

Communication Sciences

Semester I
22BASC
01

Hours of Instruction/week: 3+2

No of Credits: 3

Objectives:

- To understand the basic concepts in speech, hearing, language and communication.
- To understand the basic concepts of hearing sensitivity and acoustics
- To acquire knowledge about historic aspects of audiology and speech language pathology

Part A-Speech Language Pathology

Unit I Speech, language and communication 1

- Definitions of speech, language, communication, and their components 5
- Distinctions, similarities and functions of communication, speech and language
- Speech as an overlaid function
- Speech chain
- Normal development of speech & language
- Pre-requisites and factors affecting speech-language development
- Cultural and linguistic issues in communication; bi/multilingual issues

Unit II: Bases of speech and language 1

- Overview of speech production – speech sub-systems 5
- Speech mechanism as a sound generator, vocal tract, periodic and aperiodic sounds
- Acoustic theory of speech production
- Social, cognitive, neurological, and genetic bases of speech and language

Part B-Audiology

Unit III Sound intensity and concept of decibel 1

- Acoustic energy and power, absolute and relative units. 5
- Importance of reference sound intensity and intensity levels.
- Absolute and relative measurements and bel and decibels, sound pressure and decibel sound pressure levels.
- Relationship between intensity and pressure characteristics and application of decibels

Unit IV Audibility and Hearing. 1

- Hearing range –intensity and frequency 5
- Up-down and staircase procedure of estimating minimum audible levels
- Minimum audible pressure and field, Missing six dB and related issues
- Reference equivalent threshold sound pressure levels and hearing levels
- Sensation levels, Threshold of pain, Most comfortable levels

Unit V Introduction to Audiology and Speech Language	1
Pathology Part A: Speech and language	5
<ul style="list-style-type: none"> ☐ Historical aspects of the field of speech-language pathology ☐ Development of speech and language pathology: Indian and global context ☐ Scope of practice in speech-language pathology Interdisciplinary nature of speech-language pathology 	
Part B: Audiology	
<ul style="list-style-type: none"> ☐ Audiology – historical aspects, development of instrumentation in audiology ☐ Development of audiology: Indian and global context ☐ Branches of audiology ☐ Scope of audiology 	
Total Hours	7
	5

Recommended Books:

1. Bordon, G J., Harris, K S., & Raphael, L J. (2006). Speech science primer: Physi acoustics, & perception of speech. Lippincott-Williams & Wilkins.
2. SubbaRao, T A. (1992). Manual for developing communication skills. NIMH. ISBN: 81-86594-03-5
3. Speaks, C. E. (1999). Introduction to Sound: Acoustics for the Hearing and Speech Sciences (3 edition). San Diego: Cengage Learning.
4. Martin, F. N., & Clark, J. G. (2014). Introduction to Audiology (12 edition). Boston: Pearson.
5. Gelfand, S. A. (2009). Hearing: An Introduction to Psychological and Physiological Acoustics (5 edition). London: CRC Press.
6. Khara L. Pence, T., Laura M. & Justice (2011). Language Development: From Theory to Practice (2nd Ed.), Allyn & Bacon Communication Sciences and Disorders
7. Webb, W. G., & Adler, R. K. (2008). Neurology for the speech-language pathologist (5th Ed.). St. Louis, Mo: Mosby/Elsevier.

Course Outcomes: On the successful completion of the course, students will be able to

1. Understand the basic concepts of speech and hearing, the importance and development of speech and the factors affecting it.
2. Acquire knowledge about production of speech and its subsystems.
3. Gain knowledge about the basic units of acoustics, relationship, characteristics and its applications.
4. To obtain Hearing ranges and its procedures.
5. To know about Historical aspects, development and scope of speech and hearing.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
CO 1	M	L	H	H	M	L	M	H		M	M	H	H	L
CO 2	H		M	M	L	L	L	H	L	L	M	H	H	
CO 3	H	M	L	L	M		M	H		L	L	H	H	L
CO 4	H	M		L		M		H			L	H	M	
CO 5	M	M	L		L	L	L	M	M	H	M	M	L	

Anatomy and Physiology of Speech and Hearing

Semester

I

22BASC

02

Hours of Instruction/week:

5

No of Credits: 3

Objectives:

- To understand the anatomy of the auditory system and speech mechanism
- To obtain knowledge about physiology of hearing mechanism
- To acquire knowledge about functioning of speech and swallowing mechanism

Unit I Introduction

15

- General anatomical terms
- Anatomical positions and planes of reference
- Cells, tissues and muscles
- Muscle connection and joints
- Tissue - vascular and neural

Unit II Embryology

15

- Basic terminologies related to embryology
- Development of external ear
- Development of middle ear
- Development of Inner ear and the auditory system
- Five examples of embryonic anomalies affecting speech-language & hearing
- Development of respiratory structures
- Development of larynx
- Development of facial region and palate
- Development of tongue and teeth

- Mechanisms of breathing with emphasis on speech breathing
- Supportive frame work of larynx
- Anatomy of larynx
- Anatomy of oesophagus
- Brief mechanisms of swallowing
- Mechanisms of phonation
- Anatomy of articulators and associated structures
- Contribution of articulatory structures to speech production
- Anatomy of resonatory mechanisms
- Contribution of resonatory mechanisms to speech production

Unit IV: Anatomy and Physiology of External and middle ear.

- Anatomy of the external ear 1
- Physiology of external ear including localization 5
- Head shadow effect, inter-aural intensity and time differences
- Brief anatomy of temporal bone
- Anatomy of tympanic membrane and associate structures
- Anatomy of middle ear and ossicles
- Anatomy of eustachian tube and its middle ear muscles
- Physiology of eustachian tube
- Middle ear transformer function
- Physiology of middle ear muscles

Unit V: Anatomy and physiology of labyrinth

- Anatomy of bony and membranous labyrinth 1
- Macro anatomy of cochlea 5
- Micro anatomy of cochlea
- Innervations and blood supply to cochlea
- Overview of theories of hearing
- Physiology of cochlea
- Electrical potentials of the cochlea
- Physiology of hearing through bone conduction
- Overview to physiology of balancing mechanisms
- Overview to anatomy of central auditory pathway
Overview to central auditory mechanism

Total Hours 7
5

Recommended Books:

1. Seikel, J. A., King, D. W., & Drumright, D. G. (2010). Anatomy & Physiology for Speech, Language, and Hearing (4th edition). Delmar, Cengage Learning, Division of Thomson Learning. NY.
2. Zemlin, W. R. (2010). Speech and Hearing Science: Anatomy and Physiology: International Edition (4 edition.). Boston: Pearson.
3. Chaurasia, B.D (2004). Human Anatomy, vol 3. Head Neck and Brain 4 th Eds, CBS Publishers and Distributors, New Delhi. ISBN 81-239-1157-2.
4. Kelley, M., Wu, D., & Fay, R. R. (Eds.). (2005). Development of the Inner Ear (2005 edition.). New York: Springer.

Course Outcomes: On the successful completion of the course, students will be able to

1. Understand the basics of anatomical terms and positions, and learn about cells, muscles, and tissues.
2. Acquire knowledge about the development of Ear and the auditory system.

3. Know the anatomy and physiology of subsystems of speech and swallowing
4. Obtain anatomy and physiology of external and middle ear
5. Gain knowledge about anatomy and physiology of cochlea, its innervations, electrical potentials and balancing mechanisms.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	H	H	H	H		H		L		M	L	M	L	
C O2	H	H	H	H						M	M	M	L	
C O3	H	H	H	H	M	M		L		M		M	L	
C O4	H	H	H	H		H				M	L	M	L	
C O5	H	H	H	H		H		L		M		M	L	

Clinical Psychology

**Semester I
22BASC
03**

**Hours of Instruction/week: 4
No. of Credits: 3**

Objectives: After completing this course, the student will be able

- To understand the scope of clinical psychology and its significance for speech and hearing concept of normality, abnormality and classification of abnormal behavior cognitive, motor, emotional and social development
- Theories of learning and therapy techniques based on learning principles
- Neuropsychological assessment and rehabilitation application of neuropsychology in the field of speech and hearing and basics of counseling

Unit I Introduction to Psychology

**1
2**

- Introduction to psychology: definition, history and schools of psychology
- Scope of psychology
- Meaning and definition of clinical psychology
- Historical development, modern clinical psychology
- Significance of clinical psychology in health sciences
- Role of clinical psychology in speech and hearing
- Concept of normality
- Concept of abnormality
- Models of mental disorders: biological, psychological social models

Unit II Assessment procedures in clinical psychology

**1
2**

- Methods in clinical psychology: case history, clinical interviewing, clinical observation, definition and types of psychological testing
- Assessment of cognitive functions
- Adaptive functions,
- Personality
- Behavioral assessment
- Classification of abnormal behavior
- History, need & rationale of classification
- Current classificatory system: DSM, ICD

Unit III Development psychology

1

- Child and developmental psychology: meaning, definition and scope
- Meaning of growth, development & maturation
- Principles of child development
- Motor development: general principals of motor development
- Stages in motor development: early motor development, motor development during later childhood and adolescence, decline with age
- Cognitive development: growth from early childhood to adolescence
- Piaget's theory of cognitive development
- Emotional development

2

Unit IV Principles of learning and behavioral modification	1
? Learning: meaning, definition and characteristics	2
? Theories of learning: introduction	
? Pavlov's classical conditioning: experiments and principles	
? Skinner's operant conditioning: experiments and principles	
? Therapeutic techniques based on learning principles	
? Skill behavior techniques	
? Problem behavior techniques	
Unit V Neuropsychology and its relevance to study of speech	1
• Neuropsychology: introduction and definition	2
• Neuropsychological assessment	
• Neuropsychological rehabilitation	
• Application of neuropsychology in the field of speech and hearing	
• Counselling: introduction and definition	
• Types of counselling: directive and non-directive Characteristics of a good counsellor	
Total Hours	60

Recommended Books:

1. Morgon C.T., King R.A., Robinson N.M. Introduction to Psychology. Tata McGraw Hill Publishing Co.
2. Anastasi, A. (1999). Psychological testing, London: Freeman
3. Baura, M (2004). Human Development and Psychology, Rehabilitation Council of India, New Delhi. ISBN: 81-7391-868-6
4. Coleman J.C. Abnormal Psychology and Modern Life, Taraporevala Sons & Co.
5. Gregory, R.J. (2000). Neuropsychological and geriatric assessment in Psychological Testing: History, Principles, and Applications (3rd ed.). New York: Allyn & Bacon.
6. Hurlock, E.B. (1981). Child development. (VI Ed.). Mc Graw Hill International Book Co.
7. Kline, P. (1993). The Handbook of Psychological Testing. Routledge
8. Lezak, M., Loring, D.W., and Hannay, H.J. (2004). Neuropsychological Assessment. Fourth Edition. New York: Oxford University Press
9. Siegal M.G. (Ed). (1987). Psychological Testing from Early Childhood Through Adolescence. International Universities Press

Course Outcomes: On the successful completion of the course, students will be able to

1. Acquire the knowledge on the scope, history and role of psychology in speech and hearing

2. Understand the assessment procedures (DSM, ICD), different types of psychological testings and current classificatory system.
3. Gain Knowledge about psychology in cognitive, emotional and social development.
4. Obtain Therapeutic techniques based on learning and behavior
5. To know about Neuro psychological assessments and its managements

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	H		L	L	L	L	L	M				H	M	M
C O2	H	M	H	M	M	H	M	H	M		M	H	H	M
C O3	H		H		H	H		H	L	M	L	H	H	L
C O4	H	L	H	H	H	H	M	H	L			H	H	M
C O5	M	M	H	H	H	H	H	H	L			H	H	M

Linguistics and Phonetics

Semester I

22BASC

04

Hours of Instruction/week: 4

No. of Credits: 3

Objectives: After completing this course, the student will be able

- To understand different branches and aspects of linguistics characteristics and functions of language
- To understand different branches of phonetics, applied linguistics, and phonology morphology, syntax, semantics, pragmatics
- To understand acquisition of language and factors affecting it bi/multilingualism and related issues

Unit I Linguistics

1

- Introduction to linguistics and different branches of linguistics: applied linguistics, sociolinguistics, psycholinguistics, metalinguistics, neurolinguistics and clinical linguistics
- Language characteristics and functions, difference between animal communication systems and human language
- Morphology – concepts of morph, allomorph, morpheme, bound free and compound forms, roots etc.
- Processes of word formation, content and function words
- Endocentric and exocentric constructions, form classes, grammatical categories
- Inflection and derivation, paradigmatic and syntagmatic relationship
- Principles and practices of morphemic analysis
- Langue versus parole
Competence vs.
performance

2

Unit II Phonetics and Phonology

1

- Introduction to phonetics
- Articulatory, acoustic, auditory and experimental phonetics – an introduction
- Articulatory classification of sounds – segmental and supra-segmental
- Classification description and recognition of vowels and consonants
- Pathological aspects of speech sound production Transcription systems with special emphasis on IPA.
- Transcription of samples of normal and disordered speech
- Introduction to phonology, classification of speech sounds on the basis of distinctive features and phonotactics
- Application of distinctive feature theory to speech pathology and speech therapy, phonotactics, phonotactic patterns of English and Indian languages
- Phonemic analysis – Principles and practices; their practical implications for speech pathologists

2

- Common phonological processes - assimilation, dissimilation, metathesis, haplology, epenthesis, spoonerism, vowel harmony, nasalization, neutralization

Unit III Morphology, syntax, semantics and applied linguistics

1

- Morphology – concepts of morph, allomorph, morpheme, roots, compound forms - endocentric and exocentric constructions, free and bound morphemes, inflection and derivation, principles and practices of morphemic analysis
- Syntax – different methods of syntactic analysis IC analysis, phrase structure, grammar, transformational generative grammar
Introduction to the major types of transformations
- Sentence types, notions about competence versus performance
- Deep structure versus surface structure
- Acceptability versus grammaticality language versus parole etc.
- A brief introduction to semantics – semantic feature theory, pragmatics
- Processes of word formation, content and function words, form classes, grammatical categories
- Syntax – concepts of phrases and clauses, sentence and its types
- Different methods of syntactic analysis – Immediate constituent analysis, Phrase structure, grammar, transformational generative grammar– deep structure versus surface structure, acceptability versus grammaticality; Introduction to the major types of transformations
- Usefulness of morphemic and syntactic analysis in planning speech and language therapy
- A brief introduction to semantics, semantic relations, semantic feature theory
- A brief introduction to pragmatics and discourse.

2

Unit IV Language Acquisition

1

- Issues in first language acquisition
- Pre-linguistic stages, linguistic stages
- Acquisition of phonology, morphology, syntax, semantics, and pragmatics
- Language and cognition
- A brief introduction to theories and models of language acquisition
- Biological maturation theory, linguistic theory, behavioral theory, information processing theory, social interaction theory
- An integrated approach to theories communicative competence and its development
- Applied linguistics with special reference to communication disorders
- Usefulness of morphemic and syntactic analysis in planning speech and language therapy

2

Unit V Bi/multilingualism

1

- Introduction to the language families of the world and India
- Issues related to second language acquisition & factors influencing it

2

- Inter-language theory, language transfer and linguistic interference

- Differences between first and second language acquisition/learning
- Bilingualism/Multilingualism
- Meta phonology
- Writing systems – types of writing
- History of writing systems Indian writing systems

Total Hours **60**

Recommended Books:

1. Ball & Martin (1995). Phonetics for speech pathology. Delhi: AITBS Publishes, India.
2. Ball, Rahilly & Tench (1996). The phonetic transcription of disordered speech. San Diego: Singular Publishing Group Inc.
3. Clark and Yallop (1999). An introduction to phonetics and phonology. Oxford: Blackwell Publishes Inc.
4. Karanth, P (2003). Cross-Linguistic study of Acquired Reading Disorders. Sage Publications, New Delhi. ISBN : 0-306-48319-X
5. Ladefoged, P. (1982). A course in phonetics. New York: Harcourt Brace Jovanovich Inc.
6. Shriberg & Kent (1982). Clinical phonetics. New York: John Wiley & Sons.

Course Outcomes: On the successful completion of the course, students will be able to

1. Understand the basic concepts of linguistics and its branches
2. Study about the components of language and its segments
3. Know about Transcription in of normal and abnormal speech in IPA
4. Knowledge about Language acquisition and theories based on it.
5. Acquire knowledge about Language families around the world and the factors affecting language

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 11	P S O 12	P S O 13
C O1	H	M	L	L			M	M	L		L	M	L	
C O2	H	M	M	L	L	M	M	M				H	M	
C O3	M	M	M	M		L	L	M	H		M	H	H	M
C O4	M	M	L	M	M	M	L	M	M		M	H	M	M

C 05	H	M	M		M	M		M	M		M	H	M	M
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Electronics and Acoustics

Semester I
22BASC
05

Hours of Instruction/week: 4
No. of Credits: 3

Objectives: After completing this course, the student will be able

- To understand the concept and types of power supply for biomedical instruments
- Basic aspects of digital signal processing theoretical basis of acoustics required for audiologists
- Functioning of computers and computing systems

Unit I Electronic components and power supply

1
2

- Resistors, capacitors, inductors
- Transformers and potentiometers
- Semiconductor diodes and transistors
- Light emitting devices, seven segment displays, Liquid crystal displays
- Principles of operations and working of Field Effect Transistors, Uni- junction transistors and thyristors
- Introduction to linear and digital integrated circuits
- Block diagram of a DC power supply
- Linear regulated power supplies, line regulation and load regulation, specifications of a DC power supply unit, Switched Mode Power Supply
- AC power supply, stabilizers, Uninterrupted Power Supply, and inverters Basic electronic concepts such as Polarity, Grounding

1
2

Unit II Introduction to Acoustics

- Calibrations and their characteristics
- Sound-generation and propagation
- Characteristics of sound
- Amplitude, Frequency and phase of pure tones
- Amplitude, Frequency and phase of complex tones (FFT and spectrum, relationship between time waveform, FFT and impulse response)
- Reflection and absorption, acoustic impedance, reverberation
- Impedance and admittance
- Electro-mechano-acoustic transformers

Unit III Acoustical treatment, transducers and basis of computers

1

- Introduction to audiometric rooms
- Absorption coefficient, Sabine's formula
- Materials for construction of audiometric rooms
- Lighting, grounding and other miscellaneous issues related to audiometric rooms
- Evaluation of efficiency of sound proofing in the audiometric rooms

2

- Amplifiers
- Microphones, loudspeakers - types and function
- Fundamentals of digital electronics, binary number system, Hex code, bit, byte, logic gates, counters, flip-flops etc.
- Introduction to computers
- Operating systems, hard ware, software, memory devices and other peripherals, care and preventive maintenance of computers

Unit IV Digital signal processing **1**

- Digital signal processing –introduction and need **2**
- Analog to digital converters, sampling and quantization
- Fundamentals of digital filtering
- Infinite impulse response and finite impulse response filters
- Time domain methods of speech processing
- Frequency domain methods of speech processing
- Linear predictive analysis of speech signals
- Digital coding of speech signals
- Automatic speech recognition
- Speech synthesis

Unit V Instrumentation in speech and hearing **1**

- Introduction to electronic instrumentation in speech and hearing **2**
- Electrodes, filters and preamplifiers
- Principle of operations, block diagram, calibration, maintenance and troubleshooting of audiometers, immittance meters, oto-acoustic emissions, hearing aids, evoked potential system, speech and voice analyses systems, artificial larynx, electroglottograph

Total Hours **6**
0

Recommended Books:

1. Haughton, P., & Haughton, P. M. (2002). Acoustics for Audiologists (1st edition.). San Diego, Calif: Emerald Group Publishing Limited.
2. Moser, P. (2015). Electronics and Instrumentation for Audiologists. Psychology Press.
3. Moser, P. J. (2013). Electronics and Instrumentation for Audiologists. Psychology
4. Press. Rout, N and Rajendran, S. (2014). Hearing aid trouble shooting and Maintenance, Published by National Institute for Empowerment of Persons with Multiple Disabilities, Chennai. Freely downloadable from <http://niepmd.tn.nic.in/publication.php>. ISBN 978-81-928032-1-0.
5. Speaks, C. E. (1999). Introduction To Sound: Acoustics for the Hearing and Speech Sciences (3 edition.). San Diego: Cengage Learning.
6. Villchur, E. (1999). Acoustics for Audiologists (1 edition.). San Diego, Calif: Delmar Cengage Learning.

Course Outcomes: On the successful completion of the course, students will be able to

1. Understand electronic components and power supplies
2. To know about sound generation, propagation, reflection, absorption and reverberation.
3. To acquire knowledge about construction of audiometric rooms and basis of computers
4. To understand difference in Analog to digital and digital to analog and digital signal processing.
5. To gain knowledge about Handling instruments in speech and hearing

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
CO 1	M		L		L							M		
CO 2	M		L	L	M					M			M	M
CO 3	M		H				M	M		M		M	H	
CO 4	M	L										L	L	M
CO 5	H		H	H	M	M	M	M		M		M	M	M

Research Methods and Statistics

Semester I
22BASC06

Hours of Instruction/week: 3
No. of Credits: 3

Objectives: After completing this course, the student will be able

- To understand the basic concept of research in the field of audiology and speech-language pathology.
- To design and execution of research ethical guidelines for conducting research.

Part A-Research Methods

Unit I Introduction to research methods 9

- Meaning and purpose of research: meaning
- Need for research in audiology and speech-language pathology
- Funds/grants for research
- Steps in research: identification, selection
- Formulation of research questions: aims, objectives, statement of problem, hypothesis
- Types of variables; types of sampling procedures (random and non- random)
- Types/ methods of data collection and their advantages and disadvantages Reliability and validity (internal and external validity)

Unit II Research design in audiology and speech-language pathology 9

- Types of research: survey, ex-post facto research, normative research, standard-group comparison
- Experimental and quasi experimental research: group design & single subject design
- Internal and external validity of research
- Between groups vs. repeated measures design
- Documentation of research: scientific report writing, different formats or styles (APA, AMA and MLA),
- Ethics of research

Part B: Statistics

Unit III Introduction to statistics and data collection 9

- Application of statistics in the field of Audiology and speech-language pathology.
- Scales of measurement: nominal, ordinal, interval, ratio
- Classification of data: class intervals, continuous and discrete measurement
- Normal distribution: general properties of normal distribution, theory of probability, area under normal probability curve
- Variants from the normal distribution: skewness and kurtosis
- Measure of central tendency: mean, median, mode

- Measures of variability: range, deviation (average and standard deviation), variance

Unit IV Statistics and research designs

9

- Choosing statistics for different research designs
- Correlational techniques: Pearson's Product Moment Correlation Coefficient;
- Spearman's Rank order correlation coefficient
- Statistical inference: concept of standard error and its use; the significance of statistical measures; testing the significance of difference between two means z-test, t-test; analysis of variance, post hoc tests,
- Non-parametric tests: Chi-square test, Wilcoxon test, Mann-Whitney U test,
- Reliability and validity of test scores: reliability and validity, Item analysis
- Analysis of qualitative data
- Software for statistical analysis

Unit V Epidemiology

9

- Basic epidemiologic concepts and principles
- Epidemiologic data sources and measurements
- Epidemiologic methods – questionnaire survey, screening, personal survey, testing
- Media - their advantages and disadvantages
- Incidence and prevalence of hearing, speech, language disorders as per different census (NSSO, WHO)

Total Hours **4**
5

Recommended Books:

1. Dane F. C. (2011). Sampling and Measurement. In Evaluating research: Methodology for people who need to read research. New Delhi: SAGE publication.
2. Field, A. (n.d.). Discovering Statistics Using IBM SPSS (4th ed.). SAGE Publications.
3. Hegde M. N. (2010). A course book on Scientific and professional writing for speech language pathology (4th Edition), Singapore: Delmar publication.
4. Hegde, M. N. (2003). Clinical research in communicative disorders: Principles and strategies. (3rd Edition), Austin: Pro-ed
5. Hesse-Biber, S. N. & Leavy, P. (2011). The Ethics of social research. In The Practice of qualitative research. (2nd Edition), New Delhi: SAGE publication.
6. Jekel, F. J., Katz, L.D., & Elmore, G.J (2001). Basic Epidemiologic Concepts and Principles in epidemiology, Biostatistics, and Preventive Medicine (2nd Edition).Pennsylvian: Saunders
7. Meline, T. (2010). A research primer for communication sciences and disorders. Singapore: Pearson publication.

Course Outcomes: On the successful completion of the course, students will be able to

1. Understand the steps in research.
2. Acquire knowledge about types of research and research designs in Audiology and Speech Language pathology
3. To know about Statistics- its introduction and application in the field of audiology and speech language pathology
4. Acquire knowledge about Types of statistical measures and choosing a correct statistics method for the research design
5. To obtain knowledge about Introduction to epidemiology, concepts, methods and incidence and prevalence of disorders in speech and hearing.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 11	P S O 12	P S O 13
C O1	H		H	L		L		M			H	H	M	
C O2	H	L	H			H	M		L	M	M		H	
C O3	H		M			H	L			M	H		H	
C O4	H	L	H		M	H		M			H	M	L	
C O5	H		M	H		H	M	M			H	H	M	

Clinical Observation (Speech-Language Pathology)

Semester I
22BASC
07

Hours of Instruction/week: 3
No of Credits: 2

Objectives: After completing this course, the student will be able

- To record, observe and analyze normal aspects of language, speech, voice and fluency variations from typical individuals of different age groups
- To understand speech language stimulation techniques and other therapy techniques of various disorders

Observation:

- Observe normal aspects of speech and language, and analyze perceptually variations in voice, articulation and fluency in different recorded speech samples of typical individuals at different age groups (children, adults and older adults) and sex.
- Observe stress, rhythm and intonation and variations in rate of speech and analyze perceptually variations in prosody in different recorded samples of typical individuals at different age groups (children, adults and older adults) and sex.
- Observe Oral mechanism examination on 5 normal children and 5 normal adults.
- Prepare a diagnostic and therapy kit.
- Observe speech language stimulation techniques and other therapy techniques for various speech disorders.
- Prepare a report on the available clinical facilities and clinical activities of the institute.

Total hours:
45

Course Outcomes: On the successful completion of the course, students will be able to

1. Analyze the normal aspects of language, speech, voice and fluency variations from typical individuals of different age groups
2. Understand speech language stimulation techniques and other therapy techniques of various disorders
3. To prepare diagnostic and therapy kit
4. To perform oral mechanism examination for children and adults
5. To prepare report on available clinical facilities and activities of the institute.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 11	P S O 12	P S O 13
C O1	H	L	H	H	H	H	H	M	H		L	H		
C O2	H	L	H	H	H	H	H	M	H		L	H		
C O3	H	L	H	H	H	H	H	M	H		L	H		

C 04	H	L	H	H	H	H	H	M	H		L	H		
C 05	H	M	H	H	H	H	H	M	H		L	H		

Clinical Observation
(Audiology)

Semester I
22BASC
08

Hours of Instruction/week: 3
No of Credits: 2

Objectives: After completing this course, the student will be able

- To understand case history, tuning fork test, pure tone audiometry and speech audiometry of adults and children with normal and disabled individuals
- To understand and perform otoscopic examination

Observation:

- Observe the case history on 5 adults with hearing problem and correlate the information from case history to results of pure tone audiometry.
- Observe the case history on 5 children with hearing problem and correlate the information from case history to results of pure tone audiometry.
- Observe different tuning fork tests on 5 simulated conductive hearing loss individuals.
- Observe different tuning fork tests on 5 simulated sensori neural hearing loss individuals.
- Observe pure tone Audiometry on 10 normal hearing individuals.
- Observe speech Audiometry on 10 normal hearing individuals.
- Observe daily listening checks and subjective calibrations 20 times and observe objective calibration once
- Perform otoscopy and draw the tympanic membrane of 10 healthy normal individuals

Total hours
45

Course Outcomes: On the successful completion of the course, students will be able to

1. To understand case history for adults and children with normal and disabled individuals
2. To perform tuning for test
3. To understand pure tone audiometry and speech audiometry for adults and children with normal and disabled individuals
4. To understand and perform daily listening checks
5. To understand and perform otoscopic examinations.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		

C 05	M		H	H	H	H	H	H	M		L	H		
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Discipline Specific Elective (DSE -I)
Course Digital Health

Semester I
22BASD
01

Hours of Instruction/week:2+3
No. of Credits: 2

Objectives:

- To know about the basics of Digital Health.
- To know about AI use in the healthcare systems.
- To know about 3D products in healthcare system.

Unit 1: Digital Health

1
5

Introduction of Digital Health – Vision - Benefits of Digital Health – Digital Health Initiatives – National Digital Health Mission – Ecosystem – Architecture – Applications of Digital Health -Learning Health System –Characteristics of Learning Health Care System

Unit 2: Digital Health Care Products

1
5

Categories of Digital Health Products and Services - Wearable Fitness Tracker — Smart health watches – Wearable ECG Monitors – Wearable Blood Pressure Monitor – Wearable Biosensor –mHealth –Telehealth – Telemedicine -Difference between mHealth vs telehealth -Difference between Telehealth vs Telemedicine

Unit 3: ML and DL in Healthcare

1
5

About machine Learning – Benefits of ML in Healthcare – Cognitive Computing – Trend of ML in Medical Health – Applications of ML in Pharma and Medicine – Applications of ML in Healthcare –Big Data – Benefits of Big Data in Healthcare – Features of Big Data in Healthcare – Methods for analysing Big Data in Healthcare - Applications of Big Data in Healthcare -Introduction on Deep Learning –Deep Learning Algorithms– Deep Learning in Clinical Image Analysis.

Unit 4: Artificial Intelligence in Healthcare

1
5

AI-assisted Robotic surgery – Virtual nursing assistant – Aid Clinical judgment or diagnosis – Administrative task – Image Analysis–Develop Medicines – Analyses Unstructured Data –Forecast Kidney Disease – Contributes to Cancer Research and Treatment – Supports Health Equity – AI in Neuroscience – AI in Thoracic Surgery – AI in Cardiac Management.

Unit 5: Robotics &3D Printing in Healthcare

1
5

Role of Robots in Healthcare – Benefits of robots in Healthcare - Types of Robots in Healthcare – Surgical Robots –Exoskeletons – Care Robots – Hospital Robots –3D Printing for Healthcare – Preoperative planning – Customized Surgery – Designing medical devices

– Improving surgical instruments – Creating Protheses – 3D Printed implants – 3D Digital Dentistry – Streamlining drug administration

Total Hours **7
5**

Reference Books:

1. Dac-Nhuong Le, Chung Van Le, Jolanda G. Tromp, GiaNhu Nguyen, (2018). “Emerging Technologies for Health and Medicine - Virtual Reality, Augmented Reality, Artificial Intelligence, Internet of Things, Robotics, Industry 4.0”, ISBN 978-1-119-50981-3
2. Thomas-Vazquez, Daniel & Singh, Deepti&Hatamleh, Muhanad&Tripathi, Anuj&Vishnoi, Tanushree& Bhat, Sumrita& Thompson, Andrew & Jason, Jeremy & Kim, Keekyoung&Gleadall, Andy & Ruiz, Laura. (2019). “3D Printing in Medicine and Surgery”, Woodhead Publishing Series in Medicine, ISBN 978-0- 85709-233-5.

Website links:

1. <https://www.ncbi.nlm.nih.gov/books/NBK470260/>
2. <https://www.insiderintelligence.com/insights/wearable-technology-healthcare-medical-devices/>
3. <https://www.singlecare.com/blog/telehealth-vs-telemedicine/>
4. <https://www.mobihealthnews.com/news/contributed-top-10-use-cases-ai-healthcare>
5. https://www.researchgate.net/publication/330724271_Big_Data_in_Health_Care_Applications_and_Challenges
6. <https://www.mobihealthnews.com/news/contributed-top-8-healthcare-uses-3d-printing>
7. <https://amfg.ai/2019/08/30/3d-printing-in-healthcare-where-are-we-in-2019/>

Course Outcome: On the successful completion of the course, students will be able to

1. Get familiar with Digital Health.
2. Understand the working nature of the Wearable Devices used in Digital Health.
3. Knowledge on Machine Learning techniques used in healthcare system.
4. Knowledge on AI embedded Healthcare system.
5. Get familiar with 3D Model Products and Robots in healthcare systems.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M	M	H		H	H		M				M	H	
C O2	M	M	H		H	H		M				H	H	
C O3	M	H	H	H	H	H	M	M		M		M	H	
C O4	M	H	H	H	H	H	M	M		M		M	H	
C O5	M	M	H	H	H	H		M		M		M	H	

Neurology

Semester

Hours of Instruction/week: 4

II

No of Credits: 3

22BASC

09

Objectives: After completing this course, the student will be able to understand

- Basic concepts, anatomy and physiology of nervous system related to speech and hearing and neural organization –different structures and functions of various systems
- Neurosensory and neuromotor controls in speech, language and hearing mechanisms
- Basic principles and assessment procedures and management procedures used in speech, language and hearing

Unit I Anatomy and physiology of the nervous system

12

- General introduction to basic neurological concepts
- Organization of the neural system
- Central, peripheral and autonomic neural system
- Neural structures - applied anatomy and physiology
- Cranial nerves and those important for speech, language, hearing and balance
- Cerebral blood supply, nourishment and protection of the brain
- General principles of neural organization
- Transmission of information in neural system – nerve fibers, synaptic transmission, action potential, chemical transmission, excitatory and inhibitory potential & neuromuscular transmission
- Cerebral plasticity and development of neural plasticity and cerebral dominance

Unit II Neural organization of speech and hearing processes

12

- Neurosensory organization of speech and hearing
- Central auditory nervous system
- Anatomy of oral sensation and oral sensory receptors
- Neuromotor control of speech
- The pyramidal, extra-pyramidal system, basal ganglia and cerebellar system
- Lower and upper motor neuron
- Alpha and gamma motor neurons
- Sensory and motor examination, oral, peripheral and other reflexes
- Swallowing mechanism and neural control
- Screening and bedside neurological examination

Unit III Neural disorders associated with speech and hearing disorders - I

12

- Neural infections – meningitis, encephalitis
- Developmental anomalies – spinal cord defects, syringomelia and bulbia, Arnold chian malformations

- Hydrocephalus – source and circulation of CSF, types and etiopathogenesis
- UMN lesions –spastic dysarthria
- LMN lesions –flaccid dysarthria
- Mixed lesions
- Extra pyramidal lesions – dyskinetic dysarthria
- Cerebellum and cerebellar pathway lesions – ataxic dysarthria
- Other diverse lesions and dysarthrias

Unit IV Neural disorders associated with speech and hearing disorders - II **1**

- Cerebrovascular diseases – ischemic brain damage – hypoxic ischemic encephalopathy, cerebral infarction – intracranial hemorrhage – intracranial, subarachnoid
- Trauma to the CNS – subdural hematoma, epidural hematoma, parenchymal brain damages
- Demyelinating diseases – multiple sclerosis, perivenous encephalomyelitis, Dementia
- Degenerative, metabolic and nutritional disorders – Alzheimer’s disease, Parkinsonism
- Metabolic, hereditary, acquired, neuronal storage disorders
- Wilson’s disease, Phenylketonuria
- Nutritional – Wernicke’s encephalopathy, pellagra
- Alcoholic cerebellar degeneration
- Clinical-pathological methods and Neuro-imaging
- Tumors of the CNS – gliomas, embryonal tumors of meninges, metastasis, malignant tumors

2

Unit V Speech-language and swallowing disorders **1**

- Central language mechanism and its disorders
- Developmental motor speech disorders – cerebral palsy, muscular dystrophy
- Neurologic disorders with primitive reflexes, diagnosis and management
- Clinical neurological syndromes associated with speech and language disorders
- Childhood language disorders associated with neurologic disorders
- Swallowing associated with neurogenic disorders and assessing mastication and deglutition
- Agnosia and other conditions associated with speech and hearing disorders
- Cognitive disorders associated with neurologic disorders
- General management principles and options for childhood neurogenic speech, language and hearing disorders
- General management principles and options for adult neurogenic speech, language and hearing disorders

2

Total Hours **6**
0

Recommended Books:

1. Adams, R.D. & Sidman, R.L. (1968). Introduction to neuropathology. New Jersey: McGraw-Hill.
2. Bhatnagar, S.C. (2012). Neuroscience for the Study of Communicative Disorders. Lippincott, Williams & Wilkins
3. Garden, E. (1968). Fundamental of neurology, V Edn., Philadelphia: Sarenders Co.
4. Webb, W. G., & Adler, R. K. (2008). Neurology for the speech-language pathologist (5th Ed.). St. Louis, Mo: Mosby/Elsevier.
5. Duffy, J. R. (2013). Motor Speech Disorders: Substrates, Differential Diagnosis, and Management (3rd Ed.). University of Michigan, Elsevier Mosby.

Course Outcomes: On the successful completion of the course, students will be able to

1. Understand the basics of neuro anatomy and physiology, cranial nerves and blood supply
2. Know about Neuro sensory and neuro motor controls of speech and hearing
3. To acquire knowledge about neural disorders like infections, developmental anomalies, UMN, LMN lesions related to speech and hearing.
4. To know about cerebro vascular lesions, trauma, degenerative diseases, and metabolic disorders related to neural conditions.
5. To obtain knowledge about central language acquisition, swallowing related neurogenic disorders.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M	L	H	L	L	L	M	H		M	M	H	H	L
C O2	H		M	L	L	L	L	H	L	L	M	H	H	
C O3	H	M	M	M	M		M	H		L	L	H	H	L
C O4	H	M	M	M		L		H			L	H	M	
C O5	M	M	M	M	L	L	L	M	M	H	M	M	L	

Speech-Language Pathology

Semester II

Hours of Instruction/week: 4

22BASC10

No of Credits: 3

Objectives: After completing this course, the student will be able to understand

- The different speech and language disorders and basic concepts and tools required for diagnosing speech and language disorders
- basics of assessment procedures and intervention procedures for speech and language disorders
- identification and prevention, counseling for speech and language disorders

Unit I Basic concepts and methods of diagnostics

1

- Introduction to Speech Language Disorders
- Definition and descriptions of delay, deviancy and disorders; impairment, disability and handicap
- Incidence and prevalence of speech and language disorders
- Causes of speech and language disorders
- Basic principles in assessment, evaluation and appraisal
- Tools for diagnosis- case history, interview, self-reports, questionnaire & observations
- Diagnostic models – SLPM, Wepman, Bloom and Lahey
- Types of diagnoses – Clinical diagnosis, direct diagnosis, differential diagnosis, diagnosis by treatment, diagnosis by exclusion, team diagnosis, instrumental diagnosis, provocative diagnosis, tentative diagnosis advantage/disadvantages
- Characteristics of a diagnostic clinician, Organization and basic requirements for clinical set up and team approach, DSM, ICD classification and ICF

2

Unit II: Basic concepts and methods of therapeutics

1

- Basic concepts and terminologies in speech therapeutics
- General principles of speech and language therapy
- Speech therapy set-up
- Individual and group therapy
- Procedures and types of for speech-language therapy
- Approaches to speech and language therapy – formal, informal and eclectic approaches
- Planning for speech and language therapy – goals, steps, procedures and activities
- Importance of reinforcement principles and strategies in speech and language therapy, types and schedules of rewards and punishment
- Individual and group therapy
- AAC and other nonverbal methods of therapy

2

Unit III Overview of basic assessment and management of speech disorders	1
<ul style="list-style-type: none"> • Causes of speech disorders • Overview of assessment procedures for voice disorders; articulation and phonological disorders; and fluency disorders • Overview of management procedures for voice disorders; articulation and phonological disorders; and fluency disorders • Early identification and prevention of speech disorders • Basic concepts in assessment and management of swallowing disorders 	2
Unit IV Overview of basic assessment and management of language disorders	1
<ul style="list-style-type: none"> • Types, characteristics and classification of language disorders • Causes of language disorders • Overview of assessment procedures for child language disorders; adult language disorders; and neurogenic language disorders • Overview of management procedures for child language disorders; adult language disorders; and neurogenic language disorders • Early identification and prevention of language disorders • Issues related to bi- /multilingualism 	2
Unit V Other issues in practice as a speech - language pathologist	1
<ul style="list-style-type: none"> ❑ Professional code of conduct – social, cultural and other ethical issues ❑ Scope of practice –different set ups and prerequisites ❑ Documentation of diagnostic, therapeutic and referral reports ❑ Counselling, guidance, facilitation of parent participation and transfer of skills ❑ Evaluation of therapy outcome and follow up ❑ Evidence based practice ❑ Community based rehabilitation ❑ Role of itinerant speech therapist, Anganwadis, resource teachers etc. ❑ PWD act, National Trust, Consumer protection Act, noise pollution Act and other public laws, RCI, ISHA and other organizations controlling the field ❑ Facilities and concessions available for speech and hearing disabled 	2
Total Hours	60

Recommended Books:

1. Owens. Jr, Kimberly, A. Metz, F.E. (2014). 5th Ed. Introduction to Communication Disorders: A life span based Perspective. Pearson Communication Science and Disorders Series.
2. Hegde, M. N., & Davis, D. (2005). Clinical methods and practicum in speech language pathology (4th Ed.). Australia; Clifton Park, NY: Thomson Delmar Learning.
3. Shipley, K. G., & Roseberry-McKibbin, C. (2006). Interviewing and counselling in communicative disorders: Principles and procedures (3rd ed.). Austin, Tex: Pro-Ed.

4. Brookshire, R. H. (2003). Introduction to neurogenic communication disorders (6thed.). St. Louis, Mo: Mosby.
5. Hulit, L.M., Marle. R., Kathleen, R. H., & Fowey (2010). Born to Talk. Pearson Communication Science and Disorders Series 5th Ed.
6. Roth, F. P., & Worthington, C. K. (2005). Treatment resource manual for speech language pathology (3rd ed.). Australia; Clifton Park, NY: Thomson Delmar Learning.
7. Shipley, K. G., & McAfee, J. G. (2004). Assessment in speech-language pathology: A resource manual (3rd ed.). Australia; Clifton Park, NY: Delmar Learning.
8. Ysseldyke, J. E., & Algozzine, R. (2006). Teaching students with communication disorders: A practical guide for every teacher. Thousand Oaks, Calif.: Corwin Press.

Course outcomes: On the successful completion of the course, students will be able to

1. Acquire knowledge about the speech and language disorders and its causes, its tools to diagnosis.
2. To know about the principles of therapy and the procedures and types of therapy for speech and language disorders
3. To know about the cause, assessment and management of the voice, fluency and articulation disorders
4. To know about the cause, assessment and management of the child language, adult language and neurogenic language disorders
5. Gain knowledge about the professional ethics, scope of speech language pathologist

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	H	H	H	H	H	M	M	M		H	M	M	H	H
C O2	H	H	H	H	H	M	M	M		H	M	M	H	H
C O3	H	H	H	H	H	M	M	M		H	M	M	H	H
C O4	H	H	H	H	H	M	M	M		H	M	M	H	H
C O5	H	H	H	H	H	M	M	M		H	M	M	H	H

Audiology

Semester

Hours of Instruction/week: 4

II

No of Credits: 3

22BASC

11

Objectives: After completing this course, the student will be able to

- Take case history, administer the tuning fork tests and interpret the results
- Administer pure tone and speech audiometry including masking on clinical population and
- Carryout subjective calibration and daily listening checks of the audiometer and get adequate theoretical information necessary to understand concepts involved in objective calibration

Unit I Differential sensitivity

12

- Concept of differential sensitivity, just noticeable difference
- Weber's fraction
- Intensity discrimination
- Frequency discrimination
- Duration discrimination and temporal resolution
- Applications of jnd's
- Magnitude estimation and production
- Loudness – equal loudness level contours and its application
- Loudness scales - sone, phone, Steven's power law
- Pitch- scales of pitch

Unit II: Case history and tuning fork tests

12

- Need for case history
- Basics of history taking
- Essential factors to be included in case history for adults
- Essential factors to be included in case history for children
- Interpretation of case history
- Audiological evaluation – rationale and purpose
- Principles, procedure, interpretation, advantages and disadvantages of Rinne and
- Schwabach tuning fork test
- Principles, procedure, interpretation, advantages and disadvantages of Weber and
- Bing tuning fork test
- Audiometric version of Weber and Bing test

Unit III Pure tone audiometry

12

- Classification of audiometers, Parts of an audiometer, characteristics specifications of transducers used (earphones, bone vibrators, loud speakers)
- Audiogram- concept and symbols used

- Clinical method of threshold estimation
- Factors affecting air conduction threshold
- Bone conduction thresholds- measurements, factors effecting
- Permissible noise levels in the audiometric room

Unit IV Speech audiometry **1**
2

- Importance and purpose
- Different types of stimuli used in speech audiometry
- Concept of phonetically and phonemically balanced
- Speech detection thresholds – procedure and application
- Speech reception thresholds – procedures and application
- Word recognition scores –procedure and applications
- PIPB function – procedure and applications
- Factors affecting speech audiometry
- BC speech audiometry – procedure and its application
- Test materials available in various languages

Unit V Clinical masking and instrumental calibration **1**
2

- Definition and different terminologies
- Purpose and rationale of clinical masking
- Different types of stimulus employed in clinical masking
- Interaural attenuation and factors affecting interaural attenuation
- When to mask and how much to mask – importance of adequate noise levels
- Different procedures for masking
- Masking for speech audiometry
- Calibration definition and purpose
- Daily listening checks and subjective calibration
- Objective calibration of air conduction transducers
- Objective calibration of bone conduction transducers
- Frequency calibration

Total Hours **6**
0

Recommended Books:

1. Durrant, J. D., & Feth, L. L. (2012). Hearing Sciences: A Foundational Approach (1 edition.). Boston: Pearson.
2. Emanuel, D. C., & Letowski, T. (2008). Hearing Science (1 edition.). Philadelphia: Lippincott Williams and Wilkins.
3. Gelfand, S. A. (2009). Hearing: An Introduction to Psychological and Physiological Acoustics (5 edition.). London: CRC Press.
4. Kaplan, H., Gladstone, V. S., & Lloyd, L. L. (1993). Audiometric Interpretation: A Manual of Basic Audiometry (2 edition.). Boston: Pearson.
5. Katz, J. (2014). Handbook of Clinical Audiology (7th International edition edition.). Lippincott Williams and Wilkins.
6. Martin, F. N., & Clark, J. G. (2014). Introduction to Audiology. Boston: Pearson.

7. Silman, S., & Silverman, C. A. (1997). Auditory Diagnosis: Principles and Applications (Reissue edition.). San Diego: Singular Publishing Group

Course outcomes: On the successful completion of the course, students will be able to

1. To understand the basic concepts of differential sensitivity, discriminations in intensity and speech
2. To obtain knowledge about the need, essential factors to be included in the case history and tuning fork test procedures and interpretations in Rinne, Weber, Bing, Schwabach
3. To know about the audiometer, its parts, characteristics, procedures and factors affecting the threshold estimation
4. To know about the purpose and importance of the speech audiometer, its procedures, applications and factors affecting speech audiometry
5. Acquire knowledge about the purpose, rationale, type, procedure for masking. And also about the subjective and objective calibration, its purpose.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
CO 1	H	M	H	M	L	M	H	M		L	M	M	H	H
CO 2	H	M	H	M	L	M	H	M		L	M	M	H	H
CO 3	H	M	H	M	M	M	H	M		L	M	M	H	H
CO 4	H	M	H	M	M	M	H	M		L	M	M	H	H
CO 5	H	M	H	M	M	M	H	M		L	M	M	H	H

**Practicals-I (Speech-
Language
Pathology)**

**Semester
II
22BASC
12**

**Hours of Instruction/week: 8
No of Credits: 4**

Objectives: After completing this course, the student will be able to

1. To demonstrate normal aspect of speech, language, voice, fluency variations of typical individuals of different age groups
2. To understand transcription using IPA
3. To administer standardized test for assessment

PRACTICAL

- Demonstrate normal aspects of speech and analyze perceptually variations in voice, articulation and fluency in different recorded speech samples of typical individuals at different age groups (children, adults and older adults) and sex.
- Demonstrate normal aspects of language and analyze perceptually variations in language in different recorded samples of typical individuals at different age groups (children, adults and older adults) and sex.
- Demonstrate stress, rhythm and intonation and variations in rate of speech and analyze perceptually variations in prosody in different recorded samples of typical individuals at different age groups (children, adults and older adults) and sex.
- Use IPA to transcribe spoken words. Record a standard passage, count number of syllables and words, identify syllable structure, syntactic structures in the passage.
- Oral mechanism examination on 5 normal children and 5 normal adults. Prepare a chart and show the developmental stages of speech and language behavior.
- Administer standardized tests for assessment of delayed speech and language development such as REEL, SECS, LAT, 3DLAT, ALD each on any 2 children.
- Study the available normative data (Indian/Western) of speech such as respiratory, phonatory, resonatory and articulatory parameters.
- Measure the following in 5 normal subjects: (a) Habitual frequency (b) Frequency range (c) Intensity (d) Intensity range (e) Phonation duration (f) rate of speech (g) Alternate Motion Rates and Sequential Motion Rates (h) s/z ratio.
- Study the available normative data (Indian/Western) of language such as phonology, semantics, syntax, morphology and pragmatic measures.
- Perceptual analysis of speech and language parameters in normal (2 children and 2 adults and persons with speech disorders (3 adults + 3 children).
- Prepare a model diagnostic report of a patient with speech and language disorder.
- Prepare a diagnostic and therapy kit.
- Make a list of speech language stimulation techniques and other therapy techniques for various speech disorders.
- Familiarize with the sources for referral and parent counseling procedures.
- Prepare a report on the available audiovisual material and printed material/pamphlets relating to speech-language pathology, public education

of communication and hearing disorders, etc.

- Prepare a report on the available clinical facilities and clinical activities of the institute.

Clinical Practicum

- Observe the evaluation process and counseling of at least 5 different speech and language disorders in children.
- Observe the evaluation process and counseling of at least 5 different speech and language disorders in adults.
- Take case history of a minimum of 10 individuals (5 normal & 5 clients with complaints of speech-language problems). Observation of diagnostic procedures
- Observe various therapeutic methods carried out with children and adults with speech and language disorders.

**Total hours-120
hours**

Course Outcomes: On the successful completion of the course, students will be able to

1. To understand and demonstrate normal aspect of speech, language, voice, fluency variations of typical individuals of different age groups
2. To understand and use IPA for transcription of spoken words
3. To administer standard test for assessment
4. To study available normative data
5. To prepare report for diagnosing.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
CO 1	H	L	H	H	H	H	H	M	H		L	H	M	
CO 2	H	L	H	H	H	H	H	M	H		L	H	M	
CO 3	H	L	H	H	H	H	H	M	H		L	H	M	
CO 4	H	L	H	H	H	H	H	M	H		L	H	M	
CO 5	H	M	H	H	H	H	H	M	H		L	H	M	

Practicals-I
(Audiology)

Semester
II
22BASC
13

Hours of Instruction/week:9
No of Credits: 4

Objectives: After completing this course, the student will be able to

1. Understand and carryout PTA for normal hearing individuals
2. Understand and carryout Speech audiometry for normal hearing individuals
3. Understand clinical masking and plotting of audiograms

PRACTICAL

Calculate/derive the answers for following

- Calculate the relative intensities with different reference intensities.
- Calculate decibels when sound intensities are doubled, increased by 4 times
- Add decibels when two sounds with different intensities are produced simultaneously
- Collect pictures of audiometers that existed between 1920 and 1990.

Perform the following experiments

- Calculate reference equivalent sound pressure levels (RETSPL) for head phones and bone vibrator for any two frequencies using 30 participants.
- Measure most comfortable level on 10 participants with normal hearing sensitivity.
- Measure uncomfortable levels on 10 participants with normal hearing sensitivity.
- Calculate the sensation levels of MCL and UCLs in above 10 participants.
- Measure difference limen of intensity, frequency and duration on 10 normal hearing adults and plot it in graphical form and interpret the results.
- Measure equal loudness level contours at minimum level, 40 dB SPL, 70 dB SPL (1 kHz) in 5 normal hearing adults.
- Measure sone and mel in 5 normal hearing adults using scaling techniques.
- Take case history on 5 adults and 5 children with hearing problem and correlate the information from case history to results of pure tone audiometry.
- Administer different tuning fork tests on 5 simulated conductive and 5 sensori neural hearing loss individuals.
- Carry out pure tone and speech audiometry on 10 normal hearing individuals.
- Carry out clinical masking on 10 normal hearing individuals with simulated conductive hearing loss and carry out clinical masking on 5 individuals with conductive hearing loss and 5 individuals with sensori-neural hearing loss.
- Carryout daily listening checks and subjective calibrations 20 times and observe objective calibration once Perform otoscopy and draw the tympanic membrane of 10 healthy normal individuals
- Measure difference limen of intensity, frequency and duration on 10 normal hearing adults and plot it in graphical form and interpret the results
- Measure equal loudness level contours at minimum level, 40 dB SPL, 70 dB SPL (1 kHz) in 5 normal hearing adults
- Measure sone and mel in 5 normal hearing adults using scaling techniques

Clinical Practicum

- ☐ Observe case history being taken on 5 adults and 5 children with hearing problem and correlate the information from case history to results of pure tone audiometry.
- ☐ Administer different tuning fork tests on 5 conductive and 5 sensori neural hearing loss individuals.
- ☐ Observe the pure tone audiometry being carried out on 30 clients.
- ☐ Plot the audiogram, calculate the pure tone average and write the provisional diagnosis of observed clients.
- ☐ Perform otoscopy (under supervision) on at least 1 client with following conditions: Tympanic membrane perforation, SOM, CSOM

**Total hours-135
hours**

Course Outcomes: On the successful completion of the course, students will be able to

1. Understand, measure and calculate MCL and UCL
2. Measure difference limen of intensity, frequency and duration
3. Carryout PTA and speech Audiometry.
4. To carryout masking and plotting of audiograms
5. To measure Sone and Mel

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
CO 1	M		H	H	H	H	H	L	M		L	H		
CO 2	M		H	H	H	H	H	L	M		L	H		
CO 3	M		H	H	H	H	H	L	M		L	H		
CO 4	M		H	H	H	H	H	L	M		L	H		
CO 5	M		H	H	H	H	H	H	M		L	H		

Discipline Specific Elective (DSE - II)

Course **Otolaryngology**

Semester II

22BASD02

Hours of Instruction/week:

2+2

No of Credits: 3

Objectives: After completing this course, the student will be able to understand

- The causes, signs, symptoms, pathophysiology and management of diseases of external, middle and inner ear leading to hearing loss, and
- causes, signs, symptoms, pathophysiology and management of diseases of laryngeal
- causes, signs, symptoms, pathophysiology and management of diseases of articulatory systems

Unit I External and middle ear and their disorders

12

- Clinical anatomy of the ear
- Congenital anomalies
- Diseases of the external ear
- Tumors of the external ear
- Perforation and ruptures of tympanic membrane
- Eustachian tube dysfunction
- Otitis media with effusion
- Cholesteatoma and chronic suppurative otitis media
- Otosclerosis
- Trauma to temporal bone
- Facial nerve and its disorder

Unit II Inner ear and its disorders

12

- Congenital anomalies
- Meniere's Disorder
- Ototoxicity
- Presbycusis
- Disorders of vestibular system
- Vestibular Schwannoma
- Tinnitus and medical line of treatment
- Pre-surgical medical and radiological evaluations for implantable hearing devices
- Overview of surgical technique for restoration and preservation of hearing
- Post-surgical care and complication of surgery for cochlear implants
Overview of surgical technique, post-surgical care and complication of surgeries for implantable bone conducted hearing aids and middle ear
Implant

Unit III Oral cavity and its disorders

12

- Anatomy of the oral cavity
- Common disorders of the oral cavity
- Tumors of the oral cavity
- Cleft lip and palate – medical aspects
- Clinical anatomy and physiology of pharynx

<ul style="list-style-type: none"> ● Inflammatory conditions of the pharynx, tonsils and adenoids ● Tumors of the pharynx 	
Unit IV Larynx and its disorders	1
<ul style="list-style-type: none"> ● Clinical anatomy of larynx ● Difference between adult and infant larynx ● Clinical examination of larynx ● Stroboscopy - technique, procedure, interpretation and precautions ● Congenital laryngeal pathologies ● Inflammatory conditions of the larynx ● Vocal nodule and other disorders of the vocal folds ● Benign and malignant tumors of the larynx ● Laryngectomy – overview of surgical procedure ● Phono surgery and other voice restoration surgeries 	2
Unit V Esophagus and its disorders	1
<ul style="list-style-type: none"> ● Clinical anatomy and physiology of esophagus ● Clinical examination of esophagus ● Congenital anomalies of esophagus ● Esophageal fistula ● Inflammatory conditions of esophagus ● Benign conditions of esophagus ● Malignant conditions of the esophagus ● Airway management procedure. 	2
Total Hours	60

Recommended Books:

1. Chan, Y. and Goddard, J.C. (2015). K J Lee's Essential otolaryngology: head and neck surgery. (11th edition). New Delhi: Atlantic Publisher and Distributors
2. Dhingra, P. L. (2013). Diseases of Ear, Nose and Throat (Sixth edition). Elsevier.
3. O'Neill, J.P. and Shah, J.P. (2016). Self-assessment in otolaryngology. Amsterdam: Elsevier
4. Postic, W.P., Cotton, R.T., Handler, S.D. (1997). Ear trauma. Surgical Pediatric Otolaryngology. New York: Thieme Medical Publisher Inc.
5. Wackym, A. and Snow, J.B. (2015). Ballenger's oto rhino laryngology head and neck surgery. (18th edition). United States: McGraw-Hill Medical

Course outcomes: On the successful completion of the course, students will be able to

1. Acquire knowledge about the anatomy of the ear and diseases of the external ear and middle ear
2. To know about the inner ear and its disorders and the pre and post - surgical evaluations for implantable hearing devices.
3. To know about the oral cavity and its disorders.

