Enumerate the methods of estimating cell counts.

CO3: Demonstrate blood collection by various methods

- **COURSE CONTENT:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
Unit I	2 hrs	Introduction to Pathology		√		05%	SA
Unit II	12 hrs	Hematology 2.1. Normal constituents of Blood, their structure and functions. 2.2. Collection of Blood samples. 2.3. Various anticoagulants used in hematology. 2.4. Hemoglobin estimation, different methods and normal values. 2.5. RBC count. 2.6. WBC count. 2.7. Platelet count.	√			35%	LE,SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
Unit III	10 hrs	Blood Bank 3.1. Introduction to blood banking. 3.2. Blood group system: ABO & Rh system. 3.3. Methods of blood grouping: Forward & Reverse. 3.4. Donor selection criteria. 3.5. Collection and processing of blood for transfusion.	√			30%	LE,SE, SA
Unit IV	6 hrs	Clinical Pathology 4.1. Collection, transport, preservation and processing of various clinical specimens. □ Urine. □ CSF. □ Stool. □ Sputum. □ Body fluids. 4.2. Urine examination- collection and preservation, Physical, chemical and microscopicexamination for abnormal constituents.	√			30%	LE,SE, SA

- **Recommended Books**

1) Makroo RN. Blood Transfusion Reactions. In: Compendium of transfusion medicine.2nd ed. 2009;332-345
2) Harmening DM. Adverse effects of Transfusion In: Modern Blood Banking & Transfusion practices. 6th ed. 2012.

PART B- MICROBIOLOGY

- **Course Outcome:**

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

- The general criteria for microbial classification, Types of culture medias and methods.
- Identify key concepts of immunology.
- Implement the common sterilization and disinfection methods.
- Outline and practice general biomedical waste management.

- **COURSE CONTENT:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
Unit 1	**5Hrs**	**Introduction** 1.1 Introduction & history of Microbiology 1.2 Classifications of microorganisms & structure of bacteria 1.3 Microscopy and types of microscope	√			**10%**	LE, SE
Unit 2	**3 Hrs**	**Growth & Nutrition** 2.1 Nutrition, growth and multiplication of bacteria, Bacterial Growth Curve 2.2 Culture medias 2.3 Culture methods	√			**10%**	LE, SE,SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
Unit 3	**4 Hrs**	**Sterilization & Disinfection** 3.1 Classification of Sterilization and Disinfection 3.2Sterilization:Different methods of sterilization,Principles and use of equipment's of sterilization- Hot Air oven &Autoclave in detail 3.3 Disinfection: Commonly used chemical disinfectants and their uses	√			**30%**	LE, SE
Unit 4	**9 Hrs**	**Immunology** 4.1 Immunity-Classification and types 4.2 Antigen 4.3 Antibody 4.4 Antigen antibody reactions 4.5 Hypersensitivity reactions 4.6 Immunization schedule	√			**30%**	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
Unit 5	**4 Hrs**	**Infection** 5.1 Infection- Definition, types, sources and mode of transmission 5.2 Hospital acquired infections 5.3 Types of infectious diseases- outbreak, endemic, epidemic, pandemic	√			10%	SE,SA
Unit 6		**Applied Microbiology** 6.1 Biomedical Waste Management: Principles & Practices 6.2 Standard precautions 6.3 Hand hygiene technique and body fluids spill management 6.4 Needle stick injury management-1	√			**10%**	SE,SA

- **Recommended Books:**

1. Baveja CP. Textbook of microbiology. Arya Publications; 2005.
2. Ananthanarayan R. Ananthanarayan and Paniker's textbook of microbiology. Orient Blackswan; 2006.
3. Owen JA, Punt J, Stanford SA, Jones PP, KubyJ.Kuby immunology. Seventh edition, International edition. Basingstoke: Macmillan Higher Education; 2013

BIOCHEMISTRY

Course: Core

Credits: 4 **No of Hours: 60 Hours**

- **Course Outcomes:**

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

CO1: Have knowledge and understanding of procedures of specimen collection, reagent preparation of specimens, performing biochemical tests, interpreting results, and managing biomedical waste effectively.

CO2: Understand the basic procedures in specimen collection, reagent preparation, and testing in a clinical laboratory

CO3: Demonstrate the knowledge of properties of biomolecules and their function.

CO4: Have knowledge of the importance of nutrition in health and diseases

- **Course Content:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
Unit	5hrs	**Introduction to Biochemistry and Clinical Laboratory** **1.1Specimencollection:**Preanalytical,variables, Collection of blood, Urine, CSF, and other body fluids,Anticoagulants and Preservatives	√			15%	LE, SA, SE

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
I		**1.2 Dilutions:** Dilution of solutions (Preparation of 0.1 N NaCl from 1 N NaCl), Preparation of percent solutions, Preparing working standard from stock standard, Specimen dilutions, Serial dilutions, and Reagent dilution **1.3Special Investigations:**Normal values, methods, and interpretation of biochemical parameters. Preparation of patients for special investigations, and interfering substances **1.4Quality control:**Definition, types, IQAS and EQAS, Calculation of mean, standard deviation and percentage of coefficient variation **1.5Safety measures, Conventional and SI units** **1.6Bio Medical waste management**					

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
Unit II	10hrs	**Carbohydrate and Lipid chemistry** Introduction, Definition, Properties of carbohydrates, Classification with suitable examples. **.1**Biomedical importance of carbohydrates. Introduction, Definition, Functions, and Classification of Lipids. finition and Classification of fatty acids, Essential fatty acids with examples.	√			25%	LE, SE
Unit III	5hrs	**Protein chemistry and Plasma Proteins** Introduction, Definition, and Classification of amino acids with examples. **.1**Peptides: definition & biologically important peptides with examples **.2**Introduction, Definition, and Classification of Proteins with examples **.3**Functions of amino acids and Proteins Introduction, types, functions, and biological reference range of plasma proteins. **.1**Immunoglobulins	√			15%	LE, SE, SA
Unit IV	5hrs	**Enzymes** Introduction, Definition, classification with suitable examples, Active site of enzyme, Factors influencing enzyme	√			10%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
		activity, **.1**Definition of Cofactor, Coenzyme, And isoenzymes with examples.					
Unit V	10hrs	**Vitamins and Minerals** **5.1**Introduction, Definition, classification, Fat soluble and water-soluble vitamins: Sources, RDA, Biological functions and deficiency disorders. **5.2**Introduction, Definition and classification of macro and micro minerals with examples **5.2.1**Calcium, Phosphorous, iron, Sodium, Potassium: Sources, RDA, Reference ranges, Functions and Disorders of deficiency and excess	√			20%	LE, SE
Unit VI	10hrs	**Nutrition** **6.1**Calorific values of carbohydrates, proteins, and fats **6.2**Nutritional importance of Carbohydrates, lipids, proteins, and Essential amino acids **6.3**SDA: Definition, values for majormacronutrients, Significance of SDA Basal metabolic rate (BMR): Definition, Reference range of BMR in men and women, Factors affecting BMR	√			15%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	TYPE OF QUESTIONS
		Dietary fibers: Definition, functions, importance and their daily requirements lanced diet Essential fatty acids: Definition, functions and deficiency manifestations Define the classes of protein-energy malnutrition: marasmus and kwashiorkor.					

- **Recommended Books**

1) Vasudevan DM, Sreekumari S, Vaidyanathan K. Textbook of Biochemistry for medical students. Jaypee Brothers Medical Publishers; 2019 Sep 30.
2) Satyanarayana U and U Chakrapani. 2013. Biochemistry (version 4th ed). 4th ed. New Delhi: Elsevier Health Sciences APAC.

INTRODUCTION TO NEUROSCIENCE

Course: Core

Credits :4 **No of Hours :**60 Hours

- **Course Outcomes:**

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

CO1.Will acquire a basic knowledge regarding the human nervous system.

CO2. The students will acquire a detailed knowledge about the brain& spinal cord.

- **COURSE CONTENT**

UNIT	Hrs	CONTENT	MUST KNIOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
Neuroanatomy							
Unit I: Introduction to the Nervous system	5 Hours	1.1 Divisions of Nervous System.	√			10%	LE, SE, SA
		1.2 Tissues Constituting Nervous System		√			
		1.3 Neuron structure	√				
		1.4 Classification of neurons	√				
		1.5 Myelin Sheath and Process of Myelination	√				
		1.6 Neural Stem Cells		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		1.7 The synapse	√ √				
		1.8 Peripheral nerves	√				
		1.9 Degeneration and regeneration of neurons	√				
		1.10 Neuroglia		√			
		1.11Sensory Receptors		√			
		1.12 A brief review of techniques used in the study of neuroanatomy			√		
Unit II: Development of nervous system	5 Hours	2.1 Formation of neural tube	√				
		2.2 Formation of neural crest cells	√				
		2.3 Formation of ectodermal placodes	√			5%	LE, SE, SA

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		2.4 Development of spinal cord	√				
		2.5 Development of brain	√				
		2.6 Hindbrain		√			
		2.7 Midbrain		√			
		2.8 Forebrain		√			
Unit III: The central nervous system- an overview	3 Hours	3.1 The meninges 3.2 Anatomy of brain and Functions	√			5%	SE, SA
		3.3 Forebrain	√				
		3.4 Midbrain	√				
		3.5 Hindbrain	√				
		3.6 Spinal cord	√				

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
Unit IV : The cerebrum	4 Hours	4.1 External features of cerebral hemispheres	√			5%	SE, SA
		4.2 Cerebral cortex-structure	√				
		4.3 External features of cerebral cortex	√				
		4.4 Development of cerebral hemispheres	√				
		4.5 Functional areas of cerebrum		√			
		4.6 White matter of cerebrum		√			
Unit V : The cerebellum	4 Hours	5.1 External Features		√			
		5.2 Subdivisions of Cerebellum		√			
		5.3 Grey Matter of Cerebellum	√				

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		5.4 White Matter of Cerebellum	√			5%	SE, SA
		5.5 Connections of Cerebellum	√				
		5.6 Cerebellar Peduncles	√				
		5.7 Functions of cerebellum		√			
		5.8 Cerebellum and learning		√			
Unit VI : The brainstem	2 Hours	6.1 The Medulla	√			5%	SE, SA
		6.2 The Pons	√				
		6.3 The midbrain	√				
		6.4 Reticular formation of brainstem		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		6.5 The control of eye movement		√			
Unit VII : The Diencephalon	2 Hours	7.1 The thalamus	√			5%	SE, SA
		7.2 The hypothalamus	√				
		7.3 The epithalamus	√				
		7.4 The ventral thalamus		√			
Unit VIII: Basal Ganglia	4 Hours	8.1 Caudate Nucleus	√			5%	SE, SA
		8.2 Lentiform Nucleus	√				
		8.3 Corpus Striatum	√				
		8.4 Ventral Striatum and Pallidum	√				
		8.5 Amygdaloid body	√				
		8.6 Substantia nigra	√				

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		8.7 Subthalamus	√				
		8.8 Functions		√			
Unit IX: Ventricles of Brain	3 Hours	9.1 Lateral Ventricles	√			5%	SE, SA
		9.2 Third Ventricle	√				
		9.3 Fourth Ventricle	√				
		9.4 Cerebrospinal Fluid	√				
		9.5 Blood-Cerebrospinal Fluid Barrier	√				
Unit X : Blood supply of Brain	1 Hours	10.1Arterial supply of brain	√			5%	LE, SE, SA
		10.2Venous drainage	√				
		10.3 Blood-Brain barrier	√				

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
Unit XI: Autonomic Nervous System	4 Hours	11.1Divisions of ANS	√			5%	LE, SE, SA
		11.2 Sympathetic and parasympathetic nervous system	√				
		11.3 Autonomic plexus		√			
		11.4 Efferent autonomic pathway	√				
		11.5 Afferent accompanying autonomic pathway	√				
		11.6 Enteric nervous system		√			
		11.7 Autonomic nerve supply of some important organs		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
Unit XII: Spinal cord	3 Hours	12.1Dimensions of the cord		√		5%	SE, SA
		12.2 Spinal meninges	√				
		12.3 External features of spinal cord		√			
		12.4 Internal structures of spinal cord					
		12.5Tracts of spinal cord	√				
		12.6 Blood supply of spinal cord	√				
Unit XIII: Musculoskeletal system	3 Hours	13.1Classification	√			5%	SE, SA
		13.2 Structure	√				
		13.3 Properties		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		13.4 Supply of upper and lower limb muscles and joints	√				
Neurophysiology							
Unit I: Neurons	5 Hours	1.1 structures, classification, organization, properties	√			10%	LE, SE, SA
		1.2 Degeneration and regeneration	√				
		1.3 Neuroglia	√				
		1.4 Nervefiber: Classification, conduction of impulse continuous and saltatory		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		1.5 Synapses – Definition, structure, classification, Resting membrane potentials and postsynaptic potentials, synaptic potentials and action potentials	√				
		1.6 Receptors- Definition, classification and properties	√				
		1.7 Relationship between cellular activity and cortical waves		√			
		1.8 Polarity of surface potential in relation to cortical cellular activity		√			
		1.9 Thalamic control of the cortical rhythm		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		1.10 The relationship of EEG activity recorded from cortex and scalp		√			
Unit II: Spinal cord	3 Hours	2.1 Structure and functions	√			5%	LE, SE,SA
		2.2 Spinal cord nerve tracts- Ascending and Descending spinal tracts	√				
		2.3 UMN and LMN lesions, hemiplegia, Stroke	√				
		2.4 Pyramidal and extra pyramidal system	√				
		2.5 Parkinsonism	√				
Unit III: Muscle-Nerve Physiology	3 Hours	3.1 Introduction, Classification and structure of muscles, Motor unit	√				

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		3.2 Neuromuscular junction, Transmission across neuromuscular junction	√			5%	LE,SE,SA
		3.3 Neurotransmitters	√				
		3.4 Mechanism of muscle contraction, excitation contraction coupling	√				
		3.5 Muscular atrophy	√				
Unit IV: Special senses	4 Hours	4.1 Vision – structure of eye, Functions of different parts. Optic pathway, dark adaptation, Color vision, Disorders affecting vision	√			5%	SE,SA
		4.2 Physiology of vision		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		4.3 Hearing - Structure, functions of outer, inner and middle ear		√			
		4.4 Mechanism of hearing		√			
		4.5 Auditory pathway	√				
		4.6 Disorders	√				
		4.7 Physiology of hearing – auditory pathway	√				
Unit V: The cranial nerves	2 Hours	5.1 Organization of Functional Components of Cranial Nerve Nuclei	√				
		5.2 Functional Components, Nuclei, Brief Course, and Distribution of Individual Cranial Nerves	√			5%	SE,SA

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		5.3 Medial Longitudinal Fasciculus		√			

Recommended Books:

1. Bhuiyan P, Rajgopal L, Shyam Kishore K, Singh I. Inderbir Singh's Textbook of human neuroanatomy.
2. Splittgerber R. Snell's Clinical Neuroanatomy. 8th ed. Philadelphia, PA: Lippincott Williams and Wilkins; 2018.

ENGLISH AND COMMUNICATION –I

Course:AEC

Credits:3 **NoofHours:45**

Course Outcome

At the end of the course, students will be able to

CO1:Acquirethe LSRW(Listening,Speaking,Reading,andWriting) skills. Through Cambridge Interchange Fifth Edition, students will develop real world communication skills- enhancing fluency in speaking, listening, reading and writing – wile mastering grammar, expanding vocabulary and improving pronunciation with supportive digital tools.

CO2: Learn to appreciate Literature.

CO3:Be aware of social responsibilities.

CO4 : Enhance the analytical skill

COURSECONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable	Weightage	Types Of Questions
UnitI	10hrs	**UNIT 1: CAMBRIDGE: INTERCHANGEFIFTH EDITION** Good Memories Life in the City Making Changes Have you ever tried it? Hit the Road. Sure.I will do it. What do you use this for? Time to Celebrate.	√			23%	SA

Unit	Hrs	Content	Must Know	GoodtoKnow	Desirable to Know	Weightage	Types Of Questions
UnitII	8hrs	**UNIT-II:PHONETICS** Brief Introduction Classification of Vowels, Diphthongs and Consonants Pronouncing the words phonemically and transcribing them into Phonetics IPA	√			18%	SA
Unit III	11hrs	**UNIT–III:Grammar and Written Communication** Parts of Speech Verb Tenses Articles Capitalization and Punctuation E-mail Drafts Formal Letters Essay Writing	√			24%	SA
Unit IV	4hrs	**UNIT–IV:Prose** Steve Jobs:Commencement Address MotherTeresa's Award Winning Speech	√			9%	LE,SE

Unit	Hrs	Content	Must Know	GoodtoKnow	Desirable to Know	Weightage	Types Of Questions
Unit V	6hrs	**UNIT–V: Poetry** The Road Not Taken:Robert Frost The Man with the Wooden Leg : Catherine Mansfield Our CasuarinaTree:Toru Dutt	√			13%	LE,SE
Unit VI	6hrs	**UNIT–VI:Short Stories** Giftofthe Magi: O' Henry Kabulivala:RaindranathTagore The Blue Umbrella:Ruskin Bond		√		13%	LE,SE

LE-LongEssay,**SE**-ShortEssay,**SA**-Short Answer

- **Recommended Books:**

1. Cambridge:Interchange Fifth Edition
2. Contemporary English Grammar Structures & Composition by DavidGreen
3. English Grammar and Composition:Wren&Martin
4. English Grammar in Use by Raymond Murphy

Constitution of India

Course: VAC

Credits: 2 **No of Hours: 30 Hours**

- **Course Outcome:**

At the end of this course, students will gain knowledge on

CO1: This course is to keep the students abreast with the knowledge of the Constitution of India.

CO2: To make the students understand the importance of human rights as citizens of India.

- **COURSE CONTENT:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type Of Questions
Unit I	5hrs	**Indian Constitution** • Meaning and Importance of Constitution • The Constituent Assembly • The Preamble • Salient Features of Constitution	√			**10%**	SE, SA
Unit II	3hrs	**Fundamental Rights and Directive Principles** • Meaning and Differences between Fundamental Rights and Directive Principles • Fundamental Rights	√			20%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type Of Questions
		• Rights Information Act Meaning ,importance of RTI 2005					
Unit III	4hrs	**Union Government** • The President of India-Election ,Powers and Position • Prime Minister and Council of Ministers • Parliament – Loksabha ,Rajyasabha- Organisations and Powers	√			15%	LE, SE, SA
Unit IV	4hrs	**State Government** • The Governor • Chief Minister and Council of Ministers • State Legislature Vidhanasabha ,vidhanaParishad- Organisations and Powers	√			10%	SE, SA
Unit V	2hrs	**Federalism in India**	√			10%	

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type Of Questions
		• Meaning Federal and Unitary Features					SE, SA
Unit VI	2hrs	**The Judiciary** • The Supreme Court-Organization ,Jurisdiction and Role • The High Court-Organization ,Jurisdiction and Role	√			10%	SE, SA
Unit VII	2hrs	**Electoral Process In India** • Election Commission – Organization ,Functions	√			10%	SE, SA
Unit VIII	2hrs	**Local Governments** • Rural and Urban-Organization ,Powers and Functions	√			5%	SE, SA
Unit IX	3hrs	**Human Rights** • Human Rights-Meaning • Universal Declaration of Human Rights	√			5%	

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type Of Questions
		• Remedies against Violation of Human Rights in India					LE, SE, SA
Unit X	3hrs	**Special Constitutional Provisions** • Special Rights created in the constitution for: Dalits ,Backwards ,Women and Children and the Religious and Linguistic Minorities. • Constitution and Sustainable Development in India • Minority Commission in India	√			5%	SE, SA

➢ Recommended Books

- Basu, D.D , Constitution of India, New Delhi Himalaya Publication ; 2001
- Dinesh Shelton, David P Stuart, International Human Rights in Nutshell. Thomas Burgenthel, West Nutshell Publisher; London; 2005.
- ParvathyAppaiah, Constitution of India, Mangalore Divya Deepa Publication; 2005
- ParvathyAppaiah, Human Rights. Divya Deepa Publication Mangalore; 2016
- RajRam. M, Constitution of India Himalaya Publication, New Delhi; 1999

SEMESTER II

HUMAN ANATOMY & PHYSIOLOGY II

Course: Core

Credits: 4 **No of Hours: 60 Hours**

PART A- HUMAN NANATOMY

Course Outcomes:

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

CO1. To identify and locate each of the body systems to apply anatomical knowledge to perform minor technical procedural skills.

CO2. To know the normal disposition of the structures in the body while clinically examining a patient and while conducting clinical procedures.

CO3. To know the anatomical basis of disease and injury

CO4. To discuss the interrelationship of systems in maintaining homeostasis.

CO5. To describe the structure of each body system

- **Course Content:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	
Unit I	5hrs	Urinary system 1.1 Kidney, ureter, urinary bladder, male and female urethra. 1.2 Demonstration of parts of urinary system. Histology of kidney, ureter, urinary bladder.	√			15%	LE, SE, SA
Unit II	10hrs	Reproductive system 2.1Parts of male reproductive system, testis, vas deferens, epididymis, prostate 2.2 Parts of female reproductive system, uterus, fallopian tubes, ovary 2.3 Mammary gland: 2.4 Demonstration of section of male and female pelvis with organs in situ. Histology of male and female reproductive organs.	√			30%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	
Unit III	3hrs	Endocrine glands 3.1Endocrine glands: pituitary gland, thyroid gland, parathyroid gland, suprarenal gland 3.2 Demonstration of the glands. Histology of pituitary, thyroid, parathyroid, suprarenal glands.		√		15%	SE, SA
Unit IV	10hrs	Nervous system 4.1 Neuron, classification of nervous system, cerebrum,cerebellum,midbrain,pons, medullaoblongata,spinalcord with spinal nerve, meninges, ventricles & cerebrospinal fluid, names of basal nuclei, blood supply of brain, cranial nerves. Sympathetic trunk& names of parasympathetic ganglia 4.2 Histology of peripheral nerve & optic nerve. Demonstration of all plexuses and nerves in the body. Demonstration of all parts of brain. Histology of cerebrum, cerebellum, spinal cord.	√			25%	LE, SE, SA
Unit V	2hrs	Sensory organs 5.1 Skin: histology, appendages of skin. 5.2 Eye: parts of eye & lacrimal apparatus. Extra-ocular muscles & nerve supply. 5.3 Parts of ear: external, middle, and inner ear and contents. 5.4 Histology of thin and thick skin. Demonstration and histology of eyeball. Histology of cornea & retina.		√		15%	SE, SA

❖ **LE**- Long Essay**, SE**- Short Essay**, SA**- Short Answer

➢ **Recommended Books**

1. Chaurasia BD. BD Chaurasia's Human Anatomy. CBS Publishers & Distributors PVt Ltd.; 2010.
2. Sampath Madhyastha, Manipal Manual of Anatomy for Allied Health Sciences,New Delhi: CBS publishers and distributors.

3. Waugh A, Grant A. Ross & Wilson Anatomy and physiology in health and illness E-book. Elsevier Health Sciences; 2014 Jun 25.
4. Dilly PN. Essentials of Human Embryology. Postgraduate Medical Journal. 1984 Jun;60(704):447.
5. Inderbir S. Textbook of human histology with color atlas. New Delhi: Jaypee Brothers Medical Publishers. 2006.
6. Priya Ranganath, Leelavathy N, Basics in Human Anatomy for BSc Paramedical Courses, Revised and updated edition, The Health

PART B- PHYSIOLOGY

Course Outcomes:

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

CO1: To demonstrate the understanding of physiological structure of Renal system, endocrine system, Nervous system and special senses.

CO2: To broadly identify the clinical abnormalities of organs and its clinical physiological implications

- **COURSE CONTENT:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
Unit I	5hrs	**Digestive System** 1.1 Introduction 1.2Physiological anatomy of gastro intestinal tract (All Structures in brief), functions of digestive system 1.3Functions of Saliva 14Deglutition: definition, stages 1.5Stomach: functions 1.6Gastric secretion: composition, function, Phases of secretion	√			20%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		1.7Pancreas: Functions (exocrine), pancreatic juice: composition and regulation. Secretin and CCK-PZ 1.8Liver: Functions , Bile secretion, composition, function of bile; 1.9Bilirubin metabolism, types of bilirubin, Vandenberg reaction, Jaundice: types, significance. 1.10Gall bladder: Functions. 1.11Small intestine: functions, digestion and absorption, movements. (brief) 1.12Large intestine: functions, defecation reflex					
Unit II	5 hrs	**Renal system** 2.1 Introduction: Functions of kidneys, composition of urine, nephron, cortical and juxtamedullary nephrons (comparison), 2.2 Juxta Glomerular Apparatus: structure and function. 2.3 Mechanism of urine	√	√		20%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		formation 2.4 GFR: Definition, Normal Values, factors effecting GFR, Measurement (Creatine, Insulin Clearance). Tubular reabsorption, TMG, Tubular secretion (brief). 2.5Mechanism of urine concentration: Counter-current mechanisms, Role of ADH 2.6 Micturition, innervation of bladder, cystometrogram.					
Unit III	2 hrs	**Skin and Body temperature** 3.1Structure and function of Skin 3.2 Body Temperature: physiological variation. 3.3 Regulatory mechanisms: Mechanisms Activated by Heat/Cold 3.4 Role of hypothalamus, and fever.	√	√			SE
Unit IV	5 hrs	**Endocrine System** 4.1 Introduction: Definition, classification of endocrine glands & their hormones.		√		25%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		4.2 Hypothalamo-pitiutary Axis 4.3 Pituitary hormones: anterior and posterior pituitary hormones, Functions of Growth hormone, 4.4 Thyroid gland: Thyroid Hormones: physiological function, regulation of secretion, disorders: hypo and hyper secretion of hormone. 4.5Adrenal cortex: functions of Cortisol and Aldosterone 4.6 Adrenal medulla: functions of Adrenalline and Noradrenalline . 4.7Pancreas (Endocrine): Hormones of pancreas. 4.8Insulin: functions, regulation of blood glucose level, Diabetes mellitus 4.9 Regulation of Calcium Metabolism: Hormones involved, actions of PTH, Calcitonin, Vit D3					
Unit V	5 hrs	**Reproductive system** 5.1 Introduction, Function of reproductive	√	√		20%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		system, Changes during puberty. 5.2 Male reproductive system: functions of testes Spermatogenesis: Definition, site, stages, factors influencing, Endocrine functions of testes. 5.3 Androgens: testosterone functions. 5.4 Female reproductive system 5.5Menstrual cycle: Definition, changes, ovulation 5.6 Functions of progestorene and estrogen 5.7 Physiological changes during pregnancy, Lactation(brief), milk ejection reflex					
Unit VI	3 hrs	**Special senses** 6.1 Vision: Functions of different parts(brief) 6.2 Optic Pathway, Dark Adaptation, Colour vision. 6.3Hearing: Function of Middle Ear, Functions of inner ear, mechanism of hearing (brief).	√	√		15%	SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		6.4Chemical Senses: Taste: types, receptor, Smell: physiology, receptors.					
Unit VII	7 hrs	**Nervous system** 7.1 Introduction: Parts of CNS and PNS, Functions of nervous system 7.2Neuron: definition ,structure 7.3 Nerve Fibre: classification, conduction of impulses continuous and saltatory. 7.4Synapse: Definition, structure, types, properties (brief). Receptors: definition, classification, properties (brief). 7.5Reflex : Definition, Reflex Arc, Examples. 7.6Spinal cord nerve tracts: Diagram and Functions: Lateral Spino Thalamic Tract, Dorsal Column, Pyramidal Tract. 7.7Spinal cord nerve tracts: Diagram and Functions: Lateral Spino Thalamic Tract, Dorsal Column, Pyramidal	√	√		25%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		Tract. 7.8Cerebro Spinal Fluid (CSF): site of formation, circulation (brief), functions. 7.9Autonomic Nervous System: Sympathetic and parasympathetic distribution and functions (brief).					

- **Recommended Books**

1. Guyton (Arthur): Text Book of Physiology. Latest Ed. Prism publishers.
2. Ganong William F: Review of Medical Physiology. Latest Ed. Tata
    a. McGraw Hill
3. Chatterjee CC: Human Physiology Latest Ed. Vol-1, Medical Allied Agency. Choudhary Sujith K: Concise Medical Physiology Latest Ed. New Central Book.

PATHOLOGY &MICROBIOLOGY-II

Course: Core

Credits: 4 **No of Hours: 60 Hours**

PART A- PATHOLOGY

Course objectives:

CO1: To study fundamental aspects of different groups of microorganisms and their importance.

CO2: To compute medically important infective organisms and their diagnosis.

CO3: To enumerate the common infections of bacteria, virus, parasite and fungi.