4. To know the anatomy of larynx and disorders and the Laryngectomy surgical procedures
5. To acquire knowledge about the anatomy and physiology of the esophagus and its disorders.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	H	H	H	H	H	M	M	L		M	M	M	H	H
C O2	H	H	H	H	H	M	M	L		M	M	M	H	H
C O3	H	H	H	H	H	M	M	L		M	M	M	H	H
C O4	H	H	H	H	H	M	M	L		M	M	M	H	H
C O5	H	H	H	H	H	M	M	L		M	M	M	H	H

Voice and its Disorders

Semester
III
22BASC1
4

Hours of Instruction/week: 4+1
No of Credits: 3

Objectives:

- To understand and describe characteristics of normal voice
- To identify voice disorders and explain etiology related to voice problems, and its pathophysiology
- To assess voice disorders and to provide counselling and therapy to individuals with voice disorders

Unit I: Basic concepts in voice and its production

1

- Definition and functions of voice – biological and non-biological Parameters of voice 2
- Structures and function of respiratory system for the purpose of phonation
- Laryngeal anatomy – Structural support of larynx, muscles, vocal fold microstructure, blood supply, and innervations
- Vocal tract resonance and voice quality
- Development of voice: Birth to senescence; structural and voice related changes Aerodynamic myo-elastic theory of voice production
- Voice mechanics – Physiologic, acoustic and aerodynamic correlates of voice Pitch and loudness changing mechanism, voice registers and voice quality
- Description of normal and abnormal voice: Parametric, pathologic/perceptual, social

Unit II: Characteristics and pathophysiology of voice disorders

1

- Pathologies of the laryngeal mechanism: classification of voice disorders, incidence, and prevalence 2
- Etiology of voice disorders: voice misuse and abuse, medical related etiologies, primary disorder etiologies and personality related etiologies
- Pathologies of vocal fold cover (infective and trauma related secondary conditions) and muscular dysfunction
- Non-organic voice disorders: functional disorders, psychosomatic- functional aphonia and physiological- voice abuse, Puberphonia)
- Congenital voice disorders Neurological voice disorders
- Voice problems in systemic illnesses and endocrine disorders Voice problems in transgenders
- Voice problems in the elderly, professional voice users: teachers and singer

Unit III: Assessment of Voice

1

- Referral sources, medical examination and team approach 2
- Protocol for voice assessment: components and philosophies (ICF, ICD)
- Clinical voice laboratory: principles of instrumental measurements – electrical error, electrical safety, hygiene safety; recording of data; storage; patented soft wares, free wares
- Perceptual evaluation of voice: GRBAS, CAPE -V
- Visualization procedures- indirect laryngoscopy, video laryngoscopy & Stroboscopy Acoustic analysis of voice: F0 related measures, intensity related measures, quality related measures, phonetogram, DSI

- Electroglottography and inverse filtering procedures Aerodynamic analysis of voice: static & dynamic measures Self-evaluation of voice: PROM, VHI, V-DOP
- Reporting of voice findings, normative comparisons, differential diagnosis

Unit IV: Management of voice

1

- Voice therapy orientation: basic principles, goal setting and approaches Vocal hygiene and preventive counselling
- Symptomatic voice therapy – voice facilitation techniques
- Psychological approaches to voice therapy – psychoanalysis, rational emotive therapy and cognitive behavior therapy
- Physiological approach – breathing and postural techniques
- Holistic voice therapy approaches -1: accent therapy, confidential voice therapy, Holistic voice therapy approaches - 2: vocal function exercises, resonant voice therapy, Lee Silverman voice therapy
- Medical and surgical procedures in the treatment of benign vocal fold lesions: pharmaceutical effects on voice, phono surgery : re-innervation techniques, laryngeal framework surgeries, micro laryngeal excision
- Professional voice care

2

Unit V: Intervention strategies for voice disorders

1

- Vocal trauma related disorders
- Functional voice disorders – inappropriate vocal components Functional aphonia
- Puberphonia/mutational falsetto Muscle tension dysphonia Sulcus vocalis
- Vocal fold palsy Spasmodic dysphonia GERD/LPR
- Benign vocal fold lesions requiring surgical intervention Post-operative care for benign vocal fold lesions disorders Documenting voice therapy outcomes

2

Practicals

1

- Record phonation and speaking samples (counting numbers) from five children, adult men, adult women, geriatric men and geriatric women. Note recording parameters and differences in material.
- Make inferences on age and sex differences across the samples obtained in the previous experiment using perceptual voice profiling. Make a note of differences in pitch, loudness, quality and voice control. Explain how voice reflects one's personality and other social needs.
- Perform an acoustic voice analysis on phonation sample and generate a voice report based on acoustic findings. Compare findings between men & women.
- Perform MPT and s/z ratio. Infer differences across age and sex.
- Perform spirometry or any other appropriate aerodynamic procedure. Infer differences across age and sex.
- Perform acoustic analysis on five abnormal voice samples.
- Observe and document findings from five laryngeal examinations (pre-recorded or live) such as VLS, stroboscopy or any other relevant.
- Administer a PROM on five individuals. Prepare a vocal hygiene checklist.
- Demonstrate therapy techniques such as vocal function exercise, resonant voice therapy, digital manipulation, push pull, relaxation exercises.

5

Total Hours 75

Text Books:

1. Stemple, J.C., Glaze, L.E., & Gerdeman, B, K. (2014). Clinical voice pathology: Theory & Management (5thEd.). San Diego: Plural publishers.
2. Aronson, A.E. & Bless, D.M. (2009). Clinical Voice Disorders. (4thEd.). New York: Thieme, Inc.
3. Boone, D.R., McFarlane, S.C, Von Berg, S.L. & Zraick, R, I. (2013): The Voice and Voice Therapy. (9thEd.). Engle wood Cliffs, Prentice- Hall, Inc. New Jersy.
4. Professional Voice: Assessment and Management. Proceedings of the national workshop on “Professional Voice: Assessment and management”, 9-10 Dec 2010. All India Institute of Speech & Hearing, Mysore. 2010.
5. Andrews, M.L. (2006). Manual of Voice treatment: Pediatrics to geriatrics (3rdEd.). Thomson Delmar Learning.
6. Colton, R. H, Casper, J. K. & Leonard, R. (2006). Understanding voice problems. Baltimore: Williams& Wilkins.
7. Sapienza, C.M., & Ruddy, BH. (2013). Voice Disorders. (2ndEd.). San Diego: Plural Publisher.
8. Voice: Assessment and Management. Proceedings of the national workshop on “Voice: Assessment and management”, 14 -15 Feb 2008. All India Institute of Speech & Hearing, Mysore. 2008.

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the parameters of the voice, its development, its subsystem required for phonation.
2. Differentiate what type of voice disorders, its etiology and pathophysiology behind it
3. To analyze the voice disorders by perceptual, visualization, acoustic, aerodynamic and self reporting.
4. To know how to give voice therapy, its techniques, preventive measures, counselling and vocal hygiene programs.
5. To acquire knowledge about the voice disorders and formulating its intervention strategies.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Speech Sound Disorders

Semester
III
22BASC1
5

Hours of Instruction/week: 4+1
No. of Credits: 3

Objectives

- To describe normal speech sound development and characterization of individuals with speech sound disorders.
- To perform phonological analysis and assessment of speech sound disorders
- To plan intervention for individuals with speech sound disorders.

Unit I: Speech sound acquisition and development

1
2

- Fundamentals of articulatory phonetics - phonetic description of vowels & consonants.
- Phonology & phonological theories – generative phonology, natural phonology. Phonology & phonological theories – non-linear phonology, optimality theory. Methods to study speech sound acquisition – diary studies, cross sectional studies and longitudinal studies.
- Speech sound acquisition and factors influencing speech sound acquisition
- Acoustics of speech sounds
- Speech intelligibility, factors affecting speech intelligibility, assessment of speech intelligibility
- Co articulation: types and effects
- Phonological development in bilingual children. Phonological development in Indian languages.

Unit II: Assessment of speech sound disorders- I

1
2

- Current concepts in terminology and classification of speech sound disorders
Organically-based speech sound disorders, childhood apraxia of speech. Speech sound disorders of unknown origin, classification by symptomatology.
- Factors related to speech sound disorders
 - Structure and function of speech & hearing and oro-sensory mechanisms.
 - Cognitive – linguistic, psychosocial and social factors.
 - Metalinguistic factors related to speech sound disorders.
- Introduction to assessment procedures: aims of assessment, screening and comprehensive assessment.
- Speech sound sampling procedures - issues related to single word and connected speech samples; imitation and spontaneous speech samples, contextual testing, recording of speech samples.
- Review of tests in English and other Indian languages - Single word articulation tests, deep articulation of articulation, and computerized tests of phonology.
- Influence of language and dialectal variations in assessment.
- Transcription of speech sample - transcription methods –IPA and extension of IPA; broad and narrow transcription.

Unit III: Assessment of speech sound disorders-II	1
<ul style="list-style-type: none"> ● Introduction to independent and relational analysis. ● Independent analyses – phonetic inventory, phonemic inventory and phonotactic inventory (utility of independent analysis for analysis of speech of young children and children with severe speech sound disorders). ● Relational analyses – SODA, pattern analysis, (distinctive features, phonological process analysis). ● Phonological processes analyses - language specific issues, identification and classification of errors. ● Assessment of oral peripheral mechanism. ● Speech sound discrimination assessment, phonological contrast testing. Stimulability testing. ● Determining the need for intervention – speech intelligibility and speech severity assessment. ● Factors influencing target selection – stimulability, frequency of occurrence, developmental appropriateness, contextual testing, and phonological process analysis. ● Case study – Documenting the assessment findings and determining the need for intervention. 	2
Unit IV: Management	1
<ul style="list-style-type: none"> ● Basic considerations in therapy – target selection, basic framework for therapy, goal- attack strategies, organizing therapy sessions, individual vs. group therapy. ● Treatment continuum – establishment, generalization and maintenance; measuring clinical change. ● Facilitation of generalization. ● Maintenance and termination from therapy. ● Motor-based treatment approaches – Principles of motor learning. Discrimination/ear training and sound contrast training. ● Establishing production of target sound – imitation, phonetic placement, successive approximation, context utilization. ● Traditional approach, contextual/sensory-motor approaches. ● General guidelines for motor-based treatment approaches ● Use of technology in articulation correction 	2
Unit V: Management -II	1
<ul style="list-style-type: none"> ● Core vocabulary approach. ● Introduction to linguistically-based treatment approaches- Distinctive feature therapy. Minimal pair contrasts therapy. ● Metaphon therapy, Cycles approach. Broad-based language approaches. ● General guidelines for linguistically-based approaches. Phonological awareness and phonological disorders. ● Phonological awareness intervention for preschool children. ● Adapting intervention approaches to individuals from culturally and linguistically diverse backgrounds. ● Role of family in intervention for speech sound disorders. 	2
Practicals	1
<ul style="list-style-type: none"> ● List the vowels and consonants in your primary language and provide phonetic and acoustic descriptions for the speech sounds. 	5

- Identify the vowels and consonants of your language on the IPA chart and practice the IPA symbols by transcribing 25 words.
- Make a list of minimal pairs (pairs of words which differ by only one phoneme) in English.
- Make a list of minimal pairs in any language other than English.
- Identify the stages of speech sound acquisition by observations from videos of children from birth to 5 years of age.
- Record the speech of a two year old typically developing child, transcribe and analyze the speech sample.
- Record the speech of one typically developing child from 3-5 years of age (include single word and connected speech samples), transcribe the sample, and perform phonological assessment.
- Analyze transcribed speech samples of typically developing children – practice independent and relational analysis.
- Practice instructions for phonetic placement of selected sounds.
- Develop a home plan with activities for any one section of phonological awareness in English and in one Indian language.

Total Hours	7
	5

Course outcomes: On the successful completion of the course, students will be able to

1. Acquire knowledge about the phonological theories and speech sound development
2. To obtain knowledge about the classification of speech sound disorder, and the factors affecting it
3. To administrate the assessment procedures for the speech sound disorders and the factors affecting it
4. To execute the therapy plans for articulation and phonology, and basic considerations in therapy
5. To gain knowledge about the therapeutic techniques for the articulation and phonology and the role of family members in the intervention procedures.

Text Books:

1. Bernthal, J.E., Bankson, N.W., & Flipsen, P. (2013). Articulation and phonological disorders. (7th Ed.). Boston, MA: Pearson.
2. Dodd, B. (2013). Differential diagnosis and treatment of children with speech disorder.(2nd Ed). NJ: Wiley.
3. Rout, N (Ed)., Gayathri, P., Keshree, N and Chowdhury, K (2015). Phonics and Phonological Processing to Develop Literacy and Articulation; A Novel Protocol. A publication by NIEPMED, Chennai. Freely downloadable from <http://niepmd.tn.nic.in/publication.php>. ISBN 978-81-928032-9-5
4. Vasanta, D. (2014). Clinical applications of phonetics and phonology. ISHA Monograph. Vol 14, No. 1.Indian Speech & Hearing Association.

5. Velleman, S. L (2003). Resource guide for Childhood Apraxia of Speech. Delmar/Thomson Learning.
6. Williams, A., McLeod, S., & McCauley, R. (2010). Interventions for speech sound disorders in children. Baltimore: Brookes.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Diagnostic Audiology- Behavioral Tests

Semester
III
22BASC1
6

Hours of Instruction/week: 4+1
No. of Credits: 3

Objectives

- To enable the students to choose individualized test battery for assessing cochlear pathology, retro cochlear pathology, functional hearing loss, CAPD, vestibular dysfunctions, tinnitus and hyperacusis
- To enhance the students to independently run the tests and interpret the results to identify the above conditions and also use the information for differential diagnosis
- To make adjustments in the test parameters to improve sensitivity and specificity of tests and make appropriate diagnosis based on the test results and suggest referrals.

Unit I: Introduction to Diagnostic Audiology

1
2

- Characteristics of a diagnostic test, difference between screening and diagnostic test, functions of a diagnostic test in Audiology
- Need for test battery approach in auditory diagnosis and integration of results of audiological tests, cross-check principle
- Concept of sensitivity, specificity, true positive, true negative, false positive, false negative, hit rate
- Definition of behavioral and physiological tests and their characteristics in diagnostic audiology
- Theories and physiological bases of recruitment Theories and physiological bases of adaptation
- Clinical indications for cochlear pathology, retro-cochlear pathology, central auditory processing disorders, functional hearing loss, vestibular disorders

Unit II: Tests to identify cochlear and retro cochlear pathology

1
2

- ABLB, MLB and SISI tests Behavioral tests of adaptation Bekesy audiometry
- Brief tone audiometry PIPB function Glycerol test
- Test to identify dead regions of cochlea

Unit III: Tests to diagnose functional hearing loss

1
2

- Behavioral and clinical indicators of functional hearing loss
- Pure tone tests including tone in noise test, Stenger test, BADGE, Pure tone DAF Speech tests including Lombard test, Stenger test, lip-reading test, Doerfler-Stewart test, Low level PB word test, Yes-No test, DAF test
- Identification of functional hearing loss in children: Swinging story test, Pulse tone methods

Unit IV: Assessment of central auditory processing

1
2

- Definition, different behavioral processes
- Behavioral and clinical indicators of central auditory processing disorders Bottle neck and subtlety principles and their implications in
- Tests to detect central auditory processing disorders

- Monaural low redundancy tests - filtered speech tests, time compressed speech test, speech-in-noise test, SSI with ICM, other monaural low redundancy tests.
- Dichotic speech tests – Dichotic digit test, staggered spondaic word test, Dichotic CV test, SSI with CCM, Competing sentence test, other dichotic speech tests.
- Binaural interaction tests – RASP, BFT, MLD, other binaural interaction tests Tests of Temporal processing – pitch pattern test, duration pattern tests, other temporal ordering tests, gap detection test, TMTF
- Variables influencing the assessment of central auditory processing: Procedural and subject variables
- Test findings of important tests in subjects with central auditory disorders: brainstem lesion, cortical, CAPD in children.

Unit V: Assessment of persons with vestibular disorder, tinnitus, hyperacusis **1**

- Introduction to structure and function of vestibular system Vestibular ocular reflex and vestibulo spinal reflex Overview on other systems involved in balance **2**
- Signs and Symptoms of vestibular disorders
- Team in the assessment and management of vestibular disorders
- Behavioral tests to assess vestibular functioning: Fukuda stepping test, tandem gait test, finger nose pointing, Romberg test, Sharpened Romberg test, Dix-Hall pike test, Log- roll test
- Overview of tinnitus and hyperacusis and tests for assessment
- Pitch matching, loudness matching, residual inhibition, Feldman masking curves Johnson Hyperacusis Dynamic Range Quotient

Practicals **1**

- Administer ABLB, MLB and prepare ladder gram (ABLB to be administered by blocking one ear with impression material) **5**
- Administer classical SISI on 3 individuals and note down the scores Administer tone decay tests (classical and its modifications) and note down the results (at least 3 individuals)
- Administer Bekesy audiometry Administer Brief tone audiometry
- Plot PIPB function using standardized lists in any 5 individuals
- Administer the tests of functional hearing loss (both tone based and speech based) by asking subject to malingering and having a yardstick of loudness.
- Administer CAPD test battery to assess different processes on 3 individuals and note down the scores
- Administer Fukuda stepping test, Tandem gait test, Finger nose pointing, Romberg test, Sharpened Romberg test, Dix-Hallpike test, Log-roll test on 5 of the individuals each and note down the observations.
- Estimate the pitch and loudness of tinnitus in 2 persons with tinnitus (under supervision). Assess the residual inhibition in them.
- Plot Feldman masking curves for a hypothetical case
- Administer Johnson Hyperacusis Dynamic Range Quotient on any 2 of the individuals and note down the scores

Total Hours **7**
5

Text Books:

1. Gelfand, S.A. (2009). Essentials of Audiology. Thieme.
2. Hall, J.W., & Mueller, H.G. (1996). Audiologists' Desk Reference: Diagnostic audiology principles, procedures, and protocols. Cengage Learning.
3. Jerger, J. (1993). Clinical Audiology: The Jerger Perspective. Singular Publishing Group.
4. Katz, J., Medwetsky, L., Burkard, R. F., & Hood, L. J. (Eds.). (2007). Handbook of Clinical Audiology (6th revised North American edition). Philadelphia: Lippincott Williams and Wilkins.
5. Martin, F.N., & Clark, J.G. (2014). Introduction to Audiology (12edition). Boston: Pearson.
6. Roeser, R.J., Valente, M., & Hosford Dunn, H. (2007). Audiology: Diagnosis. Thieme.
7. Stach, B.A. (2010). Clinical audiology: an introduction (2nded). Clifton Park, NY: Delmar Cengage Learning

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the difference between the screening and diagnostic test, need for the test battery approaches.
2. To acquire knowledge about the test to rule out the cochlear and retro cochlear pathology and its interpretations
3. To identify the functional hearing loss with behavioral, pure tone, speech kind of tests.
4. To understand the concepts of central auditory processing disorders, its clinical indicators, tests to identify CAPD and the factors affecting it.
5. To know about the overview of vestibular disorders, tinnitus and hyperacusis. And also to do the subjective and objective test for assessment and its management

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Practicals-II (Speech-Language Pathology)

Semester
III
22BASC1
7

Hours of Instruction/week: 8
No of Credits: 4

Objectives: After completing this course, the student will be able to

- ☐ Administer tools to assess language abilities
- ☐ Examine the oral structures by performing OPME
- ☐ Administer case history

Practical's:

- ☐ Procedures to obtain a speech language sample for speech & language assessment from children of different age groups such as, pre schoolers, kindergarten, primary school and older age groups.
- ☐ Methods to examine the structures of the oral cavity/organs of speech.
- ☐ The tools to assess language abilities in children (with hearing impairment, specific language impairment & mixed receptive language disorder).
- ☐ Development of speech sounds in vernacular and linguistic nuances of the language.
- ☐ To evaluate speech and language components using informal assessment methods.
- ☐ To administer at least two standard tests for childhood language disorders.
- ☐ To administer at least two standard tests of articulation/ speech sounds.
- ☐ To assess speech intelligibility.
- ☐ Analysis of language components – Form, content & use – minimum of 2 samples.
- ☐ Analysis of speech sounds at different linguistic levels including phonological processes – minimum of 2 samples.
- ☐ Transcription of speech language samples – minimum of 2 samples.
- ☐ Analyze differences in dialects of the local language.
- ☐ Case history - minimum of 5 individuals with speech & language disorders.
- ☐ Oral peripheral examination - minimum of 5 individuals.
- ☐ Language evaluation report – minimum of 5. Speech sound evaluation report – minimum of 5.

**Total hours-120
hours**

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the methods to examine the oral structures, Intelligibility, language components.
2. Administer assessment tools for language disorders, Hearing Disorders.
3. Acquire knowledge and administer case history.
4. Prepare language evaluation report

5. Analyze language components, speech sounds, dialects.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		
C O5	M		H	H	H	H	H	H	M		L	H		

**Practicals-II
(Audiology)**

**Semester
III
22BASC1
8**

**Hours of Instruction/week: 8
No of Credits: 4**

Objectives:

- To understand the methods of calibration, different types of hearing loss.
- To obtain detail case history, tuning fork tests and pure tone audiometry.

Practicals:

- Methods to calibrate audiometer.
- Materials commonly employed in speech Audiometry.
- Calculation pure tone average, % of hearing loss, minimum and maximum masking levels.
- Different types of hearing loss and its common causes
- To obtain detailed case history from clients or parents/guardians.
- To carryout commonly used tuning fork tests.
- To administer pure tone Audiometry including appropriate masking techniques on adults using at least techniques
- To administer tests to find out speech reception threshold, speech identification scores, most comfortable and uncomfortable levels on adults.
- Plotting of audiograms with different degree and type with appropriate symbols – 2 audiograms per degree and type Detailed case history taken and its analysis
- Calculation degree, type and percentage of hearing loss on 5 sample conditions
- Case history on at least 5 adults and 3 children with hearing disorders
- Tuning fork test on at least 2 individuals with conductive and 2 individuals with sensori-neural hearing loss
- Pure tone audiometry with appropriate masking on 5 individuals with conductive, 5 individuals SN hearing loss and 3 individuals with unilateral/asymmetric hearing loss – 5

**Total hours-120
hours**

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the methods of calibration
2. Administer case history, tuning fork tests, pure tone audiometry.
3. Acquire knowledge about different types of hearing loss.
4. Plot audiograms and calculate the degree, type and percentage of hearing loss.
5. Understand the masking technique and speech audiometry.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
CO 1	M		H	H	H	H	H	L	M		L	H		
CO 2	M		H	H	H	H	H	L	M		L	H		
CO 3	M		H	H	H	H	H	L	M		L	H		
CO 4	M		H	H	H	H	H	L	M		L	H		
CO 5	M		H	H	H	H	H	H	M		L	H		

Discipline Specific Elective (DSE - III)

Course Amplification Devices

Semester

III

22BASD0

3

Hours of Instruction/Week: 4+1

Number of Credits: 3

Objectives

- To help the students assess the candidacy for hearing aids and counsel accordingly evaluate the listening needs and select the appropriate hearing aid
- Independently program digital hearing aids as per the listening needs of the client and independently assess the benefit from the hearing aid using subjective and objective methods
- Make all types of ear molds, counsel the parents/care givers at all stages

Unit I: Types of hearing aids

1

- Historical development of hearing aids: development of concept of amplification, development of different types of amplification devices
- Review of basic elements of hearing aids: Microphone, Amplifier, Receiver/vibrator, Cords, Batteries.
- Classification and Types of hearing aids
- Body level, ear level, in the ear, ITC, invisible in the canal, CIC Binaural, pseudo binaural, monaural
- Programmable, trimmer digital and digital hearing aids Directional hearing aids, modular hearing aids
- RIC hearing aids Implantable hearing aids Master hearing aids CROS hearing aids
- Group amplification – hard wired, induction loop, FM, infrared
- Assistive listening devices – types and selection (Telephones, Television, typing technology)

2

Unit II: Technological aspects in Hearing Aids

1

- Routing of signals, head shadow/baffle/diffraction effects
- Output limiting and issues related to them: peak clipping, compression
- Concept and use of compression in hearing aids: BILL, TILL, PILL, Wide Dynamic Range Compression, Syllabic Compression, Dual Compression
- Signal processing in hearing aids – BILL, TILL, PILL Signal enhancing technology
- Noise reduction algorithms
- Extended low frequency amplification, frequency lowering technology (transposition, compression)
- Recent advances in hearing aids

2

Unit III: Electro-Acoustic Measurements for Hearing Aids

1

- Purpose and Parameters to be considered: OSPL90, SSPL90, HFA SSPL90, Gain, Full on Gain, HFA Full on Gain, Reference test Gain, Basic Frequency Response, Total Harmonic distortion, Inter modulation Distortion, input Output functions, instrumentation, procedure, variables affecting EAM
- Electro-acoustic measurements, BIS, IEC and ANSI standards
Environmental tests. Care, maintenance and troubleshooting of hearing aids

2

<ul style="list-style-type: none"> ● Counselling and orienting the hearing aid user (Client and significant others) 	
Unit IV: Selection of Hearing Aids	1
<ul style="list-style-type: none"> ● Pre-selection factors; Prescriptive and comparative procedures; Functional gain and insertion gain methods; Use of impedance, OAEs and AEPs audiometry; Hearing aids for conductive hearing loss; Hearing aids for children; Hearing aids for elderly; Selection of non-linear programmable and digital hearing aids ● Hearing aid programming ● Methods for assessing hearing aid benefit ● Real ear insertion measurements for verification of hearing aid benefit: REIG, REUR, REAR, REOR, RESR, REIG, REAG, RECD ● Acoustic feedback in hearing aids 	2
Unit V: Mechano-acoustic couplers (ear molds)	1
<ul style="list-style-type: none"> ● Different types of molds ● Procedure for hard molds and soft mold UV curing methods ● Special modifications in the ear molds: Vents (diagonal and parallel), deep canal molds, short canal, horns, Libby horn, reverse horn, acoustic modifier ● Effect of Mechano- acoustic couplers on the hearing aid output. 	2
PRACTICALS	1
<ul style="list-style-type: none"> ● Listen to the output of different types and classes of hearing aids (monaural, binaural, analog, digital hearing aids), in different settings ● Troubleshoot hearing aids: Check the continuity of the receiver cord using multi meter, measure the voltage of different sized batteries using multi meter, Check voltage of batteries different types and sizes ● Carry out electroacoustic measurements for the body level and ear level hearing aids Program the hearing aid for different configuration and degrees of hearing loss (at least 5 different audiograms) using different prescriptive formulae ● Program the hearing aid for different listening situations (at least 3 different situations) ● Vary the compression settings in a digital hearing aid and note down the differences in the output ● Perform real ear insertion measurements using different hearing aids (body level and ear level, hearing aids of different gains) ● Compare speech perception through conventional BTE and RIC hearing aids using a rating scale ● Observe assistive listening devices such as telephone amplifier, vibro-tactile alarms, note down the candidacy and their utility. ● Administer a questionnaire to assess hearing aid benefit on 2 persons using hearing aids. ● Carry out a role play activity of counselling a hearing aid user ● Ear Molds-take impression for the ear mold using different techniques, different methods and using different materials ● Make hard moulds for any two ears, make soft moulds for any two ears, make vent in the mould you make. 	5

Total Hours

Text Books:

1. Dillon. (2012). Hearing Aids (2 edition). Thieme Medical and Scientific Publisher.
2. Hall, J. W., & Mueller, H. G. (1998). Audiologists' Desk Reference: Audiologic management, rehabilitation, and terminology. Singular Publishing Group.
3. Kates, J. M. (2008). Digital Hearing Aids (1 edition). San Diego: Plural Publishing Inc.
4. Metz, M. J. (2014). Sandlin's Textbook of Hearing Aid Amplification: Technical and Clinical Considerations. Plural Publishing.
5. Mueller, H. G., Hawkins, D. B., & Northern, J. L. (1992). Probe Microphone Measurements: Hearing Aid Selection and Assessment. Singular Publishing Group.
6. Mueller, H. G., Ricketts, T. A., & Bentler, R. A. (2007). Modern Hearing Aids: Pre-fitting Testing and Selection Considerations: 1 (1 edition). San Diego, CA: Plural Publishing Inc.
7. Sandlin, R. E. (Ed.). (1989). Handbook of Hearing Aid Amplification: Clinical Considerations and Fitting Practices v. 2. Boston: Singular Publishing Group.
8. Sandlin, R. E. (Ed.). (1993). Understanding Digitally Programmable Hearing Aids. Boston: Allyn & Bacon.
9. Tate, M. (2013). Principles of Hearing Aid Audiology. Springer.
10. Taylor, B., & Mueller, H. G. (2011). Fitting and Dispensing Hearing Aids (1 edition). San Diego: Plural Publishing Inc.
11. Valente, M. (2002). Hearing Aids: Standards, Options, and Limitations. Thieme.

Course Outcomes-After completing this course, students will be

1. Able to understand the basic concepts and types of hearing aids and its parts, its historic development, and development of amplification systems
2. Concepts of signal processing, signal enhancing and noise reduction technology
3. To know about electroacoustic measurement of the hearing aids and ANSI, BIS and IEC standards, troubleshooting of hearing aids
4. Able to compare the audiometric test results and select the appropriate type and program of the hearing aid to the patients
5. Able to acquire knowledge about the molds, its types, the processing in making the ear molds and its special modifications.

CO / PO	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Motor Speech Disorders in Children

Semester
IV
22BASC1
9

Hours of Instruction/week: 4+1

No of Credits: 3

Objectives:

- To describe the characteristics of motor speech disorders in children such as cerebral palsy, childhood apraxia of speech and other childhood dysarthrias
- To assess the speech and non-speech aspects associated with the above conditions plan
- To execute therapy strategies for children with motor speech disorders

Unit I Neuro-developmental processes in speech production and motor speech disorders

1
2

- Review of neuro-anatomy (cerebral cortex, sub-cortical structures, brainstem, cerebellum, spinal cord & cranial nerves, pyramidal and extra- pyramidal systems) Sensory-motor integration (spatial temporal planning, motor planning and feedback) Anatomic development of speech production systems
- Development of neural pathways of speech motor control (brain maturation, reflexes, sensory and motor)
- Dysarthria in children – cerebral palsy – disorders of tone (spastic, flaccid): definition, etiology, characteristics and associated problems
- Dysarthria in children – cerebral palsy – disorders of movement (hyperkinetic, hypokinetic) and disorder of balance (ataxia): definition, etiology, characteristics and associated problems
- Dysarthria in children – lower motor neuron and other syndromes with motor speech disorders
- Childhood apraxia of speech and nonverbal oral apraxia: definition, characteristics and classification

Unit II Assessment of motor speech disorders in children

1
2

- Case history and developmental neurological evaluation – primitive postural and oropharyngeal reflexes, cranial nerve examination
- Assessment of oral sensory and motor capacity – Oral peripheral mechanism examination, neuro- muscular status
- Assessment of speech sub-systems – quantitative and qualitative
- Assessment of speech intelligibility and comprehensibility
- Assessment of associated problem
- Speech assessment with specific reference to childhood apraxia of speech – Phonetic and phonemic inventory, phonotactics and syllable sequencing, variability of errors, speech intelligibility, fluency and prosody
- Test materials – checklist for childhood apraxia of speech, screening test for developmental apraxia of speech
- Protocols for non-verbal and verbal praxis specific to Indian languages
- Differential diagnosis- dysarthria and other developmental disorders

- Differential diagnosis - childhood apraxia of speech and other developmental disorders

Unit III Management of childhood dysarthria **1**

- ❑ Team approach in rehabilitation of motor speech disorders in children **2**
- ❑ Neuro-developmental therapy
- ❑ Non speech oral-motor exercises: its application for children with dysarthria
- ❑ Management of drooling Behavioral management of respiratory, phonatory, resonatory and articulatory subsystems
- ❑ Prosthetic appliances in treatment of childhood dysarthria
- ❑ AAC in management of motor speech disorders- role of devices, AAC team, candidacy and pre-requisites, symbol selection, techniques, assessment for AAC, effective use of AAC
- ❑ Case studies: Planning intervention for children with dysarthria

Unit IV Management of childhood apraxia of speech **1**

- Principles of motor learning **2**
- Integral stimulation – dynamic temporal cueing
- Multisensory and tactile cueing techniques (motor kinesthetic speech training, sensory motor approach, PROMPTS, Touch cue method & speech facilitation)
- Gestural cueing techniques (signed target phoneme therapy, adapted cueing techniques, cued speech, visual phonics, & Jordon's gestures)
- Miscellaneous techniques (melodic intonation therapy, multiple phonemic approach, & instrumental feedback)
- Cognitive/conceptual/ linguistic /phonological remedial approaches - phonotactics
- Other approaches: Vowel and diphthong remediation techniques (Northampton(Yale) vowel chart and Alcorn symbols), Nancy Kauffman's speech praxis treatment kit
- Use of AAC in childhood apraxia of speech
- Evidence-based practice in intervention for childhood apraxia of speech
- Case studies: Planning intervention for childhood apraxia of speech

Unit V Feeding and swallowing disorders in children **1**

- Embryology- periods and structures of development **2**
- Anatomical structures of swallowing- upper aero digestive system, anatomic difference between adults and children
- Physiology of swallowing- swallow phases, neural control of swallowing, reflexes related to swallowing, suckling and sucking, airway and swallowing
- Terms involved in dysphagia and development of feeding skills
- Causes of dysphagia in children
- Signs and symptoms of dysphagia in children
- Assessment – inferences from neural developmental assessment, cranial nerve examination, assessment scales, nutritive and non-nutritive assessment, instrumental assessment (VFS, cervical

auscultation),
gastrointestinal evaluation

- Management: positioning, oral- motor treatment, team approach, non-oral feeding, transitional feeding, modifications in feeding
- Role of speech-language pathologist in neonatal intensive care with reference to feeding and swallowing

PRACTICALS

1. With the help of models, charts and software, identify the motor control centers in the brain.
2. Perform oro-motor examination in five children and adults and compare
3. Identify oro-motor reflexes (rooting, suckling, & phase bite) in 5 infants.
4. Demonstrate normal posture and breathing patterns required for varied speech tasks.
5. Alter the postures and breathing patterns and notice changes in speech patterns.
6. Assess DDK rate in five typically developing children.
7. Rate intelligibility of speech in five typically developing children. Discuss factors that influenced speech intelligibility and their ratings.
8. Observe and record (a) physical status, (b) oral sensory motor abilities and vegetative skills, (c) respiration, (d) phonation, (e) resonance, (f) articulation and (g) language abilities in five typically developing children. Compare these with observations made from children with motor speech disorders.
9. Perform oro-motor exercises – isotonic and isometric. Discuss strategies to modify exercises for children.
10. Identify from video the AAC system such as low technology vs. high technology systems and different symbol system, that is, Bliss symbols, IICP symbols and different signing systems – Makaton.
11. Observe feeding and swallowing skills in different age groups of children: 2 newborns; 2 infants, 2 toddlers, and 2 older children. Identify the differences in feeding methods, food consistencies, texture, quantity, feeding habits, feeding appliances used by these children.

Total Hours **7**
5

Text Books:

1. Arvedson, J.C., and Brodsky, L. (2002) (2nd Ed.). Pediatric swallowing and feeding. San Diego, Singular publishing.
2. Caruso, F. J. and Strand, E. A. (1999). Clinical Management of Motor Speech Disorders in Children. New York: Thieme.
3. Hardy, J. (1983). Cerebral Palsy. Remediation of Communication Disorder Series by F.N. Martin. Englewood Cliffs, Prentice Hall Inc.
4. Love, R.J. (2000) (2nd Ed.). Childhood Motor Speech Disorders. Allyn & Bacon.
5. Love, R.J. and Webb, W.G. (1993). (2nd Ed.) Neurology for the Speech- Language
6. Pathologist. Reed Publishing (USA)
7. Rosenthal. S., Shipp and Lotze (1995). Dysphagia and the child with developmental disabilities. Singular Publishing Group.
8. Velleman, S. L (2003). Resource guide for Childhood Apraxia of Speech. Delmar/Thomson Learning.

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the concepts of neuroanatomy, development of its neural pathways, and disorders of dysarthria and apraxia of speech in children.
2. Assess the reflexes, OPME, subsystems of speech, speech intelligibility in children.
3. Acquire knowledge about the management of dysarthria in children
4. To know about the team approach and the therapy of speech language pathologist for the childhood apraxia of speech
5. To obtain knowledge about the anatomy and physiology of the swallowing, its development, and the issues in feeding its management.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Child Language Disorders

Semester

Hours of Instruction/week: 4+1

IV

No of Credits: 3

22BASC2

0

Objectives: After completing this course, the student will be able to

- Explain the process of acquisition of language and factors that influence its development in children and identify.
- Assess language delay and deviance in children and select appropriate strategies for intervention.
- Counsel and provide guidance to parents/caregivers of children with language disorders.

Unit I Bases of language acquisition, development and disorders

1

- Theories of language acquisition 1: Biological, Psycholinguistic/syntactic theory
- Theories of language acquisition 2: Cognitive, social interaction/pragmatic, information processing, behavioral
- Pre-cursors for normal development of language
- Development of components of language from birth to two years (pre- linguistic/ pre symbolicto symbolic)
- Development of components of language during preschool period
- Development of components of language during early school age and beyond
- Basic concepts and terminologies of language development in bilingual children –simultaneous versus sequential language acquisition, additive and subtractive bilingualism, process of second language acquisition, variables influencing second language acquisition
- Development of language in culturally diverse environments and exceptional circumstances – neglect and abuse, twins, low-socio economic background
- Over view of language disorders – definition and classification based on ICD, DSM
- Application of ICF in language disorders

2

Unit II Language disorders – definition, classification, causes, and characteristics

1

- Intellectual disability: definition, classification, causes and characteristics
- Autism spectrum disorders: definition, classification, causes and characteristics
- Attention deficit hyperactive disorder: definition, classification, causes and characteristics
- Language impairment - mixed receptive and expressive language disorder, specific language impairment: definition, classification, causes and characteristics
- Learning disability: definition, classification, causes and characteristics
- Acquired childhood aphasia: definition, classification, causes and characteristics

2

- Sensory impairments and language disorders: types, causes and characteristics
- Syndromic conditions leading to language difficulties: William syndrome, fragile x syndrome, Down syndrome
- Other developmental disabilities: deaf-blind, cerebral palsy and multiple disabilities

Unit III Assessment of language in children

1

- ❑ Preliminary components of assessment: Case history, screening, evaluation of environmental, linguistic & cultural variables. **2**
- ❑ Methods to assess children with language disorder: Formal versus informal assessment; types of assessment materials: assessment scales, observational checklists, developmental scales; standardization, reliability, validity, sensitivity and specificity of test materials
- ❑ Informal assessment - pre-linguistic behavior, play, mother-child interaction
- ❑ Language sampling: planning and collecting representative sample; strategies to collecting language sample, audio-video recording, transcription
- ❑ Analysis of language sample: Specific to various components of language such as phonology, morphology, syntax, semantics and pragmatics.
- ❑ Test materials for assessing language skills: Assessment of Language Development(ALD), 3D-Language Assessment Test, Linguistic Profile Test, Com-DEALL checklist, other Indian and global tests
- ❑ Test materials used for children with developmental delay, intellectual disability: Madras Developmental Program Scale, Bayley's Scale for infant and toddler development
- ❑ Test materials used for children with autism spectrum disorder: Modified- Checklist for Assessment of Autism in Toddlers, Childhood Autism Rating Scale, Indian Scale for Assessment of Autism
- ❑ Other test materials used for children with ADHD, ACA, LD (NIMH battery for assessment of Learning Disability)
- ❑ Documenting assessment results: diagnostic report, summary report and referral report specific to disorder. Differential diagnosis of language disorders in children

Unit IV Management of language disorders in children – I

1

- General principles and strategies of intervention in children with language impairment – purpose of intervention, basic approaches to language intervention(developmental or normative approach, functional approach) **2**
- Types of service delivery models - Individuals versus group; direct versus tele-rehabilitation; structure of therapy session, setting the environment, furniture, seating arrangements
- Reinforcement in language therapy, types and schedules of reinforcement
- Choice of language for intervention, incorporating principles of multiculturalism into treatment activities
- Choosing and framing goals and Objectives: SMART Objectives
- Specific treatment techniques Incidental teaching, self-talk, parallel talk, expansion, extension, recasting, joint routines, joint book reading, whole language, modifying linguistic input, communicative temptations drill, modelling
- Focused stimulation, vertical structuring, milieu teaching, and model

- Caregivers and family in intervention: Structured and informal approaches

Unit V Management of language disorders in children – II

12

- ☐ Team approach to intervention
- ☐ Augmentative and alternative communication – types (aided and unaided) and application in child language disorders
- ☐ Specific approaches to management of children with Autism: PECS, Lovaas, TEACCH, Com-DEALL, ABA, Facilitated Communication
- ☐ Approaches to management of children with LD
- ☐ Strategies to facilitate language skills in children with disorders such as intellectual disability: Redundancy, chunking, chaining
- ☐ Use of technology in language intervention
- ☐ Home plan and counselling for children with language disorders
- ☐ Documentation specific to the disorder: pre-therapy; lesson plan; SOAP notes
- ☐ Documentation specific to the disorder: summary report, referral report
- ☐ Decision making in therapy: transition to next objective, termination of therapy

PRACTICALS

15

1. Record mother-child interaction of one typically developing child in the age range of 0-1, 1-2, 2-4, 4-6 and 6-8 years of age. Compare linguistically the outputs from them other and the child across the age groups. Make inferences on socio cultural influences in these interactions.
2. Make a list of loan words in two familiar languages based on interaction with 10 typically developing children in the age range of 2-4, 4-6, 6-8 and 8-10 years.
3. Discuss the influence of bi- or multilingualism on vocabulary.
4. Record a conversation and narration sample from 3 children who are in preschool kindergarten, and primary school. Perform a language transcription and analyze for form, content and use.
5. Administer 3D LAT, ALD, LPT, Com DEALL checklist on 2 typically developing children.
6. Draft a diagnostic report and referral letter for a child with language disorder.
7. Demonstrate general language stimulation techniques and discuss the clinical application.
8. Demonstrate specific language stimulation techniques with appropriate materials and discuss its clinical applications.
9. Draft Subjective Objective Assessment Plan (SOAP) for a pre-recorded sample of a 45 minute session of intervention for a child with language disorder.
10. Draft a lesson plan for a child with language disorder.
11. Draft a discharge summary report for a child with language disorder

Total Hours 75

Text Books:

1. Roseberry-McKibbin, C. (2007). Language Disorders in Children: A multicultural and case perspective. Boston: Pearson Education, Inc.
2. Paul, R. (2013). Language disorders from infancy through adolescence (4th ed.).
3. St.Louis, MO: Mosby.Dwight, D.M. (2006). Here's how to do therapy: Hand-on core skills in speech language pathology. San Diego, CA: Plural Publishing
4. Hegde, M.N. (2005). Treatment protocols for language disorders in children – Vol. 1 San Diego: Plural Publishing

5. Owens, R.E. (2008). Language development: An introduction (7th ed.). Boston: Pearsons
6. Reed, V.A. (2004). An Introduction to children with language disorders (3rd Ed.)New York: Allyn & Bacon
7. Rout, N and Kamraj, P (2014). Developing Communication - An Activity Book, A publication by NIEPMED, Chennai. Freely downloadable from
8. <http://niepmd.tn.nic.in/publication.php>. ISBN 978-81-928032-41.

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the bases of language acquisition, development and disorders
2. Define, classify the Language disorders.
3. To asses language in children
4. Acquire knowledge about management of language disorders in children
5. Administer standardized test for normal and clinical population.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Diagnostic Audiology-Physiological Tests

Semester
IV
22BASC2
1

Hours of Instruction/week: 4+1
No of Credits: 3

Objectives: After completing this course, the students will be able to

- Justify the need for using the different physiological tests in the audiological assessment
- Independently run the tests and interpret the results to detect the middle ear, cochlear and retro cochlear pathologies and also differentially diagnose
- Design tailor-made test protocols in immittance, AEPs and OAEs as per the clinical need make appropriate diagnosis based on the test results and suggest referrals.

Unit I Immittance evaluation

1
2

- Clinical significance of physiological tests in audiology
- Immittance evaluation: Principle of immittance evaluation: Concept of impedance and admittance, their components,
- Tympanometry: definition, measurement procedure, response parameters, their measurement and normative, classification of tympanogram, clinical significance of tympanometry
- Eustachian tube functioning tests of tympanometry: basics of pressure equalization function of ET, Valsalva, Toynbee, William's pressure swallow, inflation-deflation test.
- Overview on multicomponent and multi-frequency tympanometry
- Overview on wide band reflectance and wide band tympanometry
- Reflexometry: definition, acoustic reflex pathway, measurement procedure, clinical applications of acoustic reflexes, special tests

Unit II Auditory evoked potentials (AEPs): Auditory brainstem response (ABR)

1
2

- ☐ Introduction and classification of AEPs
- ☐ Instrumentation
- ☐ Principles of AEP recording techniques:
- ☐ Auditory brainstem response generators
- ☐ Protocol and procedure of recording auditory brainstem response
- ☐ Factors affecting auditory brainstem responses
- ☐ Clinical applications of ABR
- ☐ ABR in the pediatric population
- ☐ Role of ABR in infant hearing screening

Unit III Overview of other AEPs	1
? ECoG	2
? Auditory Middle Latency Responses (AMLR) and their clinical applications	
? Auditory Long Latency Responses (Obligatory responses) and their clinical applications	
? Other long latency potentials such as P300, MMN, P600, N400, T-complex, CNV) and their clinical applications	
? ASSR: Instrumentation, recording and clinical applications	
? Brainstem responses to speech and other complex signals	
Unit IV Otoacoustic emissions	1
• Introduction to otoacoustic emissions	2
• Origin and classification of OAEs	
• Instrumentation	
• Procedure of OAE measurement: SOAE, TEOAEs, and DPOAEs	
• Interpretation of results: SOAE, TEOAEs, and DPOAEs	
• Clinical applications of OAEs: SOAE, TEOAEs, and DPOAEs	
• Contralateral suppression of OAEs and its clinical implications	
Unit V Physiological tests for assessment of vestibular system	1
• Electronystagmography: procedure, interpretation, clinical applications	2
• Video nystagmography, video oculograph	
• Vestibular Evoked Myogenic Potentials	
• Overview of Rotatory chair test, video Head Impulse Test,	
• Overview of Dynamic Posturography	
PRACTICALS	1
1. Measure admittance in the calibration cavities of various volumes and note down the observations	5
2. Calculate Equivalent ear canal volume by measuring static admittance in an uncompensated tympanogram (10 ears)	
3. Do tympanogram in the manual mode and measure peak pressure, peak admittance and ear canal volume manually using cursor (10 ears).	
4. Measure gradient of the tympanogram (10 ears)	
5. Administer Valsalva and Toynbee and William's pressure swallow test (5 ears)	
6. Record acoustic reflex thresholds in the ipsi and contra modes, (10 ears)	
7. Plot Jerger box pattern for various hypothetical conditions that affect acoustic reflexes and interpret the pattern and the corresponding condition.	
8. Carry out Acoustic reflex decay test and quantify the decay manually using cursor (5 individuals).	
9. Trace threshold of ABR (in 5 dB nHL steps near the threshold) for clicks and tone bursts of different frequencies (2 persons) and draw latency intensity function.	
10. Record ABR using single versus dual channels and, note down the differences	
11. Record ABR at different repetition rates in 10/sec step beginning with 10.1/11.1 per second. Latency-repetition rate function needs to be drawn.	

12. Record with each of three transducers (HP, insert phones and bone vibrator) and polarities and draw a comparative table of the same.

Students

should also record with different transducers without changing in the protocol in the instrument and calculate the correction factor required.

13. Record ASSR for stimuli of different frequencies and estimate the thresholds
14. Record TEOAEs and note down the amplitude, SNR, noise floor and reproducibility at octave and mid-octave frequencies. Note down the stimulus stability and the overall SNR (10 ears).
15. Record DPOAEs and note down the amplitude, SNR, noise floor and reproducibility at octave and mid-octave frequencies (10 ears)

Total Hours **7**
5

Text Books:

1. Hall, J. W., & Mueller, H. G. (1996). Audiologists' Desk Reference: Diagnostic audiology principles, procedures, and protocols. Cengage Learning.
2. Hood, L. J. (1998). Clinical Applications of the Auditory Brainstem Response. Singular Publishing Group.
3. Hunter, L., & Shahnaz, N. (2013). Acoustic Immittance Measures: Basic and Advanced Practice (1edition). San Diego, CA: Plural Publishing.
4. Jacobson, G. P., & Shepard, N. T. (2007). Balance Function Assessment and Management (1edition). San Diego, CA: Plural Publishing Inc.
5. Jacobson, J. T. (1985). The Auditory brainstem response. College- Hill Press.
6. Katz, J., Medwetsky, L., Burkard, R. F., & Hood, L. J. (Eds.). (2007). Handbook of Clinical Audiology (6th revised North American edition). Philadelphia: Lippincott Williams and Wilkins Mc Caslin, D. L. (2012). Electro nystagmography / Video nystagmography (1 edition). San Diego: Plural Publishing.
7. Musiek, F. E., Baran, J. A., & Pinheiro, M. L. (1993). Neuro audiology: Case Studies (1 edition). San Diego, Calif: Singular.
8. Robinette, M. S., & Glatke, T. J. (Eds.). (2007). Otoacoustic Emissions: Clinical Applications (3rd edition). New York: Thieme.

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the concepts of immittance, its components and the test under that, its procedures and its clinical significance.
2. Acquire knowledge about the auditory brainstem response, its principles, procedure and interpretation and factors affecting the tests.
3. To know about other auditory evoked potentials, its procedure and interpretation
4. Understand the origin of otoacoustic emissions, classification, procedure, interpretation and clinical applications.
5. To do the physiological test for assessment of vestibular systems.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Practicals-III (Speech-Language Pathology)

Semester
IV
22BASC2
2

Hours of Instruction/week: 7
No of Credits: 4

Objectives:

- ☐ To understand speech and language stimulation techniques and administer test materials.
- ☐ To be able to collect and analyze different sample of voice and speech production.

Practicals:

- ☐ Speech & language stimulation techniques.
- ☐ Different samples /procedures required to analyse voice production mechanism. (acoustic/ aerodynamic methods / visual examination of larynx/ self evaluation)
- ☐ Different samples /procedures required to analyse speech production mechanism in children with motor speech disorders.
- ☐ To administer at least two more (in addition to earlier semester) standard tests for childhood language disorders.
- ☐ To administer at least two more (in addition to earlier semester) standard tests of articulation/ speech sounds.
- ☐ To set goals for therapy (including AAC) based on assessment/test results for children with language and speech sound disorders.
- ☐ To record a voice sample for acoustic and perceptual analysis.
- ☐ To assess parameters of voice and breathing for speech.
- ☐ Assessment protocol for children with motor speech disorders including reflex profile and swallow skills.
- ☐ Counseling for children with speech-language disorders. Show: Acoustic analysis of voice – minimum of 2 individuals with voice disorders.
- ☐ Simple aerodynamic analysis - minimum of 2 individuals with voice disorders.
- ☐ Self evaluation of voice – minimum of 2 individuals with voice disorders.
- ☐ Informal assessment of swallowing – minimum of 2 children.
- ☐ Assessment of reflexes and pre linguistic skills - minimum of 2 children.
- ☐ Pre –therapy assessment and lesson plan for children with language and speech sound disorders - minimum of 2 children each.
- ☐ Case history - minimum of 2 individuals with voice disorders.
- ☐ Case history - minimum of 2 children with motor speech disorders
- ☐ Oral peripheral examination- minimum of 5 children Apply speech language stimulation/therapy techniques on 5 children with language disorders (with hearing impairment, specific language impairment & mixed receptive language disorder)/speech sound disorders – minimum of 5 sessions of therapy for each child.
- ☐ Exit interview and counseling - minimum of 2 individuals with speech language disorders.

**Total Hours-105
hours.**

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the speech and Language stimulation techniques
2. Administer case history for voice and motor speech disorders.
3. Record and analyze different samples of voice and speech production.
4. Acquire knowledge about the pre therapy assessment and lesson plan
5. Understand aerodynamic analysis, perceptual analysis of voice

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		
C O5	M		H	H	H	H	H	H	M		L	H		

Practicals-III (Audiology)

Semester
IV
22BASC2
3

Hours of Instruction/week: 7
No of Credits: 4

Objective:

- ☐ To administer tests to CAPD and select type of ear moulds for different population.
- ☐ To perform special tests, hearing aid fitment, hearing aid selection and electro acoustic measurement

Practicals:

- ☐ Indications to administer special tests
- ☐ Procedures to assess the listening needs National and international standards regarding electro acoustic characteristics of hearing aids
- ☐ To administer at least 1 test for adaptation, recruitment and functional hearing loss.
- ☐ Counsel hearing aid user regarding the use and maintenance hearing aids
To troubleshoot common problems with the hearing aids
- ☐ To select test battery for detection of central auditory processing disorders.
- ☐ Select different types of ear moulds depending on type of hearing aid, client, degree, type and configuration of hearing loss
- ☐ Electro acoustic measurement as per BIS standard on at least 2 hearing aids
- ☐ How to process 2 hard and 2 soft moulds How to preselect hearing aid depending on listening needs and audiological findings on at least 5 clinical situations (case files)
- ☐ How select test battery depending on case history and basic audiological information – 3 situations
- ☐ Tone decay test – 2 individuals with sensori-neural hearing loss
- ☐ Strenger test – 2 individuals with unilateral/asymmetrical hearing loss
- ☐ Dichotic CV/digit, Gap detection test – 2 individuals with learning difficulty or problem in hearing in noise
- ☐ Hearing aid fitment for at least 5 individuals with mild to moderate and 3 individuals with mod-severe to profound
- ☐ Hearing aid selection with real ear measurement system on 3 individuals with hearing impairment

**Total hours-105
hours**

Course outcomes: On the successful completion of the course, students will be able to

1. Administer special tests like tone decay, dichotic digits and Stenger test.
2. Perform hearing aid selection and fitment.
3. Acquire knowledge about test batteries for CAPD
4. Process hard and soft mould for clinical population.
5. Perform electro acoustic measurement and counsel the hearing aid user.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		
C O5	M		H	H	H	H	H	H	M		L	H		

Discipline Specific Elective (DSE - IV)
Course Implantable Hearing Devices

Semester

IV

22BASD0

4

Hours of Instruction/week: 3+1

No of Credits: 3

Objectives: After completing this course, the students will be able to

- Assess candidacy for bone anchored hearing devices, middle ear implants, cochlear implants, and ABI
- Select the appropriate device depending on the audiological and non- audiological findings
- handle post-implantation audiological management and assess the benefit derived from implantation, and counsel the parents/care givers during different stages of implantation

Unit I Implantable hearing devices – basics

9

- Need for implantable hearing devices
- History of implantable hearing devices (bone anchored hearing devices, middle ear implants, cochlear implants, auditory brainstem implants and midbrain implants)
- Candidacy for implantable hearing devices
- Team involved in implantable hearing devices
- Pre-implant counseling, Informed consent

Unit II Bone anchored hearing devices and middle ear implants

9

- Types, components
- Surgical approaches, risks, complications
- Audiological evaluations for candidacy, contraindications
- Assessment of benefits

Unit III Cochlear implant and brain stem implants – basics

9

- ☐ Terminology, types, components and features
- ☐ Bilateral, bimodal and hybrid cochlear implants
- ☐ Factors related to selection of the device, funding sources
- ☐ Surgical approaches, risks, complications
- ☐ Audiological and non-audiological candidacy criteria, contraindications

Unit IV Cochlear implants and brainstem implants

9

- Signal coding strategies, classification, types
- Intraoperative monitoring by audiologists
- Objective measures: ESRT, ECAP, prom stim, EABR, aided cortical potentials
- Post implant Mapping: schedule, pre-requisites, switch-on, mapping parameters, impedance, compliance, role of objective and subjective measures in mapping, post mapping audiological evaluation
- Assessment of benefits and Optimization of hearing aid on contra lateralear

Unit V Implantable hearing devices - Counselling and troubleshooting; 9
Rehabilitation

- Post implant Counselling on care and maintenance and troubleshooting of the device

- Overview of post implant rehabilitation including AVT
- Factors affecting outcome of implantable devices in adults and children

PRACTICALS

1. Watch videos of BAHA, middle ear implant, cochlear implant	1
2. Create hypothetical cases (at least 5 different cases) who are candidates for cochlear implantation. Make protocol for recording an EABR	5
3. List down the technological differences across different models of cochlear implants from different companies, their cost	
4. Observation of mapping	
5. Watching of videos on AVT	
6. Watch video on cochlear implant surgery	
Total Hours	6
	0

Text Books:

1. Clark, G., Cowan, R. S. C., & Dowell, R. C. (1997). Cochlear Implantation for Infants and Children: Advances. Singular Publishing Group.
2. Cooper, H., & Craddock, L. (2006). Cochlear Implants: A Practical Guide. Wiley.
3. Dutt, S. N. (2002). The Birmingham Bone Anchored Hearing Aid Programme: Some Audiological and Quality of Life Outcomes. Den Haag:Print Partners Ipskamp.
4. Eisenberg, L. S. (2009). Clinical Management of Children with Cochlear Implants. Plural Publishing.
5. Gifford, R. H. (2013). Cochlear Implant Patient Assessment: Evaluation of Candidacy, Performance, and Outcomes. Plural Publishing.
6. Hagr, A. (2007). BAHA: Bone-Anchored Hearing Aid. International Journal of Health Sciences, 1(2), 265–276.
7. Kim C. S., Chang S. O., & Lim D. (Eds.). (1999). Updates in Cochlear Implantation the 2nd Congress of Asia Pacific Symposium on Cochlear Implant and Related Sciences, Seoul, April 1999 (Vol. 57). Seoul: KARGER.
8. Kompis, M., & Caversaccio, M.-D (2011). Implantable Bone Conduction Hearing Aids. Karger Medical and Scientific Publishers.
9. Mankekar, G. (2014). Implantable Hearing Devices other than Cochlear Implants. Springer India.
10. Møller A.R. (2006). Cochlear and Brainstem Implants (Vol. 64).
11. Niparko, J. K. (2009). Cochlear Implants: Principles & Practices. Lippincott Williams & Wilkins.

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the history, need, candidacy for the implantable hearing aids.
2. Know Knowledge about the types, surgical methods and audiological evaluations in bone anchored hearing devices and middle implants
3. Obtain knowledge about the types, factors related to the selection, surgical procedures, and audiological evaluations for cochlear implants
4. Acquire knowledge about the signal coding strategies and objective measures after the surgery of cochlear implants and brainstem implants
5. Counsel and troubleshoot after the surgeries, to do the rehabilitation services

and factors affecting the outcome

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Structural Anomalies and Speech Disorders

Semester V

Hours of Instruction/week: 4+1

22BASC24

No of Credits: 3

Objectives: After completing the course, the student will be able to

- Understand the characteristics of disorders with structural anomalies including speech
- Evaluate and diagnose the speech characteristics seen in these disorders
- Learn about the techniques for the management of speech disorders in these conditions

Unit I Speech characteristics of persons with cleft lip and palate **1**

- Types, characteristics and classification of cleft lip and palate **2**
- Causes of cleft lip and palate: genetic, syndrome and others
- Velopharyngeal inadequacy: types, causes and classification
- Associated problems in persons with cleft lip and palate: speech, language, feeding, dental and occlusion, hearing, psychological

Unit II Assessment and management of cleft lip and palate speech **1**

- Team of professionals in the management of persons with cleft lip and palate: their roles in diagnosis and management. **2**
- Assessment of persons with cleft lip and palate for speech language functions: Subjective assessment of speech characteristics and speech intelligibility: profoma, tests, scales and others.
- Objective assessment of phonatory, resonatory and articulatory features Diagnosis and differential diagnosis of speech related functions
- Subjective assessment of language and communication functions
- Reporting test results using Universal Parameters
- Management of persons with cleft lip and palate
- Surgical and prosthetic management
- Techniques and strategies to correct speech sound disorders
- Techniques and strategies to improve feeding
- Counselling and guidance

Unit III Structural anomalies of tongue and mandible - Characteristics, assessment and management **1**

- ② Types, classification and characteristics of structural anomalies of tongue and mandible **2**
- ② Causes for structural anomalies of tongue and mandible
- ② Team of professionals in the management of persons with structural anomalies of tongue and mandible and their roles.
- ② Associated problems in persons with structural anomalies of tongue and mandible: Speech, Feeding, Dental and occlusion, Psychological and others
- ② Management of persons with structural anomalies of tongue and mandible Surgical and prosthetic management, Techniques and strategies to improve speech intelligibility, Techniques and strategies to improve feeding

- ☐ Counselling and guidance for persons with glossectomy and mandibulectomy

Unit IV Characteristics & assessment of laryngectomy

1

- Causes, symptoms and classifications of laryngeal cancers

2

- Team of professionals in the management of persons with laryngeal cancer
- Surgery for laryngeal cancers: types and outcome
- Associated problems in laryngectomy individuals
- Assessment of speech and communication skills of laryngectomy individuals: Pre and post-operative considerations

Unit V Management of speech and communication in laryngectomies **1**

- Esophageal speech: candidacy, types of air intake procedures, speech characteristics and its modification through techniques and strategies, complications and contraindications. **2**
- Tracheo-esophageal speech: candidacy, types of TEP, fitting of prosthesis, speech characteristics and its modification through techniques and strategies, complications and contraindications.
- Artificial larynx: types, factors for selection, output characteristics, techniques for efficient use of artificial larynx, complications and contraindications.
- Other remedial procedures: Pharyngeal speech, buccal speech, ASAI speech, gastric speech.