CO4: To understand fundamental analytical principles and process used in histopathology

➢ **COURSE CONTENT:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
Unit I	12 hrs	Histopathology 1.1 Introduction to histopathology 1.2. Grossing technique 1.3. Tissue processing (Fixation, Dehydration, Clearing & Impregnation) 1.4. Embedding technique 1.5. Section cutting 1.6. H&E staining	√			30%	LE,SE, SA
Unit II	6 hrs	Cytology 2.1. Introduction to cytology. 2.2 FNAC 2.3. PAP stain.	√			25%	SE, SA
Unit III	12 hrs	General Pathology 3.1. Cell injury: Agents causing cell injury, cellular adaptations (hypertrophy, atrophy, hyperplasia, metaplasia) reversible and irreversible injury. 3.2. Inflammation: Cardinal signs of inflammation, acute and chronic inflammation. Laboratory tests in inflammation. 3.3. Hemodynamic □ Edema & shock □ Thromboembolism & Infarction.	√			45%	LE,SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		3.4. Neoplasia: Definition of neoplasm, differences between benign and malignant tumors, Carcinogenesis. 3.5. Genetic disorders: Introduction to genetic disease and classification of genetic disorder.					

- **Recommended Books:**

1. Histopathology techniques and its management –by Dr.Ramdas Nayak
2. RamnikSood ,Text book of Medical Laboratory Technology 6th Edition, Vol 1 & 2

PART B- MICROBIOLOGY

Course Outcomes:

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

CO1: To outline fundamentals aspects of microbiology including origin, evolution of microorganisms, different groups of microorganisms and their importance, microscopy principles and applications, morphology, and structure.

CO2: To explain microbiological media, isolation, cultivation and enumeration methods of microorganisms, microbial growth characteristics, maintenance, and preservation of microbial cultures

CO3: To develop knowledge on basic immunological concepts.

CO4: To develop knowledge on basic immunological concepts.

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
Unit I	**11Hrs**	**Systematic Bacteriology** **1.1** Overview of common bacterial infections & bacterial virulence factors and Antimicrobial sensitivity test **1.2** Morphology, pathogenesis and laboratory diagnosis of medically important bacteria (Staphylococcus aureus & MRSA, Pneumococcus. Enterobacteriaceae- Salmonella (Enteric fever), E. coli, Vibrio cholerae, Mycobacterium tuberculosis **1.1** Biochemical reactions and identification of bacteria.	✓			**30%**	**LE, SE,SA**
Unit II	**8Hrs**	**Virology** 2.1 Nutrition, growth and multiplication of bacteria, Bacterial Growth Curve 2.2 Morphology, pathogenesis and laboratory diagnosis of (HIV-1, Hepatitis viruses- Hepatitis B & Hepatitis C virus, Rabies-1, Arbo viruses-	✓			**30%**	**LE, SE,SA**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		Dengue virus					
Unit III	**4 Hrs**	**Mycology** 3.1 Introduction to Mycology-1 3.2 Morphology, pathogenesis and laboratory diagnosis of (Dermatophytes, Candida, Cryptococcus)	✓			**20%**	**LE, SE,SA**
Unit IV	**7Hrs**	**Parasitology** 4.1 Introduction to Parasitology. 4.2 Morphology, Life cycle, pathogenesis and laboratory diagnosis of (E.histolytica, Plasmodium, Ascaris, T.solium, T.saginata, Ancylostoma)	✓			**20%**	**LE, SE,SA**

❖ **LE**- Long Essay**, SE**- Short Essay**, SA**- Short Answer

Recommended Books:

1. Baveja CP. Textbook of microbiology. Arya Publications; 2005.

Ananthanarayan R. Ananthanarayan and Paniker's textbook of microbiology. Orient Blackswan; 2006.

YENEPOYA
(DEEMED TO BE UNIVERSITY)

INTRODUCTION TO NEUROSCIENCE TECHNOLOGY

Course: Core

Credits :4 **No of Hours :**60 Hours

Course Outcomes:

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

CO1.By the end of the course the students will be able to understand the recording principles.

CO2.Will be able to understand the technical parameters for better interpretation.

CO3.Understand the conduction study in various nerves

CO4.Have a basic knowledge of the artifacts and associated technical errors.

COURSE CONTENT

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPES OF QUESTIONS
Unit I: Fundamentals of EEG recording	5 Hrs	1.1 Historical Perspectives		√		5%	SE, SA
		1.2 Generation of EEG waveforms	√				
		1.3 EEG Recording	√				
		1.4 EEG machine		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPES OF QUESTIONS
		1.5Electrodes	√				
Unit II: Analogue & Digital EEG	10Hrs	2.1Analogue EEG		√		10%	SE, SA
		2.2Amplifiers		√			
		2.3Impedance		√			
		2.4Averaging	√				
		2.5EEG filters	√				
		2.6Calibration signal	√				
		2.7Output and input jacks			√		
		2.8Calibration of EEG machine	√				
		2.9Digital EEG		√			
		2.10Paper transport			√		

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPES OF QUESTIONS
		2.11Electrical safety		√			
		2.12Electrical ground and its maintenance		√			
Unit III: Technical Consideration during EEG analysis	5Hr	3.1Amplitude Adjustment	√			10%	LE, SE, SA
		3.2Frequency adjustment	√				
		3.3Montage reformatting	√				
		3.4Time display		√			
		3.5EEG calibration	√				
		3.6Morphology of EEG waveforms and principles of visual analysis of EEG	√				
		3.7Recording of EEG	√				
		3.8Utility of EEG in epilepsy.		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPES OF QUESTIONS
Unit IV: Electroencephalography – An overview	5Hr	4.1Principles of EEG recording & Patient Preparation	√			10%	LE, SE, SA
		4.2Electrode placement -10-20 System	√				
		4.3Derivations& Montages	√				
Unit V: Basics of Neurophysiology	5Hr	5.1Introduction		√		10%	LE, SE, SA
		5.2Cell membrane	√				
		5.3Resting potentials	√				
		5.4Action potential	√				
		5.5Synaptic transmission	√				
		5.6Clinical correlations		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPES OF QUESTIONS
Unit VI: Principles of Motor & sensory nerve conduction study	10Hr	6.1Motor conduction study Amplitude Latency Duration Conduction Velocity"	√			20%	LE, SE, SA
		6.2Sensory conduction study Amplitude Onset latency Peak latency Duration"	√				
		6.3Special considerations in sensory conduction study -Ortho and antidromic sensory studies.		√			
Unit VII: Late Responses	5Hr	7.1 F waves	√			15%	LS, SE, SA
		7.2 H reflex	√				
		7.3 Axonal reflex	√				
Unit VIII:	5Hr	8.1 Introduction		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPES OF QUESTIONS
Artifacts &technical factors						10%	SE, SA
		8.2 Physiological factors	√				
		8.3 Non-Physiological factors	√				
Unit IX: Electricity and electronics for clinical Neuroscience Technology	5Hr	9.1 Basic principles and definition in electricity		√		5%	SE, SA
		9.2 Circuit analysis		√			
		9.3 Resistive-capacitive and Resistive-inductive circuit		√			
		9.4 Circuits containing inductors and capacitors		√			
		9.5 Filter circuits		√			
		9.6 Transistors and amplifiers		√			

UNIT	Hrs	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPES OF QUESTIONS
Unit X: Electrical safety in the Laboratory and hospital	5Hr	10.1 Introduction		√		5%	SE, SA
		10.2 Electric shock		√			
		10.3 Electrical safety principles and implementation		√			
		10.4Electric stimulation safety		√			

Recommended Books:

1. Misra U, Kalita J. Clinical neurophysiology.
2. Preston D, Shapiro B. Electromyography and neuromuscular disorders. Philadelphia: Elsevier; 2021.
3. Chathurbhuj Rathore, Jagarlapudi M K Murthy, Kurupath Radhakrishnan, EEG in clinical practice, Manipal University Press,2018

YENEPOYA
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ENGLISHANDCOMMUNICATION–II

Course:AEC

Credits:3 **No of Hours:45 Hours**

Course Outcomes:

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

CO1:AcquiretheLSRW (Listening,Speaking,Reading,andWriting) skills. Through Cambridge Interchange Fifth Edition, students will develop real world communication skills- enhancing fluency in speaking, listening, reading and writing – wile mastering grammar, expanding vocabulary and improving pronunciation with supportive digital tools.

CO2: Learn to appreciate Literature.

CO3: Be aware of social responsibilities.
CO4: Enhance the analytical skill

COURSECONTENT:

Unit	Hrs	Content	Must Know	Goodt	Desirable to Know	Weightage	Types Of Questions
UnitI	13hrs	**UNIT – I: CAMBRIDGE INTERCHANGESFIF TH EDITION** Only Time Will Tell I Like Working with People It's Really Worth Seeing It's a Long Story That's Entertainment Now I Get it I wouldn't have done that Making Excuses	√			29%	SA

Unit	Hrs	Content	Must Know	GoodtoKno	Desirable to Know	Weightage	Types Of Questions
Unit II	3hrs	**UNIT–II:Phonetics–IPA Transcription**	√			7%	SA
Unit III	13hrs	**UNIT–III:Grammar and Written Communication** Reported Speech Modals Clauses Gerunds Active and Passive Voice Synonyms and Antonyms News Report Writing Speech Writing Dialogue Writing	√			29%	SA
Unit IV	4hrs	**UNIT–IV:PROSE** Chicago Address by Swami Vivekananda I have a Dream:Martin Luther King	√			9%	LE,SE

Unit	Hrs	Content	Must Know	GoodtoKno	Desirable to Know	Weightage	Types Of Questions
Unit V	6hrs	**UNIT–V: Poetry** Still I Rise : Maya Angelou B The Raven:Edgar Allen Poe Break,Break,Break:Alfred Lord Tennyson	√			13%	LE,SE
Unit VI	6hrs	**UNIT–VI:Short Stories** The Luncheon: William Somerset Maugham The Power of Prayer: APJ Abdul Kalam The Necklace: Guy De Maupassant		√		13%	LE,SE

- **LE**-Long Essay**, SE**-Short Essay**, SA**-Short Answer

Recommended Books:

5. Cambridge:Interchange Fifth Edition
6. Contemporary English Grammar Structures & Composition by David Green
7. English Grammar and Composition:Wren&Martin
8. English Grammar in Use by Raymond Murphy

KANNADA

Course: AEC

Credits: 2 **No of Hours: 30 Hours**

Course Outcome:

- Enable students to learn alphabet, words and simple sentences in Kannada.
- Enable students to enhance speaking and writing communicative skills in Kannada and learn technical words related to medical science

COURSE CONTENT:

Unit I: Kannada Letters (vowels, Consonant)

Unit II: Words, Phrases, formation of sentences, Letter Writing, Essay Writing. Treatment related Kannada words (from English to Kannada)

Unit III:

1) Possible communication in kannada between Patients and Doctors.

2) Advising sentences to the possible questions of patients.

3) Some important sentences which enable to communicate with doctors and colleagues.

- **Recommended Books**

- Kannada Vyakarana – (8th ,9th and 10th Karnataka government text books)
- HSK, Vyavarahika Kannada

SEMESTER III

NEUROLOGICAL CONDITIONS & DISORDERS I

Course: Core

Credits : 4 **No of Hours : 60 Hours**

Course Outcomes:

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

CO1.Todifferentiate between neuropathies and myopathies.

CO2.Understand the Management and treatment of different pathological conditions

COURSE CONTENT

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
Unit 1 : Symptoms of Neurological disorders	15 Hours	1.1 Neurological diseases – A basic approach	√			15%	SE,SA
		1.2 clinical examination basics	√				
		1.3 Delirium and Dementia Scott	√				
		1.4 Aphasia, Apraxia, and Agnosia	√				
		1.5 Syncope and Seizure	√				
		1.6 Coma	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		1.7 Diagnosis of Pain and Paresthesia	√				
		1.8 Dizziness and Hearing Loss	√				
		1.9 Impaired Vision	√				
		1.10 Headache	√				
		1.11 Involuntary Movements	√				
		1.12 Syndromes Caused by Weak Muscles	√				
		1.13. Gait Disorders	√				
Unit 2 : Infections of the Nervous System	10 Hours	2.1 Bacterial Infections	√			20%	LE,SE,SA
		2.2 Viral Infections	√				
		2.3 acquired immunodeficiency syndrome	√				
		2.4 Neurosarcoidosis	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		2.5 Reye's Syndrome	√				
		2.6 Prion diseases	√				
Unit 3 : Vascular Diseases	11 Hours	3.1 Pathogenesis, Classification, and Epidemiology of Cerebrovascular Disease	√			20%	LE,SE,SA
		3.2 Examination of the Patient with Cerebrovascular Disease	√				
		3.3 Transient Ischemic Attack	√				
		3.4 Cerebral Infarction	√				
		3.5 Cerebral and Cerebellar Hemorrhage	√				
		3.6 Differential diagnosis of stroke	√				
		3.7 Stroke in Children	√				
		3.8 Treatment and Prevention of Stroke	√				
		3.9 Subarachnoid Hemorrhage	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
Unit 4 : Trauma	12 Hours	4.1 - Head Injury	√			15%	LE,SE,SA
		4.2 Spinal Injury	√				
		4.3 Intervertebral Discs and Radiculopathy	√				
		4.4 Cervical Spondylotic Myelopathy	√				
		4.5 Lumbar Spondylosis	√				
		4.6 Peripheral and Cranial Nerve Lesions	√				
		4.7 Neuropathic Pain and Posttraumatic Pain Syndromes	√				
		4.8 Radiation Injury	√				
		4.9 Electrical and Lightning Injury	√				
		4.10	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		Decompression Sickness					
Unit 5 : Disorders of mitochondrial DNA	2 Hrs	5.1 Leber Hereditary Optic Neuropathy	√			10%	LE,SE,SA
Unit 6 : Peripheral Neuropathies	5Hrs	6.1 General Considerations	√			10%	LE.SE.SA
		6.2 -Hereditary Neuropathies	√				
		6.3 Acquired Neuropathies	√				
Unit 7 : Disorders of the Neuromuscular Junction	5Hrs	7.1 Myasthenia Gravis	√			10%	LE,SE,SA
		7.2 Lambert-Eaton Syndrome	√				
		7.3 Botulism	√				

REFERENCE BOOKS:

1. Houston Merritt H. Textbook of neurology. 9th ed. Philadelphia, PA: Lippincott Williams and Wilkins; 1999

2. Davis M.D. LE, Pirio Richardson M.D. Assistant P S. Fundamentals of neurologic disease. New York, NY: Springer New York; 201

ELECTROENCEPHALOGRAPHY

Course: Core

Credits: 4 **No of Hours :**60 Hours

Course Outcomes:

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

CO1.Have a basic understanding of Epileptiform discharges and its recording parameters.

CO2.Knowledge on different patterns seen during recording in EEG.

COURSE CONTENT

`UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOODTO KNOW	DESIRABLE TOKNOW	WEIGHTAGE %	TYPE OF QUESTIONS
Unit I Normal EEG rhythm in awake EEG	10	1.1 Introduction	√			15	LE, SE, SA
		1.2 Alpha Rhythm	√				
		1.3 MU Rhythm	√				
		1.4 Beta Rhythm	√				
		1.5 Gamma Rhythm	√				
		1.6 Theta Activity	√				
		1.7 Delta Activity	√				
		1.8 Lambda wave	√				
Unit II Abnormal	10	2.1 Abnormal Background activity	√			10	LE, SA

`UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOODTO KNOW	DESIRABLE TOKNOW	WEIGHTAGE %	TYPE OF QUESTIONS
EEG rhythm in awake EEG		2.2 Abnormal theta rhythm	√				
		2.3 Spike, sharp and polyspike activity	√				
		2.4 Paroxysmal activity	√				
UnitIII Sleep and EEG	6	3.1 Introduction	√			20	LE, SA
		3.2 Normal sleep patterns in EEG	√				
		3.3 Stages of sleep	√				
Unit IV Artifacts in EEG	5	4.1 Introduction and characteristics of artifacts	√			10	LE, SE, SA
		4.2 Types of artifacts	√				
		4.3 Physiological and Non-Physiological artifacts	√				
Unit V Activation Procedures	9	5.1 Introduction	√			15	LE, SE, SA
		5.2 Routinely performed activation procedures	√				
		5.3 Eye opening and closure	√				
		5.4 Mental alerting	√				
		5.5 Hyperventilation	√				
		5.6 Intermittent Photic stimulation	√				

`UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOODTO KNOW	DESIRABLE TOKNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		5.7 Intermittent Photic stimulation	√				
Unit VI BenignVariants of EEG	10	6.1 14 and 6 Hz positive spikes	√			15	SE
		6.2 Small sharp spikes	√				
		6.3 Wicket spikes	√				
		6.4 Rhythmic mid temporal theta of drowsiness	√				
		6.5 Midline theta rhythm	√				
		6.6 Subclinical rhythmic electrographic discharge in adults	√				
Unit VII EEG and Epilepsy	10	7.1 Paroxysmal discharge and seizure diagnosis	√			15	SE, SA
		7.2 Generalized epilepsies	√				
		7.3 Focal epilepsies	√				
		7.4 Undetermined epilepsies and epileptic syndromes	√				
		7.5 Other EEG abnormalities associated with seizures	√				
		7.6 Ictal discharges	√				

Recommended Books:

1. Chathurbhuj Rathore, Jagarlapudi M K Murthy, Kurupath Radhakrishnan, EEG in clinical practice, Manipal University Press,2018
2. .Misra UK, Kalita J. Clinical Electroencephalography. 2nd ed. New Delhi, India: Elsevier; 2018.

INTRODUCTION TO PHARMACOLOGY

Course: Core

Credits: 4 **No of Hours: 60 Hours**

- **Course Outcomes:**

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

CO1. Know the basics of Pharmacology like, sources of drugs, routes of drug Administration and general principles

CO2. Describe the principles of pharmacokinetics and pharmacodynamics

CO3. To appreciate various adverse drug reactions

CO4. To have a basic knowledge of drugs affecting various body systems

- **COURSE CONTENT:**

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of Question
UNIT I - Myopathies	16 Hours	1.1 Identifying Disorders of the Motor Unit	√			20%	SE,SA
		1.2 Progressive Muscular Dystrophies	√				
		1.3 Polymyositis, Inclusion Body Myositis	√				
		1.4 Congenital Disorders of Muscle	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of Question
		1.5 Muscle Cramps and Stiffness	√				
		1.6 Dermatomyositis	√				
UNIT II- Demyelinating diseases	4 Hours	2.1 Multiple Sclerosis	√			15%	LE,SE,SA
		2.2 Neuromyelitis Optica	√				
UNIT III- Autonomic disorders	5 Hrs	3.1 Neurogenic Orthostatic Hypotension	√			20%	LE,SE,SA
		3.2 Parkinson's Disease	√				
		3.3 Neurogenic causes of Bladder, Bowel and sexual dysfunction		√			
UNIT 4: Paroxymal disorder		4.1 Migraine and Other Headaches	√			15%	LE,SE,SA
		4.2 Epilepsy	√				
		4.3 Febrile Seizures	√				
		4.4 Neonatal Seizures	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of Question
		4.5 Transient Global Amnesia	√				
		4.6 Meniere Syndrome	√				
		4.7 sleep disorder	√				
UNIT 5: Systemic diseases and general medicine	15 Hrs	5.1 endocrine diseases		√		15%	SE,SA
		5.2 Hematologic and Related Diseases		√			
		5.3 Hepatic Disease		√			
		5.4 Cerebral Complications of Cardiac Surgery	√				
		5.5 Bone Disease		√			
		5.6 Renal Disease		√			
		5.7 Respiratory Care: Diagnosis and Management		√			
		5.8 Nutritional Disorders: Vitamin B12 Deficiency, Malabsorption, and Malnutrition	√				
		5.9 Vasculitis	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of Question
		Syndromes					
		5.10 Neurologic Disease During Pregnancy	√				
UNIT 6: Environmental neurology	5Hrs	6.1 Alcoholism		√		10%	SE,SA
		6.2 Complications of Cancer Chemotherapy		√			
		6.3 Abuse of Children		√			
UNIT 7: Ethical and Legal guidelines	3Hrs	7.1 End-of-Life issues in neurology	√			5%	SE,SA

- **Recommended Books:**

1. Shan Bhag T V, Shenoy S& Nayak V.PharmacologyFor Nurses, Elesever; 3rd edition.2023.
2. Udaykumar P. Textbook of Pharmacology for Dental and Allied Sciences. Jaypee Brothers Publishers; 4th edition. 2017.
3. Clark AJ. General pharmacology. Springer Science & Business Media; 2012 Dec 6.

NERVE CONDUCTION STUDY

Course: Core

Credits :4 **No of Hours :**60 Hours

Course Outcomes:

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

CO1.understand the techniques used in stimulating various nerves.

CO2. Understand the correlation between the pathological aspects with neuroelectrophysiology.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
Unit I: Upper Extremity motor and sensory conduction studies	5 Hours	1.1 Median Motor & Sensory Conduction Study ○ Anatomy ○ Nerve Conduction study of the median nerve ○ Clinical conditions	√			10%	LE, SE, SA
		1.2 Ulnar Nerve ○ Anatomy ○ Clinical conditions	√				
Unit II: Lower extremity nerve conduction studies	5 Hours	2.1 Peroneal nerve conduction study ○ Anatomy	√			10%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		○ Nerve conduction study ○ Clinical conditions					
		2.2 Tibial nerve conduction study ○ Anatomy	√				
Unit III:Median Nerve	6 Hours	3.1 Anatomy	√			5%	SE, SA
		3.2 Techniques i. Median motor study ii. Median Palmar study iii. Median sensory study	√				
		3.3 Normal Values	√				
		3.4 Clinical Conditions	√				
Unit IV: Ulnar Nerve	7 Hours	4.1 Anatomy	√			5%	SE, SA
		4.2 Techniques i. Ulnar motor study ii. Ulnar sensory study iii. Deep ulnar motor branch study(FDI) iv. Dorsal ulnar cutaneous nerve study	√				
		4.3 Values	√				
		4.4 Clinical Conditions	√				
		4.5 Median versus ulnar digit 4 sensory study	√				
		4.5 Median versus ulnar palmar mixed nerve study	√				
Unit V: Radial Nerve	6 Hours	5.1 Anatomy	√			10%	LE, SE, SA
		5.2 Techniques i. Radial motor study ii. Radial Palmar study	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		iii. Radial sensory study					
		5.3 Normal Values	√				
		5.4 Clinical Conditions	√				
Unit VI:Facial Nerve	4 Hours	6.1 Anatomy	√			5%	LE, SE, SA
		6.2 Techniques	√				
		6.3 Values	√				
		6.4 Clinical Conditions	√				
Unit VII:Trigeminal Nerve	4 Hours	7.1 Anatomy	√			10%	LE, SE, SA
		7.2 Techniques	√				
		7.3 Values	√				
		7.4Clinical Conditions	√				
Unit VIII:Peroneal Nerve	4 Hours	8.1 Anatomy	√			5%	SE, SA
		8.2 Techniques	√				
		8.3 Values	√				
		8.4 Clinical Conditions	√				
Unit IX: Tibial Nerve	6 Hours	9.1 Anatomy	√			5%	SE, SA
		9.2 Techniques	√				
		9.3 Values	√				
		9.4 Clinical Conditions	√				
		9.5 Medial and lateral plantar nerve conduction	√				
Unit X : Superficial Peroneal	4 Hours	10.1 Anatomy	√			10%	SE, SA
		10.2 Techniques	√				
		10.3 Values	√				
		10.4 Clinical Conditions	√				
Unit XI:Sural	4 Hours	11.1 Anatomy	√			10%	SE, SA
		11.2 Techniques	√				
		11.3 Values	√				
		11.4 Clinical Conditions	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
Unit XII:Clinical-electrophysiological correlations: overview and common patterns	5 Hrs	12.1 Neuropathic lesions	√			15%	LE, SE, SA
		12.2 Axonal loss and demyelination lesions ○ Axonal loss lesions ○ Hyper acute ○ Acute ○ Subacute ○ Chronic ○ Subacute-chronic	√				
		12.3 Demyelinating lesions ○ Single proximal lesion slowing and conduction block ○ Single distal lesion slowing and conduction block ○ Early reinnervation after severe reinnervation	√				
		12.4 Traumatic demyelination ○ Neuropraxia, Axonotmesis, Neurotmesis ○ Wallerian degeneration and regeneration	√				

Reference Books:

1. Misra U, Kalita J. Clinical neurophysiology
2. Preston D, Shapiro B. Electromyography and neuromuscular disorders. Philadelphia: Elsevier; 2021.

CLINICAL NEUROSCIENCE TECHNOLOGY I

Course: SEC

Credit: 04 **Number of hours: 120 hours**

Course Outcomes:

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

CO1. The student gains basic practical skill in handling the basic Neurodiagnostic procedures.

COURSE CONTENT:

Unit	**Hrs**	**Content**	**Must Know**	**Goodto Know**	**Desirable to Know**	**Teaching Learning Method**	**Weightage**
Unit I	15 Hours	Distinguishing normal & abnormal EEG rhythms.	√			Demonstration	15%
Unit II	15 Hours	Activities during sleep in EEG	√			Demonstration	15%
Unit III	15 Hours	Artifacts arising in EEG & to differentiate between	√			Demonstration	10%

Unit	Hrs	Content	Must Know	Goodto Know	Desirable to Know	Teaching Learning Method	Weightage
		normal rhythms & artifacts					
Unit IV	15 Hours	Common activation procedures performed to increase the diagnostic yield of epilepsy.	√			Demonstration	10%
Unit V	15 Hours	Benign EEG patterns	√			Demonstration	10%
Unit VI	15 Hours	EEG activities seen in Epilepsy	√			Demonstration	10%
Unit VII	15 Hours	Common upper extremity nerve conduction studies	√			Demonstration	15%
Unit VIII	15 Hours	Common lower extremity nerve conduction studies	√			Demonstration	15%

Recommended Books:

1. Misra UK, Kalita J. Clinical Electroencephalography. 2nd ed. New Delhi, India: Elsevier; 2018.
2. Chathurbhuj Rathore, Jagarlapudi M K Murthy, Kurupath Radhakrishnan, EEG in clinical practice, Manipal University Press,2018
3. Tatum WO, Husain A, Benbadis S, Kaplan PW. Handbook on EEG interpretation. New York, NY: Demos Medical Publishing; 2007.

HUMAN RIGHTS AND GENDER EQUITY

Course: VAC

Credits: 2 **No of Hours: 30 Hours**

Course Outcome:

At the end of this course, students will gain knowledge on,

CO1: Basic Knowledge of Human Rights and its function and authorities in society and industry women's status, issues and gender equity.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type Of Questions
Unit I	5hrs	Human Rights 1.1 Human Rights –Meaning 1.2 Universal declaration of Human Rights	√			20 %	SE, SA
Unit	5hrs	Human Rights Advocacy	√			25%	

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type Of Questions
II		2.1 Global Advocacy of Human Rights; Amnesty International and Other Organisations 2.2 People's Union for Civil Liberty (PUCL) 2.3 Human Rights Commission in India 2.4 Minority Commission in India 2.5 Remedies Against Violation of Human Rights in India					SE, SA
Unit III	5hrs	Gender Equity Key Concepts- 3.1 Sex and Gender 3.2 Masculinity and Femininity 3.3 Patriarchy, Matriarchy 3.4 Gender roles and Attributes,Gender Division of Labour 3.5 Gender Bias 3.6 Gender Stereotypes 3.7 Need for Gender Sensitization	√			20%	SA
Unit IV	5hrs	Women's Status in India Important indicators-Sex Ratio,Education,Health, Nutrition, Maternal and Infant Mortality,Work Participation Rate,And Political Participation.	√			15%	SE, SA
Unit V	5hrs	Contemporary Women's Issues 5.1 Discrimination Against Girl Child 5.2 Violence Against Women 5.3 Problems of health and nutrition 5.4 Women's Education and Gender Bias in Education 5.5 Trafficking in women 5.6 Globalization and Impact on Women	√			15%	SE, SA
Unit	5hrs	State Initiatives for Gender Equity		√		05%	

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type Of Questions
VI		6.1 Constitutional Rights of Women 6.2 Laws Pertaining to Women 6.3 The National and State Commissions for Women					SE

- **Recommended Books:**

1. Parvathy Appaiah,Human Rights, Gender Equity and Environmental Studies, Shivam Books Publishers, 2012.
2. Parvathy Appaiah,Human Rights, Gender Equity and Environmental Studies, Jai BharathPrakashan Publishers, 2016.
3. Parvathy Appaiah,Human Rights, Gender Equity and Environmental Studies, Jai BharathPrakashan Publishers, 2018-19.
4. Nirmal Chiranjivi:Human Rights in India,New Delhi,OUP,2001

SEMESTER IV

NEUROLOGICAL CONDITIONS & DISORDERS II

Course: Core

Credits : 4 **No of Hours : 60 Hours**

Course Outcomes:

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

CO1.Understand the various lifestyle disorders associated with neurology.