PRACTICALS **1**

1. Identify the different types of cleft lip and palate by looking at illustrations and images **5**
2. Listen to 10 speech samples of children with cleft lip and palate and rate their nasality/ speech (articulation and cleft type errors) based on universal reporting parameters.
3. Identify the type of closure of Velopharyngeal port for 5 normal individuals and 5 individuals with cleft lip and palate using videos of nasoendoscopy / videofluoroscopy.
4. Perform oral peripheral mechanism examination on 10 individuals and document the structure and functions of the articulators.
5. Analyse the different types of occlusion in 10 individuals.
6. Identify the type of glossectomy by looking at pictures/illustrations.
7. Identify the different types of prosthesis in the management of head and neck cancer.
8. Analyse the speech profile of 5 individuals with laryngectomy.
9. Identify parts of an artificial larynx and explore its use.
10. Prepare a checklist / pamphlet illustrating care of the stoma and T-tubes in vernacular.

Total Hours **7**
5

Text Books:

1. Berkowitz. S. (2001). Cleft Lip and Palate: Perspectives in Management. Vol II. San Diego, London, Singular Publishing Group Inc.
2. Falzone. P., Jones. M. A., & Karnell. M. P. (2010). Cleft Palate Speech. IV Ed., Mosby Inc.
3. Ginette, P. (2014). Speech Therapy in Cleft Palate and Velopharyngeal Dysfunction. Guildford, J & R Press Ltd.
4. Karlind, M. & Leslie, G. (2009). Cleft Lip and Palate: Interdisciplinary Issues and Treatment. Texas, Pro Ed.
5. Kummer, A.W. (2014). Cleft Palate and Craniofacial Anomalies: The Effects on Speech and Resonance. Delmar, Cengage Learning.
6. Peterson-Falzone, S. J., Cardomone, J. T., & Karnell, M. P. (2006). The Clinician Guide to Treating Cleft Palate Speech. Mosby, Elsevier.

7. Salmon . J & Shriley (1999). A laryngeal speech rehabilitation for clinicians and by clinicians. Pro Ed
8. Yvonne, E (Ed) (1983). Laryngectomy: Diagnosis to rehabilitation. London: Croom Helm Ltd

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the types, Characteristics, cause and associated problems in cleft lip and palate
2. Acquire knowledge about team of professionals and subjective and objective measurements in cleft lip and palate.
3. Understand the types, Characteristics, cause and associated problems with structural anomalies of tongue and mandible.
4. Acquire knowledge about team of professionals, causes, symptoms and classification of laryngeal cancers.
5. To understand the laryngeal surgeries and management of speech and communication in laryngectomy

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Fluency and its Disorders

Semeste

Hours of Instruction/week: 4+1

r V

No of Credits: 3

22BASC

25

Objectives: After completion of the course, the student will be able to

- ☐ Understand the characteristics of fluency and its disorders
- ☐ Evaluate and diagnose fluency disorders
- ☐ Learn about the techniques for the management of fluency disorders

Unit I Fluency

1

- Scope and definition of fluency
- Factors influencing fluency
- Definition and characteristics of features of suprasegmental in speech: rate of speech, intonation. rhythm, stress and pause
- Suprasegmental features in typical speech
- Suprasegmental features in the speech of persons with fluency disorders
- Developmental aspects of suprasegmental of speech
- Normal non-fluency

2

Unit II Stuttering and other fluency disorders

1

- Stuttering: Definition and causes for stuttering
- Characteristics of stuttering: core and peripheral characteristics, primary and secondary stuttering, effect of adaptation and situation
- Development of stuttering
- Normal non fluency: characteristics and differential diagnosis
- Theories of stuttering: organic, functional, neurogenic, diagnosogenic and learning
- Cluttering: Definition, causes and characteristics
- Neurogenic stuttering: Definition, causes and characteristics

2

Unit III Assessment and differential diagnosis

1

- ☐ Assessment of fluency disorders: stuttering, cluttering, neurogenic stuttering and normal non fluency:
- ☐ Subjective methods: protocols and tests
- ☐ Objective methods
- ☐ Qualitative and quantitative assessment
- ☐ Differential diagnosis of fluency disorders

2

Unit IV Management of stuttering

1

- Approaches to management
- Changing scenario in management of stuttering
- Different techniques and strategies used in management with their rationale
- Relapse and recovery from stuttering
- Issues of speech naturalness in stuttering

2

Unit V Management of fluency-related entities	1
<ul style="list-style-type: none"> ● Management of cluttering: rationale, techniques and strategies ● Management of neurogenic stuttering: rationale, techniques and strategies ● Management of normal non-fluency: rationale, techniques and strategies ● Relapse and recovery in cluttering and neurogenic stuttering. Changes in normal non fluency ● Prevention and early identification of stuttering, and cluttering 	2
PRACTICALS	1
<ol style="list-style-type: none"> 1. Assess the rate of speech in 5 normal adults. 2. Record and analyse the supra segmental features in typically developing children between 2 and 5 years. 3. Record audio visual sample of 5 typically developing children and 5 adult's for fluency analysis. 4. Listen/see samples of normal non fluency and stuttering in children and document the differences. 5. Identify the types of dysfluencies in the recorded samples of adults with stuttering. 6. Instruct and demonstrate the following techniques: Airflow, prolongation, easy onset shadowing techniques. 7. Record 5 speech samples with various delays in auditory feedback and analyse the differences. 8. Administer SPI on 5 typically developing children. 9. Administer SSI on 5 adults with normal fluency. 10. Administer self-rating scale on 10 adults with normal fluency. 	5
Total Hours	7
	5

Text Books:

1. Assessment and management of fluency disorders. Proceedings of the national workshop on "Assessment and management of fluency disorders", 25-26 Oct 2007. All India Institute of Speech & Hearing, Mysore. 2007.
2. Bloodstein, O., & Ratner, N. B. (2008). A Handbook on Stuttering (6th Ed.). Clifton Park, NY, Thomson Demer Learning.
3. Guitar, B. (2014). Stuttering-An Integrated Approach to its Nature and Treatment. 4th Ed. Baltimore, Lippincott Williams & Wilkins.
4. Hegde, M. N. (2007). Treatment Protocols for Stuttering. CA Plural Publishing.
5. Howell, P. (2011). Recovery from Stuttering. New York, Psychology Press.
6. Packman, A., & Attanasio, J.S. (2004). Theoretical Issues in Stuttering. NY, Psychology Press.
7. Rentschler, G. J. (2012). Here's How to Do: Stuttering Therapy. San Diego, Plural Publishing
8. Wall, M. J., & Myers F. L. (1995). Clinical Management of Childhood Stuttering. Texas, PRO-ED, Inc.
9. Ward, D. (2006). Stuttering and Cluttering: Frameworks for Understanding & Treatment. NY, Psychology Press.
10. Yairi, E., & Seery, C. H. (2015). Stuttering - Foundations and Clinical Applications. 2nd Ed. USA, Pearson Education, In.

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the characteristics of fluency and factors affecting it
2. Understand the concept of stuttering, development, causes and theories of stuttering
3. Differentiate stuttering and other fluency related disorders
4. To treat stuttering with appropriate approaches and techniques
5. To give therapy for different fluency related disorders.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Paediatric Audiology

Semester

Hours of Instruction/week: 4+1

Year V

No of Credits: 3

22BASC

26

Objectives: After completing this course, the student will be able to understand

- Describe auditory development and list etiologies and relate them to different types of auditory disorders that may arise
- Explain different hearing screening/identification procedures and their application
- Elaborate on different aspects of paediatric behavioral and physiological /electrophysiological evaluation

Unit I Auditory development

1

- Review of Embryology of the ear
- Development of auditory system from periphery to cortex
- Neuroplasticity
- Prenatal hearing
- Normal auditory development from 0-2 years
- Infant speech perception
- Incidence and prevalence of auditory disorders in children

2

Unit II Auditory disorders

1

- Congenital and acquired hearing loss in children
- Permanent minimal and mild bilateral hearing loss
- Impact on auditory skills, speech-language, educational and socio- emotional abilities
- Moderate to profound sensorineural hearing loss
- Unilateral hearing loss
- Auditory Neuropathy Spectrum Disorders
- Central auditory processing disorders
- Pseudohypacusis
- Auditory disorders in special population and multiple handicap

2

Unit III Early identification of hearing loss

1

- ☐ Principles of early hearing detection and intervention programs
- ☐ Principles and history of hearing screening
- ☐ Joint Committee on Infant Hearing position statement (2000, 2007,2013)
- ☐ High risk register/ checklists for screening
- ☐ Sensitivity and specificity of screening tests
- ☐ Hearing screening in infants and toddlers: Indian and Global context
- ☐ Hearing screening in preschool children: Indian and Global context
- ☐ Hearing screening in school-age children (including screening for CAPD): Indian and Global context

2

Unit IV Paediatric assessment I

1

- Behavioral observation audiometry
- Conditioned orientation reflex audiometry
- Visual reinforcement audiometry, TROCA, play audiometry
- Pure tone audiometry in children: Test stimuli, response requirement and reinforcement

2

- Speech audiometry (SRT, SDT); Speech recognition and speech perception tests developed in India)
- Bone conduction speech audiometry
- Immittance evaluation in paediatric population
- Central auditory processing disorders assessment

Unit V Paediatric assessment II **1**

- Recording and interpretation of OAE in paediatric population **2**
- Factors affecting OAE in paediatric population
- Recording and interpretation of click evoked and tone burst evoked ABR in paediatric population
- Factors affecting ABR in paediatric population
- Recording ASSR in paediatric population
- Recording AMLR, ALLR in paediatric population
- Assessment of hearing loss in special population
- Diagnostic test battery for different age groups
- Diagnosis and differential diagnosis

PRACTICALS **1**

1. Observe a child with normal hearing (0-2 years) in natural settings. Write a report on his/her responses to sound. **5**
2. Observe a child with hearing impairment (0-2 years) in natural settings. Write a report on his/her responses to sound with and without his amplification device
3. Administer HRR on at least 3 newborns and interpret responses
4. Based on the case history, reflect on the possible etiology, type and degree of hearing loss the child may have.
5. Compare ABR wave forms in children of varying ages from birth to 24 months.
6. Observe live or video of BOA/VRA of a child with normal hearing and hearing loss and write a report on the instrumentation, instructions, and stimuli used, procedure and interpretation.
7. Observe OAE in a child with normal hearing and a child with hearing loss. Write a report on the instrumentation, protocol used and interpretation
8. Observe ABR in a child with normal hearing and a child with hearing loss. Write down a report on the instrumentation, protocol used and interpretation
9. Observe immittance evaluation in a child with normal hearing and a child with hearing loss. Write a report on the instrumentation, protocol used and interpretation
10. Using role play demonstrate how the results of audiological assessment are explained to caregiver in children with the following conditions
11. Child referred in screening and has high risk factors in his history
12. Child with chronic middle ear disease
13. Child with CAPD
14. Child with severe bilateral hearing impairment

Total Hours **7**
5

Text Books:

1. Chan, Y. and Goddard, J.C. (2015). K J Lee's Essential otolaryngology: head and neck surgery. (11th edition). New Delhi: Atlantic Publisher and Distributers

2. Dhingra, P. L. (2013). Diseases of Ear, Nose and Throat (Sixth edition). Elsevier.
3. O'Neill, J.P. and Shah, J.P. (2016). Self-assessment in otolaryngology. Amsterdam: Elsevier
4. Postic, W.P., Cotton, R.T., Handler, S.D. (1997). Ear trauma. Surgical Pediatric Otolaryngology. New York: Thieme Medical Publisher Inc.
5. Wackym, A. and Snow, J.B. (2015). Ballenger's otorhinolaryngology head and neck surgery. (18th edition). United States: McGraw-Hill Medical

Course outcomes: On the successful completion of the course, students will be able to

1. Understand the auditory development from the embryo till 2 years of child
2. Know about the auditory disorders both congenital and acquired
3. Know about hearing screening and early identification of hearing loss
4. To know about behavioral and objective assessment of auditory system for children
5. To know about electrophysiological assessment of children and test battery for all age groups

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Aural Rehabilitation in Children

**Semester V
22BASC
27**

**Hours of Instruction/week: 4+1
No of Credits: 3**

Objectives: After completing this course, the student will be able to understand

- Describe the different communication options available for young children with hearing impairment
- Explain the impact of hearing impairment on auditory development and spoken language communication
- Enumerate how the needs of individuals with hearing impairment using sign language and spoken language as form of communication in India are being met

Unit I Auditory development, spoken communication and acoustic accessibility

**1
2**

- Sensitivity period for auditory development
- Impact of hearing impairment on auditory development, spoken language acquisition, parent child communication
- Factors affecting auditory development
- Hearing loss implications for speech perception: acoustics of speech
- Optimizing hearing potential through hearing aids
- Optimizing hearing potential through cochlear implants
- Barriers to acoustic accessibility: distance, signal to noise ratio, reverberation
- Managing the listening environment for infants, toddlers' schools
- Signal to noise ratio enhancing technologies personal FM, loop systems, desktop group systems, blue tooth connectivity

Unit II Communication options

**1
2**

- Detecting and confirming hearing loss
- Parent support counselling, individual family service plan
- Choosing communication options
- Auditory oral approach, Auditory verbal therapy
- Manual/sign language: Indian and Global context
- Cued speech and total communication
- Listening devices hearing aid/cochlear implant
- Early intervention programs

Unit III Optimal listening and learning environments infancy and early childhood

**1
2**

- Involvement of family, Factors impacting family involvement, supporting families through information and education
- Creating optimum listening and learning environment
- Intervention: Assessment, auditory learning, listening and language facilitation techniques in infancy and early childhood
- Issues with children with mild hearing loss, unilateral hearing loss,
- Children with hearing loss, ANSD or APD: Children are intervened late
- Children with hearing loss and other special needs

- Listening and spoken language in school age: benefits of inclusion, Intervention at school age: Functional hearing assessment, communication assessment and intervention to integrate with academic targets

Unit IV Auditory - speech reading training and literacy **1**

- Candidacy for auditory training and speech reading **2**
- Auditory training/learning four design principles skill, stimuli, activity, and difficulty level
- Early training Objectives
- Analytic and Synthetic training Objectives
- Formal and informal training
- Auditory training for infants and very young children
- Outcomes of training
- Speech and language and literacy characteristics
- Speech language and literacy evaluation assessment
- Speech language therapy

Unit V Indian perspectives **1**

- Prevalence of hearing impairment in children **2**
- Education of the deaf in India historical perspectives
- Available resources for education of the hearing impaired
- Early intervention programs and centers
- Schools for the hearing impaired; day schools, residential schools
- Beyond school: college and vocational training
- Training manpower resources for service delivery
- Indian sign language
- Training sign language interpreters
- Cued speech in India
- Assessment and therapy tools developed for individuals with hearing impairment in India.

PRACTICALS

**1
5**

1. Watch documentaries such as “Sound and Fury” (2001). Write a reflection of why parents made communication choices for their children
2. Follow on links to the above film that shows the status of the children with hearing impairment after a few years.
3. Learn at least 50 signs across different categories of Indian sign language. Make a video of you signing 10 sentences. Have a class mate interpret them.
4. Interview a parent of a child with hearing impairment on how they adapted their child to wear the hearing aids and /or implant. What were the first responses to sound they observed and how language and speech develop?
5. Complete a functional auditory evaluation on one child with hearing loss. Do a speech and language evaluation and also write a report on the child strengths and weakness.
6. Design and demonstrate auditory learning activities at the four levels awareness, discrimination, identification and comprehension. Ensure that the activities encompass different skill level and difficulty levels.
7. Develop a short audio/film/pamphlet for parents in your local language on one of the following: teaching parent to trouble shooting the hearing aid/cochlear implant, establishing consistent use of listening device, activities to facilitate language across different age groups

8. Visit a school for the deaf. Document your observation about the acoustic environment in the class, strategies used by the teacher to promote listening and spoken language

Total Hours **7**
5

Text Books:

1. Fitzpatrick, E.M., and Doucet S.P. (2013) (Eds). Paediatric Audiologic Rehabilitation. Thieme, New York
2. Hosford - Dumm, H., Roser, R., & Valente, M. (2007). Audiology Practice Management (2nd edition edition). New York: Thieme.
3. Mardell, J., & Flexer, C. (2013). Paediatric Audiology: Diagnosis, Technology, and Management (2nd Ed.). New York, NY: Thieme.
4. Rout, N and Rajendran, S. (2015). Hearing aid Counselling and Auditory training Manual, A publication of NIPMED, Chennai. Freely downloadable from <http://niepmd.tn.nic.in/publication.php>. ISBN 978-81-928032-5-8.
5. Schwartz, S., (2007) Choices in Deafness : a Parent's guide to Communication Options , 3rd edition Woodbine house Bethesda
6. Status of Disability in India Hearing Impairment (2012) Rehabilitation Council of India, New Delhi
7. Tye-Murray, N., (2014) Foundations of Aural Rehabilitation: Children , adults and their family members 4th edition Plural Publishing San Diego

Course outcomes: On the successful completion of the course, students will be able to

1. To know auditory development and its sensitivity period and factors affecting it
2. To know about various communication options which are available hearing impaired
3. Know the learning environment for the HI and family members and factors affecting it
4. To choose the candidate for auditory training and speech language therapy for HI
5. Know about Indian perspectives regarding prevalence, education and early intervention, sign language for HI

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

**Semester
V
22BASC
28**

Objectives:

- ☐ To Administer standardized tests for various disorders.
- ☐ To perform assessment and prepare report for voice, language, cleft lip and palate and fluency disorders.

- ☐ To administer at least two more (in addition to earlier semesters) standard tests for childhood language disorders.
- ☐ To record a speech sample for analysis of fluency skills (including blocks & its frequency, rate of speech, prosody, etc.).
- ☐ To assess posture and breathing for speech in children with motor speech disorders.
- ☐ To consult with inter-disciplinary medical/rehabilitation team and counsel the individual/family regarding management options and prognosis.
- ☐ Rating of cleft, speech intelligibility and nasality – minimum of 2 individuals with cleft lip and palate.
- ☐ Language assessment - minimum of 2 individuals with cleft lip and palate.
- ☐ Transcription of speech sample and assessment of percentage dis/dysfluency– minimum of 2 individuals with stuttering.
- ☐ Assessment of rate of speech on various speech tasks – at least on 2 children & adults.
- ☐ Voice assessment report - minimum of 2 individuals with voice disorders.
- ☐ Fluency assessment report - minimum of 2 individuals with fluency disorders.
- ☐ Oral peripheral examination on minimum of 2 individuals with cleft lip and palate.
- ☐ Apply speech language stimulation/therapy techniques on 5 children with language disorders/speech sound disorders/ motor speech disorders – minimum 5 sessions of therapy for each child.

hours Course outcomes: On the successful completion of the course, students will be able to

1. Administer standardized tests for various disorders.
2. Record and analyze samples of fluency, voice and language disorders.
3. Prepare voice and fluency assessment report.
4. Apply speech and language therapy techniques for clinical population.
5. Rate speech intelligibility nasality for cleft lip and palate.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M		H	H	H	H	H	L	M		L	H		

C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		
C O5	M		H	H	H	H	H	H	M		L	H		

**Semester
V
22BASC
29**

Hours of Instruction/week: 6
No of Credits: 4

- ☐ To Administer various protocols for tympanometry, reflexometry, OAE and ABR.
- ☐ To perform speech stimulation and auditory training techniques.

- ❓ Different protocols in tympanometry and reflexometry.
- ❓ Different protocols used in auditory brainstem responses
- ❓ Protocols for screening and diagnostic otoacoustic emissions
- ❓ Tests to assess vestibular system Different indications for selecting implantable hearing devices
- ❓ Various speech stimulation and auditory training techniques
- ❓ To administer auditory brainstem responses for the purpose of threshold estimation and site of lesion testing
- ❓ To administer high frequency tympanometry and calculate resonance frequency
- ❓ To administer high risk register
- ❓ To modify the given environment to suit the needs of hearing impairment
- ❓ Analysis of ABR waveforms – threshold estimation 5 and site of lesion 5 Analysis of Immittance audiometry and relating to other tests – 5 individuals with conductive and 5 individuals with sensori-neural hearing loss
- ❓ How to formulate select appropriate auditory training technique based on audiological evaluation
- ❓ Threshold estimation on 5 infants (< 2 years) TEOAE and DPOAE on 5 infants (< 3 years) 2 children (3-6 years)
- ❓ Listening age of 3 children with hearing impairment Appropriate auditory training on 5 children with hearing loss.

hours

Course outcomes:

On the successful completion of the course, students will be able to

1. Administer different protocols of tympanometry, reflexometry, OAE and ABR.
2. Assess vestibular system.
3. Formulate speech stimulation and auditory training techniques.
4. Know to modify environment to suit needs of hearing impaired.
5. Perform threshold estimation and give appropriate auditory training.

[illegible]

C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		
C O5	M		H	H	H	H	H	H	M		L	H		

Aural Rehabilitation in Adults

Semester VI
22BASC34

Hours of Instruction/week: 4+1
No of Credits: 3

Objectives:

- To describe the impact on the quality of life of adults with hearing impairment
- Able to explain the principles benefits and limitations of auditory training and speech reading recognize factors that impair communication and suggest facilitative and repair strategies
- Administer different tools for assessment of hearing handicap, attitudes and beliefs that can impact aural rehabilitation

Unit I: Aural rehabilitation 1

- Definition 2
- Scope of aural rehabilitation in adults
- Prevalence of hearing loss in children (global and Indian data)
Prevalence of hearing loss in adults (global and Indian data)
- Relationship between audiometric data, hearing difficulties and amplification considerations
- Limitations of audiometric data
- Quality of life and impact on income, education, employment; Assessing communication handicap : interviews, questionnaires
Vocational rehabilitation

Unit II: Listening training and speech reading for adults 1

- ☐ Listening to speech with a hearing loss Candidacy for auditory training 2
- ☐ Listening training to improve speech perception
- ☐ Listening training to improve music perception Benefits of auditory training
- ☐ Speech reading for communication
- ☐ Characteristics of good lip readers versus good speech readers
Factors affecting speech reading
- ☐ Assessing vision only auditory only processing Traditional methods of speech reading training

Unit III: Communication strategies 1

- Factors that influence the reception of spoken message 2
- Facilitative communication strategies Repair strategies
- Repairing a communication breakdown
- Conversational styles
- Communication strategies training formal instruction, guided learning, real world practice

Unit IV: Aural rehabilitation for adults 1

- Principles of aural rehabilitation in adults Psychological impact of hearing loss Support through counselling 2
- Orienting towards hearing aid use
- Needs assessment for non-hearing and assistive technology for adults Categories of assistive technology

- Aural rehabilitation programs: Individual vs group Components of aural rehabilitation program Process of aural rehabilitation :
- Communication under adverse listening conditions

Unit V: Aural rehabilitation for older adults **1**

- Influence of aging on the older adults: quality of life and psychological perspectives Influence of aging on the older adults: quality of life and social perspectives Auditory barriers to communication **2**
- Non auditory barriers to communication Barriers to aural rehabilitation
- Factors influencing hearing aid use by the older adult
- Aural rehabilitation for different populations of older adult: independent and semi- independent older adult
- Aural rehabilitation for different populations of older adult: dependent older adult Aural rehabilitation in an old age home
- Hearing aid orientation

PRACTICALS **1**

- ☐ All scales and tools available in Hull R. H; Introduction to aural rehabilitation **5**
- ☐ Listen to the speech recorded using hearing loss simulators (available on internet) and experience the sounds as heard by persons with different degrees of hearing loss. Write your observations on the same
- ☐ Simulate hearing loss by plugging ears and administer sentence tests of word recognition.
- ☐ Write a report on the performance
- ☐ Administer any three self-report questionnaires to three adults who have hearing loss and write a report of the relationship of their hearing loss to performance on the scale
- ☐ Administer any three self-report questionnaires to three older adults who have hearing loss and write a report of the relationship of their hearing loss to performance on the scale
- ☐ Administer any three self-report questionnaires to three adults who wear hearing aids and write a report of the relationship of their hearing loss to performance on the scale Administer the hearing belief questionnaire (Saunders, 2013) on an adult.
- ☐ Identify the positive and negative attitude and behavior that may impact the success of aural rehabilitation
- ☐ Design a session of aural rehab program (Objectives, activities, outcomes assessment) for adults recently fitted with cochlear implant, group of 4 older adults. Design an individualised program for an executive using a hearing aid for the first time, and an adult moving from an analog to a digital hearing aid
- ☐ Develop a pamphlet in your local language that would address any topic in aural rehabilitation

Total Hours **7**
5

Text Books:

1. Hull, R. H., (2014) ed. Introduction to Aural Rehabilitation 2nd edition Plural Publishing, San Diego Chapters 1, 2, 11 to 20
2. Schow, R.L. & Nerbonne, M.A., (2012). Introduction to Audiologic Rehabilitation (6th edition), Allyn & Bacon, Boston.

3. Tye-Murray, N., (2014). Foundations of Aural Rehabilitation: Children, adults and their family members 4th edition Plural Publishing San Diego Chapters 5-10

Course Outcome:

1. Acquire knowledge about aural rehabilitation
2. Know about listening training and speech reading for adults
3. Gain knowledge on communicative strategies
4. Understand the aural rehabilitation of adults
5. Know about aural rehabilitation of older adults

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Audiology in Practice

Semester
VI
22BASC3
5

Hours of Instruction/week: 4+1
No of Credits: 3

Objectives:

- Able to list and describe the highlights of legislations relating to hearing impairment and other disabilities and incorporate ethical practices in professional service delivery.
- Provide information on welfare measures, policies of government when needed describe different strategies to create awareness of hearing impairment and programs to address them
- Explain the different clinical practice settings in audiology with reference to their requirement, protocols and role and responsibility of audiologist

Unit I: Scope, legislation and ethics in audiology

1

- Scope of practice in audiology (National – ISHA & International body - AAA) Professional ethics (ISHA)
- Legislations and conventions relating to disability: need and historical aspects
- Classification of hearing impairment and disability certification, Rehabilitation Council of India Act (1992) and its amendments Person with Disability Act (1995)
- National Trust Act (1999) Right to Education (2012)
- Biwako Millennium framework (2003) and Salamanca Statement 1994 UNCRPD
- Concept of barrier free access and universal design relating to individuals with hearing impairment

2

Unit II: Hearing health and strategies for prevention of hearing impairment

1

- Epidemiology of hearing disorders ICD and ICF
- Levels of prevention: Primary, secondary and tertiary
- National programs and efforts national institutes Welfare measures by Government, Camps (planning, purpose, organizing and providing remedial measures)
- Public education and information (media, radio broadcasts, street plays)
- Hearing health and prevention programs (hearing help line, dangerous decibels, online hearing tests etc.)

2

Unit III: Audiological practice in different settings

1

- Audiological Private practice ENT clinics
- Paediatric / neonatology clinic/departments
- Neurology departments Factories and Industry
- Hearing aid dispensing center/hearing aid industry Rehabilitation centers such as DRC/CRCs Schools for the hearing impaired
- Cochlear implant clinics

2

- Multiple handicap habilitation center and others

Unit IV: Noise and hearing conservation in industry and community	1
● Introduction to noise, types	2
● Sources of noise in the industry and community	
● Effects of noise in the auditory system (outer, middle and inner ear)	

- Temporary threshold shift, permanent threshold shift, factors increasing the risk of NIHL
- Non auditory effects of noise (physiological, psychological, stress, sleep, job productivity and accidents)
- Legislations related to noise, permissible noise exposure levels, workers compensation, OSHA standards, Indian legislations related to noise
- Instrumentation, measurement and procedure for measuring noise in industry Instrumentation, measurement and procedure for measuring noise in community Hearing conservation program (HCP), steps, record keeping, Ear protective devices

Unit V: Scope and practice of tele-audiology **1**

- Introduction to tele-health: definition, history of tele-health **2**
Terminologies-tele-health, tele medicine, tele practice
Connectivity: internet, satellite, mobile data
- Methods of tele-practice-store and forward and real time Ethics and Regulations for tele-audiology
- Requirements/Technology for tele- audiology: Web based platforms, Video conferencing, infrastructure
- Manpower at remote end and audiologist end, training assistants for tele-audiology Audiological screening using tele-technology : new born hearing screening, school screening, community screening, counselling
- Diagnostic audiological services using tele-technology: video otoscopy, pure tone audiometry, speech audiometry, oto acoustic emission, tympanometry, auditory brainstem response
- Intervention / aural rehabilitation using tele-technology: hearing aid counselling and troubleshooting, tinnitus, counselling, aural rehabilitation services, AVT, and counselling

PRACTICALS **1**

- ☐ Undertake the activities such as ‘Dangerous decibel’ **5**
program (www.dangerousdecibels.org)
- ☐ Noise measurement and attenuation measurement of ear protection devices.
- ☐ Sound level meter measurement in different areas (generator room, audio rooms) Speech in noise assessment for 10 subjects
- ☐ Visit an audiologist in different practice settings and provide a report Administer ICF protocols for patients with different disorders
- ☐ Explore websites of national institutes, hearing aid companied, NGOs in disability field and describe the accessibility features and information provided
- ☐ Remote control a PC based audiology equipment connected to internet using any authorized desktop sharing software
- ☐ Develop one pamphlet/poster/ in local language that would address some aspect of audiology practice
- ☐ Perform Accessibility ability of your institute/center and prepare a report

Total Hours **7**
5

Text Books:

1. Audiology Telepractice; Editor in Chief, Catherine V. Palmer, Ph.D.; Guest Editor, Greg D. Givens, Ph.D. Seminars in Hearing, volume 26, number 1, 2005.

2. Bergland, B., Lindwall, T., Schwela, D.H., eds (1999).
Guidelines on Community noise
<http://www.who.int/docstore/peh/noise/guidelines2.html> WHO
1999
3. BIS specifications relating to Noise Measurements.- IS:7194-1973
Specification for assessment of noise exposure during work for
hearing conservation purposes.
4. Census of India information on disability
5. Dobie, R. A (2001). Medical legal evaluation of hearing loss, 2nd Ed.
6. Hearing health and strategies for prevention of hearing impairment
WHO (2001). International classification of Functioning, Disability
and Health. Geneva: WHO [http://www.asha.org/Practice-](http://www.asha.org/Practice-Portal/Professional-)
Portal/Professional-
7. Issues/Audiology-Assistants/ Teleaudiology-Clinical-
Assistants/
<http://www.asha.org/uploadedFiles/ModRegTelepractice.pdf>
8. IS:10399-1982 Methods for measurement of noise emitted by
Stationary vehicles IS:6229-1980 Method for measurement of real-
ear
9. IS:9167-1979 Specification for ear protectors. 95
10. IS:9876-1981 Guide to the measurement of airborne acoustical
noise and evaluation of its effects on man- IS:7970-1981
Specification for sound level meters.
11. IS:9989-1981 Assessment of noise with respect to community response.
12. John Ribera. Tele-Audiology in the United States. In Clinical
Technologies: Concepts, Methodologies, Tools and Applications
(pp. 693-702), 2011. Hershey, PA: Medical Information Science
Reference. doi:10.4018/978-1-60960-561-2.ch305
13. Lipscomb, D. M. (1994). Hearing conservation – In industry,
schools and the military.
14. Mandke, K and Oza R.K (2014). Private practice in speech
pathology and audiology, 2014 ISHA
15. Philippe Valentin Giffard. Tele-Audiology. Tort, 2012.
ISBN 6139256615, 9786139256617
16. Rawool, V. W. (2012). Hearing conservation in
occupational, recreational, educational and home setting.
Thieme: New York
17. RCI, PWD and National Trust, and Right to education act
18. Richard Wootton, John Craig, Victor Patterson, editors. Introduction
to telemedicine. Second edition. London: The Royal Society of
Medicine Press Ltd. 2006. p. 206 ISBN: 1 85315 677 9.
19. Salamanca statement and framework for action Scope of practice
by RCI
20. Swanepoel de W, Hall JW 3rd .A systematic review of tele
health applications in audiology. Telemed J E Health. 2010
Mar;16(2):181- 200. doi: 10.1089/tmj.2009.0111.

Course Outcome:

1. Know about scope, legislations and ethics in audiology
2. Understand about the hearing health and strategies for prevention of hearing impairment
3. Gain knowledge about the audiological practice in different settings
4. Students will learn about the noise and hearing conservation in industry and community
5. Analyse the scope and practice of tele audiology

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1						H	M					H		
C O2	M	M	M		M	H	M	M				M	H	
C O3	H	M	H	M	H	M	M	M	M	M	M	M	M	H
C O4	H	M	M	M	M	L	L	L	H	L	H	H	M	M
C O5	M	M	H	H	M	H	H	H	L	M	M	M	M	H

Practicals-V (Speech-Language Pathology)

Semester
VI
22BASC3
6

Hours of Instruction/week: 8
No of Credits: 4

Objective:

- ☐ To understand the procedures to assess motor speech disorders, adult language disorders in adults.
- ☐ To perform dysphagia assessment, voice therapy, fluency therapy, bed side evaluation.

Practicals:

- ☐ Procedures to assess motor speech disorders in adults.
- ☐ Differential diagnosis of motor speech disorders in adults.
- ☐ Procedures to assess individuals with adult language disorders, and other related abnormalities.
- ☐ To administer at least two standard tests for adult language disorders.
- ☐ To administer at least two standard tests/protocols for motor speech disorders in adults.
- ☐ To record a sample for analysis of language and speech skills in adults with neuro- communication disorders.
- ☐ To assess posture, breathing, speech and swallowing in adults with motor speech disorders.
- ☐ To consult with inter-disciplinary medical/rehabilitation team and counsel the individual/family regarding management options and prognosis.
- ☐ Language assessment - minimum of 2 individuals after stroke.
- ☐ Associated problems in individuals after stroke and its evaluation. Dysphagia assessment – minimum of 2 children & adults.
- ☐ Goals and activities for therapy (including AAC) based on assessment/test results for adults with neuro-communication disorders.
- ☐ Voice therapy - Minimum of 2 individuals with voice disorders.
- ☐ Fluency therapy - Minimum of 2 individuals with fluency disorders.
- ☐ Bed side evaluation of individuals with neuro-communication disorders – Minimum of 2 individuals.
- ☐ Apply speech language stimulation/therapy techniques on 5 children with language disorders/speech sound disorders/ motor speech disorders – minimum 5 sessions of therapy for each child.

Total hours-120 hours

Course Outcome:

1. To understand the procedures to assess motor speech disorders and motor speech disorders in adults.
2. To administer standardized tests for adult language disorders, motor speech disorders.

3. To record and analyze speech and language skills in adults with neuro- communication disorders.

4. To consult with with inter-disciplinary medical/rehabilitation team and counsel the individual/family regarding management options and prognosis.
5. To perform voice therapy, fluency therapy and bed side evaluation.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		
C O5	M		H	H	H	H	H	H	M		L	H		

Practicals-V (Audiology)

Semester
VI
22BASC3
7

Hours of Instruction/week: 8

No of Credits: 4

Objective:

- ☐ To be able to carry out noise survey, mapping of cochlear implant and trouble shooting.
- ☐ To perform AVT for child with hearing impairment and involve in auditory training.

Practicals:

- ☐ National and international standards related to noise exposure.
- ☐ Recommend appropriate treatment options such as speech reading, AVT, combined approaches etc.
- ☐ To carryout noise survey in Industry and community
- ☐ To carryout mapping of cochlear implant in infants and children using both objective and subjective procedures
- ☐ To trouble shoot cochlear implant
- ☐ Analysis of objective responses like compound action potential, stapedial reflexes on at least 3 samples
- ☐ Comprehensive hearing conservation program for at least 1 situation
- ☐ AVT on at least 1 child with hearing impairment Trouble shooting and fine tuning of hearing aids on at least 5 geriatric clients
- ☐ At least one activity for different stages involved in auditory training

Total hours-120
hours

Course Outcome:

1. To understand and carry out noise survey.
2. To recommend appropriate treatment options like speech reading, AVT.
3. To carry out mapping of cochlear implants and trouble shooting.
4. To perform AVT and participate in auditory training.
5. To give comprehensive hearing conservation program.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		

C O5	M		H	H	H	H	H	H	M		L	H		
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Internship Project

Semester – VII

Instruction/Week: 6 22BASC38

Points:4

Hours of

Credit

Objectives: To enable students to

1. Determine the purpose of the study with assumed outcomes
2. Initiate relevant intervention to meet the challenges on research
3. Validate the result outcomes with societal needs

Total Hours-90 hours

Course Learning Outcomes:

1. Describe the research process and the principle activities, skills and ethics associated with the research process
2. Practice select and define appropriate research problem and parameters
3. Compose a project proposal
4. Organize and conduct research using various interventions
5. Write a project report with good APA style for scholarly writing.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
CO 1			H	H		H		H					M	
CO 2			H		M			H			M		H	H
CO 3			H		H			H			M		M	
CO 4			H	H		H	H	H		M	M			M
CO 5			M	H	M				H		M	M	M	M

Semester VII 22BASC39**In-service training in Speech Language Pathology****Objective:****Hours of Instruction/week: 15****No of Credits: 6**

- ☐ To provide clinical exposure and experience in different set ups and to be able to carry out greater quantum of work with clinical populations and in different contexts.
- ☐ To provide greater opportunity to liaise with professionals from allied fields and to demonstrate competence and independence.

Practicals:

1. Diagnosis and management of speech, language disorders across life span.
2. Report evaluation findings, counsel and make appropriate referrals.
3. Plan and execute intervention and rehabilitation programs for persons with speech language.
4. Develop and maintain records related to persons with speech-language.
5. Engage in community related services such as camps, awareness programs specifically, and community based rehabilitation activities, in general.
6. Make appropriate referrals and liaise with professionals from related fields.
7. Gain experience in different set ups and be able to establish speech centres in different set-ups
8. Demonstrate that the objectives of the B.ASLP program have been achieved.
9. Advise on the welfare measures available for their clinical clientele and their families.
10. Advise and fit appropriate aids and devices for their clinical population

Total hours-225 hours**Course Outcome:**

- ☐ To diagnose and manage of speech, language disorders across life span.
- ☐ To be able to plan, execute and report intervention and rehabilitation programs.
- ☐ To develop and maintain records.
- ☐ To make appropriate referrals and liaise with professionals from related fields.
- ☐ To advise and fit appropriate aids and devices for clinical population.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	P O 13	P O 14
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		

C O5	M		H	H	H	H	H	H	M		L	H		
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**In-service training in
Audiology**

**Semester
VII
22BASC40**

Hours of Instruction/week: 15

No of Credits: 6

Objective:

- To provide clinical exposure and experience in different set ups and to carry out greater quantum of work with varied clinical populations and in different contexts.
- To provide greater opportunity to liaise with professionals from allied fields.

Practicals:

- Diagnosis and management of hearing disorders across life span.
- Report evaluation findings, counsel and make appropriate referrals.
- Engage in community related services such as camps, awareness programs specifically, and community-based rehabilitation activities, in general.
- Make appropriate referrals and liaise with professionals from related fields.
- Gain experience in different set ups and be able to establish hearing centers in different set-ups
- Demonstrate that the objectives of the B.ASLP program have been achieved.
- Advise on the welfare measures available for their clinical clientele and their families.

**Total hours-225
hours**

Course Outcome:

- To diagnose and manage hearing disorders across life span.
- To report evaluation findings, counsel and make referrals.
- To engage in community related services and community-based rehabilitation.
- To liaise with professionals from related fields.
- To advise on welfare measures available for clinical population.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		
C O4	M		H	H	H	H	H	L	M		L	H		
C O5	M		H	H	H	H	H	H	M		L	H		

Internship Practicals-VI (Speech Language Pathology)

Semester
VIII
22BASC41

Hours of Instruction/week: 18
No of Credits:10

Objective:

- ☐ To provide clinical exposure and experience in different set ups and to carry out greater quantum of work with varied clinical populations and in different contexts.
- ☐ To provide greater opportunity to liaise with professionals from allied fields.

Practicals:

- ☐ Diagnosis and management of communication and swallowing disorders across life span.
- ☐ Report evaluation findings, counsel and make appropriate referrals.
- ☐ Plan and execute intervention and rehabilitation programs for persons with communication and swallowing
- ☐ Develop and maintain records related to persons with communication and swallowing.
- ☐ Engage in community related services such as camps, awareness programs specifically, and community-based rehabilitation activities, in general.
- ☐ Make appropriate referrals and liaise with professionals from related fields.
- ☐ Gain experience in different set ups and be able to establish speech centres in different set-ups
- ☐ Demonstrate that the objectives of the B.ASLP program have been achieved.
- ☐ Advise on the welfare measures available for their clinical clientele and their families.
- ☐ Advise and fit appropriate aids and devices for their clinical population.

Total hours:270
hours

Course Outcome:

1. To diagnose and manage communication and swallowing disorders.
2. To plan, execute, perform and report rehabilitation programs for clinical population.
3. To engage in community related services and community-based rehabilitation.
4. To liaise with professionals from related fields.
5. To advise on welfare measures available for clinical population.

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 11	P S O 12	P S O 13
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C O3	M		H	H	H	H	H	L	M		L	H		

C O4	M		H	H	H	H	H	L	M		L	H		
C O5	M		H	H	H	H	H	H	M		L	H		

Internship Practicals-VI (Audiology)

**Semester
VIII
22BASC42**

Hours of Instruction/week: 18

No of Credits: 10

Objective:

- ☐ To provide clinical exposure and experience in different set ups and to carry out greater quantum of work with varied clinical populations and in different contexts.
- ☐ To provide greater opportunity to liaise with professionals from allied fields.

Practicals:

- ☐ Plan and execute intervention and rehabilitation programs for persons with hearing disorders
- ☐ Develop and maintain records related to persons with hearing disorders
- ☐ Engage in community related services such as camps, awareness programs specifically, and community-based rehabilitation activities, in general.
- ☐ Make appropriate referrals and liaise with professionals from related fields.
- ☐ Gain experience in different set ups and be able to establish hearing centres in different set-ups
- ☐ Demonstrate that the objectives of the B.ASLP program have been achieved.
- ☐ Advise on the welfare measures available for their clinical clientele and their families.
- ☐ Advise and fit appropriate aids and devices for their clinical population.

**Total hours:270
hours**

Course Outcome:

1. To plan, execute, perform and report rehabilitation programs for clinical population.
2. To develop and maintain records related to persons with hearing disorders.
3. To engage in community related services and community-based rehabilitation.
4. To liaise with professionals from related fields.
5. To advise on welfare measures available for clinical population

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 11	P S O 12	P S O 13
C O1	M		H	H	H	H	H	L	M		L	H		
C O2	M		H	H	H	H	H	L	M		L	H		
C	M		H	H	H	H	H	L	M		L	H		

O3														
C O4	M		H	H	H	H	H	L	M		L	H		
C O5	M		H	H	H	H	H	H	M		L	H		

Value added course
Speech and Hearing Science – its
Disorders
(Department of Audiology and Speech
Language Pathology)

Semester

Hours of Instruction: 40

III

No of Credits: 2

22BASV0

1

Objectives:

- To understand the basic concepts in speech, language, Hearing and communication.
- To acquire knowledge about the normal development of hearing, speech, language and communication skills.
- To understand different speech and hearing disorders in children and adults
- To know the importance of early identification and intervention of speech and hearing disorders

Unit I Hearing, Speech, Language and Communication 2

- Basic concepts of Hearing, speech, Language and Communication and their components
- Overview of speech sub system and speech mechanism
- Overview of Auditory system and hearing mechanism

Unit II Normal development of Speech-Language and Hearing 2

- Theories and Stages of language acquisition
- Motor, Speech-Language milestones
- Factors affecting normal development- prenatal, perinatal and postnatal

Unit III Speech and Hearing disorders in Children 2

- Overview of voice disorders; articulation and phonological disorders; and fluency disorders
- Causes of speech, language and hearing disorders in children
- Signs and symptoms
- Assessment procedures
- Intervention strategies

Unit IV Speech and Hearing disorders in Adults 2

- Overview of adult language disorders and neurogenic language disorders
- Causes of speech, language, hearing and swallowing disorders in Adults
- Signs and symptoms
- Assessment procedures
- Intervention strategies

Unit V Early identification and Intervention of speech and Hearing disorders 2

- ☐ Importance of early identification
- ☐ Early intervention
- ☐ Multi-disciplinary team approach
- ☐ Counselling and guidance
- ☐ Facilitation of parent and family participation and transfer of skills
- ☐ Community based rehabilitation

☐ Facilities and concessions available for speech and hearing disabled

Practicals	3
<ul style="list-style-type: none">● Observe and record normal aspects of speech● Analyze perceptually variations in speech● Record and analyze speech samples of different age groups.● Observe and record normal aspects of language	0

- Analyze perceptually variations in language
- Record and analyze language samples of different age groups.
- Analyze language components in the 5 recorded sample
- Collect birth and developmental history for 10 children
- Collect Motor, Auditory, Speech and language milestones for 10 children
- Analyze abnormality in Speech and Language from the recorded sample
- Creating awareness among the public regarding speech and hearing disorders.

**Total Hours 4
0**

Course outcomes:

On the successful completion of the course, students will be able to

1. Understand the basic concepts of speech and hearing, the importance and development of speech and the factors affecting it.
2. Acquire knowledge about the normal development of hearing, speech, language skills
3. Gain knowledge about the different speech and hearing disorders in children and adults
4. know the importance of early identification and intervention of speech and hearing disorders

Audiological and Speech Management (Self Study)

Semester V

Hours of Instruction/week: 1

22BASC30

No. of Credits: 4

Objectives: After completing this course, the student will be able

- To Know the Management Techniques in Audiology and Speech Language pathology
- To Know about the benefits and schemes provided by the Government and NGO to the Persons with Disability
- To learn about the Team approach and importance of counselling

Unit I Audiological Management 3

- Audiological screening
- Protocols for Screening
- CAPD
- Aural rehabilitation
- Vestibular rehabilitation

Unit II Speech Management 3

- ABA
- Floor time, Play Therapy
- Smile Train
- AAC
- Hanen approach, TEACCH, PROMPT

Unit III Government Schemes and Policies 3

- ADIP
- SSA
- DEIC
- NPPCD
- Other State and National Schemes

Unit IV Multidisciplinary approach 3

- Team members
- Their role in management
- Importance of Multidisciplinary approach
- Outcome of multidisciplinary approach
- CBR

Unit V Counselling 3

- Meaning
- Nature & Scope of counselling
- Principles and goals of counselling
- Types and Techniques: Individual and Group counselling
- Applications of counselling

Total Hours 15

Recommended Books:

1. Fitzpatrick, E.M., and Doucet S.P. (2013) (Eds). Paediatric Audiologic Rehabilitation. Thieme, New York
2. Hosford - Dumm, H., Roser, R., & Valente, M. (2007). Audiology Practice Management (2nd edition edition). New York: Thieme.
3. Mardell, J., & Flexer, C. (2013). Paediatric Audiology: Diagnosis, Technology, and Management (2nd Ed.). New York, NY: Thieme.
4. Rout, N and Rajendran, S. (2015). Hearing aid Counselling and Auditory training Manual, A publication of NIPMED, Chennai. Freely downloadable from <http://niepmd.tn.nic.in/publication.php>. ISBN 978-81- 928032-5-8.

Course Outcome:

CO1: To gain Knowledge about the management techniques in audiology

CO2: To gain Knowledge about the other management techniques in Speech

CO3: To know about the Schemes and policies provided by the government

CO4: To gain Knowledge about the multidisciplinary management

CO5: To gain Knowledge about the Counselling and their applications

C O / P O	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P S O 1	P S O 2	P S O 3
C O 1	H		L	L	L	L	L	M				H	M	M
C O 2	H	M	H	M	M	H	M	H	M		M	H	H	M
C O 3	H		H		H	H		H	L	M	L	H	H	L
C O 4	H	L	H	H	H	H	M	H	L			H	H	M
C O 5	M	M	H	H	H	H	H	H	L			H	H	M



Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category A by MHRD, Estd. u/s 3 of UGC Act 1956) Re-accredited with A++Grade by NAAC.

Recognised by UGC under Section 12 B Coimbatore - 641 043, Tamil Nadu, India

(BPT) BACHELOR OF PHYSIOTHERAPY

Programme Outcomes:

1. Apply possessed knowledge of fundamental subjects to solve different problems
2. Analyse various research and scientific problems.
3. Design Rehabilitation services with appropriate consideration to safety, economy, health and Environmental Considerations.
4. To incorporate significant clinical and professional training opportunities, providing hands-on Experience with real patients in a supervised environment.
5. Uses model Therapeutic techniques, resources and equipments
6. Students will have the ability to effectively work with patients and other Clients with respect to the Care of individuals, specific groups, communities or populations.
7. Function individually and in multidisciplinary teamwork
8. Communicate effectively in both verbal and written forms.
9. One can apply a distinct body of knowledge, skills and attitudes, incorporating ethical action, to improve the health and well-being of patients & other Clients.
10. Manage the work and finance of a research, application projects.
11. During this BPT degree, one can gain a comprehensive knowledge of physiotherapy, including
areas such as Orthopaedics, neurology, cardiac & Respiratory conditions, OBG and preventative health care.

Programme Specific Outcomes:

1. To structure the assessment chart, to develop short term and long term goals of treatment and design the protocol for Physiotherapy treatment by applying basic concepts of Physiotherapy Practice.
2. To apply Advance Physiotherapy techniques to treat challenging condition and adapt to emerging changes in the field of Physiotherapy
3. Acquire skills set in diagnostic, therapeutic, rehabilitative and preventive health care services.

Scheme of Instruction & Examinations
(For students admitted from 2022-2023& onwards)

<i>Part</i>	<i>Subject Code</i>	<i>Name of the Paper/Component</i>	<i>Hrs. of Instruction/Week</i>		<i>Scheme of Examination</i>					
			<i>T</i>	<i>P</i>	<i>Duration of Exam</i>		<i>CIA</i>	<i>CIE</i>	<i>Total</i>	<i>Credit</i>
					<i>T</i>	<i>P</i>				
		First Semester								
		Core Course								
III	22BPTC01	Anatomy – I	6	-	3	-	50	50	100	4
	22BPTC02	Physiology and Applied Physiology-I	6	-	3	-	50	50	100	4
	22BPTC03	Anatomy and Physiology Practical and Oral –I	-	4	-	3	50	50	100	3
	22BPTC04	Basic and Applied Physics for Physiotherapy-I	2	2	3	-	50	50	100	2
	22BPTC05	Psychology	4	-	3	-	50	50	100	3
		Discipline Specific Elective (DSE) Course								
	22BPTD01	DSE I: Sociology	2	3	3	-	50	50	100	3
		Games		1	-	-	-	-	-	-
IV	22BXWE01	Workstation Ergonomics-I	-	-	-	-	100	-	100	1
		Second Semester								
I	22BLATA1/ 22BLAH1/ 22BLAFR1	Tamil: Pothu tamil thazh I- Tamil Ilakkiam/ Hindi: Grammar, Translation and General Essay / French: Fundamentals of French	3	-	3	-	50	50	100	3
II	22BLEN02	English Language for Communication-II	3	-	3	-	50	50	100	3
		Core Course								
III	22BPTC06	Anatomy – II	5	-	3	-	50	50	100	4
	22BPTC07	Physiology and Applied Physiology-II	4	-	3	-	50	50	100	4
	22BPTC08	Anatomy and Physiology Practical and Oral –II	-	3	-	3	50	50	100	3
	22BPTC09	Basic and Applied Physics for Physiotherapy-II	2	2	3	-	50	50	100	3
	22BPTC10	Microbiology	3	-	3	-	50	50	100	3

		Discipline Specific Elective (DSE) Course								
	22BPTD02	DSE II: Clinical Biochemistry	2	2	3	-	50	50	100	3
		Games	-	1	-	-	-	-	-	-
IV	22BXWE02	Workstation Ergonomics – II	-	-	-	-	100	-	100	1
		Third Semester								
	Core Course									
III	22BPTC11	General Medicine and Pharmacology -I	3	2	3	-	50	50	100	3
	22BPTC12	General Pathology	3	2	3	-	50	50	100	3
	22BPTC13	Biomechanics-I	3	2	3	-	50	50	100	4
	22BPTC14	Exercise Therapy-I	3	2	3	-	50	50	100	4
	22BPTC15	Exercise Therapy and Biomechanics Practical and Oral –I	-	5	-	3	50	50	100	3
		Discipline Specific Elective (DSE) Course								
	22BPTD03	DSE III: Basics of Radio Diagnostics	2	3	3	-	50	50	100	3
IV	22BXWE03	Workstation Ergonomics – III	-	-	-	-	100	-	100	1
		Fourth Semester								
	Core Course									
III	22BPTC16	General Medicine and Pharmacology -II	3	2	3	-	50	50	100	3
	22BPTC17	General Surgery, Paediatric and Geriatric	3	2	3	-	50	50	100	3
	22BPTC18	Biomechanics-II	3	2	-	3	50	50	100	4
	22BPTC19	Exercise Therapy-II	3	2	3	-	50	50	100	4
	22BPTC20	Exercise Therapy and Biomechanics Practical and Oral –II	-	5	-	3	50	50	100	3
		Discipline Specific Elective (DSE) Course								
	22BPTD04	DSE IV: Digital Health	2	3	3	-	50	50	100	3
IV	22BXWE04	Workstation Ergonomics-IV	-	-	-	-	100	-	100	1
Clinical Observation During Summer Vacation 30 days										

		Fifth Semester								
	Core Course									
III	22BPTC21	Electrotherapy - Low and Medium Frequency Current	3	3	3	-	50	50	100	4
	22BPTC22	Electrotherapy - Low and Medium Frequency Current Practical and Oral	-	4	-	3	50	50	100	3
	22BPTC23	Physiotherapy in Women's Health	3	3	3	-	50	50	100	3
	22BPTC24	Community Medicine	3	3	3	-	50	50	100	3
	22BPTC25	Biostatistics and Research	4	1	3	-	50	50	100	3
	22BPTC26	Hospital Management (Self Study)	1	-	3	-	100	-	100	4
	22BPTC27	Physiotherapy (Computer Based test)	-	-	1		-	100	100	2
	22BPTC28	Clinical Observation	-	-	-	-	100	-	100	5
IV	22BXWE05	Workstation Ergonomics -V	-	-	-	-	100	-	100	1
		Generic Elective course	2	-	3	-	100	-	100	2
		Sixth Semester								
	Core Course									
III	22BPTC29	Electrotherapy -High Frequency Current	3	3	3	-	50	50	100	3
	22BPTC30	Electrotherapy-High Frequency Current Practical and Oral	-	5	-	3	50	50	100	3
	22BPTC31	Clinical Cardio Respiratory Diseases	3	2	3	-	50	50	100	4
	22BPTC32	Physiotherapy in Cardio Respiratory Conditions	3	3	3	-	50	50	100	3
	22BPTC33	Physiotherapy in Clinical Cardio Respiratory Practical and Oral	-	3	-	3	50	50	100	3
	22BPTC34	Hospital Posting	-	4	-	-	100	-	100	4
IV	22BXWE06	Workstation Ergonomics -VI	-	-	-	-	100	-	100	1
		Seventh Semester								
III	Core Course									
	22BPTC35	Clinical Orthopedics	3	3	3	-	50	50	100	4
	22BPTC36	Physiotherapy in Orthopedics	3	3	3	-	50	50	100	4
	22BPTC37	Physiotherapy in Clinical Orthopedics	-	3	-	3	50	50	100	3

		Practical and Oral								
	22BPTC38	Rehabilitation Medicine-I	3	2	3	-	50	50	100	3
	22BPTC39	Physiotherapeutic-I	3	3	3	-	50	50	100	3
	22BPTC40	Hospital Posting	-	4	-	-	100	-	100	4
III		Eight Semester								
	Core Course									
	22BPTC41	Clinical Neurology	3	3	3	-	50	50	100	4
	22BPTC42	Physiotherapy in Neurology	3	3	3	-	50	50	100	4
	22BPTC43	Physiotherapy in Clinical Neurology Practical and Oral	-	3	-	3	50	50	100	3
	22BPTC44	Rehabilitation Medicine-II	3	3	3	-	50	50	100	3
	22BPTC45	Physiotherapeutic-II	3	3	3	-	50	50	100	3
	22BPTC46	Project –viva voce	-	3	-	-	50	50	100	4
		Ninth Semester								
		Internship Training Programme								
	22BPTC47	Internship Training in Neurology	-	5	-	3	50	50	100	5
	22BPTC48	Internship Training in Orthopedics	-	5	-	3	50	50	100	5
	22BPTC49	Internship Training in ICU & NICU	-	5	-	3	50	50	100	5
	22BPTC50	Internship Training in Cardiology and Cardio Thoracic Surgery	-	5	-	3	50	50	100	5
	22BPTC51	Internship Training in OBG/ Paediatrics/ Geriatrics	-	5	-	3	50	50	100	5
	22BPTC52	Internship Training in Rehabilitations	-	5	-	3	50	50	100	5
	Part I,II& III								Total	206
	Part IV									20
										226

Part IV

COMPONENTS

S.No	Components	Subject Code	Semester	No of .Credits
I	A. Ability Enhancement Courses			
	Environmental Studies	21BAES01	I	4
	Fundamentals of Research	21BAFU01	II	2
	Communication Skills	23BSCS01	V	2
	Soft Skills	23BSSS01	VI	2
II	Skill Enhancement Course(SEC)			
a.	Value Added Course	40 Hrs Duration	III	2
b.	Co - Curricular Course	Varied duration	IV	2
	B. Extra - Curricular Course			
	NCC/ NSS/ Sports/ WorkStation Ergonomics ** (for Bachelor of Physiotherapy)	21BXNC01-06 21BXNS01-06 21BXSP01-06 22BXWE01-06	1-6	24 Credits*
				6 Credits
				6 Credits
				6 Credits
Total Credits				20

Total credits to earn the degree

S.no	Components	Credits
1.	Part I, II & III components	- 206
2.	Part IV components	- 20

Total credits	-	226 credits

* Clinical observation: minimum 15 days (4 credits)- Maximum 30 days(6 credits)

The above may be within the regular working hours or during the vacation of the I year and II year.

** Internship(6 Months) -180 days (30 credits)

Other Course Offered by the Department: Value Added Course- 22BPTV01-**Health and Fitness**

Anatomy – I

Semester I
22BPTC01

Hours of Instruction/week: 6

No of Credits: 4

Objectives:

- To demonstrate and practically the student will be able to demonstrate knowledge in human anatomy as is necessary for the study and practice of physiotherapy.
- To develop an ability to apply the principles of anatomy in clinical practice

Unit I Introduction

18

a. Introduction

Anatomy and its subdivisions. Name regions, cavities and system of the body. Anatomical position and anatomical terms.

b. Cell

c. Tissues

Unit II Introduction to Osteology & Myology

18

a. Introduction to Bones (Osteology)

b. Introduction to Joints (Syndesmology /Arthology)

- Joint and Articulation.
- Classification of the joints and gives examples for each type.
- The basic features of a synovial joint.
- The axis and movements possible in a synovial joint.
- Range of movement and limiting factors.
- The blood supply and nerve supply in general.
- Stability of a joint.
- Demonstration common movements.
- The type, the articular surfaces, ligaments, and movements, axis of the movements, chief muscles producing the movements, limiting factors, nerve supply and blood supply of all individual joints.

c. Introduction to Muscles (Skeletal Muscle) (Myology)

Skeletal muscle, fine fasciae, tendon, and aponeurosis. Classification of the skeletal muscles by shape etc.,

- The origin, insertion, muscle work (contractions), type of muscle work, range of muscle work; group actions - protagonists, antagonists, synergists and fixators: shunt and spurt muscles; types of levers with examples.
- The position, origin, insertion, nerve supply and actions of the skeletal

Muscles. (for the skeletal muscles of soft Palate, Pharynx and larynx, position, action and nerve supply may be sufficient)

The groups of muscles by position and action, group action and nerve supply of Group of muscles. Segmental innervations of muscles.

Unit III Upper Extremity

18

- Pectoral regions
- Scapular region
- Axilla
- Shoulder Girdle
- Shoulder joint
- Upper arm
- Elbow Joint
- Forearm, Wrist and Hand
- Nerves of Upper limb
- Blood Vessels of Upper Limb
- Cutaneous Nerves of Upper Limb

Unit IV Head, Neck and Special Senses

18

- Skull (features, joints of skull bone, parts)
- Internal and external auditory meatus, foramen magnum, stylomastoid foramen and structures passing through them
- Anterior and posterior triangles of neck (boundaries and contents)
- Muscles of the face (origin, insertion, action, nerve supply, applied anatomy)
- Cranial nerve (origin, course, relation, innervations)
- Trigeminal nerve (origin, course, relation, innervations)
- General features of typical cervical vertebrae, atlas, axis, seventh cervical vertebrae.
- Cervical plexus (formation, distribution, root values)
- Sternomastoid, erector spinae, scalene
- Atlantoaxial joint (articular surface, muscles, movements, ligaments, blood supply, NS)
- Atlantooccipital joint (articular surface, muscles, movements, ligaments, blood supply, NS)
- Position and extent of subclavian, vertebral, carotid arteries
- Components of circle of Willis and its supply, applied importance
- Internal jugular and subclavian vein (position, formation, and termination)
- ANS

- Parts of brain and its function, applied importance
- Eye (parts, retina, optic pathway, nerve supply, muscles of eye)
- Nose (parts, boundaries of nose, nasal cavity, sinuses)
- Temporomandibular joint (type, articular surfaces, ligaments, movements, muscle responsible, nerve supply)
- Ear (parts, organ of corti, nerve of hearing and its applied importance)
- Skin

Unit V Systems

18

- a. Endocrine system
- b. Digestive System
- c. Genito-Urinary System

Total Hours 90

Text Books:

1. Ranganathan Ts, (2013) Textbook of Human Anatomy. 6th edition S Chand and Company Pvt Ltd Publisher, New Delhi.
2. Ross and Wilson, Anatomy and Physiology in Health and Illness, Anne Waugh 2010, Publisher ELBS with Churchill Livingstone.
3. B.D. Chaurasia, Human Anatomy -Vol. I, II, III, (1979 reprint 2008) CBS Publishers and Distributors, New Delhi

Reference books

1. Romanes G.J, Cunningham's Manual of Practical Anatomy. (1986) 15th edition, Reprint 2008 Oxford Medical Publications.
2. Singh I.B, Text Book of Human Osteology, (2006) Jaypee Brothers, Medical Publishers.
3. Ross M.H, E. and Williams L.J and Wilkins Romell, Kaye G.I, Histology: A Text and Atlas (1995), 3rd edition, Anne Waugh 2010, ELBS with Churchill Livingstone Publishers.
4. Inderbir Singh, Textbook of Human Histology. (2002), 4th Edition Jaypee Brother, New Delhi.

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1: Understand the structural and functional importance of cell and different types of tissues.
- CO2: Knowledge of osteology
- CO3: Understanding the different type of classification and general features of bone,

joints and muscular tissues in upper limb.

CO4: Knowledge of greater vessels, muscles and structural and functional importance of different viscera in head and neck region outline of visual, auditory and taste pathways, including applied aspect

CO5: Understand anatomical knowledge of Digestive & Genito- Urinary and outline of Endocrine system.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PS O1	PS O2	PS O3
CO 1	H	M	M	M	L	M	L	L	M	L	M	M	M	M
CO 2	H	M	M	M	L	M	L		M	L	M	M	M	M
CO 3	H	M	L	M	M			L	L	M	H	M	M	M
CO 4	H	M	M	M	M	L	L		H	M	H	M	M	M
CO 5	H	M	H	M	M	M	M		M	M	H	H	H	H

Physiology and Applied Physiology – I

Semester I
22BPTC02

Hours of Instruction/week: 6

No of Credits: 4

Objectives:

- To explore the normal functioning of the living organisms.
- To acquire knowledge of the normal physiology of various human body systems.
- To learn their principles, mechanisms and control.

Unit I Introduction 18

A. Cell Introduction

Basic concept of cell structure and its functions. Transport through cell membrane.
Homeostasis

B. Skin

Structure. Functions. Blood flow. Temperature regulation

C. Blood

Blood components and its structure. Plasma proteins. RBC, Erythropoiesis. ESR. Anaemia. WBC and its functions. Immunity & its types. Platelets & its functions. Coagulation of blood and clotting mechanism. Blood groups.

Unit II Muscle 18

Muscles classification. Structure of a skeletal muscle. Properties of a skeletal muscle. Neuromuscular junction & excitation contraction coupling. Changes during muscle contraction. Single muscle twitch, quantum & wave summation. Tetany, myasthenia gravis. All or none law. Types of muscle contraction. Muscle fatigue. Muscle action potential. EMG –overview. Aerobic & anaerobic view. Endurance & muscle strength. Age related changes in muscle. Age related changes in physical work capacity.

Unit III DIGESTION 18

Mouth & salivary glands. Mechanism & regulation of gastric juice secretion. Bile & pancreatic secretion. Secretions of small and large intestines. Movements (motility) of the GI tract.

Unit IV SPECIAL SENSES

Vision. Audition. Olfaction. Gustation. Vestibular apparatus

Unit V ENDOCRINE SYSTEM 18

Hormones. Pituitary gland-its functions and abnormalities. Thyroid gland-its functions and abnormalities. Thyroxin. Parathyroid glands & physiology of bone.

Total Hours 90

Text Books:

1. John E.Hall, Arthur C.Guyton, Text Book of Physiology, Saunders, 12th Edition,2010
2. S.S.Randhawa, Medical BioChemistry, PV Books, 1 Ed,2013
3. Chatterjee, Human Physiology,Central book agency, 4th edition,1958

Reference books

1. L. Prakasam Reddy,Concise Medical Physiology, JP Brothers, 3rdEdi,1999
2. Shetty nandhini, Biochemistry for Physiotherapist and AHS, JP bros, 1 Ed,2008
3. Sembulingam, Essentials of Physiology, JP Medical Ltd, 6th Ed,2013
4. Sujith Kumar Chaudhri, Concise medical physiology, New Central Book Agency, 6th Ed,2011
5. U. Sathyanarayana, Essentials of Biochemistry, Book and Allied (P)Ltd, Kolkata,1999
6. Ganong's review of medical physiology kim .E. Barrett 25thedition.
7. D.M .Vasudevan Textbook of biochemistry for medical students 7thedition.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Outline of structural and functional importance of cell, skin and blood.

CO2: Detail knowledge of muscles and classifications.

CO3: Outline of different parts and functions of digestive system.

CO4: Basic of special senses

CO5: Understanding the endocrine system.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PS O1	PS O2	PS O3
CO 1	H	M	M	M	L	M	L	L	M	L	M	M	M	M
CO 2	H	M	M	M	L	M	L		M	L	M	M	M	M
CO 3	H	M	L	M	M			L	L	M	H	M	M	M
CO 4	H	M	M	M	M	L	L		H	M	H	M	M	M
CO 5	H	M	H	M	M	M	M		M	M	H	H	H	H

Anatomy and Physiology Practical and Oral -I

Semester I
22BPTC03

Hours of Instruction/week: 4

No of Credits: 3

Objectives:

- To enhance the students with practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students, distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

List of Experiments

1. Anatomical positions, axis and planes
2. Identification of upper limb bones
3. Anatomical Identification head and neck
4. Anatomy and physiology of endocrine system
5. Anatomy and physiology of digestive system.
6. Anatomy and physiology of Genito-Urinary System
7. Anatomy of upper extremities, head and neck joints and muscles
8. Determination of blood groups
9. Measurement of Vitals: HR, Respiratory rate, Temperature, SPO2
10. Recording of blood pressure
11. Anatomy and physiology of skin
12. Anatomy and physiology special senses

Total hours 60

Text Books:

1. Jain.A.K, Manual Of Practical Physiology For MBBS, (2012), 4th Edition, Avichal Publishing Company
2. Chaurasia, Human Anatomy - VOL I, VOL II, VOL III, 7th Edition, CBS, 2016.

Reference Books:

1. Michael Swash, Michael Glynn, Hutchinson's Clinical Methods (2007). 22nd Edition, Saunders Ltd
2. Sri Nageswari.K, Rajeev Sharma, Practical Workbook of Human Physiology (2006), 1st Edition, Jaypee Brothers Medical Publishers (P) Ltd

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Demonstration of various anatomical positions.

CO2: Identification of upper limb bones, head and neck.

CO3: Brief knowledge in anatomy and physiology of endocrine system, digestive system and Genito-Urinary System.

CO4: Demonstration of the various tests and procedures in hospital and community settings.

CO5: Knowledge about the anatomy and physiology of skin and special senses.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO 1	PSO 2	PS O3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Basic and Applied Physics for Physiotherapy-I

Semester I
22BPTC04

Hours of Instruction/week: 4

No of Credits: 2

Objectives:

- The student will be able to understand about the knowledge of mechanics, muscle action, Electricity, magnetism and ionization.
- To apply the basic physics in physiotherapy aspect

Unit I Mechanics

12

- Mechanics and Biomechanics
- Force - Classification of forces, concurrent, Co planar and co-linear forces, composition and resolution of forces, angle of pulls of muscle
- Gravity - line of gravity, Centre of gravity

Unit II

12

- Equilibrium - Supporting base, types, and equilibrium in static and dynamic state
- Pulleys - system of pulleys, types and application
- Springs - properties of springs, springs in series and parallel, elastic materials in use
- Levers - function, classification and application of levers in physiotherapy order of Levers with example of lever in human body

Unit III

12

- Speed, Velocity, Work, Energy, Power, Acceleration, Momentum - principles, and Practical application
- Newton's Laws
- Friction
- Elasticity - Definition, stress, strain, HOOKE'S Law

Unit IV

12

CURRENTS:

- DC Currents -Modern concept of electricity: fundamental electric charges (proton and electron), bound and free electrons, free electrons and current, static electric charge, charging of an object potential and capacitance, potential difference and EMF
- A. C. currents: Sinusoidal wave form, frequency, wavelength, Amplitude and phase of a sine wave, Average & RMS value of a sine wave
- Quantity of electricity, magnitude of current, conductors and insulators, resistance Of conductor and Ohm's law, resistances in series and parallel

Unit V

- Capacitors: Electric field around a capacitor, charging and discharging a capacitor, types of capacitors with application of each in Physiotherapy department
- Rheostat: series and shunt Rheostat with application of each in the Physiotherapy department
- Effects of electric Current: Thermal effect, chemical effect (ionization) and magnetic effect. Electric shock, Earth shock, causes and its prevention.

12

Total Hours

60

Text Books:

1. M. Dena Gardiner, The Principles of Exercise therapy, Bell & Hymes, 4th Ed, 1981
2. Edward Bellis Clayton, Clayton's Electrotherapy, Baillier Tindill, 9th Edition, 1985

Reference books

1. Carolyn Kisner, Therapeutic Exercise, Jaypee Brothers, 6th Ed, 2012.
2. Low & Read, Electrotherapy Explained, Butterworth-Heinemann, 4th Ed, 2006

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To know the mechanics, force and gravity.

CO2: Knowledge about the muscle work, types of muscle work and forces involved and equilibrium.

CO3: To Know the laws and principles.

CO4: Knowledge about DC and AC currents along with its physiological and therapeutic effects.

CO5: Understand about capacitors, rheostat and electric current in therapeutic interventions

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PSO1	PSO 2	PSO3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Psychology

Semester I
22BPTC05

Hours of Instruction/week: 4

No of Credits: 3

Objectives:

- To demonstrate and practice and clinics the student will be able to recognize and help with the psychological factors involved in disability, pain, disfigurement, chronic illness, death, bereavement and medical – surgical patients/conditions.
- To understand the elementary principles of behavior for applying in the physiotherapeutic environment

Unit I

12

Definition of Psychology

Psychology, basic information in relation to following school's methods and Schools: structuralism, functionalism, behaviorism, and psychoanalysis, gestalt psych. Me introspection, observation, inventory and experimental method. Branches: general, child, abnormal, industrial, clinical, counseling

Heredity and Environment

Twins, relative importance of heredity and environment their role in relation to physical characteristics, intelligence and personality, nature – nurture controversy.

Development and Growth Behavior

Infancy, childhood, adolescence, adulthood, middle age, old age

Unit II

12

Intelligence

IQ, mental age, list of various intelligence tests- WAIS, WISC, Bhatia performance test, Raven progressive matrices test.

Motivation

Motive, drive, incentive, reinforcement, basic information about primary Needs: hunger, thirst, sleep, avoidance of pain, attitude to sex

Emotions

Differentiate from feelings, physiological changes of emotion. Rule of RAS, hypothalamus, cerebral cortex, SNS, adrenal gland, heredity and emotion, Nature and control of anger, fear, and anxiety. Stress-Physiological and psychological changes, relation to health and sickness: psychosomatics, professional stress, burnout

Unit III

12

Personality

The components: physical characteristics. The role of heredity, nervous system, physical characteristics, abilities, Family and culture on personal development. Basic concepts of Freud: unconscious, conscious, id, ego, super ego. Personality Assessment: interview, standardized, non-standardized, exhaustive and Stress interviews. List and define inventories BAL, CPI, MMPI. Projective tests-Rorschach, TAT, Sentence completion test.

Learning

The laws of learning as proposed by Thorndike.

Types of learning: Classical conditioning, Operant conditioning, Insight learning, Observational, Trial and error type.

The effective ways of learning: Massed & spaced, Whole & part, Recitation & reading, Serial & free recall, knowledge of results, associations organizations, mnemonic methods, incidental & international learning, role of language.

Thinking

Concepts, creativity, steps in creative thinking. List the traits of creative People, delusions.

Frustration

Sources, solution, conflict; approach – approach, avoidance – avoidance, Approach – Avoidance.

Unit IV**12****Sensation, Attention and Perception**

Sensation – vision, hearing, olfactory, gestation and cutaneous sensation, movement, Equilibrium and visceral sense.

Attention – Define attention and list the factors that determine attention: nature of Stimulus intensity, color, change, extensity, repetition, primary motives.

Perception – Define perception and list the principles of perception figure ground, Constancy, similarity, proximity, closure, continuity, values and interest, past experience context, needs, moods, religion, sex, perceived benefits and socioeconomic status. Define illusion and hallucination.

Leadership

Qualities of leadership: physical factors, intelligence, sociability, will and dominance.

Unit V**12****Psychological Reactions of Patient**

Psychological reactions of patient during admission and treatment – anxiety, shock, denial, suspicion, questioning, loneliness, regression, shame, guilt, rejection, Fear, withdrawal, depression, ego, concern about small matters, narrowed interest, emotional over reaction, perpetual changes, confusion, disorientation, hallucinations, delusions, illusions, anger, loss of hope.

Communication

Types – Verbal, non- verbal, elements in communication, developing effective communication, specific communication technique. Counseling – Definition, aim, differentiate from guidance, principles in counseling.

Emotional Needs

Emotional needs and psychological factors in relation to unconscious patient, handicapped patients, bed-ridden patients, chronic pain, spinal cord injury, paralysis, cerebral palsy, Burns, amputation, head injury, parkinsonism, leprosy, incontinence.

Geriatric Psychology and Pediatric

Specific psychological reactions and needs of geriatric patient. Specific psychological reactions and needs of pediatric patients.

Behavior Modification

Application of various conditioning and learning principles to modify patient behavior

Total Hours 60

Text Books:

Morgan & King, Introduction to Psychology, 3rd Ed, 1994

Reference books

1. Clifford T. Morgan – Introduction to Psychology, ELBS, 2 Ed, 1990
2. Hilgard & Atkinson - Introduction to Psychology, CBS, 3 Ed, 1994

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Know the Psychosocial assessment of patients in various developmental stages.

CO2: Knowledge about the concept of stress and its relationship to health, sickness and one's profession.

CO3: Understand ego defense mechanisms and learn counseling techniques to help those in need.

CO4: Understand the reason of non – compliance among patients and improve compliance behavior.

CO5: Understand gain insight into the applications of psychology in the field of Physiotherapy

CO /PO	PO1	PO 2	PO3	PO4	PO 5	PO6	PO7	PO 8	PO 9	PO 10	PO11	PS O1	PS O2	PS O3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Discipline Specific Elective (DSE-I) Course
Sociology

Semester I
22BPTD01

Hours of Instruction/week: 2+3
No of Credits: 3

Objectives:

- To understand study of social life, social changes and causes and consequences of human behavior.
- To ability to investigate the structure of groups, organizations and societies.

Unit I Introduction

15

Sociology as a science of society, uses of study of sociology, application of knowledge of sociology in Physiotherapy.

Sociology and Health

Social factors affecting health status, social consciousness and perception of illness. Social consciousness and meaning of illness, decision making in taking treatment. Institutions of health, their role in the improvement of the people.

Socialization

Meaning of socialization, influence of social factors on personality, socialization in hospital, socialization in rehabilitation of patient.

Unit II Social Group

15

Concepts of social groups influence of formal and informal groups on health and sickness, the role of primary groups and secondary groups in the hospital and rehabilitation settings.

Family

Concepts of community, role of rural and urban communities in public health, role of Community in determining beliefs, practices and home remedies in treatment.

Community

Rural community: Meaning and features –Health hazards of rurality's, health hazards to tribal community. Urban community: Meaning and features- Health hazards of urbanities.

Unit III Culture

15

Components of culture, impact of culture on human behavior, cultural meaning of Sickness and response of sickness & choice of treatment, culture induced symptoms and disease, sub-culture of medical workers.

a. Concept of Health

b. Concept of Culture

- c. Culture and Health
- d. Culture and Health Disorders

Caste System

Features of the modern caste system and its trends.

Social Change

Meaning of social change, factors of social change, human adoption and social change.

Social change and stress. Social change and deviance. Social change and health

Programmes, the role of social planning in the improvement of health and rehabilitation.

Unit IV Social Control

15

Meaning of social control, role of norms, folkways, customs, morals, religion law and other means of social control in the regulation of human behavior, social deviance and Disease.

Social Problems of The Disabled

Consequences of the following social problems in relation to sickness and disability, remedies to prevent these problems, Population explosion. Poverty and unemployment, Beggary. Juvenile delinquency, Prostitution. Alcoholism, Problems of women in employment.

Unit V Social Security

Social security and social legislation in relation to the disabled.

Social Worker

Meaning of Social Work. The role of a Medical Social Worker.

15

Total Hours 75

Text Books:

1. Sachdeva D.R. & Bhushan.V, An introduction to Sociology, Kitab Mahal Limited, 1974.
2. Textbook of Sociology for Physiotherapy Students by Neeraja

Reference books

1. Madan.G.R. Indian Social Problems, Vol.1, Chennai Applied Publications, 1973.
2. Sociology for Physiotherapists Paperback by Bid

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Understand the Sociology, uses and how to apply it in physiotherapy

CO2: Knowledge concept of social groups, family and community

C03: Understand the concept of culture, caste and social change

C04: Know the social control and social problems of the disabled

C05: Understand the social security and to know the role of social worker.

CO /PO	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO 10	PO 11	PSO1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Anatomy – II

Semester II
22BPTC06

Hours of Instruction/week: 5

No of Credits: 4

Objectives:

- To demonstrate and practically the student will be able to demonstrate knowledge in human anatomy as is necessary for the study and practice of physiotherapy.
- To develop an ability to apply the principles of anatomy in clinical practice

15

Unit I Osteology and Myology of Lower Extremity

- Hip bone, femur, tibia, fibula and patella.
- The components and features of hip bones. Identify the ends, borders, surfaces, head, neck, trochanters, condyles and epicondyles of femur and the features of the tibia and fibula.
- The origin, insertion, nerve supply and action of the muscles in the front of thigh.
- The boundaries and contents of femoral triangle and sub-sartorial canal.
- The position, course and distribution of femoral nerve.
- The course and main branches of femoral artery and mention the blood supply of neck of femur.
- The position of femoral vein.
- Medial side of Thigh
- Back of Thigh
- Gluteal region
- Hip Joints
- Back of Thigh
- Gluteal region
- Hip Joints
- Knee Joints
- Popliteal fossa
- Gluteal region
- Front of Leg and Dorsum of Foot
- Lateral Side of Leg
- Back of Leg and Sole of Foot
- Nerves
- Blood vessels

Unit II Trunk and Thorax

15

- Vertebral Column

- Thorax

Unit III Abdomen and Pelvis

15

- Abdomen
- Pelvis

Unit IV Neuroanatomy

Nervous System

15

- The subdivisions of nervous system - central, peripheral and autonomic nervous system and their subdivisions. The position and form of the spinal cord, its structure and functions in terms of neuronal connections
- The subdivisions of the brain. The external features of the brain.
- The nature and basics of muscle tone, the anatomical pathways involved in the production and maintenance of muscle tone.
- The formation, circulation and drainage of CSF, the ventricles. The meninges and spaces around it and the cisterns. Lumbar puncture and cisternal puncture. The feature of the meninges. Extradural, subdural and subarachnoid hemorrhage.
- Major blood vessels around the brain and spinal cord.
- The position and structure of the autonomic nervous system.
- The cranial nerves in serial order.
- Anatomy of spinal cord review.

Unit V Systems

Cardio – Vascular System

15

- The external and internal features of the structure of the heart and their implications.
- The basic features of blood supply and nerve supply of the heart.
- The position and general distribution of major arteries and veins. Their main branches. The types of arteries and veins. The basic microscopic structure of types of blood vessels.

Lymphatic System

- The general and regional arrangements of the lymphatic system.
- The lymphatic organs and mention their location.
- The basic structural features of lymphatic vessel, lymphatic, thymus, spleen and tonsils.
- Functional roles to the lymphatic system.
- The position and immediate relation of the spleen.

Respiratory System

1. a. The parts of the respiratory system.
b. The functional anatomy of the parts of the respiratory system.

- c. The basic features of innervations of bronchi and lungs.
2. The position, extent, gross and microscopic structure of the parietal pleura

Total Hours 75

Text Books:

1. Ranganathan Ts, (2013) Textbook of Human Anatomy. 6th editions Chand and Company PvtLtd Publisher, New Delhi.
2. Ross and Wilson, Anatomy and Physiology in Health and Illness, Anne Waugh 2010, Publisher ELBS with Churchill Livingstone.
3. B.D. Chaurasia, Human Anatomy -Vol. I, II, III, (1979 reprint 2008) CBS Publishers andDistributors, New Delhi.

Reference books

1. Romanes G.J, Cunningham's Manual of Practical Anatomy. (1986) 15thedition, Reprint 2008 Oxford Medical Publications.
2. SinghI.B, Text Book of Human Osteology, (2006) Jaypee Brothers, Medical Publishers.
3. Ross M.H, E. and Williams L.J and Wilkins Romell, Kaye G.I,Histology: A Text and Atlas(1995),3rd edition, Anne Waugh 2010, ELBS with Churchill Livingstone Publishers.
4. Inderbir Singh,Textbook of Human Histology.(2002), 4th Edition Jaypee Brother, New Delhi.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Understand the anatomical knowledge of lower extremities.

CO2: Knowledge anatomical knowledge of trunk and thorax.

CO3: Understand the structural and functional importance abdomen and pelvis.

CO4: Knowledge Basic neuroanatomy.

CO5: Learn about the cardiovascular system, lymphatic system and respiratory system.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Physiology and Applied Physiology – II

Semester II
22BPTC07

Hours of Instruction/week: 4

No of Credits: 4

Objectives:

- To explore the normal functioning of the living organisms.
- To acquire knowledge of the normal physiology of various human body systems.
- To learn their principles, mechanisms and control

Unit I Nervous System

12

Structure of a neuron. Classification of nerve fibres. Properties of nerve fibres. Receptors. Synapse and synaptic transmission. Reflexes & properties of reflexes. Spinal cord and its pathway. Spinal tracts and its functions. Physiology of pain. Brainstem, thalamus, basal ganglia. Cerebrum. Cerebral cortex. Proprioceptors. Posture & equilibrium. Vestibular apparatus. EEG. CSF. Autonomic nervous system.

Unit II Cardiovascular System

12

Cardiac muscle – structure & properties. Cardiac cycle. Heart sounds. ECG; arrhythmia. Cardiac output. Factors regulating the action of heart. Heart rate. Arterial blood pressure & its regulation. Coronary circulation. Cerebral circulation. Hemorrhage. Circulatory Shock. Cardiovascular adjustments during exercise.

Unit III Respiration

12

Overview of respiratory tract. Defense mechanism in respiratory tree. Mucociliary transport. Mechanics of respiration. Pulmonary circulation. Lung volumes & pulmonary function tests. Transport of blood gases. Acid – base balance. Artificial ventilation. Neural & chemical regulation of respiration. Hypoxia & its types. Effects of exercise on respiratory system. Acclimatization. High altitude and respiration. Decompression sickness.

Unit IV Excretion

Structure of nephron. Juxta Glomerular apparatus. Renal circulation.
Formation of urine. Micturition. Renal failure.

12

Unit V Reproductive System

Male & female reproductive system. Menstrual cycle. Pregnancy and parturition. Placenta & its functions. Lactation. Contraceptive measures. Physiology of fetus. Factors affecting fetal growth.

12

Total Hours 60

Text Books:

1. John E.Hall, Arthur C.Guyton, Text Book of Physiology, Saunders, 12th Edition, 2010
2. S.S.Randhawa, Medical BioChemistry, PV Books, 1 Ed, 2013
3. Chatterjee, Human Physiology, Central book agency, 4th edition, 1958.

Reference books

1. L. Prakasam Reddy, Concise Medical Physiology, JP Brothers, 3rd Ed, 1999
2. Shetty nandhini, Biochemistry for Physiotherapist and AHS, JP bros, 1 Ed, 2008
3. Sembulingam, Essentials of Physiology, JP Medical Ltd, 6th Ed, 2013
4. Sujith Kumar Chaudhri, Concise medical physiology, New Central Book Agency, 6th Ed, 2011
5. U. Sathyanarayana, Essentials of Biochemistry, Book and Allied (P) Ltd, Kolkata, 1999
6. Ganong's review of medical physiology kim .E. Barrett 25th edition.
7. DM .Vasudevan Textbook of biochemistry for medical students 7th edition.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Obtain Knowledge understanding of nervous system.

CO2: Understand the cardiovascular system

CO3: Knowledge of respiration.

CO4: Understand of excretion system.

CO5: Learn different parts and functions of reproductive system

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H		H	H
CO2	H	L	H			H	M		L	M	M	M	M	
CO3	H		M			H	L			M	H	M	H	
CO4	H	L	H		M	H		M			H	H	H	M
CO5	H		M	H		H	M	M			H		H	H

Anatomy and Physiology Practical and Oral -II

Semester II
22BPTC08

Hours of Instruction/week: 3

No of Credits: 3

Objectives:

- To enhance the students with practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students, distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

List of Experiments

1. Identification of lower limb Bones
2. Anatomical Identification trunk and thorax
3. Anatomy and physiology of abdomen
4. Anatomy of pelvis
5. Neuro anatomy
6. Anatomy and physiology of cardiovascular system
7. Anatomy and physiology of Limbic system
8. Anatomy and physiology of Respiratory system
9. Anatomy and physiology of Nervous System
10. Physiology of excretion
11. Anatomy and physiology of reproductive system

Total hours 45

Text Books:

1. Jain.A.K, Manual of Practical Physiology For MBBS, (2012), 4th Edition, Avichal Publishing Company.
2. Chaurasia, Human Anatomy - VOL I, VOL II, VOL III, 7th Edition, CBS, 2016.

Reference Books:

1. Michael Swash, Michael Glynn, Hutchinson's Clinical Methods (2007). 22nd Edition, Saunders Ltd
2. Sri Nageswari.K, Rajeev Sharma, Practical Workbook of Human Physiology (2006), 1st Edition, Jaypee Brothers Medical Publishers (P) Ltd

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge of bones-lower limb

CO2: Understand the anatomical identification of trunk and thorax

CO3: Understand Anatomy and physiology of abdomen and pelvis

CO4: Brief knowledge about anatomy and physiology of cardiovascular system, Limbic system, Respiratory system, Nervous System and reproductive system.

CO5: Knowledge about excretion

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H		H	L		L		M			H		H	H
CO 2	H	L	H			H	M		L	M	M	M	M	
CO 3	H		M			H	L			M	H	M	H	
CO 4	H	L	H		M	H		M			H	H	H	M
CO 5	H		M	H		H	M	M			H		H	H

Basic and Applied Physics for Physiotherapy-II

Semester II
22BPTC09

Hours of Instruction/week: 2+2

No of Credits: 3

Objectives:

- The student will be able to understand about the knowledge of mechanics, muscle action, Electricity, magnetism and ionization.
- To apply the basic physics in physiotherapy aspect

Unit I

12

- Magnetism: Magnetic - non-magnetic substances and their properties, properties of magnet, molecular theory, poles of magnet and its properties, magnetic lines of force and their properties, Electromagnetism, magnetic effects of electric current, Electromagnetic induction, Lenz's law, Inductor and Inductance types of inductor, reactance and impedance.
- Condenser – Potential & capacity, Principles, factors determining capacity, Construction. Electric field, charging & discharging and use of condenser in Electrotherapy.

12

Unit II

- Cosine law and its implications.
- Physical effects of heat and radiation. Laws governing radiation.
- Law of Grotthus and its implications.

Unit III

12

- Thermionic Valves: Thermionic emission, Diode and Triode valves and their characteristics, Construction and application of Cathode Ray Oscilloscope.
- Semiconductor Devices: Intrinsic and extrinsic semiconductors, Light Emitting Diodes, integrated circuit.
- Electronic Circuits: Rectifiers & smoothing circuits, Oscillators -Sinusoidal and non-sinusoidal types

Unit IV

A.C. AND D.C. meters: Functions and applications of Ammeter and volt meters, Ohmmeters, Wheatstone bridge

12

Introduction to Therapeutic Energies – Thermal, Mechanical, Electrical, Electromagnetic and magnetic - Definition, description, physiological effects, Pathological effects and drugs.

Unit V

- Medical Instrumentation for Physical Therapy: Brief description of generation,

12

Circuit diagrams and testing.

- Low frequency currents, Direct currents, medium frequency currents

Total Hours 60

Text Books:

1. M. Dena Gardiner, The Principles of Exercise therapy, Bell &Hymes, 4thEd,1981
2. Edward Bellis Clayton, Clayton's Electrotherapy, Baillliier Tindill, 9th Edition,1985

Reference books

1. Carolyn Kisner, Therapeutic Exercise, Jaypee Brothers, 6th Ed,2012 2.Carolyn Kisner, Therapeutic Exercise, Jaypee Brothers, 6th Ed,2012
2. Low& Read, Electrotherapy Explained, Butterworth-Heinminn, 4th Ed,2006

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about magnetism and condenser.

CO2: Learn about the laws

CO3: Understand about electricity-thermionic valves, semiconductor devices and electronic circuits and its therapeutic uses and importance of currents in treatment.

CO4: Recollect about alternating and static currents along with its physiological and therapeutic effects.

CO5: Understand the medical instrumentations for physical therapy and low frequencycurrent in therapeutic interventions.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H		H	L		L		M			H		H	H
CO 2	H	L	H			H	M		L	M	M	M	M	
CO 3	H		M			H	L			M	H	M	H	
CO 4	H	L	H		M	H		M			H	H	H	M
CO 5	H		M	H		H	M	M			H		H	H

Microbiology

Semester II
22BPTC10

Hours of Instruction/week: 3

No of Credits: 3

Objectives:

- To demonstrate and understand about the knowledge of microbiology including immunity, virology, antiseptics and allergy.
- A general understanding of the diseases that therapists would encounter in their practice

UNIT I

9

Introduction, Classification, Shape and arrangement, Disinfection and antiseptic

UNIT II

9

Sterilization and asepsis, Allergy & hypersensitivity and Immunology – Definition, antigen, Antibody reaction, autoimmunity, natural and Acquired immunity.

UNIT III

9

Infection – Definition, source of infection, portal of entry, spread of infection, type. Bacteriology – Infection caused by Gram Positive bacteria – clostridium tetani & coryne bacterium diphtheria. Gram negative bacteria – klebsiella, pseudomonas, salmonella, v.cholera

UNIT IV

9

Mycobacterium – M.tuberculosis, M.leprae, a typical mycobacteria. Outline the bacteria causing the following diseases

- RTI
- Meningitis
- Enteric infection
- Anaerobic infection
- UTI
- Leprosy, TB
- STD
- Wound infection
- Hospital acquired infection

UNIT V

Viruses – Definition, size, shape, structure, classification, cultivation, diagnosis of Viral infection.

Outline the virus causing the following diseases

- HIV
- Hepatitis
- Polio
- Measles
- Rubella
- Herpes.

Total Hours 45

Text Books:

1. Satish Gupte, The Short text book of Medical Microbiology by, JayPee Brothers, 2nd Ed, 2004.
2. Anantha narayananan & Jayaram Paniker, Text book of Micro biology, Orien Longman, 9th Ed, 2013.

Reference books

Kumar, Essentials of Microbiology, JP, 1st Ed, 2014.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about disease and changes in structure and function of cells during disease condition gained.

CO2: Understand about importance of nutrition, function of nutrition and its deficiency diseases gained

CO3: Learn the Pathogenesis and pathological changes of disease in various body systems.

CO4: Knowledge about the various microorganisms, its classification and structure gained.

CO5: To Know about the various disease caused by microorganism and its prevention

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H		H	L		L		M			H		H	H
CO 2	H	L	H			H	M		L	M	M	M	M	
CO 3	H		M			H	L			M	H	M	H	
CO 4	H	L	H		M	H		M			H	H	H	M
CO 5	H		M	H		H	M	M			H		H	H

Discipline Specific Elective (DSE-II) Course
Clinical Biochemistry

Semester II
22BPTD02

Hours of Instruction/week: 2+3
No. of Credits: 3

Objectives:

- To understand and learn the collection of biological samples and preservation
- To know about the clinical significance of abnormalities in metabolism of carbohydrate, protein and lipid.
- To learn about the clinical importance of enzymes.

Unit I
Basics

15

Muscle Contraction - Contractile elements in muscle, briefly on the process of muscle contraction, Energy for muscle contraction.

Biochemistry of Connective tissue - a. Introduction, various connective tissue proteins: Collagen, elastin - Structure and associated disorders. Glycoproteins, Proteoglycans.

Specimen collection- Blood, urine, feces, cerebrospinal fluid and amniotic fluid. Preservation of the specimens - anticoagulants and normal values of biochemical parameters.

Unit II
Energy Systems

15

- Hormone Action - a. Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function.
- Acid-Base balance - a. Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system. Role of lungs and kidneys in acid base balance, Acid base imbalance.
- Water balance - a. Water distribution in the body, Body water, water turnover, Regulation of water balance: role of ADH and thirst centre.
- Electrolyte balance - a. Osmolarity. Distribution of electrolytes. b. Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF
- ATP Production.
- Aerobic & Anaerobic Metabolism
- Lactic acid production
- Lactic acid clearance mechanism.

Unit III
Nutrition

15

- a. Introduction, Importance of nutrition. Calorific values, Respiratory quotient – Definition, and its significance. Energy requirement of a person - Basal metabolic rate: Definition, Normal values, factor affecting BMR. Special dynamic action of food.
- b. Physical activities - Energy expenditure for various activities. Calculation of energy requirement of a person
- c. Balanced diet i. Recommended dietary allowances ii. Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers
- iii. Role of lipids in diet iv. Role of proteins in diet: Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and

non- essential amino acids. Nitrogen balance v. Nutritional disorders.

Unit IV

Metabolism

15

1. Protein metabolism – General characteristics of digestion and absorption and Disorders of digestion and absorption – Lactose intolerance. Urea cycle 2. Carbohydrate metabolism 3. Fat metabolism Metabolic equivalence 2. Types of energy expenditure 3. Liver function test 4. Renal function test 5. Lipid profile in serum.

Unit V

Clinical Implication

15

Normal levels of blood and urine constituents, Relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate. Liver function tests, Renal function tests.

Total Hours:75

Text Books:

1. Chatterjee, M.N. (2011).Text Book of Medical Biochemistry, Eight Edition, Jaypee Brothers Medical Publishers, New Delhi.
- 2.Chawla, R.(2008).Practical Clinical Biochemistry - Methods and Interpretations, Third Edition, Jaypee Brothers Medical Publishers, New Delhi.
3. Bhagavan, N.V. (2004).Medical Biochemistry, Fourth Edition, Academic Press, California.

References:

1. Gaw, A., Murphy, M.J., Cowan, R.A., Rectly, D.S., Stewart, M.J. and Shepherd, J. (2008), Clinical Biochemistry, 4th ed, Churchill Livingstone, New York.
2. Gowenlock, A.H., Murray, J.R. and Lauchlan, D.M. (2006), Practical clinical Biochemistry, 6thed, CBS Butterworth publishers, New Delhi.
3. Nayak, B. (2002), Manipal Manual of Clinical Biochemistry, 1st ed, Jay Pee brothers, New Delhi.

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Knowledge of basics biological samples and preservation.

CO2: Understand the energy systems

CO3: Knowledge about the nutrition and activities

CO4: Understand the basic about the concept of metabolism

CO5: Knowledge about the clinical implications.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

General Medicine and Pharmacology–I

Semester III
22BPTC11

Hours of instruction /week:3+2
No of credits:3

Objective:

- To demonstrate a general understanding of the diseases that therapists would encounter in their practice.
- They should have a brief idea of the aetiology and pathology, what the patient's symptoms and the resultant functional disability. This would help the candidates to understand the limitations imposed by the disease on any therapy that may be prescribed.

UNIT I

15

Infections

The mode of spread and appropriate prevention measures, of the following communicable diseases. Bacterial – Tetanus .Viral – Herpes Simplex, Zoster, Varicella, Measles, German measles, Hepatitis B, Aids Protozoal – Filaria

Hematology

Clinical aspects of iron deficiency, B12 and folic acid deficiency anemia. Types of bleeding diathesis. The clinical features of Hemophilia.

UNIT II

15

Respiratory Tract

- Bronchitis - Define, lists etiological factors and describe symptoms.
- Pneumonia - List types of pneumonia (lobar, broncho, aspiration pneumonia)
- Etiologic agents and briefly outline symptoms and complications of pneumonia.
- Asthma - The etiological factors and clinical features of acute exacerbation.
- Chronic obstructive airway diseases - Define emphysema and chronic bronchitis. The pathology, symptoms of disease and clinical course.
- Tuberculosis - The aetiology, pathology and clinical features of pulmonary TB.
- Bronchiectasis - The pathology and clinical symptoms of bronchiectasis, bronchopulmonary segments and basis of postural drainage.
- Emphysema - Etiological factors.
- Chest wall deformities - funnel chest, Pigeon chest barrel chest, Kyphoscoliosis of thoracic spine.
- Functional disability of occupational, Lung diseases, List pneumoconiosis.

UNIT III

15

Cardio - Vascular System

- Cardiac failure – Definition causes and symptoms.
- Rheumatic fever - Definition and aetiology and gross pathology of rheumatic heart disease.
- Infective endocarditis. - Definition and outline aetiology, symptoms and complications.
- Ischemic heart disease- Pathology of IHD, Angina pectoris and Myocardial infarction, The clinical features and Medical and surgical therapy.
- Hypertension - The clinical features, complications and goals of therapy.
- Pathogenesis and clinical features of pulmonary embolism, Deep vein thrombosis, and pulmonary infarct.
- Congenital heart disease - ASD, VSD, Fallot's Tetralogy and PDA and the pathologic anatomy.

UNIT IV

15

Bone, Joint and Connective Tissue Disorders

- Brief introduction to concept of autoimmune disease.
- Systemic lupus erythematosus, Polymyositis, Dermatomyositis, Polyarteritis Nodosa, and Scleroderma.
- Rheumatoid arthritis - Describe aetiology, clinical features and complications, drug therapy and non-pharmacological therapy.
- Osteoarthritis - Describe aetiology, clinical features and complications and review non steroidal anti-inflammatory drugs and steroids.

UNIT V

15

Pharmacology

- Terminology
- Classification of drugs
- Factors influencing the dosage of drugs and its actions.
- Drug Allergy
- Principles of drug administration and routes.

Total hour :75

Text Books:

1. Davidson, A Text Book of Medicine, Churchill Livingstone, 21 st Ed, 2010.
2. S.D.Seth , Text Book of Pharmacology, Churchill Livingstone, 8 Ed, 2012

References:

1. K.D.Tripathi , Essentials of Medical Pharmacology, JayPee Brothers.1Ed, 2007
2. Harrison, Principles of Medicine, Mc Graw hill, 17 th Ed, 2008.
3. OP Ghai, Essential Pediatrics, CBS Publishers, 7th Ed, 2010.
4. Kumar and Clarks , Clinical medicines, Jaypee Brothers, 3 rd Ed, 2013.
5. Multani, Principles of geriatrics physiotherapy, Jaypee Brothers, 1 st Ed, 2008.
6. Tripathi, Essentials of medical pharmacology, Jaypee Brothers, 7th Ed, 2013.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about the medicines encountered in the management of physiotherapy

CO2: Know the basic idea of different diseases and infections

CO3: Knowledge on symptoms and pathology of diseases

CO4: Analyzing and interpretation imaging findings into the physical therapy diagnostic process

CO5: Understand the pharmacology

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

General Pathology

Semester III

Hours of instruction / week:3+2

22BPTC12

No of credits:3

Objectives:

- To understand about the knowledge of pathology.
- To acquire knowledge about diseases.

UNIT 1

15

Introduction to Pathology

- Introduction: Disease, concepts of disease, classifications of lesions. Bacterial, viral and parasitic infections a general outline.
- Cell injuries –
 - Aetiology and Pathogenesis with a important aspects of normal cell structure.
 - Reversible cell injury: Types, Sequential changes, Cellular swellings, vacuolation, Hyaline changes, Mucoïd changes.
 - Irreversible cell injury: Types of Necrosis and Gangrene, Autolysis. Pathologic calcification: Dystrophic and Metastatic.
 - Intracellular Accumulations - Fatty changes, Protein accumulations, Glycogen accumulations, Pigments - Melanin / Hemosiderin.
- Extra cellular accumulations: Amyloidosis - Classification, Pathogenesis, Pathology including special stains.
- Immunopathology –
 - Immune system: General concepts.
 - Hypersensitivity: type and examples, antibody and cell mediated tissue injury with examples. Secondary immunodeficiency including HIV infection.
 - Auto-immune disorders: Basic concepts and classification, SLE.
 - AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education.

UNIT II

15

Infectious diseases

- a. Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis.
- b. Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery.
- c. Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Ricktsia, Chlamydial infection, HIV infection.
- d. Fungal disease and opportunistic infections.

- e. Parasitic diseases: Malaria, Filariasis, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst.

Circulatory Disturbances

- a. Hyperemia/Ischemia and Haemorrhage Edema: Pathogenesis and types. Chronic venous congestion: Lung, Liver, Spleen, Systemic Pathology Thrombosis and Embolism: Formation, Fate and Effects.
- b. Infarction: Types, Common sites.
- c. Shock: Pathogenesis, types, morphologic changes.

Growth Disturbances and Neoplasia

- a. Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia.
- b. Precancerous lesions.
- c. Neoplasia: Definition, classification, Biological behaviour: Benign and Malignant, Carcinoma and Sarcoma.
- d. Malignant Neoplasia: Grades and Stages, Local & Distant spread.
- e. Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Heredity and cellular oncogenes and prevention of cancer.
- f. Benign & Malignant epithelial tumours. Eg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumours. Eg: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma.

UNIT III

15

Nutritional Disorders

Protein energy malnutrition: Marasmus, Kwashiorkor, and Vitamin deficiency disorders, classification with specific examples.

Genetic Disorders

Basic concepts of genetic disorders and some common examples and congenital malformation.

Hematology

- a. Constituents of blood and bone marrow, Regulation of hematopoiesis. Anemia: Classification, clinical features & lab diagnosis.
- b. Nutritional anemias: Iron deficiency anemia, Folic acid, Vit. B 12 deficiency anemia including pernicious anemia. Hemolytic Anaemias: Classification and Investigations. Hereditary hemolytic anaemias: Thalassemia, Sickle cell anemia, Spherocytosis and Enzyme deficiencies.
- c. Acquired hemolytic anaemias
 - i. Alloimmune, Autoimmune
 - ii. Drug induced, Microangiopathic Pancytopenia - Aplastic anemia.
- d. Hemostatic disorders, Vascular and Platelet disorders & lab diagnosis.
 - Coagulopathies –
 - i. Inherited

- ii. Acquired with lab diagnosis.
- e. Leukocytic disorders: Leukocytosis, Leukopenis, Leukemoid reaction.
- f. Leukemia: Classification, clinical manifestation, pathology and Diagnosis. Multiple myeloma and dysproteinemias.
- g. Blood transfusion; Grouping and cross matching, untoward reactions, transmissible infections including HIV & hepatitis, Blood-components & plasma-pheresis.

UNIT IV

15

Alimentary tract:

- a. Oral Pathology: Ulcers, leukoplakia, Carcinoma, oral cavity diseases and tumour of salivary gland & esophagus and precancerous lesions, Esophagus inflammatory, functional disorders and tumours.
- b. Stomach: Gastritis, Ulcer & Tumours.
- c. Tumours and tumour like condition of the small and large Intestine: Polyps, carcinoid, carcinoma, Lymphoma.
- d. Pancreatitis and pancreatic tumours :i) Exocrine, ii) Endocrine Salivary gland tumours : Mixed, Warthin's

Hepato – Biliary Pathology

- a. Jaundice: Types, aetio-pathogenesis and diagnosis. Hepatitis: Acute, Chronic, neonatal.
- b. Alcoholic liver disease
- c. Cirrhosis: Postnecrotic, Alcoholic, Metabolic and Portal hypertension Liver abscesses; Pyogenic, parasitic and Amoebic. Tumours of Liver.

UNIT V

15

Lymphatic System

- a. Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma. Lymphadenitis - Nonspecific and granulomatous. Causes of Lymph Node enlargements. Reactive Hyperplasia, Primary Tumours - Hodgkin's and Non hodgkin's Lymphomas, Metastatic Tumours.
- b. Causes of Splenic Enlargements.

Endocrine pathology

- a. Diabetes Mellitus: Types, Pathogenesis, Pathology, Laboratory diagnosis Non-neoplastic lesions of Thyroid: Iodine deficiency goiter, autoimmune Thyroiditis, Thyrotoxicosis, myxedema, Hashimoto's thyroiditis.
- b. Tumours of Thyroid: Adenoma, Carcinoma: Papillary, Follicular, Medullary, Anaplastic. Adrenal diseases: cortical hyperplasia, atrophy, tuberculosis, tumours of cortex and medulla.

Dermatopathology:

Skin tumours: Squamous cell carcinoma, Basal cell carcinoma, Melanoma

Total hour :75

Text Books:

1. Ananthanarayanan & Jayaram Paniker, Text book of Micro biology, Orient Longman, 9th Ed, 2013.
2. Harsh mohan, Text book of Pathology, Jaypee brothers, 7th edition-2015.

References:

1. Datta, Textbook of Pathology, JP, 2nd Ed, 2004.

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1: Knowledge about disease and changes in structure and function of cells during disease condition gained.
- CO2: Knowledge about importance of nutrition, function of nutrition and its deficiency diseases gained
- CO3: Understand pathogenesis and pathological changes of disease in various body system is understood properly.
- CO4: Knowledge about the pathology of respiratory system, cardiovascular, endocarditis, ischemic heart diseases
- CO5: Know about the pathology in lymphatic system, musculoskeletal and endocrine pathology

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Biomechanics-I

Semester III

Hours of instruction per week:3+2

22BPTC13

No of credits:4

Objectives:

- To demonstrate an understanding of the principles of Biomechanics and Kinesiology and their application in the health and disease pertaining to muscles and joints of upper limb.

UNIT I

15

Joint Structure and Function

- The basic principles of joint design and a human joint.
- The tissues present in human joints including dense fibrous tissue, bone, cartilage and connective tissue.
- Joints- Synarthrosis, Amphiarthrosis, Diarthrosis, Sub classification of synovial joints.
- Joint function, kinematic chains, range of motion.
- The general effects of injury and disease.
- Dislocation, degeneration (OA), R.A, Soft tissue injury, Sprain, Strain, Capsulitis, Bursitis.

UNIT II

15

Muscle Structure and Function

- Mobility and Stability functions of muscles.
- Elements of muscle structure- Composition of a muscle fiber, the motor unit, types of muscle fibres, muscle fiber size, arrangements and number, muscle tension, length- tension relationship.
- Types of muscle contraction, speed and angular velocity, applied load, voluntary control, Torque & Isokinetic exercise.
- Factors affecting muscle tension.
- Muscles: Spurt and Shunt muscles, Tonic and Phasic muscles.
- Factors affecting muscle function: Type of joint and location of muscle attachment, number of joints, Passive insufficiency, Sensory receptors.

UNIT III

15

Thorax & Chest Wall

- Basic Anatomy related to chest, wall.
- Diaphragm & its function.
- Lab Activity – Palpation of Sterno Clavicular Joint and Ribs.

Temporomandibular joint

- Anatomy of Temporomandibular joint, ligaments, capsule & muscles that act at Temporomandibular Joint
- Movement of Temporomandibular joint.
- Role of temporomandibular joint in equilibrium

Lab Activity – Palpation of Mastoid Process and Sternocleidomastoid Muscle and Scalene Muscles

UNIT IV

15

The Shoulder Joint

- The structural components of the shoulder complex including the articulating surfaces, capsular attachments and ligaments and movements of the following joints.
 - Sterno-clavicular
 - Acromio-clavicular
 - Scapulo-thoracic
 - Gleno-humeral
- The function of the shoulder complex including dynamic stability of the Glenohumeral joint, musculotendinous cuff, Stabilisation of the dependent arm, Scapulohumeral Rhythm, Scapulothoracic and Glenohumeral contributions.
- The muscles of elevation (Deltoid, Supraspinatus, Infraspinatus, Teres minor, Subscapularis, Upper Trapezius, Lower Trapezius, Serratus anterior, and Middle Trapezius and Rhomboids).
- The muscles of depression (Latissimus dorsi, Pectoralis, Teres major, Rhomboids)
- Muscles functioning around shoulder.
- Effect of injury & aging.
- PA, dislocation, ligament instability.
- Lab Activity –Gleno Humeral Joint, Acromio Clavicular Joint and Soft Tissue Palpation Around The Shoulder Complex

The Elbow joint

- The structure of the Humero-ulnar and Humero radial joints including articulating surfaces, Joint capsule Ligaments & Muscles.
- The function of the Humero-ulnar and Humeroradial joints including the Axis of motion, Range of motion, Muscle action.
- The structure of the superior and inferior radioulnar joints.
- The function of the superior and inferior radioulnar joints.
- The mobility and stability of the Elbow complex and its relationship to Hand and Wrist.
- The effects of injury & aging.
- Dislocation, Bursitis Dislocation, Ligament instability, Cubitus Varus, Cubitus valgus.
- Lab Activity –Superior and Inferior Radio Ulnar Joint in Wrist and Hand. Carpal and Metacarpal Bone Palpation.

The Wrist and Hand complex

- The wrist complex including Radiocarpal joint, Mid carpal joint and the Ligaments wrist complex.
- The function of the radiocarpal and Midcarpal joints including the movements and muscles involved.
- The Hand complex including: Structure of fingers (Carpometacarpal, Metacarpophalangeal and interphalangeal joints of fingers, ligaments & range of motion).
- The finger musculature including Extrinsic & Intrinsic finger flexors and the Extensor mechanism on the MCP, PIP and DIP joint function and intrinsic finger muscles.
- The structure of the Carpometacarpal, MCP and IP joints of thumb.
- The Thumb musculature including the Extrinsic and Intrinsic thumb muscles.
- Precision, Power, Cylindrical, Spherical & Hook grips.
- Precision handling, Pad to pad, Tip to tip and Pad to side Prehension and
- Functional position of wrist and hand.
- Effect of injury & aging, dislocation, deformities of hand paralysis of hand muscles.

Total hours :75

Text Books:

1. Cynthia C Norkins, Joint Structure and Function – a Comprehensive Analysis, Jaypee Brothers, 5Ed, 2010.
2. Kinesiology of the Musculoskeletal System – foundations for Physical rehabilitation – Donald A. Neumann third edition

References:

1. Gary I Soderberg, Kinesiology – Application to Pathological Motion – (especially for patho biomechanics) Williams & Wilkins, 2nd Ed, 2007
1. I.A. Kapandji, Physiology of joint structure- Churchill Livingstone pub, 6th Ed, 2010.

Course outcomes:

On the successful completion of the course, students will be able to

- CO1: Categorizing the joint structure & functions.
- CO2: Understanding muscle structure and function.
- CO3: Evaluation of the pathological basis of injury thorax, chest wall and TMJ
- CO4: Analysis of the shoulder joint and elbow joint
- CO5: Understand the wrist and hand complex

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Exercise Therapy-I

Semester III

Hours of instruction per week:3+2

22BPTC14

No of credits:4

Objective:

- To demonstrate and list the indications and contra - indications of various types of exercise therapy, demonstrate the different techniques, and describe their effects.

UNIT I

15

Introduction

Definition, types of exercise, Principles

Muscle

Definition, types, muscle work, angle of pull and mechanical efficiency of muscle
starting position: Types muscle work, forces involved, equilibrium, Derived position: Types
muscle work, forces involved, equilibrium

Movement

- Classifications of movement: Active, Passive.
- Effects of exercise: Physiological effects, Therapeutic effects.

Pelvic Tilt

- Normal pelvic tilts, Alterations from normal, anterior tilt (forward), Posterior tilt, (backward), Lateral tilt.
- Muscles responsible for alterations and pelvic rotation.
- Normal pelvic tilt, pelvic rotation and altered tilts and their corrective measures.

UNIT II

15

Passive Movements

Relaxed passive, Mobilizing passive (forced P.M. manipulations, Serial manipulations)
Passive stretching of following muscles/muscle groups and The indications. contra –
indications, physiological effects, advantages and disadvantages of each.
Upper Limb: pectoralis major, biceps brachii, triceps brachii, long flexors of the fingers.
Lower Limb: rectus femoris, iliotibial band (tensor fascialata), gastrocnemius soleus,
Hamstrings, hip abductors, ilio- psoas, Quadriceps. Neck: Sternocleidomastoid.

UNIT III

15

Resisted exercise

The types, techniques, indications and contra-indications, physiological effects, advantages
and disadvantages and demonstrate three resisted exercises in progression for the following
muscle groups: Shoulder abductors, Shoulder forward flexors, Triceps Brachii, Hip

abductors, Hip flexors, Quadriceps femoris, Abdominal muscles, Back extensors. The home programme for strengthening neck muscles and back extensors

Progressive Resisted Exercises

- Exercises, advantages and disadvantages and demonstration of the techniques types of PRE: Fractional system, Mac Queen's set system, Mac Queen's power system, Delorms, Oxford.
- The skill to grade upper and lower limb, neck and trunk muscles. Delorms, Dumbbells, Sand bags Pulleys, Power board and Weigh cuffs.

UNIT IV

15

Muscle Grading

- The types of muscles grading, principles of muscle testing key to muscle grading, techniques of muscle testing - easy test and hard test and functional test (ADL).
- Demonstration of the skill to grade upper and lower limb, neck and trunk muscles.

Re - Education of Muscle

- Muscle weakness causes of muscle paralysis / weakness prevention of muscle wasting, early, re-education.
- Re-education of muscles: the term re-education of muscles, Techniques, Spatial summation, Temporal summation.
- Demonstration of the various re-education techniques and facilitating methods on various groups of muscles.
- Demonstration of the progressive re-education exercises in strengthening using various applications: (according to their muscle power) Grade I - Grade V.
- Muscle strengthening – PNF Hold relax, slow reversal, Rhythmic stabilisation, repeated contractions.

UNIT V

15

Joint Mobility

- Joint ranges (outer range, middle range, inner range), Individual joint structures, joint movements (anatomic, accessory), causes of joint range limitations, prevention of joint stiffness, positioning (physiological resting position).
- Passive range of movement, methods of relaxation, active exercises, manual mobilization techniques, gliding techniques.
- Accessory movements: Posterior glide, Anterior glide, Superior and Inferior glide, Traction and approximation.
- Indications and contra - indications for mobilisation of individual joints and demonstrate practically the various mobilisation techniques for individual joints and teaching home programme.

Total hours :75

Text Books:

1. Dena Gardiner , Principles of Exercise therapy, Bell and Hymes, 4th Ed, 1981.

References:

1. Carolyn Kisner, Therapeutic Exercise, ,Jaypee Brothers, 6th Ed, 2012
2. Margeret Hollis, Practical Exercise therapy, ELBS, 4 Ed, 2004

3. Kendell, manual Muscle Testing, ELBS, 2Ed, 1997
4. Sebastian, Principles of Manual Therapy, Jaypee Brothers, 2nd Ed, 2013.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about the fundamentals of muscle and joint function

CO2: Gain knowledge on various muscle grading

CO3: Understand the active and passive movements of each joint

CO4: Learn practical knowledge on passive movement, passive stretching and resisted exercise

CO5: Understand and illustrates practical knowledge on muscle grading, muscle re-education and joint mobilization

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Exercise Therapy and Biomechanics

Practical and Oral -I

Semester III
22BPTC15

Hours of Instruction/week: 5
No. of Credits:3

Objectives

- Knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students, distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Practical

1. Effects of exercise: Physiological effects, Therapeutic effects.
2. Demonstration of Movement- active and passive
3. Demonstration of stretching
4. Demonstration of resisted exercises and its type
5. Muscle grading -MMT
6. Demonstration of relaxation techniques
7. Demonstration of PNF
8. Demonstration of accessory movements
9. Demonstration of muscle re-education technique
10. Demonstration of joint mobilization
11. Biomechanical of shoulder, elbow and wrist joint

Total hours: 75

Text Books:

Dena Gardiner , Principles of Exercise therapy, Bell and Hymes, 4th Ed, 1981.

References:

1. Carolyn Kisner, Therapeutic Exercise, ,Jaypee Brothers, 6th Ed, 2012
2. Margeret Hollis, Practical Exercise therapy, ELBS, 4 Ed, 2004
3. Kendell, manual Muscle Testing,ELBS, 2Ed, 1997
4. Sebastian, Principles of Manual Therapy, JaypeeBrothers , 2 nd Ed, 2013

Course outcomes:

On the successful completion of the course, students will be able to

- CO1: To Understand various assessment tests in exercises therapy.
- CO2: Demonstration of the various assessment tests in exercises therapy
- CO3: Knowledge about Effects of exercise
- CO4: Demonstration of the various exercises therapy techniques
- CO5: Brief knowledge biomechanics in upper limb joint

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Discipline Specific Elective (DSE-III) Course
Basics of Radio Diagnostics

Semester III
22BPTD03

Hours of Instruction/week:2+3
No. of Credits: 3

Objectives

- Knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students, distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Unit I

Introductions 15

General Instructional Concepts Basic Imaging Modality

Basic Imaging Modality Properties and its common clinical diagnostic application

Radiography (X-ray)

Scintigraphy (Bone Scan)

Unit II 15

Basic Imaging Modality Properties and its common clinical diagnostic application

Computed Tomography (CT)

Magnetic Resonance Imaging (MRI)

Sonography (Ultrasound)

Unit III 15

Study of electrodes. ECG

Study of Defibrillator, Larynscope

Study of Ambu bag, Suction m/c

Vitals signs monitoring –BP and NIBP Monitoring

Study of Spiro meter, Pulse oximeter. Temperature monitoring.