CO2. Understand the various systemic diseases.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	le to	Teaching Learning Method	Weightage
		Myopathies 1.1 Identifying the disorders of					

Unit	Hrs	Content	Must Know	Good to Know	le to	Teaching Learning Method	Weightage
UNIT 1 :	16 Hours	the Motor Unit 1.2 Describe on Progressive Muscular Dystrophies 1.3 Detail on Polymyositis and Inclusion Body Myositis 1.4 Discuss on Congenital Disorders of Muscle 1.5 Describe on Muscle Cramps and Stiffness 1.6 Description on Dermatomyositis	√			Didactic Lecture	20%
UNIT 2 :	4 Hours	Demyelinating 2.1 Definition of Multiple Sclerosis, Pathogenesis, Clinical features and Management. 2.2 Definition of Neuromyelitis	√			Didactic Lecture	15%

Unit	Hrs	Content	Must Know	Good to Know	le to	Teaching Learning Method	Weightage
		Optica, Clinical features & Management.					
UNIT 3 : Autonomic disorder	5 Hrs	3.1 Describe on Neurogenic Orthostatic Hypotension. 3.2 Definition of Parkinson Disease, Pathophysiology, Clinical features and Management. 3.3 Describe on Neurogenic causes of bladder, bowel and sexual dysfunction.	√			Didactic Lecture	20%
UNIT 4: Paroxymal disorder	12 Hrs	4.1 Detail on Migraine and other Headaches. 4.2 Definition of Epilepsy, Classification,	√			Didactic Lecture	15%

Unit	Hrs	Content	Must Know	Good to Know	le to	Teaching Learning Method	Weightage
		Pathogenesis, Clinical features and Management. 4.3 Brief on Febrile and Neonatal Seizures. 4.4 Description on Transient Global Amnesia. 4.5 Detail on Meniere Syndrome. 4.6 Describe on Sleep disorder					
UNIT 5: Systemic diseases and general medicine	15 Hrs	5.1 Detail on Endocrine disorders 5.2 Discuss on Hematologic and Related Diseases 5.3 Detail on Hepatic Disease 5.4 Describe on Cerebral Complications		√		Didactic Lecture	15%

Unit	Hrs	Content	Must Know	Good to Know	le to	Teaching Learning Method	Weightage
		of Cardiac Surgery. 5.5 Discuss on Bone and Renal Disease 5.6 Describe on Respiratory Care; Diagnosis and Management. 5.7 Detail on Nutritional Disorders: Vitamin B12 Deficiency, Malabsorption and Malnutrition. 5.8 Discuss on Vasculitis Syndrome. 5.9 Detail on Neurologic Disease during Pregnancy.					
UNIT 6: Environmental neurology	5Hrs	6.1 Discuss on Alcoholism. 6.2 Describe on Complications of Cancer		√		Chart Preparation/Seminar / Group discussion	10%

Unit	Hrs	Content	Must Know	Good to Know	le to	Teaching Learning Method	Weightage
		Chemotherapy. 6.3 Discuss on Abuse of children.					
UNIT 7: Ethical and Legal guidelines	3Hrs	7.1 Describe on End-of-Life issues in neurology	√			Didactic Lecture	5%

REFERENCE BOOKS:

1. Houston Merritt H. Textbook of neurology. 9th ed. Philadelphia, PA: Lippincott Williams and Wilkins; 1995.

ADVANCED ELECTROENCEPHALOGRAPHY I

Course: Core

Credits :4 **No of Hours :**60 Hours

Course Outcomes:

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

CO1.Gain knowledge on the recording of EEG in various settings

CO2. Understand the patterns seen in EEG

COURSE CONTENT:

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOODTO KNOW	DESIRABLE TOKNOW	WEIGHTAGE %	TYPE OF QUESTIONS
Unit I Focal epileptiform patterns in Adult Epilepsies	05	1.1 Introduction	√			20	LE, SE, SA
		1.2 Definition and classification of Inter ictal epileptiform discharge	√				
		1.3 Epileptiform discharges by location	√				
		1.4 Temporal lobe epilepsy	√				
		1.5 Frontal Lobe Epilepsy	√				
		1.6 Parietal Lobe Epilepsy	√				
		1.7 Occipital Lobe Epilepsy	√				
Unit II Non-Epileptiform EEG abnormalities	08	2.1 Introduction	√			20	LE, SE, SA
		2.2 Slow waves	√				
		2.3 Continuous polymorphic delta activity	√				
		2.4 Temporal lobe slow wave activity	√				
		2.5 Generalized synchronous slow wave activity	√				

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOODTO KNOW	DESIRABLE TOKNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		2.6 Generalized/regional bisynchronous slow waves	√				
		2.7 Amplitude abnormalities	√				
		2.8 Generalized increase in selected EEG features	√				
Unit III Techniques for long-term EEG recording	05	3.1 Video EEG	√			20	LE, SE
		3.2 Ambulatory EEG	√				
		3.3 ICU Recordings	√				
Unit IV Pathological changes in brain detected in EEG	06	4.1 EEG in metabolic disease of cerebrum	√			20	SE, SA
		4.2 EEG in CNS infections	√				
		4.3 EEG in head trauma, strokes, tumors	√				
		4.4 EEG in Dementia and Degenerative diseases	√				
		4.5 EEG in coma and brain death	√				
		4.6 Role of EEG in presurgical of epilepsy	√				
Unit V Magnetoenc	05	5.1 Magnetic field generation	√			20	SE

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOODTO KNOW	DESIRABLE TOKNOW	WEIGHTAGE %	TYPE OF QUESTIONS
ephalography y		5.2 Neuroanatomy of detectable magnetic fields	√				
		5.3 Sensors used in MEG	√				
		5.4 Advantages and Applications	√				

Recommended Books:

4. Chathurbhuj Rathore, Jagarlapudi M K Murthy, Kurupath Radhakrishnan, EEG in clinical practice, Manipal University Press,2018
5. .Misra UK, Kalita J. Clinical Electroencephalography. 2nd ed. New Delhi, India: Elsevier; 2018

ADVANCED NERVE CONDUCTION STUDY I

Course: Core

Credits: 4 **No of Hours:** 60 Hours

Course Outcomes:

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

CO1.Understand the difference between neuropathies and radiculopathies

CO2. Gain knowledge on performing nerve conduction study on different entrapment syndromes.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
UNIT 1: Brachial Plexus	12 Hours	1.1 Anatomy Median Ulnar Radial Axillary Musculoctaneous nerve.	√			20%	LE, SE, SA
		1.2 Etiology Traumatic brachial plexopathy. Neoplasm & other mass lesions Neuralgic amyotrophy. Post operative brachial plexopathy Delayed radiation injury Thoracic Outlet Syndrome. Electrophysiological evaluation & nerve conduction study		√			
UNIT 2: Proximal neuropathies of shoulder and arm	6 Hours	2.1 Suprascapular Neuropathy.	√			10%	SE, SA
		2.2 Axillary Neuropathy.	√				
		2.3MusculocutaneousNeuropathy	√				
		2.4 Long thoracic Neuropathy	√				
		2.5 Spinal accessary Neuropathy	√				
UNIT 3: Median	10	3.1 Anatomy of median nerve	√			25%	LE, SE,

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
Neuropathy at wrist (Carpel Tunnel Syndrome)	Hours	3.2 Carpel Tunnel Syndrome, Etiology, Clinical symptoms and sign, Differential diagnosis Electrophysiological evaluation.	√				SA
		3.3 Nerve Conduction Study Median-Versus Ulnar Comparison Studies, Median-Versus-Ulnar Palm to wrist Mixed nerve studies	√				
		3.4 Proximal median neuropathies	√				
		3.5 Anatomy of antecubital fossae	√				
		3.6 Etiology Traumatic lesions. Entrapment syndrome. Ligament of Struthers entrapment Pronator syndrome Anterior Interosseousus syndrome	√				
		3.7 Electrophysiological evaluation and Nerve conduction study	√				
UNIT 4:Ulnar Neuropathy at Elbow	8 Hours	4.1 Anatomy & detailed anatomy of the elbow	√			5 %	SE, SA
		4.2 Etiology, Clinical, Differential Diagnosis	√				
		4.3 Electrophysiological evaluation & Nerve conduction studies	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
UNIT 5 : Ulnar Neuropathy at wrist	4 Hours	5.1 Anatomy	√			5 %	SE, SA
		5.2 Etiology, Clinical , Differential Diagnosis	√				
		5.3 Electrophysiological evaluation & nerve conduction studies.	√				
UNIT 6: Radial Nerve	10 Hours	6.1 Anatomy	√			15 %	LE, SE, SA
		6.2 Clinical	√				
		6.3 Radial neuropathy at spiral groove	√				
		6.4Radial neuropathy in axilla	√				
		6.5 Posterior interosseus neuropathy	√				
		6.6 Superficial radial sensory neuropathy.	√				
		6.7 Differential diagnosis	√				
		6.8 Electrophysiological evaluation and nerve conduction study.	√				
UNIT 7: Cervical Radiculopathy	10 Hours	7.1 Radiculopathy - Introduction	√			20 %	LE, SE, SA
		7.2Clinical, etiology & Differential Diagnosis	√				
		7.3 Electrophysiological evaluation	√				
		7.4 Criteria of Radiculopathy	√				
		7.5 Cervical	√				
		7.6 Cervical spondylosis	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		7.7 S1 – S2	√				
		7.8 Spinal cord compression	√				
		7.9 Lumbar disc prolapsed	√				
		7.10 Spinal cord injury	√				

Reference:

1. Misra U, Kalita J. Clinical neurophysiology
2. Preston D, Shapiro B. Electromyography and neuromuscular disorders. Philadelphia: Elsevier; 2021.

CLINICAL NEUROSCIENCE TECHNOLOGY II

Course: Core

Credit: 04 **Number of hours: 120 hours**

Course Outcomes:

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

CO1. The student gains basic practical skill in handling the advanced basic neurodiagnostic procedures.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage
Unit 1	24 hours	EEG & Epilepsy- Patterns of EEG in adult Epilepsy.	√			20 %
Unit 2	24 Hours	Long Term video EEG recording& monitoring	√			20 %
Unit 3	24 Hours	Encephalopathic conditions & patterns of EEG in encephalopathy	√			20 %
Unit 4	24 Hours	Magnetic electroencephalography	√			20 %
Unit 5	24 Hours	Advanced Nerve conduction studies	√			20 %

Recommended Books:

1) Misra UK, Kalita J. Clinical Electroencephalography. 2nd ed. New Delhi, India: Elsevier; 2018.
2) Chathurbhuj Rathore, Jagarlapudi M K Murthy, Kurupath Radhakrishnan, EEG in clinical practice, Manipal University Press,2018
3) Tatum WO, Husain A, Benbadis S, Kaplan PW. Handbook on EEG interpretation. New York, NY: Demos Medical Publishing; 2007.

ENVIRONMENTAL STUDIES

Course: VAC

Credits: 2 **No of Hours: 30 Hours**

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

CO1: Student will be able to learn about environment, factors affecting it, environmental ethics and its protection.

CO2: Student will be able to describe a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, political, health

and safety, manufacturability and sustainability

CO3: Student will be able to critically analyze technical subject matter (Written/ oral) for scientific merit apply learnt environmental knowledge and understanding to solve technical or research problems in new contexts

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Question type
Unit I	2 hrs	Multidisciplinary nature of Environmental Studies • Multidisciplinary nature of Environmental Studies Environment definition, Components of environment, Scope of environmental studies. Four spheres of earth (Hydrosphere, Atmosphere, Lithosphere and Biosphere)					
		• Concept of sustainability and sustainable development (Brundtland Commission), pillars of sustainability; Sustainable Development Goals (SDGs). • International Agreements: Montreal protocol, Kyoto protocol, Convention on Biological Diversity (CBD)	✓			5%	SE, SA
Unit II	6 hrs	Ecosystems • What is an ecosystem? Ecological units. Structure of an ecosystem; biotic and abiotic components, and	✓			10%	SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Question type
		function of an ecosystem; energy flow in the ecosystem; biogeochemical cycle, biological interactions, food chains, food webs, ecological pyramids and ecological succession. • Types of ecosystems: a. Terrestrial • Forest ecosystem – tropical evergreen, tropical deciduous, temperate evergreen, temperate deciduous and Taiga/Boreal • Grassland ecosystem – Savannas and Temperate grasslands (Steppes, Pampas, Prairies,Veldtand Downs. • Desert ecosystem – hot and dry, semi-arid, coastal and cold. Plant and animal adaptations. b. Aquatic ecosystems – Marine, Freshwater (lentic and lotic) and Estuarine; Pond as an ecosystem. • Ecosystem services					
Unit	7	Natural Resources	✓			15%	SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Question type
III	hrs	• Classification of natural resources - Renewable and Non-renewable resources • Forest resources: Uses (timber, medicinal, food, economic importance, prevent soil erosion, control floods, religious and cultural practices) and overexploitation (Deforestation, timber extraction, mining, construction of dams). • Water resources: Uses (domestic, agricultural, industrial, electricity and transport) and over utilization of surface and ground water (drying of wells, lakes and ponds, extraction of groundwater, decrease in water table, deterioration of water quality and land subsidence). Floods, Drought, dams – benefits and problems, conflicts over water (state and international) • Land resources: Land as a resource; Land degradation,					

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Question type
		earthquake, landslides, soil erosion and desertification. • Energy resources: Renewable and non-renewable energy sources, growing energy needs, use of alternate energy sources, case studies (Kochi – first solar powered airport, Tamilnadu – windmills, Gujarat – tidal energy) • Conservation of forest, water, land and energy resources.					
Unit IV	7 hrs	Biodiversity and its conservation • Introduction; Levels of biological diversity: genetic, species and ecosystem diversity; Bio geographic zones of India; Global biodiversity hotspots • India as a mega-biodiversity nation; Endangered and endemic species of India • Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological	✓			15%	SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Question type
		invasions; • Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. • Ecosystem and biodiversity services: ecological, economic, social, ethical, aesthetic and informational value. • Human wildlife conflicts in Indian – People and wildlife					
Unit V	8 hrs	Environmental Pollution Definition • Cause, effects and control measures/management of: - a. Air pollution b. Water pollution c. Soil pollution d. Light pollution e. Noise pollution f. Thermal pollution g. Radiation pollution • Pollution case studies (London smog, Bhopal gas tragedy, Beijing/Delhi air pollution, Eutrophication, Minamata disease, Exxon Valdez oil spill, Love canal tragedy, Chernobyl disaster) • Climate change, Greenhouse	✓			15%	SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Question type
		effect, Global warming, Acid rain, Ozone layer depletion. • Solid waste management: control measures of urban and industrial wastes. • Carbon footprint – How to calculate carbon footprint and ways to reduce your carbon footprint. • Human Population growth – impacts on environment • Environmental movements: Chipko movement, Bishnois of Rajasthan,Silent Valley, Narmada bachaoandolan					

❖ LE- Long Essay, SE- Short Essay, SA- Short Answer

Suggested Readings:

1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
4. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
7. McCully, P. 1996. Rivers no more: the environmental effects of dams (pp. 29-

64). Zed Books.

8. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. &Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
14. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
17. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
18. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.
19. Wilson, E. O. 2006. The Creation: An appeal to save life on earth. New York: Norton.
20. World Commission on Environment and Development. 1987. Our Common Future. Oxford University Press

FIFTH SEMESTER

ADVANCED ELECTROENCEPHALOGRAPHY II

Course: Core

Credits: 4 **No of Hours : 60 Hours**

Course Outcomes:

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

CO1.Interpret the EEG abnormalities during the record

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CO2. Understand the EEG activities during pregnancy

C03. Understand the various stages of the maturation of EEG.

COURSE CONTENT:

Unit	**Hrs**	**Content**	**Must Know**	**Good to Know**	**Desirable to Know**	**Weightage**	**Type of Question**
Unit I: EEG in obstetrics disorders	12 Hrs	1.1 Effects of Pregnancy on Epilepsy	√			20 %	LE,SE,SA
		1.2 Metabolic Changes	√				
		1.3 Stress & anxiety	√				
		1.4 Preeclampsia & Eclampsia	√				
		1.5 Stroke related to Pregnancy	√				
		1.6 Status Epilepticus	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of Question
		in pregnancy					
Unit II: Interpretation of Neonatal EEG(Ontogeny)	12 Hrs	2.1 Introduction	√			20 %	LE,SE,SA
		2.2 Technical aspects of neonatal EEG recording	√				
		2.3 Polygraph	√				
		2.4 Premature EEG and its maturation	√				
		2.5 Behavioural states and sleep-wake cycles during maturation	√				
		2.6 Common cerebral pathologies and abnormalities encountered in preterm EEG	√				
		2.7 EEG in term neonates	√				
		2.8 Continuous EEG monitoring in neonates	√				
Unit III: Normal	12	3.1 Introduction	√			20 %	LE,SE,SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of Question
EEG during wakefulness and sleep in infancy and childhood.	Hrs	3.2 Maturation of EEG Patterns during wakefulness Patterns during sleep	√				
		3.3 Clinical EEG in Seizures and Epilepsies in preterm and term neonates	√				
		3.4 Clinical EEG in seizures and epilepsies in infants to adolescents	√				
Unit IV: Focal Epileptiform patterns in childhood epilepsies	12Hrs	4.1 Introduction	√			20 %	LE,SE,SA
		4.2 Idiopathic focal epilepsy syndrome Benign childhood epilepsy with Centro-temporal spikes Idiopathic childhood occipital epilepsy of gastaut	√				
		4.3 Temporal lobe epilepsies	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of Question
		4.4 Frontal lobe epilepsies	√				
		4.5 Posterior cortex epilepsies	√				
		4.6 Hemispheric and multilobar epilepsies	√				
Unit V: EEG findings in epileptic encephalopathies	12 Hrs	5.1 Neonatal/infantile onset epileptic encephalopathy syndromes	√			20 %	LE,SE,SA
		5.2 Early myoclonic encephalopathy	√				
		5.3 West syndrome	√				
		5.4 Severe myoclonic epilepsy of infancy	√				
		5.5 Childhood onset epileptic encephalopathy syndrome	√				
		5.6 Lenox-Gastaut syndrome	√				

Recommended Books:

1. Chathurbhuj Rathore, Jagarlapudi M K Murthy, Kurupath Radhakrishnan, EEG in clinical practice, Manipal University Press,2018
2. .Misra UK, Kalita J. Clinical Electroencephalography. 2nd ed. New Delhi, India: Elsevier; 2018.

ADVANCED NERVE CONDUCTION STUDY II

Course: Core

Credits : 4 **No of Hours : 60 Hours**

Course Outcomes:

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

CO1.Perform the Repetitive nerve stimulation study on patients.

CO2. Understand the root lesions and its associated nerves

COURSE CONTENT

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
Unit I: Lumbar Plexus	15Hrs	1.1 Anatomy- Lumbar plexus nerve Femoral Saphenous Obturator Iliohypogastric and Ilioinguinal Nerves Genitofemoral nerve Lateral femoral cutaneous nerve	√			20%	LE, SE, SA

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		1.2 Anatomy-Lower lumbosacral plexus nerve Sciatic Posterior cutaneous nerve of thigh Common Peroneal superficial Peroneal Sural Tibial	√				
		1.3 Common lumbosacral plexopathies	√				
		1.4 Electrophysiological evaluations	√				
Unit II: Tarsal tunnel syndrome	8Hrs	2.1 Anatomy	√			15%	SE, SA
		2.2 Etiology, clinical and differential diagnosis	√				
		2.3 Electrophysiological evaluations and nerve conduction study	√				
Unit III: Sciatic Neuropathy	8hrs	3.1 Anatomy	√			15%	SE, SA
		3.2 Clinical and etiology	√				
		3.3 Electrophysiological evaluations and nerve	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		conduction studies.					
Unit IV: Blink Reflex	8Hrs	4.1 Anatomy	√			15%	LE, SE, SA
		4.2 Blink reflex procedure	√				
		4.3 Patterns of abnormalities	√				
Unit V : Facial and Trigeminal neuropathy	6Hrs	5.1 Anatomy	√			15%	SE, SA
		5.2 Clinical conditions and differential diagnosis	√				
		5.3 Electrophysiological evaluations and nerve conduction study.	√				
Unit VI: Repetitive nerve stimulation	15Hrs	6.1 Introduction in RNS	√			20%	LE, SE, SA
		6.2 NMJ Physiology	√				
		6.3 Variables influencing NMJ transmission	√				
		6.4 Technique of RNS	√				
		6.5 Measurement	√				
		6.6 Interpretation of RNS	√				
		6.7 Physiological modelling of RNS	√				
		6.8 Modelling slow and rapid RNS	√				
		6.9 Exercise testing	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type of questions
		6.10 Clinical application of RNS Study	√				
		6.11 Technical factors	√				

Recommended Books:

1. Misra U, Kalita J. Clinical neurophysiology
2. Preston D, Shapiro B. Electromyography and neuromuscular disorders. Philadelphia: Elsevier; 2021.

AN INTRODUCTION TO ELECTROMYOGRAPHY

Course: Core

Credits: 4 **No of Hours: 60 Hours**

Course Outcomes:

At the end of the course, students will be able to

CO1.Perform the techniques used for recording the EMG.

CO2. Understand the various myopathic changes during recording of the EMG clinically.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
Unit I: Introduction to Electromyography	8 Hours	1.1 Anatomy of muscle	√			20%	LE,SE, SA
		1.2Types of EMG needle electrodes	√				
		1.3 Recording techniques					
Unit II: Technique of Electromyography: Muscles of Upper Limb	14 HOURS	2.1 Muscles of Hands	√			25%	LE,SE, SA
		2.2 Muscles of forearm					
		2.3 Muscle of the arm					
		2.4 Muscles of the shoulder girdle and trunk					
Unit III: Techniques of Electromyography: Muscles of Lower	13 HOURS	3.1 Muscle of the foot	√			25%	LE,SE, SA
		3.2 Muscles of leg	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
limb		3.3 Muscles of thigh	√				
		3.4 Muscles of pelvic girdle neck	√				
		3.5 Muscles of face, Head and	√				
Unit IV: Principles of Electromyography	25 HOURS	4.1 Recording techniques	√			30%	LE,SE, SA
		4.2 Insertional & spontaneous activity	√				
		4.3 Motor units	√				
		4.4 Polyphasic	√				
		4.5 Jitter and blocking	√				
		4.6 SEMG	√				
		4.7 QEMG	√				
		4.8 Fasciculations and fibrillations	√				
		4.9 Macro EMG	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		4.10 Qualitative Electromyography	√				
		4.11 Motor Unit action potential	√				
		4.12 Interference Pattern	√				
		4.13 Normal and abnormal patterns	√				
		4.14 Endplate potentials	√				
		4.15 MUP	√				
		4.16 Localization techniques	√				
		4.17 Neurogenic and myopathic patterns	√				

Reference:

1. Preston D, Shapiro B. Electromyography and neuromuscular disorders. Philadelphia: Elsevier; 2021.
2. Misra U, Kalita J. Clinical neurophysiology

NERVE CONDUCTION STUDY & IONM

Course: Core

Credits: 4 **No of Hours : 60 Hours**

Course Outcomes:

At the end of the course, students will be able to

CO1.Understand the concepts of various Intraoperative techniques in patients.

CO2. Understand the surgical outcomes while performing various surgeries in the regions of the spinal cord.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	le to	Weightage	Type of question
Unit 1 :Introductionto operating room	12 hours	1.1 aseptic technique	√			20%	LE, SE, SA
		1.2 sterilization methods	√				
		1.3 operating room attire	√				
		1.4 preparation	√				
		1.5 safety	√				
		1.6 personal protective equipment	√				
		1.7 etiquette and protocol	√				
		1.8 documentation	√				
Unit 2 :Basic neurophysiologic intraoperative monitoring	12 hours	2.1 free running emg and motor nerve studies	√			20%	LE, SE, SA
		2.2 anatomy and physiology	√				
		2.3 characterization and interpretation	√				
		2.4 motor nerve conduction studies	√				
Unit 3 :Remote monitoring	12 hours	3.1 background	√			20%	LE, SE, SA
		3.2 remote connection issues	√				
		3.3 remote niom review	√				

Unit	Hrs	Content	Must Know	Good to Know	Nice to	Weightage	Type of question
		resolutions					
Unit 4 :Anesthetic considerations	12 hours	4.1 principles of anesthesia	√			20%	LE, SE, SA
		4.2 non pharmacological factors	√				
		4.3 effects of specific anasthetic agents	√				
		4.4 anesthetic technique	√				
Unit 5 : clinical methods	12 hours	5.1 vertebral column surgery	√			20%	LE, SE, SA
		5.2 spinal cord injury	√				
		5.3 lumbosacral surgery	√				
		5.4 peripheral nerve surgery	√				
		5.5 cerebello pontine angle surgery	√				
		5.6 thoracic aortic surgery	√				
		5.7 carotid surgery	√				
		5.8 epilepsy surgery	√				
		5.9 instrumentation for intr-operative monitoring (IONM)	√				
		5.10 precautions to be taken during IONM	√				
		5.11 electrode placements, stimulation parameters for the recording, brachial plexus, dorsal column, cranial nerves, peripheral nerves & brain stem nuclei.	√				
		5.12 somatosensory evoked potentials for aneurysm surgery,spinal cord surgery	√				

Recommended Books:

1. Preston D, Shapiro B. Electromyography and neuromuscular disorders. Philadelphia: Elsevier; 2021.
2. A Practical Approach to Neurophysiologic Intraoperative Monitoring Edited by Aatif M. Husain, MD Department of Medicine (Neurology) Duke University Medical

CLINICAL NEUROSCIENCE TECHNOLOGY III

Course: SEC

Credits: 2 **No of Hours: 120 Hours**

Course Outcomes:

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

CO 1: The student gains basic practical skill in handling the advanced basic neurodiagnostic procedures.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage
Unit I:	15 Hours	EEG activities during pregnancy	√			10%
Unit II:	15 Hours	Neonatal EEG monitoring	√			10%
Unit III:	15 Hours	EEG changes in Epilepsy in neonates	√			10%
Unit IV:	15 Hours	EEG changes in encephalopathy in neonates	√			20%
Unit V:	15 Hours	Upper & Lower extremity nerve conduction studies	√			20%

Unit VI:	15 Hours	Repetitive nerve stimulation	√			10%
Unit VII:	15 Hours	Facial and trigeminal nerve conduction studies & Blink reflex.	√			10%
Unit VIII:	15 Hours	Principles, Technique & Electrodes in Electromyography	√			10%

Recommended Books:

1.Misra UK, Kalita J. Clinical Electroencephalography. 2nd ed. New Delhi, India: Elsevier; 2018.

2.Chathurbhuj Rathore, Jagarlapudi M K Murthy, Kurupath Radhakrishnan, EEG in clinical practice, Manipal University Press,2018

3.Tatum WO, Husain A, Benbadis S, Kaplan PW. Handbook on EEG interpretation. New York, NY: Demos Medical Publishing; 2007

BIOSTATISTICS

Course: AEC

Credits: 2 **No of Hours: 30 Hours**

Course Outcomes:

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

CO 1: Understand the concepts of Statistics in the field of Health Professionals.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Question
Unit I	3 hours	**Introduction** 1.1 Meaning, definition of statistics. 1.2 Importance of the study of statistics. 1.3 Branches of statistics. 1.4 Statistics and health science including nursing. 1.5 Parameters and estimates. 1.6 Descriptive and inferential statistics. 1.7 Variables and their types. 1.8 Measurement scales		√		15%	SA, SE
Unit II	3 hours	**Tabulation of Data** 2.1 Raw data, the array, frequency distribution 2.2 Basic principles of graphical representation 2.3 Types of diagrams - histograms, frequency polygons, smooth frequency polygon, cumulative frequency	√			15%	SA, SE

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Question
		curve, ogive. 2.4 Normal probability curve.					
Unit III	4 hours	**Measure of Central Tendency** 3.1 Need for measures of central tendency 3.2 Definition and calculation of mean - ungrouped and grouped 3.3 Meaning, interpretation and calculation of median ungrouped and grouped 3.4 Meaning and calculation of mode. 3.5 Comparison of the mean, and mode.	√			15%	LE, SE
Unit IV	6 hours	**Measure of Variability** 4.1 Need for measure of dispersion. The range, the average deviation. 4.2 The variance and standard deviation. 4.3 Calculation of variance and standard deviation ungrouped and grouped. 4.4 Properties and uses of variance	√			15%	LE, SE

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Question
Unit V	6 hours	**Probability and Standard Distributions** 5.1 Meaning of probability of standard distribution. 5.2 The Binominal distribution. 5.3 The normal distribution. 5.4 Divergence from normality - skewness, kurtosis.	√			15%	SA, SE
Unit VI	5 hours	**Sampling Techniques** 6.1 Need for sampling - Criteria for good samples. 6.2 Various sampling designs. 6.3 Procedures of sampling and sampling designs errors. 6.4 Sampling variation. 6.5 Tests of significance.	√			15%	LE, SA, SE
Unit VII	3 hours	**Health Indicator** 7.1 Importance of health Indicator. 7.2 Indicators of population, morbidity, mortality, health services. 7.3 Calculation of rates and rations of health.		√		10%	SA, SE

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SIXTH SEMESTER

YENEPOYA
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EVOKED POTENTIALS

Course: Core

Credits: 4 **No of Hours: 60 Hours**

Course Outcomes:

At the end of the course, students will be able to

CO1.Perform various Evoked potential l tests in neuro electrophysiology lab.