Unit IV 15

Typical Imaging Modality Applications normal and abnormal identification

Shoulder Region

Elbow Region

Wrist and Hand Region

Hip/Pelvis Region

Knee Region

Ankle and Foot Region

Unit V 15

Typical Imaging Modality Applications normal and abnormal identification

Thoraco lumbar Spine Region

Cervical Spine Region

Neurological imaging abnormalities differences between CT and MRI

Total Hours: 75

Textbook

1. The Radiology Handbook The Radiology Handbook J. S. Benseler.
2. Textbook of Radiology and Imaging by David Sutton

Reference

Imaging Education Manual 2015

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Gain knowledge on various recording techniques and diagnostic applications.

CO2: Understand the clinical application of basic imaging modality

CO3: Learn about the clinical application of therapeutic devices in cardiac care.

CO4: Knowledge about the Clinical Equipment and assessment finding in regional

aspects. CO5: Understand about the Clinical modality application normal and abnormal identification.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

General Medicine and Pharmacology–II

Semester IV
22BPTC16

Hours of instruction/week:3+2
No of credits:3

Objective:

- To demonstrate a general understanding of the diseases that therapists would encounter in their practice.
- They should have a brief idea of the etiology and pathology, what the patient's symptoms and the resultant functional disability

UNIT I

15

Renal Diseases

Acute and chronic renal failure. Urinary tract infection. - Pathogenesis, Common clinical conditions complicated by UTI.

Metabolic Diseases

Diabetes – etiology, types of diabetes and complications and use of insulin, diet and oral hypoglycemic agent in management of diabetes. Obesity and its management.

UNIT II

15

NEUROLOGY

- CVA – thrombosis, embolism, hemorrhage
- Extra pyramidal lesion – parkinsonism, athetosis, chorea, dystonia
- Disorders of muscle – myopathy, SMA, MND, Syringomyelia
- Multiple sclerosis
- Infections of nervous system – encephalitis, neurosyphilis, meningitis, transverse
- Myelitis, tabes dorsalis, TB spine
- Epilepsy
- Alzheimer disease
- Disorder of myoneural junction – myasthenia gravis

UNIT III

15

E.N.T

- The anatomy and physiology of hearing, Use of audiometry in assessment of hearing.
- Causes of hearing loss. The conservative and surgical intervention, including types and availability of hearing aids.
- The functions of vestibular apparatus
- The common ENT infectious diseases which occur hearing, breathing and speech and their management.

UNIT IV

15

Ophthalmology

- Eye lesions in leprosy, causes, treatment and complications of Lagophthalmos.
- Field defects arising from lesions in the visual pathway, clinical symptoms and methods of testing.
- Effect of Paralysis of ocular muscles and treatment.
- Causes, clinical features and a treatment of disorders of ocular movement occurring in diseases myasthenia gravis, progressive supranuclear palsy and lower motor neuron diseases.
- Causes, clinical features, treatment and prognosis in Visual failure arising from cataract, inflammatory disorders, Vitamin A deficiency, Glaucoma and Trachoma ; emphasis on preventable causes and prophylactic measures.
- Blindness and visual disability evaluation. Procedures used for testing visual failure, including basic screening procedures for visual acuity suitable for community health surveys.

Dermatology

Diseases of skin – leprosy, pigmentary anomalies, vasomotor disorders, tropic ulcers their classifications and management dermatitis, coccal and fungal parasitic and viral infections, skin diseases related to rheumatology, tropical skin diseases and Hyperhidrosis.

UNIT V

15

PHARMACOLOGY

Definition, action, indications, contra – indications, adverse reactions: Anti- inflammatory Anti-epileptic, Sedatives, Hypnotics, Tranquilizers Muscle relaxants, Alcohol Pulmonary effects of general anesthetic agents Mucolytic agents, Local anesthetic agents, Narcotic Steroids, Vasodilators, Insulin and oral hypoglycemic agents, Antibiotics – Bactericidal, Bacteriostatic, Chemotherapeutic drugs in leprosy and tuberculosis.

Total hours :75

Text Books:

1. Davidson. A Text Book of Medicine, Churchill Livingstone, 21 st Ed, 2010.
2. S.D.Seth , Text Book of Pharmacology, Churchill Livingstone, 8 Ed, 2012

References:

1. K.D.Tripathi , Essentials of Medical Pharmacology, JayPee Brothers.1Ed, 2007
2. Harrison, Principles of Medicine, Mc Graw hill, 17 th Ed, 2008.
3. OP Ghai, Essential Pediatrics, CBS Publishers, 7th Ed, 2010.
4. Kumar and Clarks, Clinical medicines, Jaypee Brothers, 3 rd Ed, 2013.
5. Multani, Principles of geriatrics physiotherapy, Jaypee Brothers, 1 st Ed, 2008.
6. Tripathi, Essentials of medical pharmacology, Jaypee Brothers, 7th Ed, 2013.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge renal and metabolic disease

CO2: Understand the diseases and infections neurology

CO3: Provides brief knowledge on ENT

CO4: Knowledge on ophthalmology and dermatology

CO5: Provides knowledge on pharmacology

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

General Surgery, Paediatric and Geriatric

Semester IV
22BPTC17

Hours of instruction/week:3+2
No of credits:3

Objectives:

- To demonstrate a general understanding of the diseases that therapists would encounter in their practice.
- They should have a brief idea of the etiology and pathology, about the patient's symptoms and the resultant functional disability. This would help the candidates to understand the limitations imposed by the disease on any therapy that may be prescribed.

UNIT I

15

Surgical Incisions

The regions of abdomen and its surgical incisions. The site extent of incision indications and post operative complications in

- Nephrectomy
- Appendicectomy
- Herniorrhaphy
- Mastectomy
- Thyroidectomy
- Colostomy
- Adrenalectomy
- Cystectomy
- Hysterectomy
- Prostatectomy
- Cholecystectomy
- Ileostomy.
- Gastrectomy

UNIT II

15

Burns

Structure and functions of skin. Classification of burns by depth and surface area. The causes, medical management and precautions in the acute stage. The potential deformities due to burns, methods of prevention and precautions. Cosmetic and functional treatment measures. The plastic surgery procedures and management in

rehabilitation of burns, including splinting methods for common deformities and prevention of burns contractures

- Physiotherapy goal setting in General Surgery, Plastic Surgery & Burns.
- Goals of pharmacological and surgical therapy.

UNIT III

15

Paediatrics

- Growth and development of a child from birth to 12 years: including physical, social, adaptive development.
- The maternal and neonatal factors contributing to high-risk pregnancy and the neonate: Inherited disease: maternal infections - viral and bacterial: maternal diseases incidental to pregnancy, such as gestational diabetes, pregnancy included hypertension: chronic maternal diseases such as heart diseases, renal failure, tuberculosis, diabetes, epilepsy: bleeding in the mother at any trimester.
- Community programmes: International (WHO), national and local, for prevention of poliomyelitis, blindness, deafness, mental retardation and hypothyroidism. The immunization schedule for children.
- Cerebral Palsy, Mental retardation, microcephaly, blindness, hearing and speech impairment, squint and convulsions. Treatment. Prevention: Appropriate management of high-risk pregnancies, prevention of neonatal and postnatal infections, metabolic problems.

UNIT IV

15

Paediatrics Condition

Muscular dystrophy, Still's disease: Classification pathology, physical findings, course & prognosis. Treatment, prevention and correction of deformity. Acute C.N.S. infections: Normal diet of new-born and child: List dietary calorie, fat, protein, mineral and vitamin requirement in a normal child and in a child with malnutrition. Etiology, findings and treatment of Rickets: Vitamin D deficiency and resistant rickets. Lung infections: The clinical findings, complications and medical treatment of bronchiectasis, lung abscess and Bronchial asthma.

UNIT V

15

Geriatrics

Diseases commonly encountered in the elderly population and their role in causing disability: Hypertension, Ischemic Heart disease, Cerebrovascular accidents, benign prostatic Hyperplasia, Cataracts and other causes of failing vision.

Total hours: 75

Text Books:

1. Hemdon, Total burn care, , CBS publishers,4th Ed ,2012
2. Janis , Essentials of Plastic surgery, CBS Publishers, 2nd Ed, 2014.
3. Jeschkie, Handbook of burns, vol – I, CBS Publishers, 2012,

References:

1. S.Das, A practical guide to operational surgery, 4th Edition SD publications, 2004.
2. Grabb , Plastic Surgery, Jaypee Brothers, 2nd Ed, 2002.
3. Cash's text book of general medicine, JP, 3Ed, 2012
4. Tidys Physiotherapy, Mosby Pub, 15th Ed, 2013.

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Knowledge of principles of surgery and the application of basic sciences to surgical treatment and describes abdominal surgical incisions.

CO2: Analysis the causes, indication, types of incisions, pre operative assessment, procedure, postoperative assessment, its complication

CO3: Understand about growth and development in paediatric population

CO4: Know the treatment and prevention of paediatric conditions

CO5: Knowledge about geriatric diseases

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PS O 1	PS O 2	PS O 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H		L	H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Biomechanics-II

Semester IV
22BPTC18

Hours of instruction/week:3+2
No of credits:4

Objectives:

- To demonstrate an understanding of the principles of Biomechanics and Kinesiology
- To study their application in the health and disease pertaining to muscles and joints of upper limb.

UNIT I

15

The Vertebral column

- The general structure and function of the vertebral column including: Primary and secondary curves, Articulations, Ligaments and muscles, typical vertebra, intervertebral disc.
- Factors affecting stability and mobility.
- Regional structure and function of cervical, dorsal, lumbar and sacral vertebrae.
- The muscle of the vertebral column – Flexors, Extensors, Rotators and Lateral Flexors.
- The effects of injury and developmental deficits.
- Scoliosis, Kyphosis, Lordosis, Spondylosis, Spondylolisthesis, Spondylitis, IVDP.
- Lab Activity – Palpation of Vertebral Body and Spinous Process. Levels of Vertebra for Cervical, Thoracic, Lumbar and Sacral Spine

UNIT II

15

The Hip Complex

- The general features of the hip joint including the articulating surfaces on the pelvis and the femur, Angulations, Angle of inclination, Angle of Torsion, internal architecture of femur and pelvis, Joint capsule, Ligaments & Muscles (flexors, Extensors –one joint extensors, two joint extensors, Adductors, Medial rotators and Lateral rotators.)
- The function of the hip – Rotation between pelvis, lumbar spine and hip: Pelvic motion, Anterior posterior pelvic tilting, Lumbar pelvic rhythm, Lateral pelvic tilting, and Pelvic rotation.
- The pelvic motions in the static erect posture.
- Femoral motion.
- Hip stability in Erect Bilateral stance, Sagittal plane equilibrium and unilateral stance.

- Reduction of forces with Weight shifting and using a cane and deviations from normal in muscular weakness & Bony abnormalities.
- Effect of injury and aging, coxa vara, coxa valga, dislocation, muscle paralysis, ligament instability
- Lab Activity – Bony Landmarks Around The Hip Joint Complex (Iliac Crest, Greater Trochanteric, Soft Tissue Around Hip Joint)

UNIT III

15

The Knee Complex

- The structure of the Tibiofemoral joints: Articulating surfaces on femur and tibia, the menisci, joint capsule and bursa, Ligaments and other supporting structures, Anterior- posterior and Medial- Lateral stability: Muscle structure: Knee flexors & extensors: Axes of knee complex: Mechanical axis, Anatomic axis and axis of motion.
- The function of the Tibiofemoral joint: Range of motion, Flexion and extension, Rotation, Abduction and Adduction, locking and unlocking, Function of Menisci and Muscle function.
- The structure and function of the Patellofemoral joint.
- The effects of injury and disease in the Tibiofemoral and Patellofemoral joints.
- The effect of injury & aging, genu valgum, genu varum, osteoarthritis, meniscal injury, ligament instability, bursitis, chondromalacia patella.
- Lab Activity – Palpation of Femoral Condyles, Soft Tissue around Knee Joint Complex.

UNIT IV

15

Type Ankle – Foot Complex

- The structure, ligaments, axis and function of the following: ankle joint, tibiofibular joints, subtalar joints, Talocalcaneonavicular joints, Transverse Tarsal joint, Tarso metatarsal joint, Plantar arches, Metatarsophalangeal joint, Interphalangeal joints.
- The terminology unique to the ankle foot complex, including inversion – eversion, pronation-supination, dorsiflexion-plantar flexion, flexion-extension and adduction and abduction.
 - Weight distribution in the ankle joint during unilateral & bilateral stance.
 - Effects of injury & aging, muscle paralysis, posture, Pes planus, pes cavus, Hammer toe, claw toe, Hallux valgus.
- Lab Activity – Palpation of Metatarsals and Calcaneum and Soft Tissues around the Heel Region.

Posture

- The effects of gravity and indicate the location of the gravity line in the Sagittal plane in optimal posture.
- Posture with respect to the optimal alignment of joints in the antero-posterior and lateral views.
- Postural malalignment in scoliosis, kyphosis, Lordosis, fixed flexion deformity.

Gait

- The stance, swing and double support phases of gait.
- The subdivisions of the stance and swing phases of gait.
- The time and distance parameters of gait.
- Gait determinants
- Gait analysis in sagittal & frontal plane
- Pathological gait: Ataxic, circumduction, High stepping gait, short stepping gait, scissoring gait, Antalgic gait, Waddling gait, lurching gait, quadriceps palm gait, sailors gait.
- Joint motion at the hip, knee and ankle for one extremity during a gait cycle.
- The location of line of gravity in relation to the hip, knee and ankle during the stance phases of gait.
- The gravitational moments of force acting at the hip, knee and ankle during the stance phase.
- Muscle activity at the hip, knee and ankle throughout the gait cycle, including why and when a particular muscle is active and the type of contraction required.
- The role of each of the determinants of gait.
- The muscle activity that occurs in the upper extremity and trunk. Compare:
- Motion of upper extremities and trunk with motion of pelvis and lower extremities.
- The traditional gait terminology with the new terminology.
- Normal gait with a gait in which there is unequal leg lengths.
- Posture including postural deviation. Gait including gait analysis and pathological gait.

Total hours: 75**Text Book:**

1. Cynthia C Norkins, Joint Structure and Function – a Comprehensive Analysis, JaypeeBrothers, 4th Edition, 2012.
2. Kinesiology of the musculoskeletal system foundations for rehabilitation, Donald A. Neumann. Third edition.

References:

1. Gary I Soderberg, Kinesiology – Application to Pathological Motion – (especially for patho-biomechanics) Williams & Wilkins, 2nd Edition, 2007
2. I.A. Kapandji, Physiology of joint structure- Churchill Livingston pub, 3rd Edition, 2005
3. Zeevi Dvir, Clinical Biomechanics, Churchill Livingstone, 2000

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about the structure and functions of cervical, thoracic, lumbar and sacral vertebra.

CO2: Understands general and specific features of the hip, knee, and ankle complex.

CO3: Evaluate the pathological basis of injury and aging of the hip, knee and ankle complex

CO4: Learn the different postural malalignment like scoliosis, kyphosis, lordosis and fixedflexion deformity

CO5: Knows about the variation between different pathological gait patterns

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Exercise Therapy-II

Semester IV
22BPTC19

Hours of instruction /week:3+2
No of credits:4

Objective:

- To list the indications and contra - indications of various types of exercise therapy.
- To demonstrate the different techniques of exercise therapy and describe their effects.

UNIT I 15

Abnormal Gaits

- Abnormal Gaits, Causes for Abnormal Gaits
- Demonstrate Abnormal Gaits, Gait Training for Abnormal Gaits.

Mobility Aids

- The indications, Contra-Indications, Measurements, Advantages and Disadvantages, precautions of the Following Mobility Aids-canes, Crutches, Walking Frame, Wheel chair
- The ambulation and transfers using the above Mobility Aids. Practical (Mobility Aids and gait retraining)

UNIT II 15

Suspension therapy

- The basic physics of simple pendulum and pendular movement.
- Types of suspension: vertical, axial and eccentric fixation (changing/shifting point of suspension)
- The indications and techniques for each type of suspension
- Axial and eccentric fixation for mobilizing and strengthening and reeducation of various muscles and joints.

Hydrotherapy

- Definition, Forces, Principles of Hydrotherapy
- Indications, Contra-indications, Precautions-Hydrotherapy

Posture

- Normal & Abnormal Posture
- Good and Bad posture. Factors responsible for good posture causes for faulty posture.

UNIT III 15

Goniometry

- Normal range of various joints. Description of goniometer, Range of measuring system. Techniques of goniometry.
- Hazards of bed rest
- Hazards of prolonged bed rest
- Principles & Methods of Maintenance

- Individual & Group exercises – principles
- Table & Scheme of exercises

UNIT IV **15**

Co – ordination

- Co-ordination, Nervous control of co- ordination, Inco- ordination – Definition, causes and its management, Frenkel’s Exercise
- In-coordination due to : Lower motor neuron lesions (flaccidity), Upper motor neuron lesions (spasticity), Cerebellar lesions, loss of kinaesthetic sense (tabes dorsalis, syringomyelia, leprosy), Imbalance due to muscular disease.
- Balance (static & dynamic)
- Re – education of balance
- Re – education techniques for balance

UNIT V **15**

Soft tissue manipulation

- History of massage.
- a.Manipulations. b. The time of day for treatment. c. The comfort and support of the patient(draping, bolstering and positioning). d. Position of operator (therapist’s stance) e. Using body weight. f. Contact and continuity. g. Techniques, indications and contra-indications.
- Physiological effects of massage on various systems of body.
 - Effects on: Excretory system, Circulatory system, muscular system, Nervous system & Metabolism system.
 - The various manipulation techniques used in massage.
- Stroking manipulation: Effleurage, Stroking.
- Pressure manipulations: Kneading: Squeezing, Stationary, Circular, Ironing (reinforced kneading), Finger kneading, Petrissage (picking up , wringing, rolling) , frictions.
- Percussion manipulation: tapotement, Hacking, Clapping, Beating & Pounding.
- Shaking manipulations: Vibration, Shaking.
- The techniques, effects & uses and contra - indications of the following manipulations:
- Massage for upper limb: a. Scapular region b. Shoulder joint c. Upper arm d. Elbow joint e. Forearm f. Wrist joint g. Hand
- Massage for lower limb: a. Thigh b. Knee joint c. Leg d. Foot (including ankle joints and toes)
- Massage for back: Neck and upper back b. Middle and lower back c. Gluteal region, arm & leg
- Massage for the face: Practical (Face, Neck, back, upper and lower limb)

Total Hours:75

Text Books:

1. Dena Gardiner , Principles of Exercise therapy, Bell and Hymes, 4th Ed, 1981.

References:

1. Carolyn Kisner, Therapeutic Exercise, ,Jaypee Brothers, 6th Ed, 2012
2. Margeret Hollis, Practical Exercise therapy, ELBS, 4 Ed, 2004
3. Kendell, manual Muscle Testing,ELBS, 2Ed, 1997
4. Sebastian, Principles of Manual Therapy, JaypeeBrothers , 2 nd Ed, 2013

Course Outcome:

On the successful completion of the course, students will be able to

CO1: To gain knowledge on joint range and their measurements

CO2: Understand posture, movement retraining, and balance and co ordination.

CO3: Evaluate the pathological gait and use of different mobility aids

CO4: knowledge about the basic information on therapeutic massage and its effect on different systems of the body.

CO5: Learn the demonstration of face, neck, back, upper limb, lower limb massage and suspension therapy.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Exercise Therapy and Biomechanics Practical and Oral -II

Semester IV
22BPTC20

Hours of Instruction/week: 5
No. of Credits: 3

Objectives

- To practice the knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Practical

List of Experiments

1. The normal gait pattern and Abnormal Gaits
2. The ambulation and transfers using the Mobility Aids
3. Suspension therapy
4. Indications, Contra-indications, Precautions-Hydrotherapy
5. Measuring of individual joint range using goniometer
6. Re-education of balance and Frenkel's Exercise
7. Manipulation techniques used in massage- upper body and lower body
8. The techniques, effects & uses and contra - indications of manipulation
9. Biomechanics of vertebral column, hip complex and knee complex
10. Biomechanics of ankle and foot

Total Hours:75

Text Books:

1. Dena Gardiner , Principles of Exercise therapy, Bell and Hymes, 4th Ed, 1981.

References:

1. Carolyn Kisner, Therapeutic Exercise, ,Jaypee Brothers, 6th Ed, 2012
2. Margeret Hollis, Practical Exercise therapy, ELBS, 4 Ed, 2004
3. Kendell, manual Muscle Testing,ELBS, 2Ed, 1997
4. Sebastian, Principles of Manual Therapy, JaypeeBrothers , 2 nd Ed, 2013

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about the demonstration of the normal gait pattern, Abnormal Gaits, Gait Training for Abnormal Gaits, ambulation and transfers using the Mobility Aids

CO2: Knowledge and practice about the suspension therapy

CO3: Understand the Indications, Contra-indications, Precautions-Hydrotherapy

CO4: Knowledge about the measuring of individual joint range using goniometer, Re - education of balance and Demonstrate Frenkel's Exercise

CO5: To Analyze the Manipulation techniques used in massage- upper body and lower body and the techniques, effects & uses and contra - indications of manipulation

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Digital Health

Semester IV

22BPTD04

Hours of Instruction/week:2+3

No. of Credits: 3

Objectives:

- To know about the basics of Digital Health.
- To know about AI use in the healthcare systems.
- To know about 3D products in healthcare system.

Unit 1: Digital Health

15

Introduction of Digital Health – Vision - Benefits of Digital Health – Digital Health Initiatives – National Digital Health Mission – Ecosystem – Architecture – Applications of Digital Health -Learning Health System –Characteristics of Learning Health Care System

Unit 2: Digital Health Care Products

15

Categories of Digital Health Products and Services - Wearable Fitness Tracker – Smart health watches – Wearable ECG Monitors – Wearable Blood Pressure Monitor – Wearable Biosensor –mHealth –Telehealth – Telemedicine -Difference between mHealth vs telehealth -Difference between Telehealth vs Telemedicine

Unit 3: ML and DL in Healthcare

15

About machine Learning – Benefits of ML in Healthcare – Cognitive Computing – Trend of ML in Medical Health – Applications of ML in Pharma and Medicine – Applications of ML in Healthcare –Big Data – Benefits of Big Data in Healthcare – Features of Big Data in Healthcare – Methods for analysing Big Data in Healthcare - Applications of Big Data in Healthcare -Introduction on Deep Learning –Deep Learning Algorithms– Deep Learning in Clinical Image Analysis.

Unit 4: Artificial Intelligence in Healthcare

15

AI-assisted Robotic surgery – Virtual nursing assistant – Aid Clinical judgment or diagnosis – Administrative task – Image Analysis–Develop Medicines – Analyses Unstructured Data –Forecast Kidney Disease – Contributes to Cancer Research and Treatment – Supports Health Equity – AI in Neuroscience – AI in Thoracic Surgery – AI in Cardiac Management.

Unit 5: Robotics &3D Printing in Healthcare

15

Role of Robots in Healthcare – Benefits of robots in Healthcare - Types of Robots in Healthcare – Surgical Robots –Exoskeletons – Care Robots – Hospital Robots –3D Printing for Healthcare – Preoperative planning – Customized Surgery – Designing medical devices

Reference Books:

1. Dac-Nhuong Le, Chung Van Le, Jolanda G. Tromp, GiaNhu Nguyen, (2018). “Emerging Technologies for Health and Medicine - Virtual Reality, Augmented Reality, Artificial Intelligence, Internet of Things, Robotics, Industry 4.0”, ISBN 978-1-119-50981-3
2. Thomas-Vazquez, Daniel & Singh, Deepti&Hatamleh, Muhanad&Tripathi, Anuj&Vishnoi, Tanushree& Bhat, Sumrita& Thompson, Andrew & Jason, Jeremy & Kim, Keekyoung&Gleadall, Andy & Ruiz, Laura. (2019). “3D Printing in Medicine and Surgery”, Woodhead Publishing Series in Medicine, ISBN 978-0-85709-233-5.

Website links:

1. <https://www.ncbi.nlm.nih.gov/books/NBK470260/>
2. <https://www.insiderintelligence.com/insights/wearable-technology-healthcare-medical-devices/>
3. <https://www.singlecare.com/blog/telehealth-vs-telemedicine/>
4. <https://www.mobihealthnews.com/news/contributed-top-10-use-cases-ai-healthcare>
5. https://www.researchgate.net/publication/330724271_Big_Data_in_Health_Care_Applications_and_Challenges
6. <https://www.mobihealthnews.com/news/contributed-top-8-healthcare-uses-3d-printing>
7. <https://amfg.ai/2019/08/30/3d-printing-in-healthcare-where-are-we-in-2019/>

Course Outcome: On the successful completion of the course, students will be able to

1. Get familiar with Digital Health.
2. Understand the working nature of the Wearable Devices used in Digital Health.
3. Knowledge on Machine Learning techniques used in healthcare system.
4. Knowledge on AI embedded Healthcare system.
5. Get familiar with 3D Model Products and Robots in healthcare systems.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PS O2	PS O3
CO1	M	M	H		H	H		M				M	H	
CO2	M	M	H		H	H		M				H	H	
CO3	M	H	H	H	H	H	M	M		M		M	H	
CO4	M	H	H	H	H	H	M	M		M		M	H	
CO5	M	M	H	H	H	H		M		M		M	H	

Electrotherapy -Low and Medium Frequency Current

Semester V
22BPTC21

Hours of Instruction/week: 3+3
No. of Credits: 4

Objectives

- To list the indications and contraindications of various types of Electrotherapy
- To demonstrate the different techniques of Electrotherapy and describe their effects.

UNIT I 18

Introduction

- Introduction to Electrotherapy - Types, Therapeutic uses, Instrumentation, Importance of currents in treatment, Equipment demonstration.
- Shock-Electrical and earth: causes, effects, management, precautions, Safety measures in Electrotherapy Department.

UNIT II 18

A) Basics of Low Frequency stimulating currents

- Bio-electricity - electrical charge within body
- Types of low frequency currents used in therapeutics

B) Low Frequency currents

- Direct current – Galvanic current
- Interrupted DC
- Faradic current
- Surged Faradic current
- Pathophysiology of nerve lesion - Principles of selection of modes for assessment of nerve muscle function

All types of therapeutic currents

- Production (Brief) - wave forms – duration
- Indication & contra indications
- Physiological effects
- Therapeutic effects
- Technique of application

C) Iontophoresis

- Theory
- Physiological effect and uses of various iontophoresis
- Effects of various ions.
- Techniques of Iontophoresis for pain relief, reduction of oedema, wound healing and hyperhidrosis.

D) Transcutaneous electrical nerve stimulation (TENS)

- Physiology of pain, pain modulation Gate control theory.
- TENS – Definition, Production, Types, Therapeutic and physiological effects.

Indication & Contraindication, Technique of application.

UNIT III 18

A) Medium frequency currents

- Interferential current
- Russian current
- Didynamic current
- Sinusoidal current

All types of medium frequency currents must be taught under the following sequence.

- Production - wave forms – duration
- Indication and contra indications
- Physiological effects
- Therapeutic effects
- Technique of application

UNIT IV 18

A) Electromyography, Nerve conduction & Bio – Feedback testing, Electro-diagnostic testing like FG test, SD curve.

- Principles
- Instrumentation
- Application and uses.

UNIT V 18

A) Traction

- Types
- Indications and contraindications.
- Physiological and therapeutic effects
- Principles and application of traction

B) External Compressive Devices

- Types
- Indications and contraindications.
- Physiological and therapeutic effects
- Principles and application of compressive devices

Total hours: 90

Text Books:

1. Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Bookseller.9th Ed, 2012.
2. John Low and Anee Reed, Electrotherapy Explained –, Butterworth Heinmann Pub. 4th Ed, 2003
3. Edward Bellis Clayton , Nigel Palastanga, Claytons Electrotherapy :Theory and practice, 9th Ed,1985
4. Valma, J.Robertson, Electrotherapy explained, Butterworth, Heinmann, Elsevier, 4th Ed, 2014.

References:

1. Jagmohan Singh, Electrotherapy, Jaypee Brothers, 2nd Ed, 2012.
2. Basanta Kumar Nanda, Electrotherapy explained, Jaypee Brothers, 1st Ed, 2006.
3. Tim Watson Electrotherapy evidence based practice, Churchill Livingston, 12th Ed, 2008.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about various types of therapeutic currents and its physiological, therapeutic effects ~~gain~~

CO2: Understand about pain and pain modulation mechanism gained.

CO3: Evaluate about different types of low and medium frequency currents. Its indication, contraindication, method of application gained.

CO4: Learn about Traction, external compression device, its indication, contraindication, method of application gained.

CO5: Diagnosis of neuromuscular dysfunctions by electro-diagnostic test. Practical application of electrotherapy modalities for various conditions gained.

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Electrotherapy -Low and Medium Frequency Current Practical and Oral

Semester V
22BPTC22

Hours of Instruction/week: 4
No. of Credits: 3

Objectives

- To enhance the practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Practical

List of Experiments

1. Types of Therapeutic current – low frequency
2. Types of Therapeutic current – medium frequency
3. Techniques of Iontophoresis
4. TENS
5. Electromyography
6. Nerve conduction study
7. Bio – Feedback testing,
8. Electro-diagnostic testing like FG test, SD curve.
9. Traction
10. External compressive devices

Total hours: 60

Text Books:

1. Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Book seller.9th Ed, 2012.
2. John Low and AneeReed, Electrotherapy Explained –, Butterworth Heinmann Pub. 4th Ed, 2003
3. Edward Bellis Clayton , Nigel Palastanga, Claytons Electrotherapy: Theory and practice, 9th Ed, 1985
4. Valma, J.Robertson, Electrotherapy explained, Butterworth ,Heinmann, Elsevier, 4th Ed, 2014.

References:

1. Jagmohan Singh, Electrotherapy, Jaypee Brothers, 2nd Ed, 2012.
2. Basanta Kumar Nanda, Electrotherapy explained, Jaypee Brothers, 1st Ed, 2006.
3. Tim Watson Electrotherapy evidence based practice, Churchill Livingston, 12th Ed, 2008.

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Understand various concepts of electrotherapy

CO2: Demonstration of the various assessment tests in electrotherapy

CO3: Knowledge about Effects of electrotherapy

CO4: Knowledge about different types of low and medium frequency currents. Its indication, contraindication, method of application gained.

CO5: Know about Traction, external compression device, its indication, contraindication, method of application gained.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Physiotherapy in Women's Health

Semester V
22BPTC23

Hours of Instruction/week: 3+3
No. of Credits: 3

Objective:

- To give physiotherapeutic techniques in Obstetrics and Gynecological conditions and relief of pain, relaxation, conditioning and posture.

UNIT I 18

- Anatomy related to OBG.
- Puberty and all types' manorial problems.
- Developmental anatomy – embryonic and fetal periods.
- Physical and physiological changes during pregnancy and during labour.

UNIT II 18

- Preparation for labour – antenatal training, breathing, relaxation.
- Lower extremity exercises abdominal and pelvic floor exercises.
- Mechanism of labour.
- Normal delivery, forceps delivery, cesarean section including management, care of the scars.
- Postnatal period, postnatal complications & management.
- Episiotomy and wound care

UNIT III 18

- Common gynecological problems in adolescence and adults
- Post-surgical management.

UNIT IV 18

- PT management in OBG, obstetric TENS.
- Pelvic inflammatory diseases salpingitis.
- Prolapse of uterus.
- Urogenital dysfunction – incontinence.

UNIT V

18

- Use of hydrotherapy in women's health.
- Pregnancy yoga.
- Prenatal and antenatal exercises – relief of pain. Postnatal care including care of the breasts and use of special garments.
- Diet and nutrition in pregnancy.
- Diastasis recti management.

Total hours :90

Text books:

1. Margaret polden, Jill Mantle, Physiotherapy in Obstetrics and Gynecology –Jaypee Brothers, 1st Edition – 2007.
2. Carolyn kisner, therapeutic exercise – foundation & techniques, Jaypee, 6th edition- 2012.

References:

1. D.C. Dutta, textbook of obstetrics, central – 2004.
2. G.B. Madhuri, textbook of physiotherapy for OBG, Jaypee 1st edition – 2007.
3. Patricia Downie, Cash's Text Book of General Medical and Surgical Conditions for physiotherapists, Editor Jaypee Brothers, 2nd Edition, 1994
4. Cesarean Section – Therapeutic Exercise – Carolyn Kisner, Lynn Allen Colby.

Course outcome:

On the successful completion of the course, students will be able to

CO1: Know about the musculoskeletal changes during pregnancy and during delivery.

CO2: Understand the antenatal and postnatal complications and its management and become well versed with antenatal, prenatal and post-natal physiotherapy management.

CO3: Recognizes the common gynecological problems in adolescence and adults.

CO4: Comprehend the physiotherapy management of various conditions like infections, urogenital dysfunction and prolapsed uterus.

CO5: Learn the exercise protocol to relieve pain during the prenatal and postnatal period and become familiar with the hydrotherapy and yoga for treating the gynecological conditions.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Community Medicine

Semester V
22BPTC24

Hours of Instruction/week: 3+3
No. of Credits: 3

Objective:

- To demonstrate and understanding of the influence of social and environmental factors of individual and society.

UNIT I 18

Introduction

- The natural history of diseases and the influence of social, economic and cultural aspects of health and diseases.
- The various measures of prevention and methods of intervention – especially for diseases with disability.
- The national care delivery system and the public health administration system at central and state Government level.

UNIT II 18

Schemes

- Selective national health schemes.
- Occupational health and list methods of prevention of occupational hazards.
- The Employees State Insurance scheme and its benefits.

UNIT III 18

Community Based Rehabilitation

- The social security measures for protection from occupational hazards, accidents, diseases, and workman's compensation act.
- The objectives and strategies of the national Family Welfare Programme.
- Community based rehabilitation and Institution based rehabilitation. The advantages and disadvantages of institution based and community- based rehabilitation.

UNIT IV 18

Communicable diseases and Epidemiology

- Communicable diseases with reference to water reservoir, mode of transmission, route of entry and levels of prevention. a. Poliomyelitis, b. Meningitis, c. Encephalitis, d. Tuberculosis, e. Filaria, f. Leprosy, g. Tetanus & h. Measles.

- The Epidemiology of Rheumatic heart disease, cancer, chronic degenerative disease and Cerebrovascular accident.
- The influence of nutritional factors such as protein Energy Malnutrition, Anemia, Vitamin deficiency and mineral deficiency on disability.

UNIT V

18

Roles of health

- The principles of health education, methods of communication, and role of health education in rehabilitation services.
- The role of community leaders and health professionals in health education. The role of international health agencies in rehabilitation of the disabled.

Total hours :90

Text Books:

1. Park's Text Book of preventive and Social Medicine – K Park, 24th ED, BDB Publishers, 2017.
2. Prabhakar, Short text book of preventive and social medicine, ,Jaypee, 2nd Ed 2012,

Reference:

1. Retan, Handbook of preventive and social medicine, 9th ed, 2007.

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Gain knowledge about Epidemiological implications of impairment and handicap and disability, health statistics and National health schemes and its benefits.

CO2: Learn about Immunization programmes – malnutrition and early detection of disabling conditions

CO3: Understand the categories various rehabilitations and describes its advantages and disadvantages.

CO4: Evaluate the communicable and non-communicable diseases and its implications.

CO5: Recognize of nutritional factors on disability and Role of community leaders and health professionals in health education.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Biostatistics and Research

Semester V
22BPTC25

Hours of Instruction/week: 4+1
No. of Credits: 3

Objective

- To have basic knowledge on Research Methodology and Biostatistics.

UNIT I

15

Introduction to Biostatistics

- Biostatistics-Introduction: Meaning, definition, characteristics of statistics., Importance of the study of statistics, Branches of statistics, Statistics and health science including physiotherapy, Parameters and Estimates, Descriptive and inferential statistics, Variables and their types, Measurement scales.
- Tabulation of Data: Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.
- Frequency distribution, Measures of dispersion, Probability and Standard Distributions: Meaning of probability of standard distribution, the binominal distribution, the normal distribution, Divergence from normality – skewness, kurtosis.

UNIT II

15

Measures of central tendency - Measure of Central Tendency: Need for measures of central Tendency, Calculation of mean – ungrouped and grouped, Meaning, interpretation and calculation of median ungrouped and grouped. Meaning and calculation of mode, Comparison of the mean, median and mode, Guidelines for the use of various measures of central tendency.

Statistical Tool

- Probability
- Correlation & regression
- Statistical inference

UNIT III

15

- Sampling techniques: Need for sampling - Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling designs errors, Sampling variation and tests of significance.
- Analysis of variance & covariance: Analysis of variance (ANOVA), Basic principle of ANOVA, ANOVA technique, Analysis of Co variance (ANACOVA).
- Format of scientific documents. (Structure of protocols, formats reporting in scientific journals, systematic reviews and meta-analysis).

Community and Hospital Statistics

- Vital statistics
- Health statistics

UNIT IV

15

Research Methodology

- Introduction to Research methodology: Meaning of research, objectives of research, Motivation in research, Types of research & research approaches, Research methods vs methodology, Criteria for good research, Problems encountered by researchers in India.
- Research problem: Statement of research problem., Statement of purpose and objectives of research problem, Necessity of defining the problem
- Research design: Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design
- Sampling Design: Criteria for selecting sampling procedure, Implications for sample design, steps in sampling design, characteristics of good sample design, Different types of sample design
- Measurement & scaling techniques: Measurement in research- Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, its classification. Important scaling techniques.

UNIT V

15

Research Report

- Methods of data collection: collection of primary data, collection data through questionnaires & schedules, Difference between questionnaires & schedules.
- Sampling fundamentals, need for sampling & some fundamental definitions, important sampling distributions.
- Processing & analysis of data: Processing operations, problems in processing, Types of analysis, Statistics in research, Measures of central tendency, Dispersion, Asymmetry, relationship.
- Testing of hypothesis: hypothesis Basic concepts concerning testing of hypothesis, Procedure of hypothesis testing, measuring the power of hypothesis test, Tests of hypothesis, limitations of the tests of hypothesis.
- Computer technology: Introduction to Computers, computer application in research, computers and researcher.

Total hour :75

Textbooks:

1. B.L Agarwal, Basic statistics, New Age International Publication.2012.

Reference:

1. Sundar rao, Introduction to biostatistics and Research Methodology, CBS, 1Ed, 2002.
2. C.R Kothari, Research methodology, New Age international publication, 3Ed, 2001

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Knowledge about the implement hypothesis testing

CO2: Understand the important concepts relating to research design and measurements and scaling techniques and to analyze experimental and observational study.

CO3: Knowledge of Processing and analyzing data can be gained

CO4: Evaluate, implement and calculate frequency distribution.

CO5: Learn the Interpretation and Report Writing can be well understood.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PS O2	PS O3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Electrotherapy - High Frequency Current

Semester VI
22BPTC29

Hours of Instruction/week: 6
No. of Credits: 3

Objectives

- To list the indications and contraindications of various types of electrotherapy.
- To demonstrate the different techniques of electrotherapy and describe their effects.

UNIT I

18

A. Electricity

Electricity and types, electromagnetic induction, Principles construction and types of transformers, Condensers, Valves, Rectifiers, Oscillation, the physics and principles of Magnetism.

Fuse and grid- The working and use of these two.

B. LASER

LASER and its therapeutic indications, contra-indications, efficacy and precautions advisable

UNIT II

18

A. Short Wave Diathermy

- Properties of H.F. currents - Sustained and unsustained, Damped and undamped, Impedance, Nodes and Antinodes. The fields, set up, Wavelength.
- Types of high frequency currents.
- Production of H.F. currents – Principles, Construction of apparatus with diagram, Tuning of machine, Regulation of current, Physiological and therapeutic effects.
- Methods - Condenser field, Cable method, Effects of 2 fields.
- Technique of Applications - Testing machine, Preparation of patient, Types of electrodes, Position and size of electrodes, Application of current, Dosage.
- Dangers and precautions.
- Pulsed diathermy: Indications and contra-indications, application.

B. Microwave Diathermy

Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

C. Long Wave Diathermy

Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

D. Shockwave Therapy

Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

Infrared Radiation

Infrared Radiation, wavelength and frequency, Types of generators and its working, Physiological effects, Therapeutic effects and uses.

- Technique of irradiation - Choice of apparatus, Preparation of patient, Arrangement of lamp, Application of treatment, Duration and frequency.
- Dangers
- Indications & contra-indications

Ultra Violet Radiation

- Electric arc - Process of ionization & Transmission of current through gases, Types of lamps, Construction of lamps, Fluorescent tube for U.V. production.
- PUVA apparatus and Care of lamp.
- Physiological and therapeutic effects - in detail photosensitization.
- Indications, contra-indications and dangers.
- Technique of application: Test dose, Local treatment and General irradiation.
- Conditions (common) in which above treatment is given.
- Sensitizers
- Filters

Ultrasound Therapy

- Properties of Ultrasound – Reflection, Transmission, Absorption. Piezo-electric effects
- Properties of ultrasonic fields: depth of penetration in relation to (a) Intensity and (b) frequency.
- Physiological and therapeutic Effects on tissues – Thermal, Mechanical, Chemical and biological.
- Indication and Contra Indications
- Coupling media
- Pulsed Ultrasound Therapy - Principles of pulsed Ultrasound, Effects and uses of pulsed Ultrasound.
- Techniques of application: a. Methods - direct contact, water bath, water bag.
b. Dosage in acute and chronic conditions
- Dangers
- Phonophoresis – Method and effects, Choice of drug used for phonophoresis.

A. Paraffin Wax

- Methods of heating tissues, Effects and indications, Circulatory effects.
- Effects on sensory nerves, Effects on skin, Indications & contra indications, its uses in various Conditions.

B. Moist Heat (Fluidotherapy)

- Methods of heating tissues, Effects and indications, Circulatory effects.
- Effects on sensory nerves, Effects on skin, Indications and contra indications, its uses in various Conditions.

C. Cryotherapy

- Physical principles, Physiological effects and uses, Techniques of application – Preparation, Application, and Modification.
- Methods: Ice pack, Ice towel, Immersion, Ice cube.
- Indications & contra-indications.
- Cryokinetics and its effect.

Total hours :90

Text Books:

1. Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Bookseller. 9th Ed, 2012.
2. John Low and Anee Reed, Electrotherapy Explained –, Butterworth Heinmann Pub. 4th Ed, 2003
3. Edward Bellis Clayton, Nigel Palastanga, Claytons Electrotherapy: Theory and practice, 9th Ed, 1985.
4. Valma, J. Robertson, Electrotherapy explained, Butterworth, Heinmann, Elsevier, 4th Ed, 2014.

References:

1. Jagmohan Singh, Electrotherapy, Jaypee Brothers, 2nd Ed, 2012.
2. Basanta Kumar Nanda, Electrotherapy explained, Jaypee Brothers, 1st Ed, 2006.
3. Tim Watson Electrotherapy evidence based practice, Churchill Livingstone, 12th Ed, 2008

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about various types of therapeutic high frequency currents and its physiological, therapeutic effects gained.

CO2: Knowledge about LASER therapy and its uses gained.

CO3: Effects of various types of heat therapy and method of applications

CO4: Knowledge about Cryotherapy and its method of application, effect and uses gained.

CO5: Knowledge about recent physical modalities and its method of application, effect and uses gained. Practical application of electrotherapy modalities for various conditions.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Electrotherapy-High Frequency Current Practical and Oral

Semester V
22BPTC30

Hours of Instruction/week: 5
No. of Credits: 3

Objectives

- To gain knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Practical

List of Experiments

1. Short wave diathermy
2. Microwave Diathermy
3. Long and Shockwave diathermy
4. Infrared radiation
5. Ultraviolet radiation
6. Ultrasound
7. Wax
8. Fluidotherapy
9. Cryotherapy
10. Laser

Total hour: 75

Text Books:

1. Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Bookseller.9th Ed, 2012.
2. John Low and AneeReed, Electrotherapy Explained –, Butterworth Heinmann Pub. 4th Ed 2003
3. Edward BellisClayton , Nigel Palastanga, Claytons Electrotherapy: Theory and practice, 9th Ed,1985
4. Valma, J.Robertson, Electrotherapy explained, Butterworth ,Heinmann, Elsevier, 4th Ed, 2014.

References:

1. Jagmohan Singh, Electrotherapy, Jaypee Brothers, 2nd Ed, 2012.
2. Basanta Kumar Nanda, Electrotherapy explained, Jaypee Brothers, 1st Ed, 2006.
3. Tim Watson Electrotherapy evidence based practice, Churchill Livingstone, 12th Ed, 2008.

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Understand various concepts of electrotherapy

CO2: Knowledge about Effects of electrotherapy

CO3: Understand the effects of various types of heat therapy and method of applications

CO4: Knowledge about Cryotherapy and its method of application, effect and uses gained.

CO5: Learn about recent physical modalities and its method of application, effect and uses gained. Practical application of electrotherapy modalities for various conditions

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Clinical Cardio-Respiratory Diseases

Semester VI
22BPTC31

Hours of Instruction/week: 3+2
No. of Credits: 4

Objectives

- To demonstrate an understanding of cardio respiratory conditions causing disability and their management.

UNIT I

15

Lung and its Investigation

Upper respiratory tract, lower respiratory tract, muscles of respiration. Mechanism of respiration, respiratory center, regulation of respiration. Chest wall movements, lung and chest compliance, ventilation - perfusion relationship. Airway resistance, applied aspects of chest, spinal deformities. Lung volumes and capacities, spirometer, lung function test, pulmonary circulation, cough reflex.

UNIT II

15

Heart and its Investigation

Structure of heart and its blood supply – coverings, chambers, conductive system, valves. Cardiac output, coronary circulation, heart sounds, blood pressure, pulse. Investigative procedures – ECG, Echocardiography, chest x ray, Angio, ABG, stress testing and its principles, EECF.

UNIT III

15

Cardiovascular diseases

- Acquired heart disease – Ischemic heart disease, myocardial infarction, angina, heart failure, rheumatic fever, hypertension, infective endocarditis, myocarditis, cardiomyopathy.
- Congenital heart disease
- Acyanotic heart disease – Atrial Septal Defect, Ventricular Septal Defect, Coarctation of Aorta, Patent Ductus Ateriosis, Over Riding of Aorta.
- Cyanotic heart disease- Tetralogy of Fallot (ventricular septal defect, pulmonary stenosis, right ventricular hypertrophy, transposition of greater vessels), Pentalogy of Fallot.
- Valvular heart disease – mitral stenosis, mitral regurgitation, aortic stenosis, aortic regurgitation.
- Cyanosis, syncope.

UNIT IV

15

Respiratory conditions

- COPD – chronic bronchitis, emphysema
- Bronchial asthma, bronchiectasis, lung abscess, bronchopneumonia, bronchostenosis.
- Infectious diseases – pulmonary tuberculosis, pneumonia.
- Interstitial lung disease
- Occupational lung disease
- Pulmonary vascular disease – pulmonary hypertension, pulmonary thrombo embolism.
- Lung cancer, aspergillosis, cystic fibrosis
- Pleural diseases – empyema, pleural effusion, pneumothorax.
- Chest wall injuries - Flail chest, fracture rib, haemothorax, haemopneumothorax, lung contusion and laceration, injury to heart and its greater vessels.

UNIT V

15

Cardio respiratory surgeries

Cardiac surgeries and reoccurring conditions

- Open heart surgery .Thoracotomy – median sternotomy (CABG, valve replacement, valvotomy,transplant, cyanotic heart diseases, valvular heart diseases.
- Closed heart surgery -PTCA, angioplasty, PDA, COA.

Thoracic surgeries – extent, use and complications

- a. Thoracotomy, Lobectomy, Segmentectomy,Bilobectomy,Pneumonectomy,Pleuropneumonectomy, Decortications, Lung Transplantation, Tracheostomy, ICD.
- b. Heart lung machine (ECMO), ventilators - types, modes, uses, defibrillators, CPR.
- c. Pulmonary embolism, DVT, peripheral vascular disease, diabetes mellitus, hypertension.
- d. Common drugs used in cardio pulmonary conditions and its use.

Total Hours:75

Text Books:

1. Crofton &doogles Respiratory Diseases Vol – I & II, SEATON,1 Ed, 2003
2. Downie, Cash text book of chest, Heart & Vascular disorders –ELBS, 1 Ed, 2005
3. Berne, Cardio Vascular Physiology ,Mosby, 4Ed, 2012.

References:

1. Nelson, ECG interpretation, Jaypee, 1st ed, 2011.
2. Bhalrao, Essentials of clinical cardiology, Jaypee, 1st ed , 2013

3. Chatterjee, Cariology an illustrated Text book , Jaypee,1st ed, 2012.
4. Beachey, Respiratory care- Anatomy and physiology: foundation, CBS ,3rd ed, 2013.
5. George Mathew & Praveen Aggarwal – Manual for UG, Medicine ed,2015.

Course outcome:

On the successful completion of the course, students will be able to

CO1: Knowledge about the cardiac conditions pathology like infectious diseases ischemic diseases

CO2: Learn the Lung infections and diseases its pathology are clearly studied

CO3: Understand the Cardio pulmonary resuscitation, uses of defibrillators

CO4: Know the Chest deformities and spinal deformities

CO5: Knowledge about the movements and muscles responsible for respiration and thoracic cage

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Physiotherapy in Cardio-Respiratory Conditions

Semester VI
22BPTC32

Hours of Instruction/week: 3+3
No. of Credits: 3

Objectives

- To identify cardio respiratory dysfunction, set treatment goals.
- To apply their skills in exercises therapy, electrotherapy and massage in clinical situations to restore cardiorespiratory function.

UNIT I

18

Respiratory system

Trachea and Bronchial tree, Bronchopulmonary segments, Respiratory unit, Muscles of respiration, Lung & Chest wall compliance, v/q ratio, Anatomical dead space and Physiological dead space, Pulmonary defence mechanism, Mechanics of breathing, Surface anatomy of lungs, Lung volumes and Lung capacities, Respiratory investigation – PFT, X-Ray, ABG, Exercise tolerance, Auscultation, Normal and abnormal breath sounds. Measurement Chest expansion at different levels (axillary, nipple, xiphoid),

Cardiovascular system

Structure and function of cardiovascular system, surface anatomy of heart. Coronary and pulmonary circulation, Conductive system of heart, Cardiac cycle, cardiac output. CVS investigations – ECG, Echo, Angio, Stress testing. EECp

UNIT II

18

Assessment

Subjective assessment – chief complaints, history, Functional assessment – ADL assessment, Objective assessment – physiotherapy assessment of cardiothoracic conditions. Assessment for Respiratory Conditions - Obstructive lung disease – Chronic bronchitis and Emphysema, Bronchiectasis, Bronchial asthma, Lung abscess, Chest Infections – Pneumonia, Restrictive lung disease – OLD, Chest wall deformities, Pulmonary Surgery – Pneumonectomy, Lobectomy, Segmenectomy Pre-operative and post-operative PT management.

Assessment for Cardiac conditions - Coronary artery diseases – IHD, MI, Heart failure, Hypertension, Cardiac surgery – CABG, PTCA Pre-operative and Post-operative PT management

Physiotherapy Treatment

Indications, contraindication, physiological effect, types, steps, precaution, complication of the following chest physical therapy technique Breathing exercise –DBE, Costal, Segmental, Apical Breathing control Breathing re-education during functional activities.

Relaxation position for breathlessness patient, Forced expiratory technique, Thoracic expansion exercise, Chest mobility exercise, Active cycle of breathing, Positive expiratory pressure, Manual hyperinflation, Incentive Spirometry.

Postural drainage – Modified PD, Home PD, Cough – Stages of cough, types of cough, steps in teaching voluntary cough, Factors affecting cough mechanism, Huff – Low, Mid, High lung volume huff. Vibrations, Percussion, Shaking.

UNIT III

18

Physiotherapy in intensive care unit

Ventilator – Definition of ventilator, Types of ventilator, Principles of Ventilator, Indication Of ventilator, PT assessment of ventilator dependent patient, weaning. Humidification – Physiology, Bubble jet, Pass over, Ultrasonic nebulizer 77 humidifier Nebulization – Physiology, MDI, Ultrasonic, Suctioning – Oropharyngeal, Nasopharyngeal, intubated, steps, complications.

UNIT IV

18

Cardiopulmonary rehabilitation and pediatric physiotherapy.

Pulmonary Rehabilitation, indication, outcomes, steps in pulmonary rehabilitation, contraindication Education Cardiac Rehabilitation. Indication, Phases of cardiac rehabilitation, contraindication, benefits. Indications, Types of ICU, Equipment used in adult and pediatric ICU, Assessment, Principles of physiotherapy for a patient in ICU including chest Physiotherapy and adjacent for adult and pediatric patient. Physiotherapy for ventilator dependent patient

UNIT V

18

Physiotherapy in general surgery and other conditions

Education Physiotherapy in general surgery Pre-operative and Post-operative management for patient with abdominal surgery Conditions – appendectomy, mastectomy, gastrectomy, hysterectomy, herniography, cholecystectomy, colostomy Physiotherapy in Intensive Care Unit PT management Physiotherapy for peripheral vascular diseases Definition, Physiology Conditions of PVD, evaluation-arterial, venous, lymphatic, Doppler, Treatment-Buerger's exercise, cold laser, electrical stimulation, intermittent compression.

Total Hours:90

Text Books:

1. Amrohit , Text book of chest physiotherapy, Jaypee ,1st ed, 2010,
2. Madhuri , Text book of physiotherapy for cardiothoracic surgery condition ,CBS, 1st ed , 2008.

References:

1. Patricia Downie , Cash's Text Book of chest heart and vascular disorders for Physiotherapists, Jaypee, 4th ed, 1993.
2. Joanne Watchie , Cardio-pulmonary physical therapy, Jaypee ,3rd ed, 1998
3. Brompton , A-Clinical guide to chest PT, Jaypee, 2nd ed, 1992

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Understand the Basic anatomy, physiology of heart and lungs

CO2: Knowledge about taking assessment of cardio respiration in physiotherapy

CO3: Knowledge about the Importance of physiotherapy intervention in ICU for cardiac and pulmonary disease.

CO4: Assessment of Cardiopulmonary rehabilitation and pediatric physiotherapy.

CO5: Understand the Pre and post operative care for all surgery

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	H		H	L		L		M			H	H	M	
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Physiotherapy and Clinical Cardio-Respiratory Practical and Oral

Semester VI
22BPTC33

Hours of Instruction/week: 3
No. of Credits: 3

Objectives

- To enhance the practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Practical

List of Experiments

1. Physiotherapy assessment of cardiothoracic conditions.
2. Chest physical therapy technique Breathing exercise
3. Pulmonary function test (normal lung volume and capacity)
4. Demonstration of Relaxation position for breathlessness patient, Forced expiratory technique, Thoracic expansion exercise, Chest mobility exercise, Active cycle of breathing, Positive expiratory pressure
5. Spirometry exercises
6. Heart and breath sound (on auscultation)
7. Postural drainage demonstration
8. Physiotherapy in intensive care unit.
9. Cardiopulmonary rehabilitation and pediatric physiotherapy
10. Physiotherapy in general surgery Pre-operative and Post-operative management for patient with abdominal surgery Conditions
11. Physiotherapy for peripheral vascular diseases

Total Hours:45

Text Books:

1. Amrohit , Text book of chest physiotherapy, Jaypee ,1st ed, 2010,
2. Madhuri , Text book of physiotherapy for cardiothoracic surgery condition ,CBS, 1st ed , 2008.

References:

1. Patricia Downie , Cash's Text Book of chest heart and vascular disorders for Physiotherapists, Jaypee, 4th ed, 1993.
2. Joanne Watchie , Cardio-pulmonary physical therapy, Jaypee ,3rd ed, 1998
3. Brompton , A-Clinical guide to chest PT, Jaypee, 2nd ed, 1992

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Understand the Basic anatomy, physiology of heart and lungs

CO2: Knowledge about taking assessment of cardio respiration in physiotherapy

CO3: Knowledge about the Importance of physiotherapy intervention in ICU for cardiac and pulmonary disease.

CO4: Assessment of Cardiopulmonary rehabilitation and pediatric physiotherapy.

CO5: Understand the Pre and post operative care for all surgery

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

EMPLOYABILITY –GREEN
ENTROPRENEURSHIP- BLUE
SKILL – YELLOW

General Anatomy

Semester I
22BOPC01

Hours of Instruction/week: 4
No of Credits: 3

Objectives:

- To understand the structure of our human body.
- To comprehend the gross, functional and applied anatomy of various structures in the human body.
- To identify and locate the source of the disease.

Unit I Human body as a whole, skeletal system

15

Subdivisions of Anatomy - Regional and Systemic Anatomy, Planes of the Body, Terminology, Cavities and system of the body, Cells and various types of tissues of the body, Skeletal System - Bones of the body. Joints - Classification, Joints of the body. Epithelium and glands of the body.

Unit II Skin, Muscles and glands

10

Anatomical differences in different areas, functional and protective variations, innervations, relationship with muscles and nerves. Different types of muscles, their functional differentiation, their relationship with different structures, their neural supply, different types of glands (exocrine and endocrine), functional differences, neural control of glands.

Unit III Blood vessels and Lymphatic system

10

Differentiation between arteries and veins, embryology, histology of both arteries and veins, Functional differences between the two, anatomical differences at different locations. Functions, relationship with blood vessels and organs.

Unit IV Head, Neck and Special Senses

10

Scalp. Face- Facial bones, Temporo Mandibular Joint, facial muscles, Facial nerve, Arteries, Applied anatomy of face. Structures of neck, Triangles of neck. Other areas-Parotid region, Temporal and Infra-temporal fossae. Sub-mandibular region. Mouth- boundaries, structures, soft and hard Palate, Pharynx, Larynx, blood vessels and lymphatic drainage of head and neck. Outline anatomy of special senses.

Unit V Nervous system, Human Brain and Cranial Nerves

15

Cranial cavity-Cranial fossa, Meninges, Dura mater, Spinal cord - spinal segments, external features and internal structure. Brain - medulla oblongata, pons, mid-brain, cerebellum and cerebrum, Ventricles, cerebrospinal fluid, circle of willis. Cranial Nerves and Spinal nerves. Pyramidal and extra pyramidal motor systems, upper and lower motor neurons. Parts of Nervous system, cell types of nervous system, Autonomic nervous system - Sympathetic and parasympathetic nervous system, Central Nervous system.

Total Hours 60

Text Books:

1. B D Chaurasia: Handbook of general Anatomy, Third edition, CBS Publishers and Distributors, New Delhi - 110 032.
2. J.Tortora&N.P.Anagnostakos: Principles of Anatomy and Physiology.

Reference Books:

1. Gray's Anatomy: The Anatomical Basis of Clinical Practice. Elsevier Churchill Livingstone, 2021.
 2. Williams, P. L., & Warwick, R. (1989). Gray's anatomy. Churchill Livingstone (36th to 42nd edition).
 3. Mariano S.H.Difiore: Atlas of Human Histology, 5th Edn., 1981, Lea &Felige.
-

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the human body.

CO2: To learn about the muscles and glands of human body.

CO3:To discuss the mechanics of blood supply and its relationship to organs.

CO4:To comprehend the anatomy of head and neck.