CO2. Gain knowledge on the instrumentation parameters used while recording the Evoked potentials.

COURSE CONTENT:

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
Unit I	05	1.1 Definition	√			10	SA
		1.2 Principles of averaging/recording techniques	√				
		1.3 Instrumentation.	√				
		1.4 Signal to noise ratio	√				
		1.5 Frequency response	√				
		1.6 Internal noise	√				
Unit II	08	2.1 Introduction	√			10	LE, SE, SA
		2.2 Patient preparation	√				
		2.3 Factors affecting	√				
		2.4 Auditory pathway	√				
		2.5 Normal values and waveform limitations	√				

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOODTO KNOW	DESIRABLE TOKNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		2.6 Clinical conditions	√				
UnitIII	05	3.1 Practice	√			10	SE,SA
		3.2 Methodological considerations	√				
		3.3 Maturation of BAEP	√				
		3.4 Clinical application of BAEP in Paediatrics.	√				
Unit IV	06	4.1 Introduction	√			10	LE, SE, SA
		4.2 Patient preparation	√				
		4.3 Factors affecting	√				
		4.4 Visual pathway	√				
		4.5 Normal values and waveform limitations	√				
		4.6 Clinical conditions	√				
Unit V	05	5.1 Methodology	√			10	LE, SA
		5.2 Maturation of VEP	√				
		5.3 Measurement of VEP	√				
		5.4 Clinical Applications	√				
Unit VI	10	6.1 Anatomical and Physiological Basis of SSEP	√			15	LE, SA
		6.2 Median SSEP	√				
		6.3 Tibial SSEP	√				

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
		6.4 Reproducibility of SEP	√				
		6.5 Patient Related Factors	√				
		6.6 Clinical Applications of SSEP	√				
		6.7 Surgical Monitoring	√				
Unit VII	05	7.1 Practice	√				
		7.2 Methodological considerations	√			10	SE, SA
		7.3 Maturational Changes	√				
		7.4 Clinical Applications	√				
Unit VIII	10	8.1 Anatomy & Physiology of Corticospinal tract	√				
		8.2 Physiological basis of Motor Evoked Potential	√				
		8.3 Methods of Motor Evoked Potentials	√			15	LE, SE
		8.4 Comparison of electrical and magnetic stimulation	√				
		8.5 Clinical Applications	√				
Unit IX	06	9.1 P3	√				
		9.2 Waveform identification & Measurement	√				
		9.3 Variables affecting P3	√			10	SE, SA
		9.4 Generators of P3	√				

Recommended Books:

1. Misra U, Kalita J. Clinical neurophysiology
2. Preston D, Shapiro B. Electromyography and neuromuscular disorders. Philadelphia: Elsevier; 2021

POLYSOMNOGRAPHY & AUTONOMIC LAB

Course: Core

Credits: 4 **No of Hours: 60 Hours**

Course Outcomes:

At the end of the course, students will be able to

CO1.Interpret the EEG changes associated during sleep.

CO2. To perform the Polysomnography on patients with sleep or respiratory related problems.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
Unit I: Sleep medicine and polysomnography	15 Hours	1.1 Anatomy of sleep sleep apnea	√			20%	LE,SE,SA
		1.2 Medical disorders of sleep	√				
		1.3 Insomnia	√				
		1.4 Obstructive	√				
		1.5 Central sleep apnea	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		1.6 Mixed apnea	√				
		1.7 Hypopnea	√				
		1.8 sleep disorders in elderly	√				
		1.9 Narcolepsy and related disorders	√				
		1.10 REM sleep disorders	√				
		1.11 RERA	√				
		1.12 AHI	√				
		1.13 CPAP	√				
		1.14 BiPAP	√				
Unit II: Stages of sleep & sleep Patterns	10 Hours	2.1 Stages of Sleep	√			10%	SE,SA
		2.2 Waveforms	√				
		2.3 K complex	√				
		2.4 POST	√				
		2.5 Sleep spindles	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		2.6 VST	√				
Unit III: Polysomnography	10 Hours	3.1 Introduction	√			25%	LE,SE,SA
		3.2 Normal adult PSG	√				
		3.3 Sleep center environment	√				
		3.4 Recording parameters	√				
		3.5 Audio and video recording	√				
		3.6 Biocaliberations	√				
		3.7 Multiple sleep latency test	√				
		3.8 PLMS & RLS	√				
Unit IV: Paediatric PSG	15 Hours	4.1 Introduction	√			25%	LE,SE,SA
		4.2 Diseases	√				
		4.3 Apnea	√				
		4.4 OSA	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		4.5 Gastroesophageal reflex	√				
		4.6 Nocturnal Seizures	√				
		4.7 PLMD (Periodic Limb movement disorders	√				
		4.8 SIDS	√				
		4.9 Sleep center environment	√				
		4.10 Recording parameters	√				
		4.11Capnography	√				
		4.12 Audio and video recording	√				
		4.13Paediatric montages	√				
		4.14Biocaliberations.	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
Unit V: Autonomic Nervous system	10 Hours	5.1 Anatomical & Functional Basis	√			20%	LE,SE,SA
		5.2 Autonomic Function Tests	√				
		5.3 Sympathetic skin response	√				
		5.4 R-R analysis	√				
		5.5 Valsalva maneuver	√				
		5.6 Tilt table	√				
		5.7 Heart rate variability	√				

Recommended Books:

1. Chathurbhuj Rathore, Jagarlapudi M K Murthy, Kurupath Radhakrishnan, EEG in clinical practice, Manipal University Press,2018

2. Misra UK, Kalita J. Clinical Electroencephalography. 2nd ed. New Delhi, India: Elsevier; 2018.

ADVANCED ELECTROMYOGRAPHY

Course: Core

Credits: 4 **No of Hours: 60 Hours**

Course Outcomes:

At the end of the course, students will be able to

CO1.Perform Electromyography studies in ICU settings.

CO2. Interpret the instrumentation settings used while performing EMG.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
Unit I: Single Fiber Electromyography	12 Hrs	1.1 Introduction	√			20 %	LE,SE,SA
		1.2 Methods of SFEMG	√				
		1.3 SFEMG in Neurologic disease	√				
		1.4 Neuromuscular Transmission Disorders	√				
		1.5 SFEMG in Neurogenic Disorders	√				
		1.6 SFEMG in Myopathies	√				
		1.7 Macro- EMG	√				
Unit II: Disorders affecting NMJ	12 Hrs	2.1 ALS	√			20 %	SE,SA
		2.2 Myopathy	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
junction		2.3 Myotonia	√				
		2.4 Dystonia	√				
		2.5 Muscular dystrophies	√				
		2.6 DMD	√				
		2.7 Polymyositis	√				
		2.8 Anterior Poliomyelitis	√				
		2.9 Wilson's disease	√				
		2.10 Deep tendon reflex	√				
Unit III: Myopathy	12 Hrs	1.1 Introduction	√			20 %	SE,SA
		1.2 Clinical	√				
		1.3 Electrophysiological evaluations- Electromyographic approach	√				
		1.4 Clinical and electrophysiological patterns in selected myopathies	√				
		1.5 Myotonic muscle disorders and periodic paralysis syndromes	√				
		1.6 Muscle cooling	√				
		1.7 Dystrophic myotonic muscle disorders	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		1.8 Nondystrophic myotonic muscle disorders and periodic paralysis syndromes	√				
		1.9 Other conditions associated with myotonia	√				
Unit IV: Electromyography in special clinical discharges	12 Hrs	4.1 Approach to Electro diagnostic studies in ICU	√			20 %	LE,SE,SA
		4.2 Introduction	√				
		4.3 Differential diagnosis of neurological weakness in ICU	√				
		4.4 Electrodiagnostic patterns in ICU	√				
		4.5 Nerve conduction and electromyographic protocol in ICU setting.	√				
Unit V: Approach to pediatric electromyography	12 Hrs	1.1 Neuromuscular diagnosis in children	√			20 %	LE,SE,SA
		1.2 Maturation issues	√				
		1.3 Technical issues	√				

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Types of Questions
		1.4 Patient safety in EMG	√				

Recommended Books:

1. Preston D, Shapiro B. Electromyography and neuromuscular disorders. Philadelphia: Elsevier; 2021.
2. Misra U, Kalita J. Clinical neurophysiology

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CLINICAL NEUROSCIENCE TECHNOLOGY IV

Course: SEC

Credits: 4 **No of Hours: 60 Hours**

Course Outcomes:

At the end of the course, students will be able to

CO1.The student gains basic practical skill in handling the advanced basic neurodiagnostic procedures.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage
Unit I:	15 Hours	Special Techniques in Nerve conduction study including Autonomic Function tests	√			10 %
Unit II:	15 Hours	Conducting Intra operative neuro monitoring procedures by eliminating artifacts and obtaining a proper recording	√			10 %
Unit III:	15 Hours	Evoked Potentials & its Instrumentation and procedure	√			20 %

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage
Unit IV:	15 Hours	Polysomnographic studies	√			20 %
Unit V:	15 Hours	Sleep activities during polysomnographic studies	√			10 %
Unit VI:	15 Hours	Polysomnographic studies In Children	√			10%
Unit VII:	15 Hours	Electromyography in Children	√			10 %
Unit VII:	15 Hours	Electromyography in ICU setting	√			10 %

Recommended Books:

1.Misra UK, Kalita J. Clinical Electroencephalography. 2nd ed. New Delhi, India: Elsevier; 2018.

2.Chathurbhuj Rathore, Jagarlapudi M K Murthy, Kurupath Radhakrishnan, EEG in clinical practice, Manipal University Press,2018

3.Tatum WO, Husain A, Benbadis S, Kaplan PW. Handbook on EEG interpretation. New York, NY: Demos Medical Publishing; 2007

MEDICAL ETHICS

Course: VAC

Credits: 2 **No of Hours: 30 Hours**

Course Outcomes:

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

CO1: Increasing the awareness and knowledge of students of the value dimensions of interactions with the patients, colleagues, relations andpublic.

CO2: Fostering the development of skills of analysis, decision making and judgment.

CO3: Making the students aware of the need to respect the rights of the patient.

COURSE CONTENT:

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type Of Questions
Unit I	3hr	**Introduction to ethics** What is ethics, what are values and norms, freedom and personal responsibility?	√			15%	SA, SE
Unit II	4hrs	**Definition of medical ethics** Major principles of medic ethics.	√			20%	LE, SA
Unit III	4hrs	**Perspective of medical ethics** The Hippocratic oath, The Declaration of Helsinki, The WHO Declaration of Geneva, International code of	√			15%	LE, SA, SE

Unit	Hrs	Content	Must Know	Good to Know	Desirable to Know	Weightage	Type Of Questions
		Medical Ethics (1993), Medical Council of India Code of Ethics (2002).					
Unit IV	4hrs	**Ethics of the individual**Truth and confidentiality, the concept of disease, health and healing, theRighttohealth.	√			15%	SE
Unit V	3hrs	**The ethics of human life** Prenatal sex determination.	√			15%	SA, SE
Unit VI	4hrs	**The family and society in medical ethics** Euthanasia, cancer and terminal care.		√		10%	LE, SA
Unit VII	4hrs	**Death and dying** Use of life-support systems, the right to die with dignity, suicide–the Ethical outlook.		√		05%	LE, SA, SE
Unit VIII	4hrs	**Professional Ethics** Contract and confidentiality, malpractice and negligence.		√		05%	SA, SE

- **Recommended Books:**

1. Tsai DF. The WMA medical ethics manual. Journal of Medical Ethics. 2006 Mar 1;32(3):163 Loewy EE, Loewy RS. Textbook of healthcare ethics. Springer Science & Business Media; 2004 Jun 29.

INTERNSHIP (SEMESTER VII &VIII)

ELIGIBILTY:

A candidate should have passed in all the courses (Core, AECC and Electives) amounting to 138 number of credits before entering in to internship.

DURATION:

A candidate has to mandatorily complete 1 year (2 semesters) of internship. The total credit per semester is 20 and for two semesters it is 40.

OBJECTIVES:

1. Be able to develop skills to provide comprehensive eye examination
    a. To acquire knowledge on ocular structures, its functions and pathological changes
    b. To carryout ophthalmic investigations
    c. To impart knowledge with regard to common eye diseases
    d. To impart knowledge on treatment modalities from the perspective of counselling
    e. To acquire knowledge about the referral guidelines for ocular and systemic conditions.
2. Be able to correct refractive error and provide spectacle prescription
3. Be able to fit, evaluate, prescribe and dispense contact lenses for refractive correction and other ocular conditions
4. Be able to assess the low vision and provide comprehensive low vision care.
5. Be able to do complete binocular vision assessment, manage non-strabismic binocular vision anomalies and refer condition which warrants surgery
6. Be able to assess the visual demands for various occupations and match it to the visual capabilities. Also be able to advice on eye safety wear for various occupations.
7. Have knowledge and skill for early detection of various ocular conditions and pathologies – Refractive error, Strabismus, Cataract, Diabetic retinopathy, Glaucoma etc.