CO5: To inspect the anatomy of nervous system and cranial nerves.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	L	H	M	L	M	M	L	M	L	L	H	M	M
CO 2	H	M	M	L		M	L			M	M	M	L	L
CO 3	H	L	M	M	M	M				L	M	M	L	L
CO 4	H	H	H	M	M	M	M	L	L	L	M	M	L	L
CO 5	H	H	M	M	H	H	M	M	M	M	H	M	M	M

General Physiology

Semester I
22BOPC02

Hours of Instruction/week: 3+1
No of Credits: 3

Objectives:

- To explain the normal functioning of various organs of the body and their interactions.
- To elucidate the physiological aspects of normal growth and development.
- To know the physiological principles underlying pathogenesis of disease.

Unit I Cell structure, its organization and Blood

10

Tissue organization, Epithelium, Connective tissue - Collagen fibres, Elastic fibres, Areolar fibres. Cartilage- Bone, Contractile tissue – Striated, Skeletal, Cardiac, Non striated, Plain, Myoepithelial. General principles of cell physiology, Physiology of skeletal muscle. **Blood** - Composition, Volume measurement & variations. Plasma proteins - classification & functions. Development, morphology & measurements - functions & dysfunctions of RBC, WBC and Platelets. Clotting-factors, mechanism, anti- coagulants dysfunctions. Blood grouping – classification, importance in transfusion, Rh factor & incompatibility, Suspension stability. Osmotic stability and Reticuloendothelial system – Spleen, lymphatic tissue, Thymus, bone marrow, immune system, cellular, Humoral, Autoimmune.

Unit II Environmental Physiology, Circulatory and Respiratory system

10

Environmental physiology - Body temperature regulation (including skin Physiology). Exposure to low and high atmospheric pressure. **Circulatory system**- General principles. Heart – myocardium, innervation, transmission of cardiac impulse. Events during cardiac cycle, cardiac output. Peripheral circulation- peripheral resistances, arterial blood pressure. Measurements – factors regulation variations, capillary circulation and venous circulation. Special circulation- coronary cerebral, miscellaneous. **Respiratory system** - Mechanics of respiration, Pulmonary function tests, transport of respiratory gases, Neural and Chemical regulation of respiration – hypoxia, cyanosis, and dyspnoea–asphyxia.

Unit III Digestive and Excretory System

10

Digestive system - General arrangement. Functions & regulations of Salivary digestion, Gastric digestion, Pancreatic digestion and Intestinal digestion. Liver & bile - Absorption, Motility, Deglutition, Vomiting, Defecation. Functions of large intestine, Neurohumoral regulations of alimentary functions, summary. **Excretory System**: Body fluids –distribution, measurement & exchange. Kidney –structure of nephron, mechanism of urine formation, composition of the urine and abnormal constituents, urinary bladder & micturition.

Unit IV Endocrine and Reproductive system

10

Endocrine System: Hormone mechanism - Negative feed backs, tropic action, permissive action, cellular action, hypothalamic regulation. Hormones, actions, regulations of Thyroid, Adrenal cortex, Adrenal medulla, Parathyroid, Islets of pancreas, Miscellaneous. Common clinical disorders. **Reproductive System**: Male reproductive system – control & regulation. Female reproductive system –uterus, ovaries, menstrual cycle regulation –pregnancy & delivery, breast, family planning.

Unit V Nervous system and special senses**10**

Nervous System – Neuron, Conduction of impulse – synapse, receptor. Sensory organization-pathways and perception. Reflexes –cerebral cortex –functions. Thalamus –Basal ganglia, Cerebellum, Hypothalamus. Autonomic nervous system –motor control of movements, posture and equilibrium. SPECIAL SENSES – (Elementary) Olfaction –Taste –Hearing.

Practicals:**10**

1. Radial pulse tracing
2. Estimation of blood pressure and effect of posture on blood pressure
3. Enumeration of RBC and WBC
4. Differential count
5. Estimation of Hemoglobin
6. Determination of blood group
7. Determination of blood bleeding time and clotting time
8. Determination of erythrocyte sedimentation rate
9. Clinical estimation of Cardiovascular and Respiratory system
10. Clinical assessment of motor and sensory system
11. Clinical assessment of cranial nerves
12. Pain measurement using pain scale

Total Hours 60**Text Books:**

1. G J Tortora, B Derrickson: Principles of anatomy & physiology, 11th edition,
2. A C Guyton: Text book of Medical Physiology, 6th edition, saunders company, Japan, 1981.

Reference Books:

1. R.M. Berne & M.N. Levy, Physiology, 7/e, Mosby Inc., 2017.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To inspect the structural organization of cell and physiology of blood.

CO2: To elucidate normal growth, response, adaptations and development of different systems.

CO3: To apprehend the function of digestive and excretory system.

CO4: To comprehend the physiological functions of endocrine and reproductive system.

CO5: To discuss Physiological functioning of nervous system and Special senses.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	M	M	L	L	M	H	M	M	L
CO 2	H	M	M	M	M	L	M		M	M	M	M	M	L
CO 3	H	M	M	M			L			L	M	M	M	L
CO 4	H	M	M	L	L	M	M	M	L		M	M	M	L
CO 5	H	H	M	M	M	H	H	H	M	M	H	M	M	M

Geometric Optics - I

Semester I
22BOPC03

Hours of Instruction/week: 4+1
No. of Credits: 3

Objectives:

- To gain a thorough knowledge of Stimulus of vision.
- To understand lenses, mirrors, prisms and aberrations.
- To understand the basic properties of the images formed on the retina by the optics of the eye.

Unit I Light

10

Nature of light – light as electromagnetic oscillation, ideas of sinusoidal oscillations, amplitude and phase, speed of light in vacuum and other media, refractive index. Optical path length, Reversibility of light, rectilinear propagation of light. Wavefronts – spherical, elliptical and plane. Curvature and vergence ray, convergence and divergence in terms of rays and vergence, vergence at a distance Refractive index, its dependence on wavelength.

Unit II Refraction

10

Snell's Law, Fermat's and Huygen's Principle – Derivation of laws of reflection and refraction. Snell's law from these principles of refraction at a plane surface. Glass slab – displacement without deviation, displacement without dispersion. Total internal reflection, Critical angle, Mirage, optical fibers. Refraction by a spherical surface – sign convention. Introduction to spherical aberration using image formed by a spherical surface of a distance object – sag formula.

Unit III Lens & Vergence

15

Vergence at a distance formula, effectivity of a refracting surface. Paraxial approximation, derivation of vergence equation. Imaging by a positive and negative powered surface. Lens – Definition of a lens as a combination of two surfaces, different types of lens shapes. Image formation by a lens by application of vergence at a distance formula, definitions of front and back vertex powers, equivalent power, first and second principal planes/points, primary and secondary focal planes/points and focal lengths. Newton's formula, linear magnification, angular magnification. Thin lens as a special case of thick lens, review of sign convention. Imaging by a thin convex lens and thin concave lens- image properties (real/virtual, erect/inverted, magnified/minified) for various object positions. System of two thin lenses, review of front and back vertex powers and equivalent power, review of six cardinal points. System of more than two thin lenses, calculation of equivalent power using magnification formula.

Unit IV Mirrors and Nodal Plane

10

Plane mirrors – height of the mirror, rotation of the mirror. Reflection by a spherical mirror. Paraxial approximation, sign convention, derivation of vergence equation. Imaging by concave and convex mirror. Reflectivity, transmittivity. Nodal Planes.

Unit V Prisms**20**

Prisms – angular dispersion, dispersive power, Abbe's number. Thick prisms – angle of prism, deviation produced by a prism, refractive index of the prism. Definition of crown and flint glasses, materials of high refractive index. Thin prism – definition, definition of Prism diopter, deviation produced by a thin prism, its dependence on refractive index. Prentice's Rule.

Practicals:**10**

1. Construction of pinhole camera
2. Apparent depth
3. Glass slab experiment
4. Construction of kaleidoscope
5. Image formation by Concave and Convex lenses

Total Hours 75**Text Books:**

1. Tunnaclyffe A. H, Hirst J. G, *Optics*, The association of British Dispensing Opticians, London, U.K., 1990.
2. Keating NM. P, *Geometric, Physical and Visual Optics*, Butterworth- Heinemann, Massachusetts, USA, 2002.
3. Subrahmanyam N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

Reference Books:

1. Pedrotti L. S, Pedrotti Sr. F. L, *Optics and Vision*, Prentice Hall, New Jersey, USA, 1998.
2. Loshin D. S. *The Geometric Optics Workbook*, Butterworth-Heinemann, Boston, USA, 1991.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To understand the nature and properties of light.

CO2: To learn the refractive properties of light.

CO3: To gain knowledge on lens and vergence.

CO4: To comprehend about mirrors, reflectivity and nodal planes.

CO5: To elucidate the optics of prisms.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	M	H	M	M	M		M	L	M	H	M	M
CO 2	H	M	M	M	L	L	L		L	L	M	M	M	M
CO 3	H	M	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	M	L	M	M	L	M	M	M	M	M	M	M	M
CO 5	H	M	L	M	M	L	M	L	M	M	H	M	M	M

Physical Optics

Semester I
22BOPC04

Hours of Instruction/week: 5
No. of Credits: 3

Objectives:

- To illustrate the working of various laws related to optical phenomenon.
- To enlighten the students about the various optical parameters such as Interference, Diffraction and Polarisation.
- To demonstrate the advanced principles of physical optics in instruments.

Unit I Nature of light

15

Nature of light – light as electromagnetic oscillation – wave equation, ideas of sinusoidal oscillations – simple harmonic oscillation, transverse nature of oscillation, concepts of frequency, wavelength, amplitude and phase. Sources of light, Electromagnetic Spectrum.

Unit II Interference & Diffraction

15

Interference phenomena in optics – Constructive interference, Destructive interference. Applications of interference. Coherence- Spatial coherence, Temporal coherence. Fringes, fringe width. Interference in a thin films, interference due to transmitted and reflected light, anti-reflection coating, interferometer. Newton's rings, refractive index of a liquid. Diffraction, diffraction by a circular aperture – qualitative and quantitative. Airy's disc. Resolution of an instrument (telescope, for example), Raleigh's criterion. Double slits, multiple slits, gratings.

Unit III Polarization & Scattering

15

Polarized light- linearly polarized light and circularly polarized light. Intensity of polarized light, Malus' Law. Polarizers and Analyzers. Methods of producing polarized light. Brewster's angle. Birefringence, ordinary and extraordinary rays. Heidegger's Brushes, laser scanning polarimetry, Polaroid Glasses. Scattering, Raleigh's scattering, Tyndall effect. Holography.

Unit IV Fluorescence, Phosphorescence, radiometry and photometry

15

Fluorescence and Phosphorescence – Introduction to Fluorescence and Phosphorescence. Application to Fluorescence in Angiography. Radiometry, solid angle, radiometric units, photopic and scotopic luminous efficiency and efficacy curves, photometric units. Inverse square law of photometry, Lambert's law. Other units of light measurement, retinal illumination, Trolands.

Unit V Laser

15

Basics of lasers – Coherence, spatial and temporal coherence, spontaneous and stimulated emission. Einstein's theory of lasers. Population inversion, Laser pumping. Different types of lasers – gas lasers, Helium- Neon laser, Argon laser. Solid lasers – Ruby laser, semi-conductor lasers. Ophthalmic use of lasers – Excimer laser, LASIK.

Total Hours 75

Text Books:

1. N.Subramanyam, BrijLal and Dr.M.N.Avadhanulu: A text book of Optics, S.Chand& Co. (2019).
2. Keating NM. P, *Geometric, Physical and Visual Optics*, Butterworth- Heinemann, Massachusetts, USA, 2002.
3. Pedrotti L. S, Pedrotti Sr. F. L, *Optics and Vision*, Prentice Hall, New Jersey, USA, 1998.

Reference Books:

1. The Principles of Physical Optics: An Historical and Philosophical Treatment Charles A. Bennett, Wiley, (2008).
2. Physical Optics: Concepts, Optical Elements, and Techniques, Giovanni Giusfredi (2019).

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1: To recollect the knowledge on various theories and components of light.
CO2: To perceive the effect of interference and diffraction of light on lenses.
CO3: To examine the polarization and scattering properties of light on lenses.
CO4: To evaluate the role of Fluorescence, Phosphorescence, radiometry and photometry in Optometry.
CO5: To scrutinize the role of Lasers in Optometry.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	L	M	L	L	L	M	M	L	M	L
CO 2	H	H	M	M	M	L	M		L	L	L	M	M	M
CO 3	H	H	M	M	M	M	L		L	M	M	M	M	M
CO 4	H	H	M	M	L	L	M	L	M	M	M	M	M	M
CO 5	H	H	H	H	H	M	H		H	H	H	H	H	M

Microbiology

Semester I
22BOPC05

Hours of Instruction/week: 3
No. of Credits: 2

Objectives:

- To gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites.
- To acquire knowledge of the principles of sterilization.
- To know disinfection process in hospital and ophthalmic practice.

Unit I Introduction to Microbiology and Classification

09

Introduction to Microbiology, Types of Microorganisms, Physiology of Microorganisms – Nutrition, Enzymes, Metabolism and energy. Classification of bacteria, virus and fungi-morphology and staining.

Unit II Microbial pathogenesis and Immunology

09

Pathogenesis-Colonization, The development of Infection, the disease process, pathogenicity and virulence and damage to host tissue. Immunology – innate, humoral and defense mechanisms.

Unit III Control of Microbial Growth and Aseptic techniques

09

Control of Microbial Growth – Antimicrobial methods and Chemotherapy, Culture of microbes, Microbes versus Humans. Sterilization, disinfection and antiseptics.

Unit IV Ocular Bacteriology and Ocular Mycology

09

Gram positive – Staphylococcus aureus, Staphylococcus epidermidis, Streptococcus, Propionibacterium, actinomyces, Nocardia. Bacteria including acid fast bacilli – Mycobacterium tuberculosis, Mycobacterium leprae. Role of gram positive bacteria in eye and eye diseases. Gram negative Bacteria – Pseudomonas, Haemophilus, Brucella, Neisseria, Moraxella. Spirochetes – Treponema, Leptospiraceae. Role of gram negative bacteria in eye and eye diseases. Fungi, Yeasts, Filamentous, Dimorphic – Intracellular parasites – Chlamydia. Protozoa – Toxoplasmosis, Acanthamoeba. Helminths- Toxocariasis, Filariasis, Onchocerciasis, Trematodes their role in eye and eye diseases.

Unit V Ocular Virology

09

Virology, Classification of Viruses in Ocular Disease, Rubella, Adenovirus, Oncogenic Viruses – HPV, HBV, EBV, Retroviruses, HIV.

Total Hours 45

Text Books:

1. BURTON G.R.W: Microbiology for the Health Sciences, third edition, J.P. Lippincott Co., St. Louis, 1988.
2. M J Pelczar (Jr), ECS Chan, NR Krieg : Microbiology, fifth edition, TATA Mc GRAW-HILL Publisher, New Delhi, 1993

Reference Books:

1. KJ Ryan, CG Ray: Sherris Medical Microbiology- An Introduction to infectious Diseases, fourth edition, Mc GRAWHILL Publisher, New Delhi, 1994
2. MACKIE & McCartney Practical Medical Microbiology, SYDNEY M. FINEGOLD & ELLEN JO BARON: Diagnostic Microbiology (DM).

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To decode the nature of microorganisms.

CO2: To decipher the pathogenesis of microbes and immunological response by the human body.

CO3: To figure out techniques to control the microbial growth and embrace the aseptic techniques to be followed.

CO4: To unravel the behavior of bacteria and fungi in the human eye.

CO5: To inspect the menaces of virus in human eye.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	L	M	M	M	L	L	L	M	M	M	M	M
CO 2	H	L	M	L	M	L	L	L	L	M	M	M	M	M
CO 3	H	M	M	M	H	H	H	M	M	H	H	H	H	H
CO 4	H	M	M	L	H	M	H	M	M	H	H	H	H	H
CO 5	H	H	H		H	H	H	M	M	H	H	H	H	H

Practical I – Physical Optics

Semester I
22BOPC06

Hours of Instruction/week: 4
No of Credits: 2

Objectives:

- To experimentally learn the properties of light
- To verify the properties of light
- To apply the optical principles to learn the physiology of light and vision

List of experiments:

1. Gratings – determination of grating constant using Sodium vapour lamp; determination of wavelengths of light from Mercury vapour lamp.
2. Reflection grating
3. Dispersive power of grating
4. Newton's Ring's - Radius of curvature - Refractive index of lens
5. Newton's Ring's - Refractive index of a Liquid
6. Air wedge experiment thickness of a wire (hair).
7. Refractive index of prism.
8. Diffraction: Single and double slit experiment – Slit width determination.
9. Cauchy's constant and resolving power of prism.

Total Hours 60

Text Books:

1. N.Subramanyam, BrijLal and Dr.M.N.Avadhanulu: A text book of Optics, S.Chand& Co. (2019).
2. Keating NM. P, *Geometric, Physical and Visual Optics*, Butterworth- Heinemann, Massachusetts, USA, 2002.
3. Pedrotti L. S, Pedrotti Sr. F. L, *Optics and Vision*, Prentice Hall, New Jersey, USA, 1998.

Reference Books:

1. The Principles of Physical Optics: An Historical and Philosophical Treatment Charles A. Bennett, Wiley, (2008).
2. Physical Optics: Concepts, Optical Elements, and Techniques, Giovanni Giusfredi (2019).

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To apply the optical principles and learn the role of light in seeing.

CO2: To practically examine the polarization properties of light on lenses.

CO3: To practically determine the wavelength of light using mercury vapour lamp

CO4: To determine the refractive index using Newton's ring

CO5: To practically determine the slit width using diffraction.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	L	M	L	L	L	M	M	L	M	L
CO 2	H	H	M	M	M	L	M		L	L	L	M	M	M
CO 3	H	H	M	M	M	M	L		L	M	M	M	M	M
CO 4	H	H	M	M	L	L	M	L	M	M	M	M	M	M
CO 5	H	H	H	H	H	M	H		H	H	H	H	H	M

DSE I: Biochemistry

Semester I
22BOPD01

Hours of Instruction/week: 2+2
No of Credits: 2

Objectives:

- To demonstrate structure, properties and function of various biomolecules.
- To throw light on the basic structure of biomolecules in metabolic pathways.
- To provide the knowledge on the significance of these biomolecules

Unit I Biomolecules

10

Carbohydrates – Classification, Properties and their biological importance. Lipids - Classification and properties of fatty acids, triglycerides, phospholipids, other compound lipids, cholesterol its derivatives and their biological significance. Proteins - Classification and properties of Amino acids. Classification and properties of proteins, plasma proteins, structure of protein, immunoglobulins. Metabolism – role of carbohydrates, proteins and lipids.

Unit II Vitamins, Minerals and Enzymes

10

Vitamins - Classification, functions, source, deficiency manifestations and hypervitaminoses. Minerals - Calcium, Phosphorus, Sodium, Potassium, iron, selenium, iodine, copper – functions, sources, water – electrolyte balance and imbalance. Enzymes - Definition, classification, co-enzymes, factors affecting their action, enzyme inhibition, enzymes of clinical importance, mechanism by which they facilitate biochemical reactions, organ function tests – LFT, kidney function tests, thyroid function tests, adrenal function tests, pancreatic function tests, gastric function tests and tumor markers.

Unit III Hormonal Biochemistry

10

Hormones – communication between cells and tissues, general mechanism of action of hormones, function of steroid hormones, polypeptide hormones, thyroid hormones, parathyroid and pancreas, clinical disorders of hormones. Composition and function of lymph, CSF, ascetic fluid. pleural fluid, synovial fluid. Blood sugar, urea, creatinine and bilirubin significance of their estimation and applications in optometry.

Unit IV Biochemistry of diseases

10

Disorders of metabolism, DM, glycogen storage diseases, plasma lipids and lipoprotein abnormalities, hypercholesterolemia, lipidosis, hypolipoproteinemias. Disorders of nucleic acid metabolism, hypo and hyper urecemia, gout, disorders of erythrocyte metabolism, hemoglobinopathies, thalassemia and anemias. Inborn errors of metabolism- Phenylketonuria, alkptonuria, albinism, tyronisis, maple syrup urine disease, lesch – nyhan syndrome, sickle cell disease, anemia. Biochemistry of DM, artherolsclrosis, fatty liver, obesity and cancer.

Unit V Ocular Biochemistry

10

Ocular Biochemistry - Various aspects of the eye, viz., tears, cornea, lens, aqueous, vitreous, retina and pigment rhodopsin. Role of Carbohydrates, lipids, proteins, vitamins, minerals, enzymes and hormones and their metabolism in relation eye and eye diseases. Importance of the biochemical constituents in ocular tissues. Rhodopsin, Iodopin and Visual cycle. Application of biochemistry techniques in optometry.

Practicals:**10**

1. Reactions of Monosaccharides, Disaccharides and Starch – Glucose, Fructose, Galactose.
2. Estimation of Glucose: Detect hypo/hyperglycemia (blood)
3. Lipid profile: estimation of cholesterol, and triglycerol (blood)
4. Urine analysis: Qualitative analysis of urine to detect diseases
5. Estimation of alkaline phosphatase.

Total Hours 60**Text Books:**

1. Dr.S.Ramakrishnan: Essentials of Biochemistry & Ocular Biochemistry 1992, Publications Division, Annamalai University. (EBO)

Reference Books:

1. G.Rajagopal &Dr. S.Ramakrishnan: Practical Biochemistry for Medical students. M/s. Orient Longman, Calcutta, 1985.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To acquire knowledge on structure, properties and biological functions of carbohydrates, lipids and proteins.

CO2: To apprehend the significance of Vitamins, mineral and enzymatic functions in human body.

CO3: To collate the uptake and digestion of macronutrients and role of hormones in human body and study the significance of biochemical tests.

CO4: To elucidate the role of biochemical analysis in order to understand the diseases of human body.

CO5: To comprehend the biochemistry of ocular systems.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	M	M	L	M	L	L	M	L	M	M	M	M
CO 2	H	M	M	M	L	M	L		M	L	M	M	M	M
CO 3	H	M	L	M	M			L	L	M	H	M	M	M
CO 4	H	M	M	M	M	L	L		H	M	H	M	M	M
CO 5	H	M	H	M	M	M	M		M	M	H	H	H	H

English Language for Communication - II

Semester II
22BLEN02

Hours of Instruction/week: 3
No of Credits: 3

Objectives:

- To become familiar with the nuances of academic writing
- To produce short and simple connected texts on familiar topics.
- To communicate effectively and appropriately in real-life situations

Unit I Communicate: Outside the Class

09

Patterns of Language-Modal Verbs
Speaking-Useful Everyday Expressions
Making Language Work – Expressions to Indicate Speculations and Making Inferences

Unit II Communicate: At the Post Office

09

Patterns of Language-Phrasal Verbs/ Idioms Speaking
Distinguishing between pairs of expression
Making Language Work-Clipping , Forming Sentences,
Converting SMS into Normal Script

Unit III Contemplate: How to Win

09

Writing: completing a story, dialogue

Unit IV Contemplate: View Points

09

Speaking: Agreeing/Disagreeing, expressing oneself

Unit V Contemplate: Snakes and Ladders

09

Contemplate: Your Self

Speaking: Making comparisons Writing: Preparing lists

Assignments and Activities in Class:

- (a) Model question paper in the text book.
- (b) Vocabulary building, analyzing poems and listening activities (from CD)

Total Hours 45

Text Books:

1. Krishnaswamy N, sriraman T, Creative English for Communication, 2nd ed. Haryana, Macmillan, 2012.

Reference Books:

1. Das, Bikram K, Functional Grammar and Spoken and Written communication in English (A Short friendly Edition), New Delhi: Orient Black Swan, 2010.
2. Mudhatkel, Maya and Saraswathi, English for Competitive Examinations, Emerald Publishers, 2003.
3. Rajeevan, Geetha and Kiranmani Dutt, Basic Communication Skills, New Delhi: Foundation Books, 2010.
4. Rajeevan K and Radhakrishna Pillai, Spoken English For You, Chennai: Emerald Publishers, 2014

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Use increased vocabulary in their writing

CO2: Use expressions in appropriate context

CO3: Use the English language accurately and appropriately for different purposes

CO4: Understand how phrasal verbs, idioms enrich language

CO5: Demonstrate effective writing skills.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO 1	H	M	M	M	L	M	L	L	M	L	M	M	M	M
CO 2	H	M	M	M	L	M	L		M	L	M	M	M	M
CO 3	H	M	L	M	M			L	L	M	H	M	M	M
CO 4	H	M	M	M	M	L	L		H	M	H	M	M	M
CO 5	H	M	H	M	M	M	M		M	M	H	H	H	H

Ocular Anatomy

Semester II
22BOPC07

Hours of Instruction/week: 4
No of Credits: 3

Objectives:

- To comprehend the gross, functional and applied anatomy of various structures in the eye and adnexa.
- To comprehend the basic structure and connections between the various parts of the central nervous system and the eye.
- To understand the basic principles of ocular embryology.

Unit I Ocular Embryology

12

Formation of optic vesicle and optic stalk, formation of lens vesicle, formation of optic cup, changes in associated mesoderm, development of various structure of eye ball – retina, optic nerve, crystalline lens, cornea, sclera, choroid, ciliary body, iris, vitreous. Development of accessory structures of eyeball – eyelids, lacrimal apparatus, extra-ocular muscles, orbit. Milestones in the development of the eye.

Unit II Orbit& Eyelids

12

Bony orbit - Size, shape and relations, walls of the orbit, Base of the orbit, Apex of orbit. Orbital fascia – Fascial bulbi, Fascial sheaths of extraocular muscles, intermuscular septa. Spaces of orbit - Orbit fat and reticular tissue, apertures at the base of orbit. Contents of the orbit - Orbital nerve, oculomotor, Trochlear, Abducent, Trigeminal, facial nerves - their functional components, course and distribution, clinically applied aspects. **Lids** - Structures of the lids, Skin, Subcutaneous Areolar Layer, Layer of Striated muscle, Sub muscular Areolar Tissue, Fibrous Layer, Conjunctiva. Glands of the Lids- Meibomian Glands, Glands of Zeis and Glands of Moll. Blood Supply of the Lids, Lymphatic Drainage of the Lids, Nerve Supply of the Lids.

Unit III Lacrimal Apparatus & Conjunctiva

12

The lacrimal apparatus - Lacrimal gland, palpebral part, ducts of lacrimal gland, structure of the lacrimal gland, blood supply & nerve supply of the lacrimal gland, lacrimal passages. Anatomy of the Ocular Adnexa & glands. **Conjunctiva** - Palpebral Conjunctiva, Bulbar Conjunctiva, Conjunctival Fornix, Microscopic Structure of the conjunctiva- Epithelium, Substantia Propria. Conjunctival Glands - Krause's Glands, Wofring's Glands, Henley's Glands, Manz Glands. Blood Supply of the Conjunctiva, Nerve Supply of the Conjunctiva, Caruncle, Plica, Semilunaris.

Unit IV Cornea and the Anterior Segment

12

Cornea - Layers & peculiarities, Blood supply and nerve supply of cornea, Corneal Transparency. **Lens** - Zonules. Structure of lens - capsule, Anterior Epithelium, lens fibers(structured & zonal arrangement), Ciliary zonules - structure, gross appearance, Arrangement of zonules fibers. Uveal Tract & its vascular supply. Macroscopic & Microscopic appearance of Iris, Ciliary body and Choroid. Blood supply to uveal structure- Short & Long Posterior artery and Anterior Artery, Venous drainage, anterior chamber and its angle- angle of the anterior chamber. Trabecular meshwork. Canal of Schlemm, Schwalbe's line. Drainage of aqueous humor.

Unit V Anatomy of the Posterior Segment

12

Vitreous- main masses of vitreous, base of the vitreous. Hyaloidean vitreous. Vitreous cells. **Sclera** – Anterior, posterior & middle apertures. Episclera, Sclera proper, Lamina fuscia. Blood supply of the sclera. Nerve supply of the sclera. **Retina** - vascular supply, Gross anatomy, Microscopic structure of fovea centralize, Blood retinal barrier. **Optic Nerve** - Anatomy of optic nerve, Optic Chaisma optic tracts, Lateral Geniculate body, optic radicalism, visual cortex, Arrangement of nerve fibers, Blood supply of visual pathways (Arterial circle of willis& its branches). **The Ocular motor system** - Extraocular muscles, nerve supply, motor nuclei, supra nuclear motor centers. The pupillary &ciliary muscle - Anatomy of sphincter & Dilator muscle. **Ciliary muscle** – Anatomy, types, the nerve supply of the eye ball.

Total Hours 60

Text Books:

1. Snell RS, Lemp MA. Clinical anatomy of the eye. John Wiley & Sons; 2013.
2. A Remington: Clinical Anatomy of the Visual System, Second edition, Elsevier Butterworth Heinemann, Missouri, USA, 2005.

Reference Books:

1. AK Khurana, InduKhurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To investigate the growth of human eye.

CO2: To apprehend the anatomy of orbit.

CO3: To analyze the anatomy of cornea and the anterior segment of eye.

CO4: To look into the anatomy of posterior segment of the eye.

CO5: To observe the anatomy of conjunctiva and lacrimal apparatus.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	M	L	M	M	M	L	M	M	H	H	H	H
CO 2	H	M	M	L	H	M	M	L	M	M	H	H	H	H
CO 3	H	M	M	L	H	M	H	M	M	M	H	H	H	H
CO 4	H	M	M	L	H	M	H	M	M	M	H	H	H	H
CO 5	H	M	M	L	H	M	H	M	M	M	H	H	H	H

Ocular Physiology

Semester II
22BOPC08

Hours of Instruction/week: 3+2
No of Credits: 3

Objectives:

- To explain the normal functioning of all the structures of the eye and their interactions.
- To elucidate the physiological aspects of normal growth and development of the eye.
- To understand the phenomenon of vision and physiological principles of underlying pathogenesis and treatment of disease of the eye.

Unit I Tear film, Eyelid and Cornea

15

Protective Mechanism of the eye: Blinking – muscles of lid opening & lid closure (orbicularis oculi, levator palpebrae, Muller's muscle, blinking reflexes. Lacrimation – Lacrimal glands, Pre corneal tear film, Chemistry of lacrimal secretion tear film & Tear film dynamics (secretion of tear, formation of tear), retention & redistribution of tear, displacement phenomena, evaporation from tear film, drying & breakup of tear film, dynamic events during blinking, elimination of tear. **Cornea-** Brief idea about ultra & histological structure of cornea, Corneal transparency & hydration, Regulation of corneal transparency & hydration. Corneal vascularization. Maurice theory & Goldman's theory. **Uveal tissue-** Brief idea about uvea, Uveal meshwork, Uveo-scleral drainage, Schlemm's canal switch. Formation of Aqueous humour, Drainage & circulation of Aqueous Humor. Rates of production & flow. Functions of Aqueous humour.

Unit II Extraocular muscles and eye movements.

10

Extra ocular muscles - their function & nerve supply. Mechanics of actions of extra ocular muscles -cross sectional area of muscle, length of muscle. Arc of contact, muscle plane, Muscle axis of rotation. Physiology of ocular movement – Basic Kinematics, (position of gaze, Fick's axes). Ocular Movement (monocular and Binocular). Supra nuclear control of eye movements. **Ocular movements: Monocular Movements** - Adduction, Abduction, Supraduction, Infraduction, Incycloduction, Excycloduction. **Binocular Movements:** Versions- (saccadic & pursuit movement, position maintenance movements, stabilization movements & their characteristics). Vergences – (Convergence, divergence, vertical vergence).

Unit III Pupils, Accommodation and Intraocular Pressure

10

Pupil: Normal pupil, Physiological changes in pupil size – Isocoria, Pupillary unrest, Hippies. Pupillary reflex – Light reflex, Near reflex, Darkness reflex, Psycho sensory reflex, Lid closure reflex. Intraocular pressure - Features of normal IOP, Factors influencing the IOP, Control of IOP, Measurement of IOP. **Accommodation-** Far point, near point, range & amplitude of Accommodation. Mechanism of accommodation – Increased tension theory, Relaxation theory, Role of lens capsule, Gullstrand mechanical model of accommodation. Stimulus for accommodation. Ocular changes in accommodation. Changes in accommodation with age (Presbyopia). Nervous mechanism for accommodation.

Unit IV Lens, Vitreous, Retina, Optic nerve and Ocular circulation

15

Lens- Basic idea about human lens, Function of lens, Lens transparency, Lens culture, Changes in ageing lens. **Vitreous** - Composition & distribution of vitreous humour, Physiology & function of vitreous humour, Optical role of vitreous humour. **Retina**- Retinal structure, layers of retina, brief idea about rod & cones, Organization of retina, function of retina. **Optic Nerve** - Physiology of optic nerve. **Ocular Circulation** - Vascular structure of the eye, ocular circulation, blood-ocular barrier (Blood-retinal, blood Vitreous & blood aqueous barrier). Regulation of ocular circulation.

Unit V Physiology and Neurophysiology of Vision

15

Visual perception –Higher integrative activity, Binocular perception, stereoscopic depth perception. Neurophysiology of perception – Higher visual pathways (primary visual Pathway to cerebral center, Lateral Geniculate body, non-geniculate targets for retinofugal input, visual center). Neurophysiology of perception – Spatial analysis, Double pathway to higher visual centers. **Physiology of vision** - Visual acuity, Visual angle, Components of Visual acuity (Minimum visible, Resolution, Recognition Hyperacuity), Factors affecting, Measurement of visual acuity. Contrast Sensitivity – Types (spatial & Temporal contrast sensitivity), Neural Mechanism, Measurement of contrast sensitivity (Arden gratings , Cambridge low contrast gratings, Pelli – Robson chart). Light & Dark adaptation - Dark adaptation curve, Mechanism of dark adaptation, Factors influencing dark adaptation, Time course of light adaptation, Mechanism of light adaptation, Rod vs. cone light adaptation. Purkinje shift of spectral sensitivity. Binocular vision - Grades of binocular vision (simultaneous, fusion & stereopsis), Advantages of binocular vision, visual direction & horopter, Binocular fusion, Dichoptic stimulation , Depth perception, Integration of motor & sensory system. Electro diagnostic tests - ERG, EOG, VER. Color vision- Physiological, Photochemical & neurological basis of color vision. Electrophysiology of color vision. Granit's modulator and dominator theory, Purkinje phenomenon. Young-Helmholtz theory. Types of color defects, Color blindness. Neural analysis Geniculate cortex: Structure of geniculate cortex. Electrophysiology. Projection – retinal projection. Detail idea about visual cortex & function of visual cortex.

Practicals:

10

1. External examination of the eye – assessment of eyelids and lashes
2. Examination of cornea, conjunctiva and lens using torch light
3. Measurement of blink rate
4. Measurement of Palpebral fissure height (Horizontal and Vertical)
5. Measurement of Visible iris diameter (Horizontal and vertical)
6. Ocular motility test
7. Test action of LPS
8. Test for Lacrimation, ROPLAS
9. Syringing
10. Observation of tear film, puncta

11. Test corneal Sensitivity
12. IOP – Finger tension
13. Assessment of iris
14. Assessment of pupillary reflexes and pupillary diameter using IPD ruler and torch light.
15. Vision assessment, Contrast sensitivity assessment, Color Vision, Stereopsis.

Total Hours 75

Text Books:

1. AK Khurana, InduKhurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006.

Reference Books:

1. R D Ravindran: Physiology of the eye ,Aravind eye hospitals, Pondicherry,2001.
2. PL Kaufman, A Alm: Alder's Physiology of the eye clinical application, 10th edition, Mosby,2002.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1:To inspect the physiology of cornea, dynamics of aqueous humor and eyelid and tear film physiology.

CO2:To interpret physiology of lens, vitreous humor, retina, optic nerve and ocular circulation.

CO3:To investigate the physiology of extra ocular muscles and eye movements

CO4:To examine the physiology of pupils, accommodation and intraocular pressure

CO5:To scrutinize the physiology and neurophysiology of vision

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	M	L	M	M	M	L	M	M	H	H	H	H
CO 2	H	M	M	L	H	M	M	L	M	M	H	H	H	H
CO 3	H	M	M	L	H	M	H	M	M	M	H	H	H	H
CO 4	H	M	M	L	H	M	H	M	M	M	H	H	H	H
CO 5	H	M	M	L	H	M	H	M	M	M	H	H	H	H

Geometric Optics - II

Semester II

22BOPC09

Hours of Instruction/week: 4

No of Credits: 3

Objectives:

- To impart knowledge on telescopes and microscopes.
- To understand the laser optics phenomenon in detail.
- To gain knowledge of errors of refraction in GSE

Unit I Cylindrical lenses

15

Cylindrical Lenses - image formation, relation between cylinder axis and line image orientation. Imaging due to two cylinders in contact with axes parallel. Two cylinders in contact with axes perpendicular line images and their orientations to the cylinders' powers, interval of Sturm, circle of least confusion (CLC), spherical equivalent, position of CLC. Spherical lens and a cylindrical lens in contact, spherical equivalent, interval of Sturm and CLC Spherocylindrical lens notations – plus/minus cylinder form, cross cylinder/meridian form, transformations between them.

Unit II Fields, Apertures & Pupil

10

Field stops and apertures, entrance and exit pupils. Apertures and defocus blur. Receiver/detector diameter, depth of focus, depth of field.

Unit III Aberrations

12

Chromatic Aberrations- methods of removing chromatic aberrations, Abbe number. Monochromatic Aberrations – deviation from paraxial approximation, difference between ray aberrations and wavefront aberrations. Third order aberrations – spherical aberrations, coma, astigmatism, distortion and curvature of fields. Ways of minimizing spherical aberrations – pupil size, bending of lens, shape factor. Lens tilt – astigmatism. Higher order aberrations, introduction to Zernike Polynomials.

Unit IV Telescopes & Microscopes

11

Telescopes – Keplerian, Galilean and Newtonian. Position of cardinal points, entrance and exit pupils, magnifications, advantages and disadvantages Microscopes – magnification, tube length.

Unit V Gullstrand's Schematic Eye (GSE)

12

Calculation of the power of the cornea, the lens and the eye, axial length, calculation of the position of the cardinal points, magnification. GSE - Purkinje images and their reflectances. GSE - entrance and exit pupils for a 3mm pupil, Ocular aberrations – spherical aberrations, chromatic aberrations and coma. GSE– introduction to refractive errors - myopia and hyperopia, corneal curvature, axial length, far point, blur size calculations, corrections, astigmatism, blur size, circle of least confusion, correction. GSE - Object closer than at infinity. Introduction to accommodation - far point, near point, presbyopia, spectacle and contact Lens corrections - comparison of magnification.

Total Hours 60

Text Books:

1. Tunnaclyffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
2. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.

Reference Books:

1. Subrahmanyam N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.
2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
3. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To apprehend the nature of cylindrical lenses and its relation to eye.

CO2: To inspect the effects of pupil, apertures and field stops.

CO3: To scrutinize aberrations and its impact on our eyes.

CO4: To resolve telescopes and microscopes.

CO5: To decode Gullstrand's schematic eyes.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	M	H	M	H	H	M	H	H	H
CO 2	H	H	M	M	L		L		L	L	L	M	M	M
CO 3	H	H	M	M	M	L	L		L	M	M	M	M	M
CO 4	H	H	M	M	H	M	M	L	M	M	M	M	M	M
CO 5	H	H	M	H	H	M	M	L	M	H	H	M	H	M

Nutrition

Semester II
22BOPC10

Hours of Instruction/week: 3
No of Credits: 2

Objectives:

- To know the concept of nutrition and its assessment.
- To gain knowledge in the planning and preparation of therapeutic diets.
- To understand the planning, selection and preparation of foods during health and deficiency conditions.

Unit I Introduction to Nutrition and Energy

07

History of Nutrition - Nutrition as a science, Food groups, RDA, assessment of nutritional status. Measurements of energy and value of food, Energy expenditure, Total energy/calorie requirement for different age groups and diseases, Satiety value. Energy imbalance- obesity, starvation. Limitations of the daily food guide. Digestion, absorption and transport of Food.

Unit II Proteins, fats, Carbohydrates

08

Proteins - Sources and functions, Essential and non- essential amino- acids, Incomplete and complete proteins, Supplementary foods, PEM and the eye, Nitrogen balance, Changes in protein requirement. **Fats** - Sources and functions, Essential fatty acids, Excess and deficiency, Lipids and the eye, Hyperlipidemia, heart diseases, atherosclerosis. **Carbohydrates** - Sources, functions, excess/deficiency, relationship with eyes. Digestion of Proteins, carbohydrates & lipids.

Unit III Vitamins, Minerals, Water and Fiber

12

Vitamins - General functions and food sources, Vitamin deficiencies and associated eye disorders with particular emphasis to Vitamin A, Promoting sound habits in pregnancy, lactation and infancy, Nutrient with antioxidant, Properties. **Minerals** -General functions and sources, Macro and micro minerals associated with the eye, Deficiencies and excess – ophthalmic complications (e.g. iron, calcium, iodine etc.). **Water**- Importance, functions, requirements. **Fiber**- definition, classification, sources and role of fiber in human nutrition and disease.

Unit IV Concept of Diet Therapy

10

Classification, purpose and principles of therapeutic diets, modification of normal diets. Obesity and underweight - Etiological factors, grade of malnutrition, complications and diet modification. Definition, causes, signs and symptoms, diet modification for diabetes mellitus. Febrile conditions - Typhoid, Tuberculosis, Malaria, Pneumonia, Influenza. Gastrointestinal disorders- Peptic ulcer, Diarrhea, Dysentery, Constipation. Liver and kidney diseases- Jaundice, Hepatitis, Cirrhosis, Hepatic coma, Acute and chronic renal failure, Dialysis. Cardiovascular disease- Atherosclerosis, Hypertension, diet and eye.

Unit V Antioxidants & Miscellaneous and Nutrition for different age groups**08**

Antioxidant - Lutein, zeaxanthin, lycopene, Monosodium Glutamate, aspartame and their role in vision and ageing. **Miscellaneous** - Measles and associated eye disorders, low birth weight. Food and nutritional requirements for infants – nutritional importance of breast feeding, preschool and school going children, adolescent, adult, elderly, pregnant and lactating mothers and the impact of nutritional deficiency in eye.

Total Hours 45**Text Books:**

1. M Swaminathan: Hand book of Food and Nutrition, fifth edition, Bangalore printing & publishing Co.Ltd, Bangalore,2004

Reference Books:

1. C Gopalan, BV Rama Sastri, SC Balasubramanian: Nutritive Value of Indian Foods , National Institute of Nutrition, ICMR, Hyderabad,2004
2. Frank Eperjesi & Stephen Beatty: Nutrition and the Eye A practical Approach.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To comprehend the concept of nutrition and energy.

CO2: To equip on the sources, function of proteins, fats and carbohydrates and their role in eye.

CO3: To gain knowledge on the role of vitamins, minerals, water and fiber in digestion and absorption of food and its impact on eyes.

CO4: To decipher the concept of diet and effectively plan a diet.

CO5: To understand the nutritional requirements for different age groups and the impact of nutritional deficiencies in eye.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	M	M	L	M	L	L	L	L	M	M	M	M
CO 2	H	M	M	M	L	M	M	L	L	L	M	H	H	M
CO 3	H	M	M	M	M	M	L	L	L	M	H	H	H	M
CO 4	H	M	L	M	M	L		L	L	M	H	M	M	M
CO 5	H	M	H	M	M	H	L	M	M	M	H	H	M	M

Practical II - Geometric Optics

Semester II
22BOPC11

Hours of Instruction/week: 3
No of Credits: 2

Objectives:

- To enhance the students with practical knowledge of various procedures.
- To gain the skills about various procedures involved in geometrical optics.
- To apply the geometrical aspects of light to understand the physiology of eye

List of experiments:

1. Thick Prism – determination of prism angle and dispersive power; calculation of the refractive index.
2. Thin Prism – measurement of deviation; calculation of the prism diopter.
3. Apical angle of a prism
4. Dispersive power of prism
5. Refractive index of prism
6. Image formation by spherical mirrors.
7. Convex lens - power determination using lens gauge, power determination using distant object method; power determination using the vergence formula.
8. Concave lens – in combination with a convex lens – power determination.
9. Imaging by two cylinders in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinders' powers and orientations.
10. Imaging by a spherocylindrical lens – sphere and cylinder in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinder's power and orientations.

Total Hours 45

Text Books:

1. Tunnaclyffe A. H, Hirst J. G, *Optics*, The association of British Dispensing Opticians, London, U.K., 1990.
2. Keating NM. P, *Geometric, Physical and Visual Optics*, Butterworth- Heinemann, Massachusetts, USA, 2002.
3. Subrahmanyam N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To investigate geometric properties of light in the role of vision.

CO2: To gain practical knowledge on image formation by spherical mirrors.

CO3: To construct tabletop microscopes and telescopes.

CO4: To determine the prism angle and dispersive power using thick and thin prisms.

CO5: To determine the magnifying power of a simple and a compound microscope.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	M	H	M	H	H	M	H	H	H
CO 2	H	H	M	M	L		L		L	L	L	M	M	M
CO 3	H	H	M	M	M	L	L		L	M	M	M	M	M
CO 4	H	H	M	M	H	M	M	L	M	M	M	M	M	M
CO 5	H	H	M	H	H	M	M	L	M	H	H	M	H	M

Optometric Optics – I

**Semester III
22BOPC12**

**Hours of Instruction/week: 3
No of Credits: 2**

Objectives:

- To identify different forms of lenses.
- To impart knowledge on manufacturing process of lenses.
- To understand safety standards of lenses.

Unit I Lenses

09

Introduction – Light, Mirror, Reflection, Refraction and Absorption. Lenses – Definition, units, terminology used to describe, form of lenses. Lens shape, size and types i.e. spherical, cylindrical and Sphero-cylindrical lenses.

Unit II Manufacturing of lenses

09

Raw materials – History and General Outline, Manufacturing of Ophthalmic Blanks – Glass & Plastics, Terminology used in Lens Workshops, Surfacing process from Blanks to lenses. Glazing & edging (manual & automatic).

Unit III Lens Materials and its properties

09

Definition, Materials, Types and Characteristics of Glass, Plastics, Polycarbonate, Trivex. Lens. Properties - Refractive index, specific gravity, UV cut off, impact resistance – include drop ball test, Abbe value, and Center thickness.

Unit IV Lens Safety Standards and Lens Faults

09

Lens quality, Faults in lens material, Faults on lens surface. Best form of lenses & Safety standards for Ophthalmic lenses - FDA, ANSI, ISI, Others.

Unit V Vertex Calculations & Transpositions

09

Vertex Calculations: Vertex distance and vertex power, Effectivity calculations. Spherometer & Sag formula, Edge thickness calculations. Transpositions – Simple Transposition, Toric Transposition and Spherical equivalent.

Total Hours 45

Text Books:

1. Jalie M: The principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1994.
2. David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission, 1999.

Reference Books:

1. C V Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth-Heinemann, USA, 1996.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To discuss on forms and types of lenses.

CO2: To know the manufacturing process of lenses.

CO3: To gain knowledge on lens materials and its properties.

CO4: To acquire knowledge on safety standards of lenses.

CO5: To learn transposition and its types in detail

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	M	H	M	H	H	H	H	H	H
CO 2	H	H	M	M	H		M		M	L	M	M	H	M
CO 3	H	H	M	M	M	L	M	M	M	M	M	M	H	M
CO 4	H	H	M	M	H	M	H	H	H	M	M	H	H	M
CO 5	H	H	M	H	M	M	M	M	H	H	H	H	H	M

Visual Optics – I

Semester III
22BOPC13

Hours of Instruction/week: 3
No of Credits: 3

Objectives:

- To understand the fundamentals of optical components of the eye.
- To gain knowledge on visual acuity measurement.
- To impart knowledge on causes of refractive errors and its types.

Unit I Review of Geometric Optics

09

Conjugacy, object space and image space, Sign convention, Spherical refracting surface, Spherical mirror; catoptric power, Cardinal points, Magnification, Light and visual function - Clinical Relevance of - Fluorescence, Interference, Diffraction, Polarization, Bi-refringence, Dichroism, Aberration and applications.

Unit II Optics of Ocular Structures

09

Cornea and aqueous, Crystalline lens, Vitreous, Schematic and reduced eye

Unit III Measurement of the optical constants of the eye

09

Corneal curvature and thickness, Keratometry, Curvature of the lens and Ophthalmophakometry, Axial and axis of the eye.

Unit IV Basic Aspects of Vision.

09

Visual Acuity, Light and Dark Adaptation, Colour Vision, Spatial and Temporal Resolution Science of Measuring visual performance and Application to Clinical Optometry

Unit V Refractive anomalies and their causes

09

Etiology of refractive anomalies, Contributing variability and their ranges, Populating distributions of anomalies, Optical component measurements, Growth of the eye in relation to refractive errors.

Total Hours 45

Text Books:

1. Bennett & Rabbetts: Clinical visual Optics
2. David O Michaels: Visual Optics & Refraction (DOM)

Reference Books:

1. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
2. T Grosvenor: Primary Care Optometry, 4th edition, Butterworth – heinemann, USA, 2002
3. WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To review geometrical optics and inspect its role in seeing and vision.

CO2: To acquire knowledge on optics of components of eye.

CO3: To compute the optical constants.

CO4: To comprehend the basic aspects of vision.

CO5: To inspect the refractive anomalies of the eye and their causes.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	M	M	M	H	H	H	H	H	H
CO 2	H	H	M	M	H		H	M	H	M	H	H	H	M
CO 3	H	H	M	M	M	L	M	M	M	M	M	M	H	M
CO 4	H	H	M	M	H	M	H	H	H	M	M	H	H	M
CO 5	H	H	M	H	H	M	H	M	H	H	H	H	H	H

Optometric Instruments

Semester III
22BOPC14

Hours of Instruction/week: 3
No of Credits: 3

Objectives:

- To gain theoretical and basic practical knowledge in handling the Optometric & Ophthalmic instruments.
- To know the purpose, set-up and devices required for the test.
- To demonstrate various Orthoptic and Ophthalmic instruments and Screening devices.

Unit I Refractive Instrument

10

Optotypes and Modulation Transfer Function [MTF], Spatial Frequency, Test charts standards., Choice of test charts, Trial case lenses, Refractor (phoropter) head units, Optical considerations of refractor units, Trial frame design, Near vision difficulties with units and trial frames. Retinoscope – types available, Adjustment of Retinoscopes- special features, Objective optometers, Infrared optometer devices, Projection charts, Illumination of the consulting room., Brightness cuity test, Vision analyzer, Pupilometer, Potential Acuity Meter, Abberometer.

Unit II Ophthalmoscopes and related devices

08

Design of Ophthalmoscopes – illumination/viewing, Ophthalmoscope disc, Filters for ophthalmoscopy, Indirect ophthalmoscopes and uses of the ophthalmoscope in special cases.

Unit III Anterior Segment Instruments

09

Lensometer, lens gauge or clock, Keratometer and Corneal topography, Refractionometer. **Slit lamp** - Slit lamp systems, Viewing microscope systems, Scanning laser devices, Slit lamp accessories, Mechanical design in instruments. **Tonometer** – principles, types of tonometers, standardization, uses and interpretation of tonometers.

Unit IV Ancillary Assessment Instrument

09

Color Vision Testing Devices, Fields of Vision Screening Devices –Perimeter and the visual field, Illumination of field-testing instruments, Projection perimeters, Screening devices for field defects, Results of field examination, Vision screeners – principles, details, analysis of screener results, Bowl perimeters, Goldmann and Humphery Visual Field Analyzer.

Unit V Imaging

09

Ophthalmic Ultrasonography - Biometry/Ultrasound/'A' Scan/'B' Scan/UBM. Retina and **Electro diagnostics** - ERG, VEP, EOG, OCT, FFA, ICG. Glaucoma diagnostics, HRT, GDX, Microperimetry. Cornea Diagnostics - OCTA, Topo, Pentacam, Specular microscopy, Confocal microscopy.

Total Hours 45

Text Books:

1. David Henson: Optometric Instrumentations, Butterworth- Heinemann, UK, 1991
2. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinemann, USA, 2007.

Reference Books:

1. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo-Optical Instrumentation, 2002.
2. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997.

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1: To understand various vision testing and screening devices and its principles.
CO2: To know about the design, features and advantages of ophthalmoscope and related devices.
CO3: To know the types, principle and procedures of slit lamp and tonometers.
CO4: To gain knowledge in ultrasonography and visual field analyser.
CO5: To understand electro diagnostic procedures in detail.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	H	H	M	H	H	H	H	H	H
CO 2	H	H	M	M	H	H	H	M	H	M	H	H	H	H
CO 3	H	H	M	M	M	H	H	M	M	M	M	M	H	H
CO 4	H	H	M	M	H	H	H	H	H	M	M	H	H	H
CO 5	H	H	M	H	H	H	H	M	H	H	H	H	H	H

Ocular Diseases - I

Semester III
22BOPC15

Hours of Instruction/week: 5
No of Credits: 4

Objectives:

- To understand the introduction of pathology and pathology related to Ocular diseases.
- To impart knowledge on anatomy, causes, signs, symptoms, differential diagnosis and treatment of various Ocular conditions.
- To acquire knowledge on diagnostic approach and management of Ocular diseases.

Unit I Orbit and Eyelids

15

Orbit- Review of Anatomy, Proptosis - Classification, Causes, Investigations, Enophthalmos. Developmental Anomalies - Craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome. Orbital Inflammations - Preseptal cellulites, Orbital cellulitis, Orbital Periostitis, Cavernous sinus Thrombosis. Grave's Ophthalmopathy, Orbital Tumors - Dermoids, capillary haemangioma, Optic nerve glioma. Orbital blowout fractures, Orbital surgery - Orbitotomy, Orbital trauma. **Eyelids** - Review of Anatomy, Congenital anomalies - Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos. Oedema of the eyelids - Inflammatory, Solid, Passive oedema. Inflammatory disorders - Blepharitis, External Hordeolum, Chalazion, Internal hordeolum, Molluscum Contagiosum. Anomalies in the position of the lashes and Lid Margin - Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis. Tumors - Papillomas, Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma.

Unit II Conjunctiva and Lacrimal system

15

Conjunctiva - Review of Anatomy, Inflammations of conjunctiva - bacterial, chlamydial, viral, Allergic and Granulomatous conjunctivitis. Degenerative conditions - Pinguecula, Pterygium, Concretions. Symptomatic conditions - Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration. Cysts and Tumors. **Lacrimal system** - Review of Anatomy, Tear Film, The Dry Eye (Sjogren's Syndrome). The watering eye - Etiology, clinical evaluation. Dacryocystitis, Swelling of the Lacrimal gland - Dacryoadenitis.

Unit III Cornea

15

Review of Anatomy and Physiology, Congenital Anomalies - Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea. Inflammations of the cornea - Ulcerative keratitis and Non ulcerative. Etiological classifications - Infective, Allergic, Trophic, Traumatic, Idiopathic. Degenerations - Classifications, Arcus senilis, Vogt's white limbal girdle, Hassall-Henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration. Dystrophies - Reis-Bückler dystrophy, Recurrent corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, Macular dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy. Keratoconus, Keratoglobus, Corneal oedema, Corneal opacity, Corneal vascularization, Penetrating Keratoplasty.

Unit IV Uvea and Sclera**15**

Uveal Tract - Review of Anatomy, Classification of uveitis, Etiology, Pathology, Anterior Uveitis, Posterior Uveitis, Purulent Uveitis, Endophthalmitis, Panophthalmitis, Pars Planitis, Tumors of Uveal tract - Melanoma. Clinical examination of Uveitis. **Sclera** - Review of Anatomy, Episcleritis and scleritis. Clinical examination of Scleritis.

Unit V Lens**15**

Review of Anatomy and Physiology, Clinical examination, Classification of cataract. Congenital and Developmental cataract. Acquired - Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic cataract. Morphological classification - Capsular, Sub capsular, Cortical, Supranuclear, Nuclear and Polar cataract. Complications of cataract surgery, Displacement of lens - Subluxation, Displacement. Lenscoloboma, Lenticonus, Microsperophakia. Management of cataract - Non surgical and surgical measures, preoperative evaluation, Types of surgeries.

Total Hours 75**Text Books:**

1. Jack J. Kanski: Clinical Ophthalmology, Butterworths, 2nd Ed., 1989.
2. Stephen J. Miller: Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990.

Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007.

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1: To inspect the diseases affecting the orbit and eyelids of the eye.
CO2: To comprehend the diseases of conjunctiva and lacrimal apparatus.
CO3: To learn the diseases affecting the cornea.
CO4: To gain knowledge on diseases affecting uvea and sclera.
CO5: To inspect the disease affecting lens.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	M	H	H	H	H	H	H
CO 2	H	H	H	M	H	H	H	M	H	M	H	H	H	H
CO 3	H	H	H	H	M	H	H	M	M	M	M	M	H	H
CO 4	H	H	H	M	H	H	H	H	H	M	M	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Clinical Examination of Visual System (CEVS)

Semester III
22BOPC16

Hours of Instruction/week: 4+1
No of Credits: 3

Objectives:

- To impart knowledge on preliminary examination of eye.
- To gain theoretical and basic practical knowledge in anterior and posterior segment assessment.
- To demonstrate various Orthoptic workups.

Unit I Preliminary Assessment

12

History taking, Visual acuity estimation, Pupil examination, Hirschberg, Shadow test, Finger tension test, Lid eversion, Torch light examination, Lensometer, Duochrome, Bruckner's red reflex test.

Unit II Binocular Vision Assessment

12

Extraocular motility, Cover test, Alternating cover test, Near point of Accommodation (NPA), Near point of Convergence (NPC), Stereopsis, Maddox rod, Maddox wing, Hirschberg test, Synaptophore, Krimsky and Modified Krimsky., Saccades and Pursuits.

Unit III Ancillary Assessment

12

Confrontation test, Amsler grid test, Color vision test, Schirmer's test, TBUT, Tear meniscus level, NITBUT (keratometer), ROPLAS, Photostress test, HVID, VVID.

Unit IV Anterior segment Assessment

12

Slitlamp biomicroscopy, Keratometry, Digital pressure, Schiotz Tonometry, Applanation Tonometry, Van Herrick Grading. Gonioscopy.

Unit V Posterior Segment Assessment

12

Direct Ophthalmoscope and Indirect Ophthalmoscope., 90D

Practicals:

15

1. Lensometer
2. Keratometer
3. Slit lamp biomicroscopy
4. Tonometer
5. Ophthalmoscope

Total Hours 75

Text Books:

1. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinemann, USA, 2007.
2. D B. Elliott: Clinical Procedures in Primary Eye Care, 3rd edition, Butterworth-Heinemann, 2007.

Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007.
2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007.
3. J.B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins, 1991.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To conduct preliminary ocular examination.

CO2: To inspect the binocular vision status of the eye.

CO3: To master the tests used to measure the field of vision, diagnose dry eye, distinguish optic nerve/macular pathology.

CO4: To gain knowledge on anterior segment assessment.

CO5: To comprehend examination of posterior segment examination.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	M	M	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	M	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Practical III - Clinical Examination of Visual System

Semester III
22BOPC17

Hours of Instruction/week: 4
No of Credits: 3

Objectives:

- To impart practical knowledge on preliminary examination of eye.
- To gain basic practical knowledge in anterior and posterior segment assessment.
- To demonstrate various Orthoptic workups.

List of Experiments:

1. History taking
2. Visual acuity estimation
3. Pupils Examination
4. Hirschberg test, Modified Krimsky test
5. External examination of the eye, Lid Eversion
6. Extraocular motility, Cover test, Alternating cover test
7. Maddox Rod
8. Stereopsis
9. Saccades and pursuit test
10. Confrontation test
11. Schirmer's, TBUT, Tear meniscus level, NITBUT (keratometer)
12. Color Vision
13. Photostress test
14. Slit lamp biomicroscopy
15. Tonometry
16. Van Herrick Grading
17. Ophthalmoscopy
18. ROPLAS
19. Amsler grid test
20. Contrast sensitivity function test

Total Hours 60

Text Books:

1. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinemann, USA, 2007.
2. D B. Elliott :Clinical Procedures in Primary Eye Care, 3rd edition, Butterworth-Heinemann, 2007.

Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007.
2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007.
3. J.B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins, 1991.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To conduct preliminary ocular examination.

CO2: To inspect the binocular vision status of the eye.

CO3: To master the tests used to measure the field of vision, diagnose dry eye, distinguish optic nerve/macular pathology.

CO4: To gain knowledge on anterior segment assessment

CO5: To comprehend examination of posterior segment examination.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	M	M	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	M	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Clinical Psychology

Semester III
22BOPC18

Hours of Instruction/week: 3
No of Credits: 2

Objectives:

- To impart knowledge on clinical psychology and the ideas of Sensation and Determinants.
- To illustrate the human psychology factors and methodologies involved in counselling therapy.
- To provide knowledge on the psychological reaction of patients and rehabilitation.

Unit I Psychology

09

Introduction to Psychology - Definition, History, Branches, Scope and Current Status. Methods, Concepts of Normality and abnormality in Clinical Psychology

Unit II Sensation and Determinants

09

Sensation, Attention and Perception, Primary senses, Types of attention and determinants. Principles of perception and determinants.

Unit III Human Psychology Factors

09

A – Intelligence, B - Learning, C - Memory, D - Personality, E – Motivation and F – Body. Image, personality integration, problem solving and decision making.

Unit IV Counseling therapy

09

Helper - Helpee relationship and Ophthalmic counseling, Characteristics of therapist, Relationship between the therapist and client, Counseling patient with partial sight, colour blindness and hereditary vision defects.

Unit V Reaction and Rehabilitation

09

Psychological Reaction- A-Illness, loss and Grief; B-Adapting changes in Vision (age, diseases, etc.). Tests for people with disability- WAIS-R. WISC-R (for visually handicapped), Blind learning aptitude tests. Disability and Rehabilitation, Depression, Anxiety and Stress.

Total Hours 45

Text Books:

1. Introduction to Psychology, Morgon C.T., King R.A., Robinson N.M., Tata Mc Graw Hill Publishing Co

Reference Books:

1. Introduction to Psychology, Hilgard and Atkinson, Tata Mc Graw Hill Publishing Co. Psychology 5th Ed. Dworetsky J.P.
2. Child Development Hurlock, EB, VIED, Mc Graw Hill International Book Co. (1981)

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To gain basic knowledge on introduction to Psychology and Concepts of Normality and abnormality

CO2: To understand the basics of clinical psychology and analyse the steps involved in sensation process and determinants.

CO3: To understand the role of counseling and patient and therapist relationship.

CO4: To illustrate the factors involved in human psychology and personality integration.

CO5: To identify the disability and to allow the patients through rehabilitation process.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	M	M	L	H	H	M	M	L	M	M	M	M
CO 2	H	M	H	M		M	M	M	M	M	H	H	H	H
CO 3	H	H	H	H	L	H	H	H	M	L	H	H	H	H
CO 4	H	M	H	M		H	H	H	H	M	M	H	H	H
CO 5	H	H	M	H	M	H	H	H	M	M	H	M	H	M

DSE III: Epidemiology and Biostatistics

Semester III
22BOPD03

Hours of Instruction/week: 2+2
No of Credits: 2

Objectives:

- To acquire knowledge on disease characteristics, study designs, sources of error and data, screening for disease
- To learn apply statistics to understand disease characteristics
- To apply the knowledge on statistics to understand the natural history of diseases.

Unit I Introduction to Epidemiology

12

Introduction to Epidemiology - Definition of epidemiology, population and medicine epidemiology, health and disease, natural history of disease, level of prevention, application of prevention and natural history, stroke. Epidemiological concept - the scope of epidemiology, epidemic verses endemic disease, classification of disease, multiple causation of disease.

Unit II Study designs, Measurement, Sources of error and Data

12

Analytical Studies - Observational verses studies, analytic studies, retrospective and prospective studies, randomized clinical trial. Descriptive epidemiology - person, place, time. Measurements of morbidity and mortality, rates, ratios and proportions, incidence and prevalence rate, crude, specific and adjusted rates, major source of error in measurement of disease. Source of data on community health - censuses, vital statistics, morbidity data, linked health records.

Unit III Screening and Sampling

12

Screening in detection of disease- definition, principle underlying screening programs, evaluation of screening programs. Sampling and sample size determination - sampling strategies, probability and convenience sampling, sample size calculation formula for various study design examples, risk estimation, causation vs. association, bias and confounding, survival analysis.

Unit IV Biostatistics I

12

Biostatistics - Introduction, population and sample, collection of data, classification and tabulation of data, diagrams and graphs, frequency distribution. Descriptive statistics - Measurement of central tendency, averages, dispersion, skewness and kurtosis. Inferential statistics, probability, theoretical probability distribution. Practical with MS Office Excel. Random variables - Discrete and continuous, probability mass function and density function-simple problem. Moments - relation between central and raw moments.

Unit V Biostatistics II

12

Chi-square test, binomial, Poisson and normal distribution. Inference about population, sampling methods, hypothesis testing, confidence interval. Practical with MS Office Excel. Students t-test, Analysis of variance, correlation, simple, multiple and logistic regression, demography, computer application in biology, number system. Mathematical statistical software, handling, knowledge, usage and interpretation. Practical with MS Office Excel, SPSS, R

Total Hours 60

Text Books:

1. J.S Mausner and S.Bahn Epidemiology - An introductory text,2nd Ed,W.B. Saunders Co. 1984.
2. V.B Rastogi, Biostatistics, 3rd edition, Medtec Publishers,2015.

Reference Books:

1. L. Gordis Epidemiology, 6th Edition, Saunders 2018.
2. R. J Rossi, Applied Biostatistics for health science, 2/e willey Blackwell publishers,2022.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To digest the facts and myth on epidemiology

CO2: To master the study design, measurement, source of error and data

CO3: To conquer the knowledge on screening and sampling.

CO4: To expertise in descriptive and inferential statistics.

CO5: To subjugate statistics practically.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	M	M	L	M	M	M	M	L	M	M	M	M
CO 2	H	H	H	M	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 4	H	M	H	M	M	H	H	M	H	H	H	H	H	H
CO 5	M	H	M	H	M	M	M	H	M	M	H	H	H	M

Optometric Optics - II

Semester IV
22BOPC19

Hours of Instruction/week: 3
No of Credits: 3

Objectives:

- To acquire knowledge on multifocal lenses and ophthalmic prisms.
- To illustrate the types of filters and coatings used in lenses.
- To impart knowledge on manufacturing and types of frames.

Unit I Multifocal Lenses

09

Bifocal designs – manufacturing, types & uses (Kryptok, Unis D, Executive, Invisible, Occupational). Progressive Addition Lenses, modified near vision lenses - designs, advantages, limitations.

Unit II Ophthalmic Prisms

09

Definition of Prisms, Units of Prism Power, Thickness Difference and Base - Apex Notation, Dividing, Compounding and Resolving Prisms, Rotary Prisms and Effective Prism Power in Near Vision, Prismatic Effect, Decentration, Prentice's Rule, Prismatic Effect of Spherocylinders and Plano Cylinders, Differential Prismatic Effects.

Unit III Lens Enhancements

09

Special lenses – Lenticular & Aspheric lenses, Fresnel lenses & Prisms, Recumbent prisms, Aniseikonic lenses, High Refractive index glasses, Spectacle magnifiers. Photochromatics, Polaroids, Tinted lens - Tints, Filters. Lens enhancements - Scratch resistant coatings (spin/dip), Anti-reflection coating, UV coating and hydrophobic coating.

Unit IV High Refractive Power Lenses and Aberrations

09

Lenses for high refractive errors - Design of High Powered Lenses, Hi-index lenses, Calculation of Refractive index. Magnification in high plus lenses, Minification in high minus lenses. Aberration in Ophthalmic Lenses. Tilt induced power in spectacles.

Unit V Frames

09

History of Spectacles, manufacturing overview, Definition, parts & measurements Classification of frames – Materials, Colours and Temple position - advantages & disadvantages, where to use. Special purpose frames - sports, kids, reading.

Total Hours 45

Text Books:

1. Jalie M: The principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1994.
2. David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission, 1999.

Reference Books:

1. C V Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth-Heinemann, USA, 1996.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To gain knowledge on multifocal lenses.

CO2: To understand effects, units, base – apex notation, prismatic effect of Ophthalmic prisms.

CO3: To acquire knowledge on special lenses and lens enhancement coatings.

CO4: To understand high index lenses and aberration of ophthalmic lenses in detail.

CO5: To understand the spectacle frame – manufacturing and their materials.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	M	H	M	H	H	H	H	H	H
CO 2	H	H	M	M	H		M		M	M	M	M	H	M
CO 3	H	H	H	M	M	L	M	M	H	H	M	H	H	H
CO 4	H	H	H	M	H	M	H	H	H	H	M	H	H	H
CO 5	H	H	H	H	M	M	M	M	H	H	H	H	H	H

Visual Optics – II

Semester IV
22BOPC20

Hours of Instruction/week: 3+1
No of Credits: 3

Objectives:

- To understand the fundamentals of optical components of the eye.
- To gain knowledge on visual acuity measurement.
- To acquire knowledge on methods of objective and subjective clinical refraction.

Unit I Refractive conditions

09

Emmetropia, Myopia, Hyperopia, Astigmatism, Presbyopia. Anisometropia and Aniseikonia. Aphakia and Pseudo aphakia. Correction and Management of Amblyopia.

Unit II Accommodation and Convergence

09

Accommodation- Far and near points of accommodation, Range and amplitude of accommodation, Mechanism of accommodation, Variation of accommodation with age, anomalies of accommodation. **Convergence** - Type, Measurement and Anomalies, Relationship between accommodation and convergence-AC/A ratio.

Unit III Objective Refraction (Static & Dynamic)

09

Streak Retinoscopy - Principle, Procedure, Difficulties and interpretation of findings, Transposition and spherical equivalent. Dynamic retinoscopy - various methods, Radical retinoscopy and near retinoscopy, Cycloplegic refraction.

Unit IV Subjective Refraction

10

Principle and fogging, Fixed astigmatic dial(Clock dial),Combination of fixed and rotator dial(Fan and block test),JCC, Duochrome test - Binocular balancing- alternate occlusion, prism dissociation, dissociate Duochrome balance, Borish dissociated fogging, Binocular refraction- Various techniques, MEM, prescribing add and prescription writing.

Unit V Effective Power & Magnification

08

Ocular refraction vs. Spectacle refraction, Spectacle magnification vs. Relative spectacle magnification, Axial vs. Refractive ametropia, Knapp's law, Ocular accommodation vs. Spectacle accommodation, Retinal image blur-Depth of focus and depth of field.

Practicals:**15**

1. Objective refraction
2. Subjective refraction
3. Prescribing add
4. Binocular balancing
5. Cycloplegic refraction
6. Alternative test to Cycloplegic refraction
7. Duochrome test
8. MEM
9. Prescription writing

Total Hours 60**Text Books:**

1. Bennett AG, Rabbetts RB. Bennett and Rabbetts' clinical visual optics. Elsevier Health Sciences; 1998.
2. Michaels DD. Visual optics and refraction: a clinical approach. Mosby; 1985.

Reference Books:

1. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
2. T Grosvenor: Primary Care Optometry, 4th edition, Butterworth –heinemann, USA, 2002
3. WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To conceptualize various optical components of eye, types of refractive errors and its management.

CO2: To learn the concept of accommodation and convergence in detail.

CO3: To gain knowledge on objective refraction and its type.

CO4: To understand various methods used to achieve accurate subjective refraction.

CO5: To learn the concept of ocular and spectacle refraction.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	M	M	M	H	H	H	H	H	H
CO 2	H	H	M	M	H		H	M	H	M	H	H	H	M
CO 3	H	H	M	M	M	L	M	M	M	M	M	M	H	M
CO 4	H	H	M	M	H	M	H	H	H	M	M	H	H	M
CO 5	H	H	M	H	H	M	H	M	H	H	H	H	H	H

Ocular Diseases – II

Semester IV
22BOPC21

Hours of Instruction/week: 5
No. of Credits: 4

Objectives

- To understand the introduction of pathology and pathology related to Ocular diseases.
- To impart knowledge on anatomy, causes, signs, symptoms, differential diagnosis and treatment of various Ocular conditions.
- To acquire knowledge on diagnostic approach and management of Ocular diseases.

Unit I Choroid & Vitreous

15

Choroid - Review of Anatomy, Classification, Etiology, Pathology of Choroiditis, Clinical examination of Choroiditis . Vitreous –Review of Anatomy, Developmental Abnormalities, Hereditary Hyaloidoretinopathies, Juvenile Retinoschisis, Asteroid Hyalosis, Cholesterosis, Vitreous Haemorrhage, Blunt trauma and the Vitreous, Inflammation and the Vitreous, Parasitic Infestations, Pigment Granules in the Vitreous, Vitreous Complications in Cataract Surgery.

Unit II Retina

15

Retina - Review of Anatomy, Congenital and Developmental Disorders: Optic Disc - Coloboma, Drusen, Hypoplasia, Medullated nerve fibers, Persistent Hyaloid Artery. Inflammatory disorders: Retinitis - Acute purulent, Bacterial, Virus, mycotic. Retinal Vasculitis - Eales's. Retinal Artery Occlusion - Central retinal Artery occlusion. Retinal Vein occlusion - Ischaemic, Non Ischaemic, Branch retinal vein occlusion. Retinal degenerations - Retinitis Pigmentosa, Lattice degenerations. Macular disorders - Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration. Retinal Detachment - Rhegmatogenous, Tractional, Exudative. Retinoblastoma.

Unit III Clinical Neuro Ophthalmology

15

Anatomy of visual pathway, Lesions of the visual pathway, Pupillary reflexes and abnormalities - Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopic pupil, Marcus Gunn pupil, Argyll Robertson pupil, Adie's tonic pupil. Optic neuritis, Anterior Ischemic optic neuropathy, Papilloedema, optic atrophy. Cortical blindness, Malingering, Nystagmus, Clinical examination.

Unit IV Glaucoma

15

Glaucoma - Review of anatomy and physiology of anterior segment, Clinical Examination, Definitions and classification of glaucoma, Pathogenesis of glaucomatous ocular damage, Congenital glaucomas, Infantile glaucoma, Juvenile glaucoma Syndromes. Primary open angle glaucoma, Ocular hypertension, Normal Tension Glaucoma, Primary angle closure glaucoma - Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure. Secondary Glaucomas. Management - common medications, laser intervention and surgical techniques.

Unit V Ocular Injuries

15

Ocular Injuries: Closed globe injury - contusion, lamellar laceration. Open globe injury - rupture, laceration, penetrating and perforating injury. Mechanical injuries - Extraocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis. Non Mechanical Injuries - Chemical injuries, Thermal, Electrical, Radiational. Clinical approach towards ocular injury patients.

Total Hours 75

Text Books:

1. Jack J. Kanski: Clinical Ophthalmology, Butterworths, 2nd Ed., 1989.
2. Stephen J. Miller: Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990.

Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To understand the symptoms of diseases, diagnostic approach and treatment of vitreous.

CO2: To identify the symptoms of diseases, diagnostic approach and treatment of retinal and macular disorders.

CO3: To analyse the symptoms of diseases, diagnostic approach and treatment of neuro ophthalmology disorders.

CO4: To explain disease, diagnostic approach and treatment of glaucoma.

CO5: To describe the symptoms of diseases, diagnostic approach and treatment of Ocular Injuries.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	M	H	H	H	H	H	H
CO 2	H	H	H	M	H	H	H	M	H	M	H	H	H	H
CO 3	H	H	H	H	M	H	H	M	M	M	M	M	H	H
CO 4	H	H	H	M	H	H	H	H	H	M	M	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Pharmacology

Semester IV
22BOPC22

Hours of Instruction/week: 3
No. of Credits: 2

Objectives

- To acquire basic knowledge in principles of Pharmacokinetics and Pharmacodynamics.
- To understand commonly used ocular drugs, mechanism, indications, contraindications, drug dosage, and adverse effects.
- To know about drugs used in ophthalmic surgery.

Unit I General Pharmacology

09

Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics - emphasis on ocular pharmacokinetics, Pharmacodynamics & factors modifying drug actions.

Unit II Systemic Pharmacology – ANS

09

Autonomic nervous system: Drugs affecting pupillary size and light reflex, Intraocular tension, Accommodation; Cardiovascular system: Anti-hypertensive and drugs useful in Angina; Diuretics: Drugs used in ocular disorders

Unit III Systemic Pharmacology – CNS

09

Central Nervous System: Alcohol, sedative hypnotics, General & local anaesthetics, Opioids & non-opioids; Chemotherapy : Introduction on general chemotherapy, Specific chemotherapy –Antiviral, antifungal, antibiotics; Hormones : Corticosteroids, Antidiabetics; Blood Coagulants

Unit IV Ocular Pharmacology

09

Ocular preparations, formulations and requirements of an ideal agent; Ocular Pharmacokinetics, methods of drug administration & Special drug delivery system; Ocular Toxicology

Unit V Diagnostic & Therapeutic applications of drugs used in Ophthalmology

09

Diagnostic Drugs & biological agents used in ocular surgery, Anaesthetics used in ophthalmic procedures, Anti-glaucoma drugs; Pharmacotherapy of ocular infections –Bacterial, viral, fungal & chlamydial; Drugs used in allergic, inflammatory & degenerative conditions of the eye; Immune modulators in Ophthalmic practice, Wetting agents & tear substitutes, Antioxidants

Total Hours 45

Text Books:

1. K D TRIPATHI: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004 .
2. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, NewDelhi, 1996

Reference Books:

1. T J Zimmerman, K S Kooner, M Sharir, R D Fechtner: Text Book of Ocular Pharmacology, Lippincott-Raven, Philadelphia, 1997.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To explain the process of drug absorption and distribution mechanism.

CO2: To understand pharmacodynamics process in detail.

CO3: To gain knowledge on Ocular pharmacology and ocular drug delivery methods

CO4: To know ocular drugs and its usage in detail.

CO5: To acquire knowledge on neurotransmitters and toxicity of Ocular drugs.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	M	H	H	H	H	H	H
CO 2	H	H	H	M	H	H	H	M	H	M	H	H	H	H
CO 3	H	H	H	H	M	H	H	M	H	H	H	M	H	H
CO 4	H	H	H	M	H	H	H	H	H	M	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Pathology

Semester IV
22BOPC23

Hours of Instruction/week: 3
No. of Credits: 2

Objectives:

- To learn basics of pathology
- To apply and analyze the pathological basis of ocular diseases
- To know about Inflammation and repair aspects.

Unit I General Pathology

07

General Pathology - Principles, Pathophysiology of Ocular Angiogenesis, Ocular Infections.

Unit II Eyelids and Orbit

08

Pathology of eyelids and adnexa. Pathology of orbital space occupying lesions.

Unit III Cornea and Conjunctiva

10

Pathology of cornea and Conjunctiva, Pathology of Uvea.

Unit IV Lens and Glaucoma

10

Pathology of Glaucoma, Pathology of Lens

Unit V Retina and Optic nerve

10

Pathology of Retina, Pathology of retina in systemic disease/disorders, Retinoblastoma. Pathology of the optic nerve.

Total Hours 45

Text Books:

1. Biswas, J. (2010). *Manual of Ocular Pathology*. Jaypee Brother Pub.
2. K S Ratnagar: Pathology of the eye & orbit, Jaypee brothers Medical Publishers, 1997

Reference Books:

1. CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004.
2. S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To know about Inflammation and repair aspects.

CO2: To understand the pathology of various eye parts and ocular adnexa.

CO3: To acquire knowledge on pathology of retina, cornea and conjunctiva.

CO4: To learn about pathology of orbit and optic nerve.

CO5: To understand the pathology of lens.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	M	H	H	H	H	H	H
CO 2	H	H	H	M	H	H	H	M	H	M	H	H	H	H
CO 3	H	H	H	H	M	H	H	M	H	H	H	M	H	H
CO 4	H	H	H	M	H	H	H	H	H	M	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Monocular Sensory Perception

Semester IV
22BOPC24

Hours of Instruction/week: 3
No of Credits: 2

Objectives:

- To picturize the ways through which image is perceived in the retina.
- To depict the perception of various domains of vision
- To visualize the image processing in eye by the human brain.

Unit I Physiology of Vision

10

Processing of light each layer of retina, types of cells – bipolar, ganglion cells, reception fields, post retinal pathways in terms of visual processing, duplex retina – photopic and scotopic visual system, absolute sensitivity of vision, parallel pathways – magno and parvo reticulogeniculate pathways, and postnatal human vision development.

Unit II Introduction to Visual Psychophysics

09

Weber's law and Fechner's law, classical concepts of thresholds, modern concepts of thresholds – statistical nature of thresholds, internal and external noise, factors affecting thresholds, psychophysical methods of threshold estimation – methods of limits, staircase and adaptive techniques of threshold estimation, forced – choice procedures.

Unit III Spatial and Temporal aspects of vision

08

Basic concepts of photometry and radiometry, V lambda function, luminance, illuminance, Modulation Transfer Function (MTF), Contrast Sensitivity Function (CSF), effect of optical and neural disorders on the CSF, spatial summation, Ricco's law, differences between acuity types, conversion of visual acuity to grating acuity, Nyquist limit, temporal procession of vision, critical flicker frequency, temporal summation, Bloch's law.

Unit IV Color vision

08

Rod and cone spectral sensitivity function, theories of color vision, visual processing involved in color vision perception, clinical testing of color vision and principles.

Unit V Perception

10

Form perception - Object recognition and Form recognition. Motion perception – theories and depth perception – monocular cues to binocular vision.

Total Hours 45

Text Books:

1. S.H. Schwartz, Visual perception – A clinical orientation, 5/e, McGraw- Hill Medical publishing division, New York, USA, 2017

Online Resource:

<https://psych.hanover.edu/javatest/Media/Chapter3/MedFig.LightIntensity.html>

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To appreciate the physiology of vision.

CO2: To equip on visual psychophysics.

CO3: To visualize the spatial and temporal aspects of vision.

CO4: To decipher the theories, pathways and principles behind colour vision and colour vision testing.

CO5: To recognize the perception of objects, motion and depth.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	M	M	H	M	H	H	H	H	M	H	H	H
CO 2	H	M	M	M	M	L	M	M	M	M	M	M	M	M
CO 3	H	M	M	M	M	L	M	M	M	M	H	M	M	M
CO 4	H	H	H	M	H	M	H	H	H	H	H	H	H	H
CO 5	H	M	M	M	H	M	H	H	H	H	H	H	H	H

Clinics / Hospital Posting

Semester IV
22BOPC25

Hours of Instruction/week: 5
No. of Credits: 4

Objectives:

- To perform ocular examination to identify ocular diseases
- To treat/manage/rehabilitate the conditions appropriately
- To impart practical knowledge on various Orthoptic workups.

Practicals:

1. History taking – General & Specific conditions
2. Lensometry
3. Vision Check
4. Retinoscopy- Static, Dynamic and Cycloplegic Retinoscopy
5. Subjective Refraction – JCC, Clock Dial, Duochrome, Borish Delayed
6. IPD
7. HVID& VVID
8. Amplitude of Accommodation
9. Near Point of Convergence
10. Maddox rod (Phoria)
11. Schirmer's test
12. Tear Break up time
13. Confrontation test
14. Amsler's Grid test
15. Keratometry
16. Slit lamp examination
17. Finger tension, Applanation Tonometry
18. Van Herick Grading of Anterior chamber depth
19. Color vision test
20. Gonioscopy

Total Hours 75

Text Books:

1. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinemann, USA, 2007.
2. D B. Elliott :Clinical Procedures in Primary Eye Care, 3rd edition, Butterworth-Heinemann, 2007.

Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007.
2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007.
3. J.B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins, 1991.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To perform comprehensive work-up.

CO2: To impart knowledge on history taking.

CO3: To inspect the binocular vision status of the eye.

CO4: To master the tests used to measure the field of vision, diagnose dry eye.

CO5: To gain knowledge on anterior segment assessment.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	M	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	M	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

DSE IV: Public Health and Community Optometry

Semester IV
22BOPD04

Hours of Instruction/week: 2+2
No of Credits: 2

Objectives:

- To promote community based eye care in India.
- To develop Information Education Communication materials on eye and vision care for the benefit of the public.
- To organize health education programs in the community.

Unit I Philosophy of Public Health

10

History, Concepts and Implementation – Dimensions, determinants and indicators of health

Unit II Health Care Systems

10

Organization of health services (principles of primary, secondary and tertiary care), levels of disease prevention, levels of health care patterns – contrasting between clinical and community health programmes – Screening for diseases

Unit III Epidemiology and Health Care Programs

10

Epidemiology of blindness, vision impairment, childhood blindness, Community Eye Care Programs, Community based rehabilitation programs - Vision 2020. National and International health agencies, NPCB. Right to sight, Nutritional blindness with reference to Vitamin A deficiency

Unit IV Modes of Health and Vision Care delivery

10

Information, Education and Communication for Eye Care programs. KAP, Health manpower and planning & Health Economics, Organization, Management, Promotion of health programmes (eye care programmes) – Service delivery models, Evaluation and assessment of health programmes

Unit V Optometrists and Public health

10

Role of Optometrist as a primary eye care professional, role of optometrist in public health, organization and management of eye care programmes, role of optometrist in school children eye health, Role of Tele Optometry and its application in Public Health.

Practicals:

10

1. Preparation of IEC materials
2. Awareness implementation using IEC materials
3. KAP
4. Eye camp

Total Hours 60

Text Books:

1. K Park: Park's Text Book of Preventive and Social Medicine, 19th edition, BanarsidasBhanot publishers, Jabalpur, 2007
2. Oxford Text Book of Public Health & Preventive Medicine.
3. GVS Murthy, S K Gupta, D Bachani: The principles and practice of community Ophthalmology, National programme for control of blindness, New Delhi, 2002.
4. Newcomb RD, Jolley JL : Public Health and Community Optometry, Charles C Thomas Publisher, Illinois, 1980

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To understand the foundation and basic sciences of public health optometry and health care systems.

CO2: To learn about organization of health care services.

CO3: To acquire knowledge on public health care programs.

CO4: To understand the modes of vision care delivery system.

CO5: To know about Tele Optometry and its application in public health.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	H	L	M	H	M	M	H	M	M	H	H	M
CO 2	L	M	H	L	H	M	H	M	M	H	M	L	M	M
CO 3	H	H	H		H	H	H	H	M	M	M		H	H
CO 4	M	H	H		H	H	M	M	M	M	H	M	H	H
CO 5	M	M	H	L	H	H	H	H	H	M	H	H	M	M

Contact Lens – I

Semester V
22BOPC26

Hours of Instruction/week: 3
No of Credits: 3

Objectives:

- To illustrate knowledge on fitting philosophies and recent development of contact lenses.
- To impart knowledge on designing skills of various types of contact lens
- To provide knowledge to students in both theoretical and practical aspects of contact lenses.

Unit I Introduction to Contact lenses

09

Introduction to Contact lenses and Review of Anatomy and Physiology of Tear film, Lids, Conjunctiva and Cornea. Corneal Anatomy and Physiology, Corneal Physiology and Contact Lens, definition, classification/types of contact lenses.

Unit II History and Manufacturing of Contact Lenses

09

History and optics of Contact lenses, magnification and visual field, accommodation and convergence, back and front vertex power/ vertex distance calculation. CL materials, properties of different CL materials, indications and contraindications, various manufacturing methods of RGP and Soft CL.

Unit III Soft Contact Lenses

09

Parameters, design, terminologies, materials, fitting – pre/post fitting, types of fit, calculation/ordering and verification/dispensing of soft CLs including insertion and removal.

Unit IV Rigid Gas Permeable Lenses

09

Parameters, design, terminologies, materials, fitting – pre/post fitting, types of fit, modifications with RGP's calculation/ordering and verification/dispensing of RGP CLs including insertion and removal.

Unit V Care and Maintenance and Follow Up

09

Care and maintenance - Cleaning agents & Importance, Rinsing agents & Importance, Disinfecting agents & importance, Lubricating & Enzymatic cleaners, common handling instructions (recap) – insertion/removal techniques, do's and don'ts, follow up care and complications of CL.

Total Hours 45

Text Books:

1. Robber B Mandell: Contact lens Practice, hard and flexible lenses, Charles C. Thomas, 3rd Edition, 1981, Illinois, USA.
2. Ruben M Guillon: Contact lens practice, 994, 1st Edition.

Reference Books:

1. IACLE modules 1 – 10
2. CLAO Volumes 1, 2, 3

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1: To review the anatomy, physiology of cornea, tear film, lids, conjunctiva, and classify contact lenses.
- CO2: To trace the origin of contact lens designs optics, manufacturing and materials of contact lenses.
- CO3: To master soft contact lenses.
- CO4: To excel rigid contact lenses.
- CO5: To perceive the care and maintenance of follow up care of contact lens patients.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Binocular Vision – I

Semester V
22BOPC27

Hours of Instruction/week: 3
No of Credits: 3

Objectives:

- To impart knowledge on the aspects and evolution of binocular vision.
- To gain in-depth knowledge of gross anatomy and physiology relating to the extra ocular muscles.
- To provide a detailed explanation of aetiology, investigation and management of binocular vision anomalies

Unit I Binocular Vision and Space Perception

09

Relative subjective visual direction, Retino motor value, Grades of BSV, SMP and Cyclopean Eye, Correspondence, Fusion, Diplopia, Retinal rivalry, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's space, Neural aspects of Binocular vision, BSV. Stereopsis and monocular cues – significance, Egocentric location, clinical applications. Theories of Binocular vision.

Unit II Anatomy & Physiology of EOM and Ocular Motility

09

Anatomy of Extra Ocular Muscles – Rectii, Obliques and LPS - Innervations & Blood Supply. Physiology of Ocular movements - Center of rotation, Axes of Fick, Action of individual muscle. **Ocular movements**- Uniocular and Binocular movements - fixation, saccadic & pursuits, Version & Vergence, Fixation & field of fixation. **Laws of ocular motility** - Donder's and Listing's law, Sherrington's law, Herring's law.

Unit III Near Vision Complex and Non – Strabismic binocular vision Anomalies

09

Accommodation and Convergence - Definition and mechanism (process), interaction between vergence and accommodation, Heterophoria – Diagnosis of disorders of accommodation and vergence, treatment with lenses, prisms and occlusion, Vision therapy – Principles and applications.

Unit IV Sensory adaptations, Eccentric fixation and ARC

09

Sensory adaptations - Confusion, Suppression, Abnormal Retinal Correspondence - Investigations, Management, Blind spot syndrome. Eccentric Fixation - Investigation and management.

Unit V Amblyopia and Nystagmus, Aniseikonia

09

Classification, Aetiology, Investigation, Management. – Amblyopia, Nystagmus, Aniseikonia.

Total Hours 45

Text Books:

1. Steinman, S. B., Steinman, B. A., & Garzia, R. P. (2009). Foundations of Binocular Vision: A clinical perspective. McGraw-Hill.
2. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincott Williams & Wilkins publishers.
3. Basic Science, A.A.O - Pediatric Ophthalmology and Strabismus.

Reference Books:

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd.

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1: To know the basis of normal binocular vision and space perception.
CO2: To learn about the theories of binocular vision in detail.
CO3: To understand the gross anatomy and physiology of extra ocular muscles and its motility.
CO4: To acquire knowledge on accommodation and convergence.
CO5: To develop knowledge of various binocular vision anomalies, diagnostic approaches and its management.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Dispensing Optics

Semester V
22BOPC28

Hours of Instruction/week: 3
No of Credits: 3

Objectives:

- To demonstrate verification and dispensing of ophthalmic materials and special practices in clinics.
- To impart the knowledge on lens standards for the usage in the dispensing instruments.
- To illustrate the design and selection of frames for the optics and safety wear.

Unit I Spectacle and Spectacle prescription

09

Definition, parts and measurements of a spectacle, classification of frames – materials, colours and temple position – uses, advantages and disadvantages, boxing and datum system of measurements, effective diameter and its relevance to lens and frame selection, Components of spectacle prescription & interpretation, transposition, Add and near power relation.

Unit II Frame & Lens selection, markings and Measurements

09

Frame selection based on ages, occupation, face shape, lens and frame markings- bifocal height, PAL's markings, Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments – facial wrap, pantoscopic tilt, Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height, facial, lens and frame measurements using ABDO's ruler.

Unit III Special frames, lenses and lens coatings

09

Special type of spectacle frame – monacles, Ptosis glasses, welding glasses, industrial safety glasses, Polaroids, photochromatics, aniseikonic lenses, anti-reflection coatings and UV and scratch resistant coatings, lens, frame and coatings considerations for high refractive error glasses.

Unit IV Process followed for dispensing of spectacles

09

Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements), Neutralization – Hand & Lensometer, axis marking, prism marking, and Geneva lens measure, Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction), Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories – Bands, chains, boxes, slevets, cleaners, screwdriver kit,. Spectacle repairs – tools, methods, soldering, riveting, frame adjustments.

Unit V Frame and Lens availability in Indian market

09

Frame and lens availability in Indian market, ANSI standards for all lenses and frames, FAQ's by customers and their ideal answers.

Total Hours 45

Text Book:

1. Clifford W Brooks & Irvin M Borish: System of Ophthalmic Dispensing, Professional press, 1979.

Reference Books:

1. Dispensing Optics, Ajay Kumar Bhootra, JP Medical Ltd, 2015.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To explain the interpretation and components of spectacle prescription.

CO2: To identify the faults in spectacles.

CO3: To demonstrate the use of dispensing instruments in lens measurements and frame fittings.

CO4: To identify and select the right frame designs and fittings for the patients.

CO5: To gain knowledge on leading brand frames available in market.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Geriatric Optometry

Semester V
22BOPC29

Hours of Instruction/week: 3
No of Credits: 2

Objectives:

- To infer the general aspects of ageing.
- It helps in perceiving the various factors of ageing – biochemical, social, psychological, physical, mental aspects of ageing in respect to eyes
- It guides in diagnosing and managing the age related eye diseases.

Unit I Introduction to Geriatrics and Prospects of ageing

10

Introduction to Geriatrics and Gerontology and Prospects of ageing, Geriatrics vs. Gerontology, GNFC – AOA statistics, epidemiology of ageing in India, functional perspective on ageing Social, psychological aspects of ageing, Healthy ageing - Preventive geriatrics – periodic health assessment, lifestyle.

Unit II Biochemistry of ageing and Nutrition for Elderly

09

Biochemical changes in elderly, Biochemical changes in different ocular structures, nutrition for elderly.

Unit III Disorders of ageing

08

Age related disorders- physiological and pathological, implications of systemic diseases in eye.

Unit IV Refractive changes and Ocular diseases

10

Refraction in elderly, structural and physiological changes in the eye, age related eye diseases – orbit, lids, cornea, conjunctiva, lens, uvea, retina, optic nerve, glaucoma.

Unit V Optometric examination and Management

08

Comprehensive work –up in elderly, Ancillary tests, Optometric management and rehabilitation, Fitting and dispensing in elderly.

Total Hours 45

Text Books:

1. Sharma OP. Geriatric Care-A Text book of Geriatrics and Gerontology. New Delhi: Sanat Printers. 2008.
2. Rosenblatt DE, Natarajan VS. Primer on geriatric care—A clinical approach to the older patient. Cochin: Printer's castle. 2002:2.
3. Alfred A Rossenbloom Jr and Meredith W Morgan: Vision and Ageing.

Reference Books:

1. Edward claffin: Age protectors; Rajendra publishing home Pvt.ltd;Mumbai,1998.
2. Lueck AH. Functional vision: A practitioner's guide to evaluation and intervention. American foundation for the blind; 2004.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To identify, investigate the age related changes in the eyes.

CO2: To counsel the elderly

CO3: To dispense spectacles with proper instructions

CO4: To gain knowledge on common ocular diseases

CO5: To guide in diagnosing and managing the age related eye diseases.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Low Vision Aid

Semester V

Hours of Instruction/week: 3

22BOPC30

No of Credits: 2

Objectives:

- To cognize the causes of low vision.
- To unravel the effects of low vision on activities of daily living of an individual with low vision.
- To enable the learners to examine, envisage the problem and provide appropriate management or rehabilitation.

Unit I Overview of Low Vision Care

09

Overview of low vision care - Definitions, terminologies, prevalence and Classification.

Unit II Causes

09

Central field loss, Peripheral field loss, overall blurred vision.

Unit III Role of Optometrist in Low Vision Care

09

Role of optometrist in patients with low vision process, Low vision care examination in patients with central field loss, overall blurred vision and central field loss, Functional vision assessment.

Unit IV Management, Rehabilitation and Referral

09

Types of devices - Optical vs Non-Optical, principles of devices, And principles of management. Prescribing low vision devices - Central field loss, peripheral field loss, Overall blurred vision, Care and Management of Pediatric patients, Management of adults. Referrals to appropriate inter- disciplinary service. Social and Psychological factors affecting in Visual adaptation and rehabilitation in children and adults.

Unit V Legal aspects and Recent advances

09

Legal aspects in India, Recent updates - Virtual reality, augmented reality, mixed reality, visual enhancement systems, Concept of Visual rehabilitation.

Total Hours 45

Text Books:

1. M.V.S Shailaja, G. Sarika, E. Vaithilingam's Practice of Low vision care for eye care professionals, 2/e., SankaraNethralaya, Elite School of Optometry, 2016.
2. C. Dickinson, Low vision principles and practice, Butterworth- Heinemann, Elsevier, 2002.

Reference Books:

1. R. T Jose, Understanding low vision, American foundation for the blind, 2004.
2. B. Silverstone, B. P. Rosenthal, M. A. Lang, E. E. Faye, Light house handbook on Vision Impairment and Rehabilitation (Vol 1&2), Oxford University, 2000.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To define low vision.

CO2: To scrutinize the causes of low vision

CO3: To venture the role of optometrist in low vision care.

CO4: To gain knowledge in management and rehabilitation of low vision

CO5: To speculate the legal aspects and recent advances in low vision.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Occupational Optometry

Semester V

Hours of Instruction/week: 3

22BOPC31

No of Credits: 2

Objectives:

- To analyze the effects of potential hazards at work place and provide appropriate management.
- To comprehend the visual requirements of different occupations.
- To set vision requirements and standards for various jobs.

Unit I Introduction to Occupational health

09

Introduction to occupational health, hygiene, safety, National and International bodies, Acts and Rules- Factories act, WCA, ESI acts.

Unit II Occupational diseases

09

Occupational diseases caused by physical agents, chemical agents, and biological agents, due to radiations: Electromagnetic radiation, ionizing and non-ionizing radiations, diseases due to toxins from metals and chemicals, Pesticides- general and ocular effects, Light- terminologies, illumination, colour and their role, dermatitis and heat stress.

Unit III Occupational safety and Prevention and Visual display units

09

Occupational analysis: Cause- analysis and prevention, personal protective equipments, prevention, Visual display units – general and ocular effects.

Unit IV Vision standards

09

Vision standards for jobs (General and specific), Visual task analysis, Creating Vision standards.

Unit V Contact lens and Sports Vision

09

Contact lenses and Work, Sports vision – need, vision requirements, Ocular complications and their management.

Total Hours 45

Text Books:

1. Dr Santanam's Text book of Occupational. Optometry. 1st ed. Chennai: Elite School of Optometry, Unit of Medical Research Foundation; 2015.

Reference Books:

1. R.V. North, Work and the eye, Butterworth – Hienemann, Elsevier, 2001.
2. G. Jayaraj, Occupational health practice in Indian Industries, Occupational health foundation, 2014.
3. J. Anshol, Visual Ergonomics Handbook, CRC Press, 2019.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To know the rules, laws and act of governing bodies for the welfare of occupational workers.

CO2: To understand the occupational health hazards and its impact.

CO3: To prescribe suitable corrective lenses, therapies, personal protective equipments.

CO4: To understand the vision requirements and standards for various jobs.

CO5: To impart knowledge on occupational Ocular complications and its management.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Practical IV - Contact Lens and Low Vision Aid

Semester V
22BOPC32

Hours of Instruction/week: 2
No of Credits: 2

Objectives:

- To enhance the students with practical knowledge of various procedures.
- To demonstrate CL evaluation and fitting.
- To gain skills in low vision evaluation.

List of experiments:

Contact Lens:

1. Pre fitting evaluation – History, Review of Refraction, Cornea & Tear film assessment
2. HVID & VVID
3. SCL insertion & Removal.
4. Fitting assessment.
5. Over refraction.
6. Follow up examination.
7. RGP CL insertion & Removal.
8. Fitting assessment.
9. Over refraction.
10. Follow-up Examination.
11. Toric contact lens fitting and assessment.
12. Cosmetic contact lens fitting and assessment.

Low Vision:

1. History Taking
2. Refraction, special charts, Radical retinoscopy.
3. Evaluating near vision: Amsler grid and field defects, prismatic scanning.
4. Demonstrating aids – optical, Non-optical, Electronic.
5. Guidelines to determining magnification and selecting low vision aids for distance, intermediate and near.
6. Spectacle mounted telescopes and microscopes.
7. Choice of tests, aids in different pathological conditions.
8. Contact lens combined system.
9. Rehabilitation of the visually impaired.

Total Hours 30

Text Books:

1. Ruben M Guillon: Contact lens practice, 994, 1st Edition.
2. C. Dickinson, Low vision principles and practice, Butterworth- Heinemann, Elsevier, 2002

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To demonstrate insertion and removal of contact lens .

CO2: To demonstrate the instruments used in CL fitting.

CO3: To evaluate the fitting assessments in CL.

CO4: To examine Low Vision patients.

CO5: To illustrate the use of low vision aid in low vision patients.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Clinical Assessment - I

Semester V
22BOPC33

Hours of Instruction/week: 3
No of Credits: 4

Objectives:

- To carry out comprehensive eye examination
- To treat/manage/rehabilitate the Ocular conditions appropriately
- To impart practical knowledge on various Orthoptic workups.

Practicals:

1. History taking
2. External examinations of eye
3. Cover Test & Confrontation Test
4. PGP
5. Visual acuity
6. Orthoptic Workups
7. Objective Refraction
8. Subjective Refraction
9. Subjective Power Verification methods
10. Prescribing Add / Near Power Calculation
11. Slit lamp examination
12. Tonometry
13. Keratometry
14. CL Insertion & Removal
15. Overrefraction
16. Direct & Indirect Ophthalmoscopy
17. Color Vision Test
18. Dry Eye Evaluation
19. Final Rx
20. Counselling / Advice

Total Hours 45

Text Books:

1. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinemann, USA, 2007.
2. D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007.

Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007.
2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach,6th edition, Butterworth-Heinemann, 2007.
3. J.B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins,1991.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To perform comprehensive work-up.

CO2: To gain knowledge on history taking.

CO3: To impart knowledge on refraction.

CO4: To inspect the binocular vision status of the eye.

CO5: To master the tests used to measure the field of vision, diagnose dry eye.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	M	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	M	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Hospital Management (Self Study)

Semester V

22BOPC34

Hours of Instruction/week: 1

No of Credits: 4

Objectives:

- To familiarize the learner with basic And advanced concepts of Hospital Management.
- To enable the students to take up consultancy in the Hospital Planning
- To learn the principles of Health Care Administration and its applications in hospital settings

Unit I Basic Concepts of Management

3

Introduction, definition, aims, objectives and role of optometry in various fields - Functions of hospital administration, Organizational structure and design, Administrative responsibilities. Patient-centric management, Organization of hospital departments, Roles of departments/managers in enhancing care.

Unit II Roles and Responsibilities

3

Roles and responsibilities of hospital administrator (CEO), applications of Hospital Information System (HIS) and Management Information System (MIS), Hospital accreditation - NABH rules and regulation, methods of infection control, Hospital Waste Management (HWM). Disaster Management: Rapid response team. Security organization and management; Emergency Management.

Unit III General Administration

3

Admission and discharge procedures – discharge summary – hospital utilizations – Planning of Communication, Modes of Communication – Marketing Management in Health Care System, report of different departments like Medical Officers (MO), NICU, OT, security and maintenance department, – Medico Legal Cases (MLC). Significance of the meetings, follow-up services, feedback.

Unit IV Patient Care Management

3

Patient centric management - Concept of patient care, Patient counselling & Practical examples of patient centric management in hospitals - Patient safety and patient risk management. Clinical Services: Medical Ethics. Outpatient and inpatient services; Accident and Emergency services; Management of Operation Theatres and Labour room service. Laboratory and Radiological services

Unit V Public Health System

3

Project Management - An overview, Definition, Plan-Programme, Projects and Activities; Project identification and formulation; Development Projects – Development and environmental and sustainable development, Project implementation - Planning, Project monitoring, Project organization, Project operations - Structure, System and control.

Total Hours 15

Text Books:

1. R.C Goyal, "Hospital Administration and Human Resource Management", PHI – 4th Edition, 2006.
2. G.D.Kunders, "Hospitals – Facilities Planning and Management – TMH", New Delhi-5th Reprint 2007.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To understand the basic concepts of management .

CO2: To gain knowledge on the role and responsibilities of the hospital administration and applications

CO3: To understand the working nature of the different departments in the hospital .

CO4: To understand the importance of patient care management

CO5: To the basic concepts and methods of epidemiology .

Contact Lens – II

Semester VI
22BOPC37

Hours of Instruction/week: 3+1
No of Credits: 3

Objectives:

- To illustrate knowledge on fitting philosophies and recent development of contact lenses.
- To impart knowledge on designing skills of various types of contact lens
- To provide knowledge to students in both theoretical and practical aspects of contact lenses.

Unit I Soft Toric lens Fitting and Presbyopia

12

Fitting, ordering, checking, dispensing techniques in handling Soft Toric lenses, Presbyopia management: Monovision practice, multifocal lens fitting.

Unit II Speciality and Special Purpose Contact Lenses

12

Fitting in Aphakia, Psuedophakia, Keratoconus: Rose K fitting, PROSE and Mini-Scleral fitting (theory). Special purpose lenses - Swimming, sports, occupation.

Unit III Contact lens for Pediatrics and Orthokeratology

12

Fitting CL in Pediatric patients, Orthokeratology – principles and practice- management of myopia.

Unit IV Therapeutic and Bandage lenses

12

Therapeutic/ Bandage lens, Fitting following Surgeries, Continuous wear lenses, Extended wear lenses, Frequent Replacements.

Unit V Contact Lens Care and Instrumentation

12

Lens care products and solutions, Complications of CL wear, Instrumentation in CL practice, checking finished lens parameters, modification of finished lenses. Advancements and recent research in CL practice.

Total Hours 60

Text Books:

1. Robber B Mandell: Contact lens Practice, hard and flexible lenses, Charles C. Thomas, 3rd Edition, 1981, Illinois, USA.
2. Ruben M Guillon: Contact lens practice, 994, 1st Edition.

Reference Books:

1. IACLE modules 1 – 10
2. CLAO Volumes 1, 2, 3

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To impart knowledge on multifocal contact lens fitting.

CO2: To cognize fitting of contact lenses in special cases.

CO3: To expertise fitting contact lenses in pediatric patients and inspect the role of Orthokeratology in management of Myopia.

CO4: To unravel the mystery behind therapeutic and bandage contact lens.

CO5: To ensure the lens care and instrumentation involved in fitting of contact lens.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Binocular Vision - II

Semester VI

Hours of Instruction/week: 4+1

22BOPC38

No of Credits: 3

Objectives:

- To trace ocular complaints due disturbances in the co-ordination of eye muscles and rectify them.
- To collate the effects of head injury and neurological disease and provide appropriate management.
- To demystify the Strabismus

Unit I Visual perceptual disorders, Learning disabilities and Diplopia

10

Introduction to visual perceptual disorders, learning disability, Diplopia – causes, tests and management – Prescribing prisms.

Unit II Introduction to Neuro – Optometry

10

Introduction, ABI – Classification, comprehensive work-up, Management – Prisms, Vision therapy, Rehabilitation.

Unit III Esotropias

15

Definition, types, causes, clinical presentation, tests and management- surgical and non-surgical.

Unit IV Exotropias

15

Definition, types, causes, clinical presentation, tests and management – surgical and non-surgical.

Unit V A-V pattern, Cyclovertical deviations and Special forms of strabismus

15

Definition, types, causes, clinical presentation, tests and management – surgical and non-surgical.

Practicals:

10

1. Measurements of Accommodation and Convergence
2. Phoria assessment
3. Lag/lead of accommodation
4. Vergence amplitude assessment
5. Vergence facility assessment
6. Cover test - PBCT
7. Diplopia charting

Total Hours 75

Text Books:

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers
2. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers.
3. Basic Science, A.A.O - Pediatric Ophthalmology and Strabismus.

Reference Books:

1. Steinman, S. B., Steinman, B. A., & Garzia, R. P. (2009). Foundations of Binocular Vision: A clinical perspective. McGraw-Hill.
2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
3. Christensen LE. Pediatric Ophthalmology and Strabismus Kenneth W. Wright, MD; Peter H. Spiegel, MD. ARCHIVES OF OPHTHALMOLOGY. 2002;120:524-.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To Visualize and cater to the needs of patients with special needs and unify diplopia

CO2: To unravel the course of acquired brain injury and help patients overcome their difficulty

CO3: To demystify Esotropias

CO4: To cognify Exotropias

CO5: To simplify A-V pattern tropias, cyclovertical deviations and special forms of strabismus.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Paediatric Optometry

Semester VI

Hours of Instruction/week: 3

22BOPC39

No of Credits: 2

Objectives:

- To have a knowledge of the principal theories of childhood development and Visual development
- To specialize in examining and apprehending the ocular difficulties in children.
- To provide appropriate management of ocular diseases affecting children.

Unit I Embryology and Milestones

08

Embryology of eye, developmental milestones.

Unit II History taking and Paediatric Eye examination

08

History taking, Vision tests for different age groups: Infants, Toddlers, Pre- schoolers, schoolers, teenagers, Paediatric eye examination- refractive status, binocular status, development status, sensory motor ability.

Unit III Paediatric diseases

10

Diseases affecting the lids, orbit, Cornea, Lacrimal system, Conjunctiva, Lens, Retina, Optic nerve and Glaucoma - Signs, symptoms, Pathophysiology, treatment and management.

Unit IV Paediatric syndromes, Strabismus and Special Children

09

Syndromes, amblyopia, nystagmus, strabismus and assessment and management of special children.

Unit V Art of Prescribing and Myopia Control

10

Compensatory and Remedial therapy for Management of Refractive errors. Art of prescribing and dispensing spectacles in children and special children, contact lens - indications, contraindications and practice techniques, Myopia Control – recent researches and evidence based approach.

Total Hours 45

Text Books:

1. Paediatric Optometry - JEROME ROSNER, Butterworth, London 1982
2. Paediatric Optometry – William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004.

Reference Books:

1. Binocular Vision and Ocular Motility - VON NOORDEN G K Burian Von Noorden's, 2nd Ed., C.V.Mosby Co. St. Louis, 1980.
2. Clinical paediatric optometry.LJPress, BDMoore, Butterworth- Heinemann, 1993

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To have knowledge of childhood development and visual development

CO2: To understand the varied assessment concepts of paediatric vision disorders

CO3: To gain knowledge of the epidemiology and treatment of eye disease in children

CO4: To understand the aetiology, clinical presentation and treatment of amblyopia

CO5: To have knowledge of the art of dispensing spectacles, contact lens and low vision aids

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Systemic Disease

Semester VI

22BOPC40

Hours of Instruction/week: 3

No of Credits: 2

Objectives:

- To comprehend the natural history of diseases affecting human being and their management.
- To envisaging facts about common ailments encountered in Optometric clinic.
- To apprehend the impact of the common ailments and their management in eye.

Unit I History and Examination

07

Medical history: Patient profile – demographics, chief complaints, associated complaints, general health, allergy history, occupational history, social history, family history, summary. Physical, neurological, laboratory and radiological examination – interpretation of test results, diagnostic implications – General and Ocular.

Unit II Cardiovascular, Immune system disorders and Infectious diseases

10

Diseases affecting the Heart, Kidney, immune system and Infectious diseases - Pathophysiology, clinical signs and symptoms, genetic profile, testing, prognosis, risk factors, other systemic and ocular implications, treatment.

Unit III Pulmonary, GI tract diseases and Endocrine disorders

09

Diseases that affect the lungs, liver, Organs of GI tract and Endocrine disorders - Pathophysiology, Clinical signs and Symptoms, genetic profile, Prognosis, risk factor, implications and treatment.

Unit IV Haematology, Oncology, Dermatology and Psychological disorders

09

Cells, Disorders of blood, Cancer, Skin and Psychological disorders - Pathophysiology, clinical signs and symptoms, testing, prognosis, risk factors, genetic profile, other systemic and ocular implications, treatment.

Unit V Neurological disorders, Complications and Implications of Systemic medications

10

Stroke, CVA, Neurological disorders, Medical emergencies - Pathophysiology, Clinical signs and Symptoms, genetic profile, Prognosis, risk factor, implications and their management, complications of systemic medicines – their management, ocular implications of systemic medications and systemic implications of ocular medications and complications of ocular medicines.

Total Hours 45

Text Books:

1. Bruce Muchnick OD. Clinical medicine in optometric practice. Elsevier Health Sciences; 2007 Oct 24.
2. Ralston SH, Penman ID, Strachan MW, Hobson R, editors. Davidson's Principles and Practice of Medicine E-Book. Elsevier Health Sciences; 2018 Feb 2.

Reference Books:

1. Rabow MW, Papadakis MA, McPhee SJ, editors. Current Medical Diagnosis & Treatment, 2011. McGraw-Hill Medical; 2011.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To cognize the history taking and examining techniques.

CO2: To extricate knowledge on diseases of the CVS, immune system, infectious diseases and their impact in eye.

CO3: To disentangle the diseases affecting Lungs, GI tract, endocrine system and evaluate their ocular comorbidities.

CO4: To investigate the ocular disturbances due to diseases affecting the blood, skin and tumors

CO5: To scrutinize the ocular effects of Neurological disorders, and investigate the Complications

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	H	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Law and Optometry

Semester VI

22BOPC41

Hours of Instruction/week: 3

No of Credits: 2

Objectives:

- To create awareness among students regarding their rights and liabilities.
- To safeguard students against future probable litigations.
- To understand medical liabilities

Unit I Introduction to Law and Optometry

09

Introduction to Law and Optometry - brief about development of optometry in India, definition of optometry, definition of law, theory of proximity, Optometry association. **Professional conduct, etiquette and ethics** - Professional conduct, code of medical ethics, duties and responsibilities of an optometrist in general, duties of optometrists to their patients, responsibilities of optometrist to each other.

Unit II Nature of Contract

09

Nature of contract - Objective of the law of contract, The Indian contract act, 1872 definition of contract, essential element of a valid contract. Role of consent in medical negligence, importance of consent, relevance of consent in civil law, real and informed consent, In USA, UK and India nature of information required to be furnished by a doctor in India. Consent in emergency cases, consent when invalid, consent implicit, re- exploration without consent or knowledge of patient - necessity is no defense, convenience is no defense.

Unit III Medical negligence and liabilities of a doctor

09

Medical negligence and liabilities of a doctor - general, civil liability, criminal negligence and civil liability. Existence and breach of legal duty, damage caused by breach, negligence as tort or deficiency in service, medical negligence, legal position - reasonable degree, error of judgements, day to day instances, negligent diagnosis, operation and payment thereof, liabilities of hospital, duty of care, quackery, negligence in eye camp operations, standard of care, liability of legal heirs of deceased doctors, skill of medical men, proof of negligence, role of medical record, elaborate evidence, shifting on onus- don's and don'ts for doctors and patients, checklist for optometrists and patients.

Unit IV Consumer rights and Nature of Medical Service

09

Provision of Consumer Protection act 1986, general nature of medical service -appeal and revision, limitation in the context of medical negligence, cause of action accrues in favour of complaints and the reason- penal provisions.

Unit V Medical evidence and Medical witness

09

Medical evidence and Medical witness: Evidence - examination of witnesses, medical certificate, expert opinion treatise - medico legal report. Eye donation and transplantation of the human organs act, 1994 - clinical establishment act, 2010 - procedures in civil court, criminal court and the consumer forums.

Total Hours 45

Text Books:

1. B. Vijayakumar, Law and Optometry - A guide for vision care professionals and Optometry students in India. Elite School of Optometry and SankaraNethralaya Publications, Chennai India 2017.

Reference Books:

1. Y. V. Rao. Y. V. Rao Law Relating to Medical Negligence, 3/e, Asia Law House, Hyderabad 2019.
2. A.K Sharma, S. D. Joshi. Legal boundaries in Ophthalmology. DrSharmas' Legal ConsultancyPublications. Maharashtra, India 2004.

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1: To describe the evolution of Indian Optometry, definition and theory of proximity.
CO2: To cognize Professional conduct, etiquette and ethics necessary for Clinical Optometry practice in India.
CO3: To apprehend on the nature of contract from Indian Perspective and the role of consent in medical negligence.
CO4: To discuss about Consumer rights and nature of medical service.
CO5: To comprehend role of evidence and witness in medical service.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	L	M	L	L	H	H	M	M	L	L	M	H	M
CO 2	H	M	H	M		H	H	H	H	M	M	H	H	H
CO 3	H	M	M	M	M	H	H	M		L	M	M	H	M
CO 4	H	M	H	M	M	H	H	H	H	M	M	H	H	H
CO 5	H	M	M	M	M	H	H	M	M	M	H	M	H	M

Practical V - Binocular Vision and Paediatric Optometry

Semester VI

Hours of Instruction/week: 3

22BOPC42

No of Credits: 3

Objectives:

- To carry out perfect Orthoptic workup
- To adapt skills and interpret clinical results following investigation of binocular vision anomalies
- To provide appropriate management of ocular diseases affecting children.

List of experiments:

1. History taking
2. Stereopsis- Different Methods
3. Vision check
4. Refraction
5. IPD
6. Extra ocular Motility
7. Measurements of Accommodation and Convergence
8. Phoria assessment
9. Amplitude of accommodation
10. Lag/lead of accommodation
11. Accommodative facility
12. AC/A ratio
13. Relative accommodation testing
14. Vergence amplitude assessment
15. Vergence facility assessment
16. Cover test- PBCT
17. Fusion & Suppression- Worth 4 Dot test
18. Diplopia charting
19. Hess charting
20. Vision therapy techniques

Total Hours 45

Text Books:

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
Paediatric Optometry - JEROME ROSNER, Butterworth, London 1982.
2. Paediatric Optometry – William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To understand the aetiology, clinical presentation and treatment of amblyopia

CO2: To understand the measurements of Accommodation and Convergence tests

CO3: To practically gain knowledge on Phoria and Tropia assessment

CO4: To practically impart knowledge on diplopia and hess charting

CO5: To gain knowledge on Vision Therapy techniques

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	M	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	M	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Clinical Assessment - II

Semester VI

22BOPC43

Hours of Instruction/week: 5

No of Credits: 4

Objectives:

- To carry out comprehensive eye examination
- To treat/manage/rehabilitate the Ocular conditions appropriately
- To impart practical knowledge on various Orthoptic workups.