Learning Outcomes

Sl. No.	Learning Outcomes	Knowledge	Application/Evaluation
1.	Develop skills on various Neurological examination	Knowledge on Neurological structures, its functions and pathological changes	Determines tests and Procedures to the patient's neurological condition, and performs the tests and arrange follow ups on the basis of findings.
2.	Develop skills in performing Qualitative History taking before comprehensive evaluation.	Able to Collect and review background information relevant to the patient's health before performing the Neurological Evaluations.	Develop Rapport to obtain history and current health status.
3.	Develop skills on Conducting Electrophysiological Tests	Knowledge on Conducting Neuro-electro-physiological devices	Performs the tests, Determines and responds properly for the appropriate Neurological findings obtained.
4.	Acquiring skills on complete Electroencephalography evaluation & Nerve Conduction studies	Knowledge on Performing & Reporting Electroencephalography or Nerve conduction testes	Performs various Electroencephalographies& Nerve conductions in accordance to the patients condition
5.	Develop skills to manage and learn about the neurological examinations done on various patients	Knowledge on Neurological diseases and requirements in Various Occupations.	Evaluates and Also be able give to advice on the condition of Neurological diseases

6.	Developing skills and knowledge in analyse various patients with various Neurological conditions	Knowledge and skill for early detection of various neurological conditions and pathologies	Complete comprehensive history taking and evaluations of various ocular conditions and guidance to the patient on further follow ups.

INTERNSHIP TRAINING RULES AND CODE OF CONDUCT

1. The duration of the internship shall be a minimum of one year or 2 semesters (8 hours of practice a day, totaling to 36 credits).

2. The Interns shall be entitled for 12 day total leave on any account during the entire period of Internship and no other leave shall be permissible.

3. The candidate is expected to work for minimum 8 hours per day and this may be more depending on the need and the healthcare setting.

4. If the period of leave exceeds the sanctioned limit, Internship is liable to be extended at the discretion of the authority. In case of Emergency any additional leave asked for shall be discretion of the authority and will be doubled.

5. The attendance of all the interns shall be marked/monitored by the respective Clinical coordinator and concerned HOD, by maintaining the intern's attendance register. All the interns are directed to mark their attendance, by putting their full initials (specimen signature to be given to the Clinical coordinator).

6. Interns shall observe duties as per the roaster devised by the department, and no change in duty shall be permissible without the permission of clinical coordinators Interns shall be courteous, polite, respectful and sympathetic towards the patients, their accompanying attenders, hospital staff and their colleagues.

7. Intern shall maintain decorum and commitment and discipline of the profession and show

keen interest in patient care.

8. The interns will be entrusted with clinical responsibilities under supervision of the senior Technician/Technologist and are expected to discharge the duties assigned to them sincerely & effectively.

9. Aprons/scrubs & ID is mandatory while reporting to the Hospital and always carry the required articles needed for examination of the patients. A fine of Rs.500/- will be charged from the interns not using white coat/scrubs and identification card during their duty in the Hospital.

10. Scrubs should be worn inside the campus only. If found outside, a fine of Rs 500/- will be charged.

11. The performance shall be assessed based on the assessment sheet provided in the Log Book.

12. Maintains safe and clean working environment by complying with procedures, rules, and regulations.

13. Provides continuous of care by developing and implementing patient-management plans.

14. Each semester of Internship shall be minimum of 18 credits. The credits are calculated based on 1 credit = 3 to 5hoursofpractical training. There shall be an exit exam at the end of the each semester.

INTERNSHIPCOMPLETION

The student should score minimum 50% marks to be eligible for the Internship completion certificate.

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ANNEXURES

List of Annexures:

- ANNEXURE – I: Question Paper Layout for Internal Assessment and Semester end Examination of Theory Examination (Core)
- ANNEXURE – II: Question Paper Layout for Internal Assessment and Semester end Examination of Theory Examination (AEC & VAC)
- ANNEXURE – III: Internship Competency Checklist
- ANNEXURE – IV: Internship Assessment and Evaluation Format
- ANNEXURE – V: Logbook Format

ANNEXURE – I

Model Question Paper for theory of Internal assessment & Semester end Examination

I Semester B.Sc. Neuroscience Technology

Time: 2 Hours Max. Marks: 50 Marks

SUBJECT NAME:

Q.P Code:

Your answer shall be specific to question asked.

Draw neat and labeled diagrams wherever necessary.

LONG ESSAY (Answer any One) **(1x10=10Marks)**

1.

2.

SHORT ESSAY (Answer any Five) **(5x4=20Marks)**

3.

4.

5.

6.

7.

8.

9.

SHORT ANSWERS (Answer any Ten) **(10x2=20Marks)**

10.

11.

12.

13.

14.

15

16.

17.

18.

19.

20.

21.

ANNEXURE – II

YENEPOYA
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Model Question Paper of theory for Internal assessment and Semester end Examination of AEC & VAC

I Semester B.Sc. Neuroscience Technology

Time: 2 Hours **Max. Marks: 25 Mark**

Subject name

Q.P Code:

Your answer shall be specific to question asked.

Draw neat and labeled diagrams wherever necessary.

LONG ESSAY (Answer any Three) (3x5=15Marks)

1.
2.
3.
4.
5.

SHORT ANSWERS (Answer any Five) **(5x2=10Marks)**

6.
7.
8.
9.
10.
11.
12.

YENEPOYA
(DEEMED TO BE UNIVERSITY)

Model Question Paper of theory for Internal assessment and Semester end Examination of AEC & VAC

I Semester B.Sc. Neuroscience Technology

Time: 2 Hours **Max. Marks: 50 Marks**

Subject Name

Q.P Code:

Your answer shall be specific to question asked.

Draw neat and labeled diagrams wherever necessary.

LONG ESSAY (Answer any One) **(1x10=10Marks)**

1.

2.

SHORT ESSAY (Answer any Five) **(5x4=20Marks)**

3.

4.

5.

6.

7.

8.

9.

SHORT ANSWERS (Answer any Ten) **(10x2=20Marks)**

10.

11.

12.

13.

14.

15

16.

17.

18.

19.

20.

21.

ANNEXURE III

Internship Competency Checklist

COMPETENCYCHECKLIST:

Clinical posting area: Clinical Coordinator:

Duration (From):---------- Signature:

(To):.....

Clinical Skills	Complete	Incomplete	NA
Participation / Observation record			
Patient preparation & consent			
Infection control & electrical safety			
Equipment handling & calibration			
Artifact identification & troubleshooting			
Routine EEG recording			
EEG electrode placement (10–20 system)			
Activation procedures (HV, Photic)			
Video / Long-term EEG assistance			
Motor nerve conduction study			
Sensory nerve conduction study			
F-wave & H-reflex studies			
Recognition of basic			

EMG patterns			
Visual Evoked Potentials (VEP)			
Brainstem Auditory Evoked Potentials (BAEP)			
Somatosensory Evoked Potentials (SSEP)			
Pediatric neurodiagnostic assistance			
ICU / bedside EEG assistance			

ANNEXURE – IV

Internship Assessment and Evaluation Format

CLINICAL EVALUATION:

Quality and Quantity of Work:

Quality and Quantity of work	**Poor** **(1)**	**Good** **(2)**	**VeryGood** **(3)**	**Excellent** **(4)**	**Remarks**
1.Towhatextenthasthequalityofintern'swork Matched the responsibilities given?					
2.How thorough and complete has the intern's work been?					
3. How successful has the intern been in meeting the requirements with respect to the amount of work within the time allocated?					
4.Defineinquantity(list)work done: 1. 2. 3. 4.					

Knowledge of work and working abilities evaluation:

Knowledge of work and working abilities	Poor (1)	Good (2)	Very Good (3)	Excellent (4)	Remarks
1.To what extent does the intern demonstrate capability of using scientific facts and skills as a Basis for his/her performance?					
2.To what extent does the intern demonstrate a desire to learn more than just routine aspects of The prescribed work?					
3. To what extent does the intern adjust to new work methods and conditions?					
4. How effective has the intern been in planning and organizing his/her work?					
5.How effectively does the intern communicate in speech and writing					
6.To what extent does the intern accept the maximum responsibilities for his work and Volunteer for new assignments?					
7. How effective has the intern been in establishing a working relationship?					
8.To what extent is the intern receptive to new ideas and information?					

General Performance	Poor (1)	Good (2)	Very Good (3)	Excellent (4)	Remarks
1.To what extent has the intern been punctual and complied with the working hours of the institution?					
2. How effective has the intern been in following departmental policies and procedures?					
3. How effective were the intern's attitudes towards other members of the health care team?					

ClinicalEvaluation

Thetotalpointsacquiredwillbecalculatedforthe15componentsandthepointsacquiredoutof60markswillbenormalisedto 50 marks for grading.

CasePresentation

Slidepreparationandexplanationskill	5marks
NeurologicalcareManagement	10marks
Reasoningskills/newupdates	10marks
TotalMarks	25marks

- **RUBRICSFORCLINICALEVALUATION:**

Skills	Marks
ClinicalEvaluation	50marks
CasePresentation	25marks
Log Book	25marks
TotalMarks	100marks

ANNEXURE – V

YENEPOYA
(DEEMED TO BE UNIVERSITY)

YENEPOYA
(DEEMED TO BE UNIVERSITY)

YENEPOYA SCHOOL OF ALLIED HEALTH SCIENCES

Constituent unit of Yenepoya **(Deemed to be University)**
University Road, Deralakatte, Mangaluru – 575018

ACCREDITED WITH GRADE A+ NAAC

LOG BOOK - CLINICAL TRAINING

Bachelor of Science in Neuroscience Technology (B.Sc. NST)

Name :

Reg. No. :

Academic Year :

YENEPOYA SCHOOL OF ALLIED HEALTH SCIENCES

Constituent Unit of **Yenepoya (Deemed to be University)**

Academic Details

Name: _____

Register ID: _____

Campus ID : _____

Semester : _____

Batch : _____

Academic Year : _____

Name of the Centre : _____

Signature of Student

Programme Coordinator

YENEPOYA
(DEEMED TO BE UNIVERSITY)

YENEPOYA SCHOOL OF ALLIED HEALTH SCIENCES

Constituent Unit of **Yenepoya (Deemed to be University)**

CERTIFICATE

This is to certify that the candidate Mr/Ms……

Reg.No ……..……., admitted in the year ……to the Yenepoya School of Allied Health Sciences, a constituent college of Yenepoya (Deemed to be University) has satisfactorily completed the requirements mentioned in this logbook for ……Semester, B.Sc. Neuroscience Technology during the period from …… to……...

CLINICAL COORDINATOR **PROGRAMME COORDINATOR**

YENEPOYA
(DEEMED TO BE UNIVERSITY)

YENEPOYA SCHOOL OF ALLIED HEALTH SCIENCES

Constituent Unit of **Yenepoya (Deemed to be University)**

GENERAL INSTRUCTIONS

1)The logbook is a record of the clinical activities of the student,who would beresponsible for maintaining his/her logbook.

2) It is the responsibility of the student to enter the training details, which is required to be verified by the Clinical Supervisor daily.

3) The Programme Coordinator will scrutinize/verify that the training is as per the Specific Learning Objectives.

4) The logbook is a record containing the students':

- Overall participation & performance.
- Clinical training attendance.
- Acquisition of required competencies and skills.
- Acquiring the specific learning outcome.



COURSE-SPECIFIC LEARNING OBJECTIVES

AIM

To impart students to perform and interpret electrophysiology procedures. The students willacquire skills to assess the patient and plan various electrodiagnostic procedures and implement them.

OBJECTIVES

At the end of the course the student shall be able to:

- Function as competent entry level Neuroscience technologists
- Demonstrate the ability to use theoretical knowledge and critical thinking skills in clinical practice
- Perform and report Electrodiagnostic test
- Provide patient care before, during and after the procedures
- Operate and maintain equipment
- Understand the various diagnostic and therapeutic modalities based on the patient's history and examination findings
- Perform Sleep studies, Autonomic function tests, Presurgical evaluation of epilepsy EEG (including Neonatal and long-term monitoring), Nerve conduction studies, Electromyogram, Visual evoked potential, Brainstem auditory evoked potential, Somatosensory evoked potential & Sleep studies.
- Assist physicians with Electromyographic procedures
- Demonstrate effective oral and written communication skills.
- To demonstrate and provide proper electrodiagnostic reports.

AREAS OF POSTINGS

1) NEUROPHYSIOLOGY LAB – ELECTROENCEPHALOGRAPHY

SPECIFIC LEARNING OUTCOME

- Practical skill in handling EEG and nerve conduction studies.
- To learn EEG and its techniques used for treatment.
- To Differentiate between normal EEG and EEG with artifacts.
- To Differentiate between Epileptiform and normal EEG patterns.
- Understand the stimulating procedures in EEG
- To understand the various epileptiform patterns associated to certain regions of brain.
- Gain knowledge on encephalopathic changes associated with EEG
- Gain knowledge on the recording of EEG in various settings.

2) NEUROPHYSIOLOGY LAB – NERVE CONDUCTIVE STUDIES/ELECTROMYOGRAPHY/EVOKED POTENTIALS

SPECIFIC LEARNING OUTCOME

- To learn the different recording techniques in nerve conduction tests.
- To understand the difference between various lesions affecting nervous system.
- To learn the conduction studies of the different nerve entrapment neuropathies.
- To understand the various radiculopathies associated to various regions of spinal cord.
- Understand the correlation between the pathological aspects with neuroelectrophysiology.
- Understand the difference between neuropathies and radiculopathies
- Gain knowledge on performing nerve conduction study on different entrapment syndromes.

DETAILS OF CLINICAL TRAINING

SI. No.	Reported on	Departments	Completed on	Remarks	Signature of the Clinical Supervisor

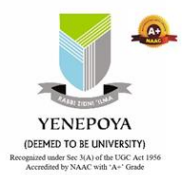
CLINICAL COORDINATOR

DAILY EVALUATION

NERVE CONDUCTION/EVOKED POTENTIALS/ELECTROMYOGRAPHY

NAME OF THE PATIENT			
S.NO		MONITORED /HANDS ON	
OP/IP NO.		DATE	
AGE/SEX		TECHNOLOGIST	
Patient History			
Clinical Diagnosis			
Medications			
Neurophysiological findings:			
Impression:			

SIGNATURE OF THE FACULTY INCHARGE



DAILY EVALUATION

NAME OF THE PATIENT			
S.NO		MONITORED /HANDS ON	
OP/IP NO.		DATE	
AGE/SEX		TECHNOLOGIST	
ID.NO			
Patient History			
Clinical Diagnosis			
Medications			
Electroencephalographic findings:			
Impression:			

SIGNATURE OF CO-ORDINATOR