Practicals:

1. History taking
2. External examinations of eye
3. Cover Test & Confrontation Test
4. PGP
5. Visual acuity
6. Orthoptic Workups
7. Objective Refraction
8. Subjective Refraction
9. Subjective Power Verification methods
10. Prescribing Add / Near Power Calculation
11. Slit lamp examination
12. Tonometry
13. Keratometry
14. CL Insertion & Removal
15. Overrefraction
16. Direct & Indirect Ophthalmoscopy
17. Color Vision Test
18. Dry Eye Evaluation
19. Final Rx
20. Counseling / Advice

Total Hours 75

Text Books:

1. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinemann, USA, 2007.
2. D.B.Elliott: Clinical Procedures in Primary Eye Care, 3rd edition, Butterworth-Heinemann, 2007.

Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007.
2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007.
3. J.B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins, 1991.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To perform comprehensive work-up.

CO2: To gain knowledge on history taking.

CO3: To impart knowledge on refraction.

CO4: To inspect the binocular vision status of the eye.

CO5: To master the tests used to measure the field of vision, diagnose dry eye.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M	H	H	H	H	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CO 3	H	H	H	M	H	H	H	M	H	H	H	H	H	H
CO 4	H	H	H	M	H	H	H	H	H	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Project

Semester VI
22BOPC44

Hours of Instruction/week: 4
No of Credits: 4

Objectives:

- To provide a structured systematic research experience to the students involving all phases of research.
- To perform a project and trained to perform literature review, methodology, collect and analyze data
- To write their dissertation and defend their project.

Guidance:

Each student will receive guidance from the optometry teacher towards referring relevant literature / collect required data and discuss them with the project guide periodically.

After correction and edition of handwritten manuscripts by the project guide, the student will compile his / her study / work into a manual form for submission to the institution of study.

Under case study, the student may study the patients in clinical areas, consolidate the findings and discuss them with the project guide before compiling into final shape.

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1: To acquire the basic knowledge and experience of conducting research systemically.
CO2: To become a part of research team
CO3: To demonstrate an understanding of the relevant roles and responsibilities involved.
CO4: To organize and conduct research using various interventions
CO5: To write a project report with good APA style for scholarly writing.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	H	H	M	M			M	H	H	H	H	H	M
CO 2	M	H				M	M	H		M		M	H	
CO 3	H	H	H	M	H	M	H	M	M	H	H	H	H	M
CO 4	H	H	H	M	H	H	M		H	H	H		H	
CO 5	M	H					H		H	M			M	

	Skill
	Employment
	Entrepreneurship



Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category A by MHRD, Estd. u/s 3 of UGC Act 1956)

Re-accredited with A++ Grade by NAAC. Recognised by UGC Under Section 12 B

Coimbatore - 641 043, Tamil Nadu, India

Department of Clinical Embryology

M.Sc. Clinical Embryology

Programme Outcomes:

1. Acquiring enhanced knowledge on the theoretical and practical aspects of embryology.
2. Learning all theoretical aspects of human development from gamete formation, ovulation, fertilization, pre-and post- implantation events.
3. Acquiring hands on skills of the diagnostic sperm tests and procedures performed in an ART unit ranging from sperm preparation to oocyte aspiration to ICSI.
4. Understanding the working, maintenance and calibration of equipments in an IVF unit.
5. Enhancing analytical and trouble shooting skills required for the successful functioning of an ART unit.
6. Learning the nuances of setting up and working in an ART laboratory.
7. Understanding the government regulations required for running an IVF unit – level 1 and 2/ART bank.
8. Analyzing the KPI's and maintaining records/documents as per government norms.
9. Applying advanced professional ethics in clinical and laboratory practices.
10. Understanding about embryology counselling and acquiring communication skills.
11. To learn experientially and use the theoretical knowledge acquired.

Programme Specific Outcomes:

1. Developing hands-on skills in the various procedures performed in an IVF unit.
2. Ability to relate and connect concepts of professional ethics and values in clinical embryology and its application.
3. Complete understanding about all the laboratory aspects required for an ART unit.

Scheme of Instruction and Examinations
(For students admitted from 2022-2023 & onwards)

Part	Subject Code	Title of the Paper/Component	Hrs of Instruction /Week		Scheme of Examination				
			T	P	Duration of Exam	CIA	CE	Total	Credits
First Semester									
I	22MCEC01	Cell Biology and Reproductive Genetics	5	-	3	40	60	100	3
I	22MCEC02	Fertility and Infertility - Basics	5	-	3	40	60	100	3
I	22MCEC03	Examination and Processing of Human Semen	5	-	3	40	60	100	4
I	22MCEC04	Andrology Laboratory and IUI (Intrauterine Insemination)	5	-	3	40	60	100	5
I	22MCEC05	Practical I – Semen Analysis	-	3	3	40	60	100	5
I	22MCEC06	Practical II – Sperm Processing Techniques	-	3	3	40	60	100	4
II		Medical Camp	2	-	-	-	-	-	-
		Library	2	-	-	-	-	-	-
Second Semester									
I	22MCEC07	Laboratory Insights	5	-	3	40	60	100	4
I	22MCEC08	Embryo Culture Systems	6	-	3	40	60	100	4
I	22MCEC09	Clinical Applications for In Vitro Procedures	6	-	3	40	60	100	5
I	22MCEC10	Practical III - Cryopreservation of Sperm	-	3	3	40	60	100	5
I	22MCEC11	Practical IV- Media Aliquoting	-	3	3	40	60	100	5
I	22MCEC12	Mini Project	-	1	-	100	-	100	2
I		Interdisciplinary Course	4	-	3	40	60	100	4
II	22MSXMC1	Medical Camp	2	-	-	-	-	100	1
Internship during Summer Vacation for One Month									
Third Semester									
I	22MCEC13	Micromanipulation, Fertilization, Zygote and Embryo Assessment	6	-	3	40	60	100	5
I	22MCEC14	Choosing the Right Embryo and Chromosomal Abnormalities (Self study)	6	-	3	40	60	100	4
I	22MCEC15	Practical V – Oocyte Handling	-	4	3	40	60	100	5
I	22MCEC16	Practical VI – Intracytoplasmic Sperm Injection (ICSI) and In Vitro Fertilization (IVF) Insemination	-	4	3	40	60	100	5
I	22MCEC17	Practical VII – Intracytoplasmic Sperm Injection (ICSI) and In Vitro Fertilization (IVF) Insemination	-	4	3	40	60	100	5
I	22MCEC18	Practical VIII – Embryo and Oocyte Cryopreservation	-	4	3	40	60	100	5

I		Multidisciplinary Course	2	-	3	100	-	100	2
II		Professional Certificate Course	-	-	-	-	-	-	2
II	22MCEC19	Internship	-	-	-	100	-	100	2
Fourth Semester									
I	22MCEC20	Practical XI – Laser Hatching and Embryo Biopsy	-	5	3	40	60	100	3
I	22MCEC21	Research Project	-	25	-	100	100	200	8
Total Credits									100

Other course to be undergone by the students:

MOOC course – 2 to 4 credits

Note: Minimum 100+2 to 4 credits to earn the degree

Cell Biology and Reproductive Genetics

Semester – I
22MCEC01

Hours of Instruction/Week: 5
No. of Credits: 3

Course Objectives: To enable students to

1. Understand the basics of cells and reproductive cells
2. Application of genetics in the field of reproductive medicine
3. Complete understanding of the basics of reproduction

Unit 1: Basic Cell Biology

15 hours

Nature and function of cells – Cell membrane – Internal membranes – Nucleus – Mitochondrion and chloroplast – Cytoskeleton – Cell matrix and cell to cell communication – Mitosis and meiosis – Evolution of cells – Cell theory

Unit 2: Reproductive Cell Biology

15 hours

Anatomy of male reproductive system – Anatomy of female reproductive system - Development of testis – Development of ovary - Hormonal regulation of testicular function – Hormonal regulation of ovarian function – Oogenesis and spermatogenesis

Unit 3: Molecular Genetics

15 hours

DNA structure – Genes – Genetic code – Gene transcription – tRNA, rRNA, mRNA – Translation – DNA replication – Regulation of gene expression in prokaryotes and eukaryotes

Unit 4: Mechanisms of Inheritance

15 hours

Mendelian genetics – Mendelian's Law of Inheritance – Linkage - Sex determination – Sex and inheritance – Inbreeding – Probabilities

Unit 5: Genetics in Infertility

15 hours

Genetics of male infertility – Genetics of female infertility – Genes and recurrent pregnancy losses – Preimplantation genetic diagnosis and preimplantation genetic screening in infertility

Total hours: 75

Reference Books:

1. Thomas d. Pollard (2017), Cell biology, 3rd edition
2. Rastogi (2019) Genetics, 4th edition
3. P. Vogt (2017), Genetics of Human infertility
4. Richard.E. Jones and Kristin.H. Lopez, Human Reproductive Biology, 4th edition, 2014

Course Outcomes:

1. Learn the basics of cell biology.
2. Understand cell biology and its relevance in the reproduction field.
3. Acquire knowledge on the basics of genetics.
4. Understand molecular genetics with relevance to sex and inheritance.
5. Recognize the relevance of genetics in infertility.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	M	H	M						M		L		M	M
CO 2	M	H	H		M				M	L	M	L	M	L
CO 3	L	H	H		M				L	M	H	M	L	M
CO 4	M	H	H	L	M	L	L		M	M	M	M	M	L
CO 5	M	H	H		M	H	M	M	M	M	M	M	H	H

Fertility and Infertility - Basics

Semester – I
22MCEC02

Hours of Instruction/Week: 5
No. of Credits: 3

Course Objectives: To enable students to

1. Understand the biology of in vivo fertilization and implantation
2. Learn the basics of the causes and diagnosis of male and female infertility
3. Acquire knowledge about the prognosis of diagnostic procedures

Unit 1: In Vivo Fertilization and Implantation– An Overview

15 hours

Genetics of fertilization – Sperm and oocyte structure - Stages of fertilization – Gamete interaction (1st cleavage) – Embryo development (1st cleavage to implantation) – Implantation – Post implantation embryology – Early pregnancy

Unit 2: Causes of Infertility

15 hours

Female fertility causes – Male fertility causes – Unexplained infertility - **Prognostic factors involved in infertility**

Unit 3: Male Examination and Diagnostic Procedures

15 hours

Physical examination of the male – Basic examination of the sperm sample – Testicular sperm – Pre and post examination procedures – WHO norms and basic examination of sperm

Unit 4: Female Examination and Diagnosis

15 hours

Physical examination of the female – Ovulation – Pelvic ultrasonography – Tubal function – Endometrium and receptivity

Unit 5: Reproductive Immunology

15 hours

Antigens tolerance for testis and ovary – autoimmune disease in testis and ovary – Antisperm antibodies – Pathogenesis of immunological infertility – **Laboratory assays for immunological infertility – Treatment of immunological infertility**

Total hours: 75

Reference Books:

1. Larsen's Human Embryology, 6th edition, 2021, Schoenwolf
2. The infertility manual by Dr. Kamini.A.Rao
3. Walter K.H.Krause and Rajesh K Naz, 2nd edition, Immune infertility: Impact of immune reactions on human fertility
4. John Aitken, David Mortimer, Gabor Kovacs, Male and sperm factors that maximize IVF success

Course Outcomes:

1. Obtain knowledge about the sequence of events in vivo.
2. Understand the causes of infertility, both male and female.
3. Thorough understanding of the physical examination of male and diagnosis.
4. Acquire knowledge about the female examination and diagnosis.
5. Understand the basics of immunological infertility.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H	H	L						L	L	L	L	M	M
CO 2		M	H	L					L	M	M		L	
CO 3		M	H	H	M	M	M	H			L	H	L	H
CO 4		M	H	H	M	M	M	H			L	H	L	H
CO 5	L	L	M						M		L			H

Examination and Processing of Human Semen

Semester – I
22MCEC03

Hours of Instruction/Week: 5
No. of Credits: 4

Course Objectives: To enable students to

1. Understand the structure of sperm
2. To teach the sperm defects leading to infertility
3. Acquire knowledge about the prognosis of diagnostic procedures and quality control

Unit 1: Extended Examination of the Human Sperm

15 hours

Sperm defects – Interpretation of sperm examination results - Sperm DNA fragmentation causes and tests - Immature germ cells – Biochemical assays for accessory sex gland function – Assessment of sequence of ejaculation – Template of semen analysis form

Unit 2: Advanced Examination of the Human Sperm

15 hours

Seminal oxidative stress and reactive oxygen species testing – Assessment of the acrosome reaction and sperm chromatin – Transmembrane ion influx and transport of sperm – Effect of environmental factors on sperm parameters - CASA – Emerging technologies

Unit 3: Sperm Processing of Ejaculate Samples

15 hours

General principles – Simple washing – Direct Swim-up – Discontinuous density gradient – Magnetic cell sorting techniques – HIV infected sperm samples – Testicular and epididymal spermatozoa – Retrograde ejaculation samples – Assisted ejaculation samples

Unit 4: Quality Control and Quality Assurance

15 hours

Nature of errors in ejaculate examination – QA programmes – Statistical procedures for analysing and reporting between technician variability – external quality control – National external quality control programs for semen analysis

Unit 5: Accreditation for IUI Laboratories

15 hours

Indian laws for level 1 clinics – Personnel and equipment requirements – Consent forms for IUI procedures – Ethical requirement for IUI procedures

Total hours: 75

Reference Book:

1. WHO laboratory manual for the examination and processing of human semen, 6th edition, 2021.

Course Outcomes:

1. Obtain knowledge about thorough examination of the sperm.
2. Understand about the advanced examinations required for sperm.
3. Theoretical knowledge about the various sperm processing techniques.
4. Acquire knowledge about the quality control in the procedures.
5. Knowledge on the latest Indian regulations for an IUI center.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	M	L	H	M	L	L	M		M		L	H	M	H
CO 2	M	L	H	M	L	L	M		M		L	H	M	H
CO 3	M		H	M	M	M	M		H		M	H	L	H
CO 4		M	H	H	M	L		L	H		M	H	L	H
CO 5			M	H	M	M	H	H	H	L	L	H	M	M

Andrology Laboratory and IUI (Intrauterine Insemination)

Semester – I
22MCEC04

Hours of Instruction/Week: 5
No. of Credits: 5

Course Objectives: To enable students to

1. Acquire knowledge on the setting up of an andrology laboratory
2. To understand about the equipments, consumables and disposables required
3. Understand the clinical aspects of an IUI procedure, cryopreservation and fertility preservation

Unit 1: Andrology Laboratory

15 hours

Ideal laboratory design with various rooms – Air filtering systems - Workstations – Equipment, supplies and reagents – Safety guidelines for an IUI laboratory

Unit 2: Clinical Aspects of IUI Procedure

15 hours

Indications for IUI – Pre procedure work up – Ovulation induction protocols – Ultrasound monitoring – IUI technique – Insemination catheters - Luteal phase support – IUI complications – Statistics and trouble shooting

Unit 3: Cryopreservation of Sperm

15 hours

Technical considerations for sperm freezing – Sperm freezing and thawing protocols – Vitrification methods – cryobiology of sperm - Autologous and donor sperm banking for infertility – Sperm banking for other indications – Funding challenges for sperm freezing – ethical challenges in sperm freezing – future avenues for sperm preservation

Unit 4: Oncofertility in Male

15 hours

Fertility preservation in adult male cancer patients – Managing fertility in childhood cancer patients – Fertility risk in paediatric and adolescent cancers – cryopreservation techniques and limitations

Unit 5: Transgender Males

15 hours

Factors that affect reproduction – Fertility preservation options – International transgender parenting rights – Limitations of Indian laws

Total hours: 75

Reference Books:

1. Chaitanya Nagori, Practical guide to Intrauterine Insemination.
2. Narendra Malhotra, Manual on IUI: What, when and why.
3. Teresa.K.Woodruff, Textbook of oncofertility research and practice: a multidisciplinary approach.

Course Outcomes:

1. Obtain thorough knowledge about the setting of an IUI laboratory.
2. Understand the clinical female perspectives for an insemination procedure.
3. Theoretical knowledge about the cryobiology and cryopreservation of sperm.
4. Acquire the know-how of fertility preservation in onco patients.
5. Understanding the current need for transgenders in the reproductive medicine field.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1			H	H	H	H	M	H	M			H	L	H
CO 2	M	M	H	H	H	L	M	M	H	M		H	M	H
CO 3			H	H	M	M	H	M	H		L	H	L	H
CO 4	M	H	H		L			L	M	H	M	L	H	L
CO 5	M	M							H	M	H		M	H

Practical I – Semen Analysis

Semester – I
22MCEC05

Hours of Instruction/Week: 3
No. of Credits: 5

Course Objectives:

1. To learn about the examination of the semen sample and differentiate between the normal and abnormal parameters
2. To learn motility grading
3. To learn the morphology grading and identify the sperm defects
4. To learn to generate a sperm analysis report based on the findings

- | | |
|---|----------------|
| <ul style="list-style-type: none">• Examination of the semen sample – appearance, liquefaction time, volume, pH• Abnormality in the semen parameters | 8 hours |
|---|----------------|

- | | |
|---|-----------------|
| <ul style="list-style-type: none">• Sperm concentration using the Makler chamber• Sperm concentration using the slide• Sperm concentration using the Neubauer chamber | 15 hours |
|---|-----------------|

- | | |
|--|----------------|
| <ul style="list-style-type: none">• Sperm viability assessment using the eosin and nigrosine staining method | 7 hours |
|--|----------------|

- | | |
|---|-----------------|
| <ul style="list-style-type: none">• Sperm morphology assessment using the eosin-nigrosin staining method<ul style="list-style-type: none">○ Normal sperm○ Acrosome defect○ Head defect○ Neck defect○ Tail defect○ Neck defect○ ERC○ Fructose test○ Leukocyte test | 15 hours |
|---|-----------------|

Total hours: 45

Reference Books:

1. WHO laboratory manual for the examination and processing of human semen, 2021, 6th edition
2. David Mortimer, Practical laboratory andrology

Course Outcomes:

1. Thorough understanding about the semen parameters and the abnormalities
2. Acquire knowledge about the calculation of sperm concentration using various methods
3. Understanding about the staining methods and its principles
4. Learn about the assessment of the live and dead sperm based on the staining methods
5. Learn to assess the normal and abnormal sperm

Practical II – Sperm Processing Techniques

Semester – I
22MCEC06

Hours of Instruction/Week: 3
No. of Credits: 4

Course Objectives:

1. To learn various methods of sperm processing methods
2. To learn to choose the specific processing method based on the sperm analysis
3. To dilute the sperm samples for IUI, IVF and ICSI procedures
4. To calculate the sperm DNA fragmentation index using a kit

<ul style="list-style-type: none">• Simple centrifugation method• Swim-up method• Density gradient centrifugation method	19 hours
<ul style="list-style-type: none">• Dilution of sperm sample for IUI, IVF and ICSI procedures	13 hours
<ul style="list-style-type: none">• Sperm DNA fragmentation testing using the kit	13 hours

Total hours: 45

Reference Books:

1. WHO laboratory manual for the examination and processing of human semen, 2021, 6th edition
2. David Mortimer, Practical laboratory andrology

Course Outcomes:

1. Assessment of the kind of processing method to be used based on the sperm parameters.
2. Understanding of the use of a combination of one or two techniques to maximize sperm concentration.
3. Learn the different dilution methods for the various procedures used in the IVF laboratory.
4. Understanding of handling the Sperm DNA fragmentation kit and calculating the SDF index.

Laboratory Insights

Semester – II
22MCEC07

Hours of Instruction/Week: 5
No. of Credits: 4

Course Objectives: To enable students to

1. Acquire knowledge on the morphological and handling aspects of the oocyte
2. Understand the nuances of setting up of an ART laboratory
3. To understand about the equipments and maintenance of IVF unit

Unit 1: Handling of Oocytes

15 hours

Pioneers of IVF – History of the first IVF procedure - Early IVF lab – Emergence of IVF industry – International regulations for IVF practices – Processes and procedures

Unit 2: Establishment of an ART Clinic

20 hours

Location – Design – Facilities – Construction, renovation and building materials – Designing and operation of andrology, cryopreservation and PGD facilities – ‘Burning In’ of finished facility - Staff requirements

Unit 3: IVF Culture Systems: An Overview

20 hours

Incubators and working – Workstations and working – Microscopes and basic microscopy – Micromanipulators and working – Other equipments – Consumables, gases and culture media – New age equipments and their functioning

Unit 4: Air Quality Control in Reproductive Laboratories

20 hours

Design and implementation of air quality control – Air handling unit – Control of particles – Control of volatile organic products -VOC testing – pH testing – Co2 analyser – Cleaning and maintenance of a functioning IVF unit

Total hours: 75

Reference Books:

1. Alex Varghese, A practical guide for setting up an IVF lab, Assessment of embryo culture systems and running the unit
2. Gautam Nand Allahbadia, Textbook of Assisted Reproduction

Course Outcomes:

1. Obtain thorough knowledge about the historical perspectives of early IVF.
2. Understand the intricacies involved in the setting of an IVF unit.
3. Theoretical knowledge about the various equipments and their functioning.
4. Acquire the know-how of air quality control in a reproductive laboratory.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	M	M	M	H	L	L	L	M	H	M		M	M	H
CO 2	M		H	H	M	H	L	L	L			M		H
CO 3	M	H	H	H	M	L	L	L			M		M	L
CO 4			M	M	H	M	L	L	H		L	H		H

Embryo Culture Systems

Semester – II
22MCEC08

Hours of Instruction/Week: 6
No. of Credits: 4

Course Objectives: To enable students to

1. Understand the background of gamete and embryo culture
2. Acquire knowledge about the media culture
3. Obtain the know-how of the various aspects of the culture systems

Unit 1: Historical Background of Gamete and Embryo Culture

25 hours

Development of culture media based on oviduct and uterine fluids composition and simplex optimization – Physiology of embryo culture based on temperature, pH regulation, cellular volume and density regulation, effects of environmental pollution/infection – Development of embryology using animal models

Unit 2: Media Composition

25 hours

Salts and osmolality – Energy sources and metabolism – Amino acids and cellular homeostasis – Macromolecules and embryo growth – Antioxidants/chelators and cellular function – pH and buffers – Growth factors

Unit 3: Culture Systems

20 hours

Single step – Sequential – Embryo co-culture – Low oxygen culture – Embryo density – Air quality – Mineral oil overlay – Physiological and environmental factors that can affect the outcome of human ART – Microfluidics

Unit 4: Culture Medium

20 hours

Media comparisons – Monozygotic twinning due to culture systems – Epigenetic effects of embryo culture, culture media, serum, oxygen tension, multiple ART's

Total hours: 90

Reference Books:

1. Gary D.Smith, Embryo culture
2. Patrick Quinn, Culture media, Solutions and Systems in Human ART

Course Outcomes:

1. Understand the basics and historical aspects of embryo culture.
2. Acquire the knowledge about the various factors involved in media composition.
3. Theoretical knowledge about the different kinds of culture systems involved.
4. Understand about the external factor effects that are caused by extended embryo culture.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H	H	H	L	L	L	M	L	M		M	H	M	M
CO 2	M			M			M		H	L	H	H	M	H
CO 3	H	H	H	L	M	H	M	L	M		M	H	M	M
CO 4	H	H	H	L	M	H	M	L	M	L	M	H	M	M

Clinical Applications for In Vitro Procedures

Semester – II
22MCEC09

Hours of Instruction/Week: 6
No. of Credits: 5

Course Objectives: To enable students to

1. Understand the indications for IVF treatment and the initial investigations
2. Acquire knowledge about the use of stimulation protocols
3. Obtain the know-how of the classification of oocyte and sperm selection

Unit 1: Patient Investigation and the Use of Drugs

15 hours

Diagnosis for IVF indication – IVF outcomes for the various causes – Diagnosis to prognosis and the prognostic factors – Prediction models for individualizing the treatment protocols – Overview of the male and female investigations

Unit 2: Stimulation Protocols for IVF

15 hours

Basics of follicular development – Monitoring ovarian stimulation – Roles of LH and HCG in protocols - Use of recombinants - Agonists and antagonists in COH – Ovarian stimulation for PCOS and poor responders – Luteal phase support

Unit 3: Oocyte Aspiration

20 hours

Stereo zoom microscope and its basics - Monitoring follicular development – Trigger and oocyte aspiration clinical aspect – Identification of oocyte and culture – Assessment of cumulus complex – Biology of stripping of cumulus complex

Unit 4: Oocyte Classification

20 hours

Inverted microscopy and basics - Morphological characteristics of the oocyte (cytoplasm, vacuole, SER, refractile body, perivitelline space, zona pellucida, polar body) – Identification of nuclear maturity – Abnormal oocytes

Unit 5: Non-invasive Sperm Selection

20 hours

Novel sperm tests – Sperm selection based on surface electrical charge – Microfluidics for sperm selection – Sperm binding to the zona pellucida, hyaluronic acid binding assay and PICSI – Non apoptotic sperm selection – MSOME – IMSI

Total hours: 90

Reference Books:

1. Gautam Nand Allahbadia, 2015, Ovarian stimulation protocols
2. Pasquale Patrizio, A color atlas for Human Assisted Reproduction
3. Ashok Agarwal, Non-invasive sperm selection for in vitro fertilization

Course Outcomes:

1. Understand the investigation process and prognosis.
2. Acquire knowledge about the various stimulation protocols.
3. Theoretical knowledge about the classification of oocytes.
4. Understand about the handling of oocytes in the laboratory.
5. Thorough knowledge about the sperm selection tests.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1			H				L	M	M	H	L	M	L	
CO 2	M	H			L	M	L	M	M		L	H	L	H
CO 3	L	M	M	H	M	M			L		L	H	M	M
CO 4			H	H	M	M	M	M	L			M	M	H
CO 5	L		H	L	L		M	M	H		M	H		M

Practical III – Cryopreservation of Sperm

Semester – II
22MCEC10

Hours of Instruction/Week: 3
No. of Credits: 5

Course Objectives:

1. To learn about the vitrification cryopreservation methods
2. To learn the freezing methods for ejaculate, testicular sperm samples

- Sperm cryopreservation methods for ejaculate samples
 - Sperm freezing methods for ejaculate samples
 - Sperm thawing methods for ejaculate samples
- Sperm cryopreservation methods for testicular samples
 - Sperm freezing methods for testicular samples
 - Sperm thawing methods for testicular samples
- Recovery rate for the freezing -thawing methods

45 hours

Total hours: 45

Reference Books:

1. WHO laboratory manual for examination and processing of human semen, 6th edition, 2022
2. In vitro fertilization, 4th edition, Kay Elder and Brian Dale

Course Outcomes:

1. Understanding of the appropriate processing method for sperm cryopreservation based on the sperm parameters.
2. Acquire knowledge about the appropriate sperm processing method for ejaculate samples.
3. Learn the appropriate method for thawing with maximum sperm survival.
4. Acquire knowledge about the appropriate sperm processing method for testicular tissue sample.
5. Learn the appropriate method for thawing testicular sperm samples with maximum sperm survival.

Practical IV – Media Aliquoting

Semester – II
22MCEC11

Hours of Instruction/Week: 3
No. of Credits: 5

Course Objectives:

1. To learn about media aliquoting for the various procedures
2. To learn about the cold storage maintenance of media
3. To learn about the temperature and pH maintenance of media prior to procedures

- Media aliquoting for oocyte aspiration
- Media aliquoting for oocyte screening
- Media aliquoting for sperm processing
- Media aliquoting for hyasing
- Media aliquoting for ICSI
- Media aliquoting for IVF
- Media aliquoting for IVF fertilization check
- Media aliquoting for embryo culture
- Media aliquoting for embryo transfer

45 hours

Total hours: 45

Course Outcomes:

1. Learn about the various media required for the necessary procedure.
2. Understand the calibration required for media prior to the procedures.
3. Acquire knowledge about the various consumables used for media aliquoting.
4. Acquire knowledge about the good laboratory practices to follow while aliquoting media.
5. Obtain the know-how of aliquoting media for the processes.

Mini Project

Semester – II
22MCEC12

Hours of Instruction/Week: 1
No. of Credits: 2

Course Objectives: To enable students to

1. Apply Research Methodology to practice.
2. Emphasize on action research.
3. Spread scientific knowledge through presentations and publication

Course Outcomes:

1. Apply the concepts of research and its methodologies identify appropriate research topics.
2. Practice select and define appropriate research problem and parameters.
3. Compose a project proposal.
4. Organize and conduct research.
5. Write a project report with good APA style for scholarly writing.

skill
Entrepreneurship
Employability



**Avinashilingam Institute for Home Science and Higher Education for Women
Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD
Re-accredited with 'A++' Grade by NAAC.CGPA 3.65/4, Category I by UGC
Coimbatore-641 043, Tamil Nadu, India**

**Department of Psychology
M. Sc. Clinical Psychology**

Programme Outcomes:

1. Acquiring Advanced knowledge of Theoretical and Historical Perspectives in Clinical Psychology
2. Analyze the complex Biopsychosocial and Neurological aspects of Human Behaviour
3. Understand the appropriate Statistical Techniques be used in Research
4. Empirically assessing and interpreting Psychological functioning of an individual from Clinical Psychology Perspective.
5. Enhancing analytical and critical skills in abstract and logical reasoning.
6. Identifying the symptoms, etiology and diagnosis for psychopathological disorders.
7. Analyzing and implement the various psychotherapeutic interventions in Clinical settings.
8. Identify the various Research Methods and effectively analyze the data by appropriate Statistical Packages.
9. Apply the advanced professional ethics in clinical and therapeutic practices.
10. Understanding the Clinical Psychology perspectives in Forensic, psycho oncology and Alternative Healing techniques.
11. To learn experientially and use the Theoretical Knowledge acquired.

Programme Specific Outcomes:

1. Developing specialized skills in mental status examination, case analysis and case presentations pertaining to specific psychopathology.
2. Ability to relate and connect concepts of professional ethics and values in clinical psychology and its application.
3. Conducting Psychometric assessment, diagnosis and interventions using appropriate psychotherapies

Scheme of instruction and examinations
(For students admitted from 2023-24& onwards)

Part	Subject Code	Title of the Paper/ Component	Hrs. of Instruction /Week		Scheme of Examination				
			T	P	Duration of Exam	CIA	CE	Total	Credit
First Semester									
I	23MCPC01	Theories and Systems of Psychology	5		3	40	60	100	4
I	23MCPC02	Physiology of Behaviour	5		3	40	60	100	4
I	23MCPC03	Applied Cognitive Psychology	5		3	40	60	100	4
I	23MCPC04	Psychopathology - I	5		3	40	60	100	4
I	23MCPC05	Practicum and Assessment-I		6	3	40	60	100	4
II		C.S.S.	2		-	-	-	-	
		Library	2						
Second Semester									
I	23MCPC06	Personality Theories	4		3	40	60	100	4
I	23MCPC07	Psychotherapy-I	4		3	40	60	100	4
I	23MCPC08	Psychopathology - II	4		3	40	60	100	4
I	23MCPC09	Research Methods in Clinical Psychology	4		3	40	60	100	4
I	23MCPC10	Clinical Forensic Psychology	1		3	40	60	100	4
I	23MCPC11	Practicum and Assessment-II		6	3	40	60	100	4
I	23MCPC12	Minor Research Project	1		-	100	-	100	2
I		Interdisciplinary Course	4		-	40	60	100	4
II	21MSXCS1	C.S.S.	2		-	-	-	100	1
Internship during Summer Vacation for One Month									
Third Semester									
I	23MCPC13	Introduction to Clinical Psychology	4		3	40	60	100	4
I	23MCPC14	Clinical Neuropsychology	4		3	40	60	100	5
I	23MCPC15	Psychotherapy-II	4		3	40	60	100	5
I	23MCPC16	Child Psychopathology	4		3	40	60	100	5
I	23MCPC17	Academic Writing and Research Skills	4		3	40	60	100	4
I	23MCPC18	CBT for Common Psychiatric Disorders	4		3	40	60	100	5
I	23MCPC19	Case Analysis and Presentation	1		3	40	60	100	4
I	23MCPC20A 23MCPC20B	Contemporary Healing Techniques: Alternative Indian Healing Practices/ Psycho Oncology and Hospice Care	3		3	100	-	100	2
I		Multidisciplinary Course	2		3	100	-	100	2

II		Professional Certification Course	-		-	-	-	-	2
II	23MCPC21	Internship	-		-	100	-	100	2
Fourth Semester									
I	23MCPC22	Clinical Internship		9	3	100	-	100	2
I	23MCPC23	Research Project		21	-	100	100	200	8
Total Credits									101

Other Course to be undergone by the Students:

MOOC Course – 2 to 4 Credits

Note: Minimum 101+2 Credits to Earn the Degree

Other Courses offered by the Department:

Interdisciplinary Course - 21MCPI01 Positive Psychology

Multidisciplinary Course - 21MCPM01 Emotional Intelligence

Theories and Systems of Psychology

Semester – I
23MCPC01

Hours of Instruction/Week: 5
Credits Points : 4

Course Objectives: To enable students to

1. Describe the key contributions of major figures in the history of psychology
2. Relate the major perspectives in Psychology with the individuals responsible for articulating them
3. Understand how historical trends and events have influenced the development of Psychology as a scientific discipline

Unit 1: Introduction to Theories and System of Psychology

15 hours

Approaches to Historical Investigation, Eastern Tradition in Psychology, Psychological Foundations in Ancient Greece - Early Explanations of Psychological Activity - The Crowning of Greek Philosophy

Unit 2: Psychology's Historical Foundation

15 hours

The Emergence of Modern Science - The French Tradition - The British Tradition - The German Tradition - Nineteenth Century Bases of Psychology - The Founding of Modern Psychology in Indian Context

Unit 3: Twentieth Century System of Psychology

15 hours

American Functionalism - Major Proponents - Basic Principles - The Gestalt Movement - Major Proponents - Basic Principles – Psychoanalysis - Behaviourism - Major Proponents - Basic Principles

Unit 4: The Third Force Movement

15 hours

European Philosophical Background - Major Proponents - Basic Principles Existential Phenomenological Psychology - Major Proponents - Basic Principles - Humanistic Psychology.

Unit 5: Contemporary Trends

15 hours

Post System Psychology - Learning - Motivation and Memory - Perception - Development Psychology - Social Psychology

Total Hours 75

Reference Books:

1. Brennan, J. F. (2003). "History and Systems of Psychology". 6th Edition. Library of Congress
2. Sternberg, J. R. (2009). "Applied Cognitive Psychology: Perceiving, Learning and Remembering", Cengage Learning India, New Delhi.

3. Solso, R. I. (2005). "Cognitive Psychology", 6th Edition, Pearson Education, Delhi.
4. Hunt, R. & Ellis, H. C. (2006). "Fundamentals of Cognitive Psychology", 7th Edition, Tata McGraw Hill, New Delhi.

Course Outcomes:

1. Delineate the early explanations of Greek Philosophy
2. Recognize the emergence of British Tradition and Modern Psychology
3. Outline the Twentieth Century System of Psychology
4. Debate about the European Philosophical background and its major proponents
5. Apply Contemporary Trends in Psychology

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H					M					H		M	
CO 2	H	M									H	M		
CO 3	H			M							H		M	
CO 4	H	M									H		M	
CO 5	H			M							H	M		

Physiology of Behaviour

Semester – I
23MCPC02

Hours of Instruction/Week: 5
Credit Points: 4

Course Objectives: To enable students to

1. Help the students to have knowledge on the physiological basis of behaviour
2. Understand the structure and functioning of the nervous system
3. Distinguish the sensory processes in relation to the nervous system

Unit 1: Introduction to Physiology of Behaviour

15 hours

Biological Roots of Physiological Psychology - Evolution of Large Brains - Structure and Functions of Cells of the Nervous System – Introduction - Cells of the Nervous System- Neurons - Internal Structure - Neural Communication - Supporting Cells - The Blood Brain Barriers - The Action Potential - Communication between Neurons - The Concepts of Chemical Transmission - Structure of Synapses - Release of Nervous System - Activation of Receptors - Post Synaptic Potentials - Termination of Post Synaptic Potentials - Effects of Post Synaptic Potentials - Auto Receptors.

Unit 2: Neurotransmitters and Neuromodulators

15 hours

Introduction - Acetylcholine - Dopamine - Norepinephrine – Serotonin - Glutamate- GABA - Glycine – Peptides

Unit 3: Structure of Nervous System

15 hours

Basic Features of Nervous System - Blood Supply - Meninges - The Ventricular System and Production of CSF - The Central Nervous System - The Peripheral Nervous System - The Autonomic Nervous System - Methods and Strategies of Studying Brain - Experimental Ablation - Stereotaxic Surgery - Stereotaxic Apparatus – **Scanning Technologies**.

Unit 4: Sensory Processes of Brain

15 hours

Vision - The Stimulus - Anatomy of the Visual System - The Eyes - The Photoreceptors - Connections between Eye and Brain – Audition - The Stimulus - Anatomy of the Ear - Auditory Hair Cells and the Transduction of Auditory Information - The Auditory Pathway - The Vestibular System – Somatosenses - The Stimuli - Anatomy of the Taste Buds and Gustatory Cells – Olfactory System

Unit 5: Sleep

15 hours

A Physiological and Behavioural Description of Sleep - Stages of Sleep - Mental Activity during Sleep Functions of Slow Wave and REM Sleep - Disorders of Sleep

Total Hours 75

Reference Books:

1. Carlson, N. R. (1999). Foundation of Physiological Psychology, WH Freeman and Company.
2. Kalat, J. W. (1995). Biological Psychology, 5th Edition, Brooks/Cole Publishing Company

Course Outcomes:

1. Delineate the structure and function of neurons.
2. Identify the importance of Neurotransmitters and Neuromodulators.
3. Outline the structure of nervous system and the types of brain imaging.
4. Summarize the various sensory process of brain.
5. Analyze and evaluate the mechanism of sleep and its disorders

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H	M									H	M		
CO 2	H	H				H					M			
CO 3	H	H				H						M		
CO 4	H	H			M							H		
CO 5	H	M			H							H		

Applied Cognitive Psychology

Semester – I

Hours of Instruction/Week: 5

23MCPC03

Credit Points: 4

Course Objectives: To enable students to

1. Understand the normal mental processes and their relationship to Brain, Mind and Behaviour.
2. Recognize the higher mental processes and its relevance in daily living.
3. Relate the concepts of language and problem solving to neuropsychology.

Unit 1: Cognition and Perception

15 hours

Exploring Cognitive Psychology - Cognitive Psychology Definition - Philosophical Antecedents of Psychology- Psychological Antecedents of Cognitive Psychology - Emergence of Cognitive Psychology - Cognitive Neuroscience - Exploring Cognitive Psychology - From Neuron to Brain: Organisation of the Neuron System - Cognition in the Brain - Cerebral Cortex and Other Structures – Perceptions - From Sensation to Representation - Theoretical Approaches to Perception - Deficit in Perception

Unit 2: Attention and Memory

15 hours

Attention. The Nature of Attention and Consciousness -Attention – Selected and Divided Attention - Cognitive Neuroscientific to Attention and Consciousness – **Memory** - Models and Research Methods - Memory Processes - Representation and Manipulation of Knowledge in Memory: Image and Propositions - Representation and Organisation of Knowledge in Memory Concepts, Categories, Networks and Schemas.

Unit 3: Language

15 hours

Properties of Language - Process of Language Comprehension - Language Acquisition - Language in Context; Neuropsychology of Language

Unit 4: Problem Solving

15 hours

Problem Solving. The Problem Solving Cycle; Types of Problems - Expertise: Knowledge and Problem Solving; Creativity; Types of Creative Contributions

Unit 5: Decision Making and Intelligence

15 hours

Judgment and Decision making - Deductive Reasoning - Inductive Reasoning – An Alternative View of Reasoning Intelligence Measures & Structures of Intelligence - Information Processing and Intelligence - Alternative Approaches to Intelligence - **Improving Intelligence: Effective, Ineffective and Questionable Strategies. Development of Intelligence in Adults**

Total Hours 75

Reference Books:

1. Sternberg, J. R. (2009). “Applied Cognitive Psychology: Perceiving, Learning and Remembering”, Cengage Learning India, New Delhi.
2. Solso, R. I. (2005). “Cognitive Psychology”, 6th Edition, Pearson Education, Delhi.
3. Hunt, R. & Elli, H. C. (2006). “Fundamentals of Cognitive Psychology”, 7th Edition, Tata McGraw Hill, New Delhi.

Course Outcomes:

1. Recall the theoretical approaches of cognitive neurosciences.
2. Recognize the various concepts of attention and memory.
3. Describe the process, acquisition and neuropsychology of language and development.
4. Analyze the aspects of problem solving and decision making.
5. Assess the structures, approaches of intelligence and strategies to improve intelligence

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	M			H		H							M	
CO 2				H	H						M	M		
CO 3		H				H	H				M			
CO 4		H				H	M				H			
CO 5		H				H	M				H			

Psychopathology - I

Semester – I
23MCPC04

Hours of Instruction/Week: 5
Credit Points: 4

Course Objectives: To enable students to

1. Develop knowledge and skills required for Diagnosis of Psychological Conditions
2. Enhance Skills required for Psychopathological Formulations
3. Introduce them to different Perspectives and Models of Etiology

Unit 1: Introduction to Psychiatry

15 hours

Diagnosis and Classification in Psychiatry: Definition, Normal Mental Health, Classification in Psychiatry, Multi Axial Classification, Psychiatric History and Examination: Identification Data, Chief Complaints, History of Present Illness, Past Psychiatric and Medical History, Treatment History, Family History, Personal and Social History, Alcohol and Substance History, Physical Examination, Mental Status Examination.

Unit 2: Assessments in Psychiatry

15 hours

Clinical Assessment: Basic Elements in Assessment, Assessment of the Physical Organism, Psychosocial Assessment, The Integration of Assessment Data, Classifying Abnormal Behaviour, The Interview, Intelligence Tests, Neuropsychological Tests, Personality Assessment, Behavioural Assessment, Cognitive Assessment, Relational Assessment, Bodily Assessment. Case Studies of Assessments

Unit 3: Stress

15 hours

What is Stress? Criteria for DSM-IV and ICD-10 Effects of Severe Stress Stress and Coping Skills, Biological and Psychological Effects of Stress, Effects of Long Term Stress Post Traumatic Stress Disorder: Reactions to Catastrophic Events. Prevalence of PTSD Case Studies Prevention and Treatment of Stress Disorders, Challenges in Treating Stress Disorders

Unit 4: Disorders of Bodily Preoccupation

15 hours

Somatoform Disorders - Pain Disorder Somatization Disorder Conversion Disorder Hypochondriasis Body Dysmorphic Disorder Factitious Disorder and Malingering Criteria for DSM-IV and ICD-10 Prevalence Risks and Causal Factors Treatment and Outcomes

Unit 5: Eating Disorders and Obesity

15 hours

Anorexia Nervosa and Bulimia Nervosa Criteria for DSM-IV and ICD - 10 Medical Complications Other Forms Prevalence Risks and Causal Factors Treatment and Outcomes

Total Hour 75

Reference Books:

1. *Ahuja, N.(2002).“A Short Text Book of Psychiatry (5th Edition)”, New Delhi, Jaypee Brothers.*
2. *Sadock, B. J. & Sadock, V. A.(1995). “Comprehensive Textbook of Psychiatry, 6th Edition”, Vol. 1 & 2, William & Wilkins: London*

Course Outcomes:

1. Interpret diagnose and classify Psychiatry and know about collection of case history.
2. Categorize the components and classification of assessments.
3. Discuss stress disorders and its effects with the prevention and treatment..
4. Analyze the conditions of Somatoform and dissociative disorder on the bases of ICD 10 and DSM IV
5. Appraise eating disorders and its treatment

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H				M						H	M		
CO 2				H	H						M	M		
CO 3		H			H						H	M		
CO 4		H		H	M							M		
CO 5				H			H				H		M	

Practicum and Assessment-I

Semester – I
23MCPC05

Hours of Instruction/Week: 6
Credit Points: 4

Course Objectives: To enable students to

1. Appraise the subjects in a phenomenological background
2. Apply skills in diagnosis
3. Practice the conduction of psychological experiments

Unit 1: Intelligence **20 hours**

Bhatia's Battery of Performance Test, WISC, BKT, MISIC, WAPIS

Unit 2: Personality **15 hours**

16 Personality Factor Questionnaire, NEO- FFI, IPDE

Unit 3: Clinical Assessment **20 hours**

EPQ, MMPI, PANSS, Young Mania, SCID, MMPI

Unit 4: Cognitive Abilities **20 hours**

Standard Progressive Matrices, BGT, Neuropsychological Impairment Scale

Unit 5: Mental Disposition **15 hours**

STAI, BDI, BPRS

Total Hours 90

Reference Books:

1. Myers, A. & Hamen, C. (2012). Experimental Psychology, 7th Edition, Cengage Learning.
2. Sharma, R. & Sharma, R. (2006). Experimental Psychology, 3rd Edition, Atlantic Publishers.
3. Martin, D. W. (2008). Doing Psychology Experiment, 7th Edition, Thomson Learning Academic Resource Center.

Course Outcomes:

1. Demonstrate various scales of intelligence and its domain
2. Analyze and distinguish the types and traits of personality
3. Apply cognitive abilities
4. Examine the importance of social relations and its distinctions.
5. Analyze and categorize mental dispositions using scales

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1			M	H							H			H
CO 2				H	M	M								H
CO 3			H	H							M			H
CO 4		M		H	M						M		H	
CO 5		H	M	H							M			

Personality Theories

Semester – II
23MCPC06

Hours of Instruction/Week: 4
Credit Points: 4

Course Objectives: To enable students to

1. Explain the major theories of personality
2. Enhance personal growth and development
3. Facilitate self actualization

Unit 1: Psychodynamic Theories

12 hours

Sigmund Freud and Psychoanalysis - Major Concepts; Dynamics; Limitations of Psychoanalysis - Carl Gustav Jung and Analytical Psychology - Major Concepts. Dynamics; Evaluation. Alfred Adler and Individual Psychology - Major Concepts; Dynamics; Evaluation. Erik Erikson and the Life Cycle - Major Concepts; Eight Stages of Human Development; Dynamics; Evaluation

Unit 2: Trait Theories

12 hours

Gordon Allport and Trait Approach - Nature of Personality; Personality Traits; Motivation; Personality Development in Childhood; Healthy Adult Personality; Assessment; Reflections on Allport's Theory. Raymond Cattell and the Trait Approach - Personality Traits; Influences of Heredity and Environment; Stages of Personality Development; Assessment; Reflections on Cattell's theory. Eysenck and Behavioural Genetics - Dimensions of Personality; Primary Role Heredity

Unit 3: Behavioural Theories

12 hours

Skinner and Radical Behaviourism - Major Concepts; Dynamics; Evaluation. Albert Bandura and Social Learning Approach - Modelling; The process of Observational learning; Self Reinforcement and Self Efficacy; Developmental Stages of Modeling and Self Efficacy; **Behaviour Modification**; Reflections on Bandura's Theory.

Unit 4: Humanistic Theories

12 hours

Fredrick S. Perls and Gestalt Therapy - Gestalt Psychology; Major Concepts; Dynamics; Evaluation Carl Rogers and Person Centered Perspective - Major Concepts; Dynamics; Evaluation. Abraham Maslow and Self Actualization Psychology - Major Concepts; Dynamics; Evaluation.

Unit 5: Advances in Personality Theory**12 hours**

Julian Rotter: Locus of Control; Assessment of Locus of Control; Age, Gender, Socioeconomic Behavioural and Physical Health Differences; Developing Locus of Control in Childhood; Reflections on Locus of Control. Martin E. P. Seligman and Learned Helplessness - Learned Helplessness in Elderly Persons; Learned Helplessness and Emotional Health; Optimism and Pessimism; Depression; The Attribution Model; The Development of Learned Helplessness in Childhood; Reflections on Learned Helplessness.

Total Hours 60**Reference Books:**

1. Frager, R. & Fadiman, J. (1984). "Personality and Personal Growth", 2nd Edition, Harper Collins Publishers, USA.
2. Schultz, D.P. & Schultz, S.E. (2005). "Theories of Personality", 8th Edition, Wadsworth Publications, Australia.
3. Hjelle, L.A. & Ziegler, D.J. (1992). "Personality Theories", McGraw Hill International Edition.

Course Outcomes:

1. Delineate and discuss the major concepts and evaluations of Psychodynamic Theories
2. Define and analyze Trait theories, approaches, dimensions and assessment
3. Describe and evaluate the major concepts, evaluations and dimensions of behavioural theories
4. Delineate and explain the major concepts, evaluations and dimension of Psychodynamic Theories
5. Analyze the Advances in Personality Theory

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H	M		M							H			
CO 2	H	M		M								H		
CO 3	H	M		M							H			
CO 4	H			H							H	M		
CO 5	H	H		M							M			

Psychotherapy-I

Semester – II
23MCPC07

Hours of Instruction/Week: 4
Credit Points: 4

Course Objectives: To enable students to

1. Develop a comprehensive view of the profession of counselling
2. Prepare the students qualify for professional counselling
3. Demonstrate knowledge in designing psychological interventions

Unit 1: Basic Issues in Counselling Practice

11 hours

Introduction and Overview - The Counsellor: Person and Professional, Ethical Issues in Counselling

Unit 2: Psychodynamic therapies

12 hours

Psychoanalytic Therapy - Introduction, The Therapeutic Process and Applications - Jung's Theory - Contemporary Trends - Object Relation Theories - Self Psychology and Relational Psycho analysis - Alderian Therapy

Unit 3: Existential and Humanistic Therapies

10 hours

Existential and Person Centered Therapy - Gestalt Therapy and Transactional Analysis

Unit 4: Behaviour Therapies

12 hours

Behaviour Therapy - Cognitive Behaviour Therapy - Albert Ellis Rational Emotive Behaviour Therapy - Aaron Becks Behaviour Therapy - Donald Meichenbaum's Cognitive Behaviour Modifications

Unit 5: Other Approaches of Psychotherapy

15 hours

Reality Therapy and Feminist Therapy - Post Modern Approaches - Introduction to Social Constructionism - Solution Focused Brief Therapy, Narrative Therapy- Family System Therapy - Introduction, Development of Family Systems Therapy and Personal Development of the Family Therapist - A Multilayered Process of Family Therapy

Total Hours 60

Reference Books:

1. Corey, G. (2013). The Theory and Practice of Counselling and Psychotherapy, 9th Edition, Cengage Learning Publications.
2. Welfel, E. R. & Patterson, L. E. (2007). “The Counselling Process - A Multitheoretical Integrative Approach”, Sixth Edition, Thomson Books/Cole.
3. Gelso, C. & Fretz, B. (2001). “Counselling Psychology”, Second Edition, Harcourt College Publishers.

Course Outcomes:

1. Describe counselling and its implication
2. Illustrate the psychodynamic theories involved in counselling
3. Analyze the significance of Existential and Humanistic Approaches in Counselling
4. Appraise various behavioural therapies
5. Discuss about the contemporary approaches of Psychotherapy

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H	H							M		M			
CO 2	H	H					M		M		H			
CO 3	H	H					H		H					
CO 4	H	H					M		M					
CO 5	H	H				H			M					

Psychopathology - II

Semester – II
23MCPC08

Hours of Instruction/Week: 4
Credit Points: 4

Course Objectives: To enable students to

1. Delineate the causes and consequences of different psychological conditions
2. Discriminate between different conditions based on symptomatology
3. Evaluate the severity of the psychological condition based on DSM-V

Unit 1: Sexual Variant Disorders

10 hours

Views of Sexual Behaviour. Sexual Dysfunction. Criteria of DSM - IV and V Dysfunctions of Sexual Desire, Sexual Arousal, Orgasmic Disorders, Dysfunctions involving Sexual Pain. Sexual and Gender Variants. Paraphilias Sexual Victimization. Sexual Abuse. Child Sexual Abuse. Pedophilia. Incest. Rape.

Unit 2: Substance Related Disorders

10 hours

Alcohol Abuse and Dependence - Criteria of DSM - IV and V. Prevalence. Comorbidity and Demographics. Acute Intoxification. Withdrawal State. Drug Abuse and Dependence. Other Drugs.

Unit 3: Schizophrenia and Other Psychotic Disorders

10 hours

Schizophrenia - Criteria of DSM - IV and V. Etiology. Schizophrenic Spectrum Disorders - Paranoid Disorganized, Catatonic, Undifferentiated, Residual Type, Other Psychotic Disorders. Clinical Picture in Schizophrenia: Delusion, Hallucination, Disorganized Speech, Disorganized and Catatonic Behaviour, Negative Symptoms.

Unit 4: Cognitive Disorders

15 hours

The Brain: An Interactional Perspective, Vulnerability to Brain Disorders, Assessing Brain Damage: Delirium, Dementia, Alzheimer's Disease, Pick's Disease, Huntington's Disease, Parkinson Disease. Brain Trauma: Injuries, Tumours and Infections. Amnesic Disorders. Criteria of DSM-IV and V. Cognitive Impairment Disorders: Cerebrovascular Disorder, Vascular Dementia, Korsakoff's Syndrome, Epilepsy

Unit 5: Personality, Anxiety and Mood Disorders

15 hours

Criteria of DSM-IV and V. Clinical Features of Personality, Difficulties doing Research on Personality Disorder, Categories of Personality Disorders, Treatments and Outcomes. Panic Anxiety and Other Disorders, Prevalence, Gender and Age of Onset and Comorbidity. Generalized Anxiety Disorder, Prevalence, Gender and Age of Onset and Comorbidity. Obsessive Compulsive Disorder, Prevalence, Gender and Age of Onset and Comorbidity. Mood Disorders, Treatments and Outcomes.

Total Hours 60

Reference Books:

1. Ahuja, N. (2002). "A Short Text Book of Psychiatry (5th Edition)", New Delhi, Jaypee Brothers.
2. Sadock, B. J. & Sadock, V. E. (2003). "Synopsis of Psychiatry: Behavioural Sciences/Clinical Psychiatry (9th Edition)", Philadelphia: Lippincott Williams & Wilkins.
3. Sadock, B. J. & Sadock, V. E. (1995). "Comprehensive Textbook of Psychiatry, 6th Edition", Vol. 1 & 2, William & Wilkins: London

Course Outcomes:

1. Describe the disorders related to sexual dysfunction
2. Categorize the various stages of Substance Abuse Disorders
3. Analyze and differentiate Schizophrenia and other Psychotic Disorder
4. Classify the about the different types of Cognitive Disorders
5. Evaluate Personality, Anxiety and Mood Disorders

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1		H				H	M				M			
CO 2		M				H	M				M		H	
CO 3		H				H	M				M	H		
CO 4		M				H			M		M			
CO 5		M		H		H					M		H	

Research Methods in Clinical Psychology

Semester – II
23MCPC09

Hours of Instruction/Week: 4
Credit Points: 4

Course Objectives: To enable students to

1. Employ scientific, systematic and empirical method of research
2. Examine the appropriate method of answering a research question
3. Critically evaluate and justify the findings of the research

Unit 1: Science, Problems and Hypotheses, Variables

10 hours

Science – Methods, Functions, Aim, Theory; Problems and Hypotheses – Generality and Specificity, Importance, Virtues. Concepts and Constructs; Variables - Types

Unit 2: Sampling and Randomness, Testing Hypotheses

12 hours

Sampling, Random Sampling and Representativeness. Randomness. Randomization. Random Assignment. Sample Size. Kinds of Samples. Differences between Means, Absolute and Relative Differences. Correlation Coefficients. Hypothesis Testing: Substantives and Null Hypotheses. Nature of a Standard Error. A Monte Carlo Demonstration. Statistical Inference

Unit 3: Analysis of Variance, Factorial ANOVA, Correlated Groups, Nonparametric ANOVA

15 hours

Variance Breakdown. The t – Ratio Approach. Analysis of Variance Approach. Calculation of One Way ANOVA. Correlation and the ANOVA. Components of Variance. Factorial ANOVA – Two Research Examples. Nature, Interaction. Factorial ANOVA With Three or More Variables. Advantages. Correlated Groups – Extracting Variances by Subtraction. Nonparametric ANOVA – Properties

Unit 4: Design of Research

13 hours

Research Design – Purpose, Principle. Inadequate Designs and Design Criteria – Experimental and Expost Facto Approaches – Conceptual; Foundation of Research Design. Simple Randomized Subjects Design, Factorial Designs. Correlated Groups – Two Group Designs, Multigroup, Factorial, ANCOVA, Procedural Description

Unit 5: Types of Research, Measurement

10 hours

Ex Post Facto Research – Laboratory, Field and Field Studies. Survey Research. Reliability and Validity - Psychometric Test Construction – Introduction – Steps – Types of Tests and tools – Factor Analysis - Introduction to Structural Equation Modelling

Total Hours 60

Reference Books:

1. Kerlinger, F. N. (2012). Foundations of Behavioral Research, Surjeet Publications, New Delhi.
2. Panneerr selvam, R. (2005). “Research Methodology”, Prentice Hall of India Private Limited, New Delhi-110 001.

Course Outcomes:

1. Explain the methods and function of research
2. Classify sampling, hypotheses testing and statistical inference
3. Solve Variance and its components
4. Classify various Research Designs
5. Apply the types of research and psychometric properties

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1			H					H			M			H
CO 2			H					H			M			H
CO 3			H					H			M			H
CO 4			H					H			M			H
CO 5			H					H			M			H

Clinical Forensic Psychology

Semester – II
23MCPC10

Hours of Instruction/Week: 1
Credit Points: 4

Course Objectives

1. To identify and describe major subareas of forensic psychology
2. To illustrate roles and tasks performed by forensic psychologists
3. To understand the various opportunities and training needed to become forensic psychologists
4. To enhance strategies and psychological writing skills

Unit 1: Introduction

3 hours

Forensic Psychology: Definition; Historical Perspectives and Development of Forensic Science – Forensic School Psychology - Professional Opportunities in Forensic Psychology – Fields of Forensic Psychology - Police Psychology: A Developing Profession – Forensic Assessment in Police and Public Safety Psychology –Practicing Ethical Forensic Psychology – Training in Forensic Psychology

Unit 2: Psychology of Investigations

3 hours

Investigative Psychology: Profiling – Crime Scene Profiling – Geographical Profiling and Crime Mapping – Suspect Profiling – Psychological Profiling – Problems with Profiling – Crime Scene Profiling Limitations - Psychological Profiling Limitations – Police Investigation and Interrogation – Forensic Hypnosis

Unit 3: Practical Psychology for Forensic Investigations and Prosecutions

3 hours

Interviewing Victims of Crime Including Children and People with Intellectual Disabilities – Investigating Criminal Cases of Delayed Reports of Sexual Abuse – Improving the Interviewing of Suspected Offenders – Preventing Withdrawal of Complaints and Psychological Support for Victims – Communicating Risk to the Court

Unit 4: Special Applications

3 hours

Evaluating Eyewitness Testimony of Adults: Extend of the Problem – Informational and Decisional Considerations in Relation to Eyewitnesses Memory – Evaluating Eyewitness Testimony; Evaluating Eyewitness Testimony of Children: Children's Age – Parental Communication – Participant versus Bystander Child Witnesses – Psychological Distress – Children's Suggestibility, False Reports and False Memory - Disclosure of Abuse – Jurors Reactions to Child Eyewitnesses

Unit 5: Experts Opinions and Intervening with Offenders**3 hours**

Strategies for Preventing False Confessions and their Consequences – Forensic Reports – Testifying in Court – Practicing Psychology in Correctional Settings – Treating Criminal Offenders – Assessing and Testing Sex Offenders – Positive Behavioural Supports for Managing Violence Risk in Forensic Setting

Total Hours 15**Reference Books:**

1. Kebbell, M. & Davies, G. (2006). Practical Psychology for Forensic Investigations and Prosecutions, 1st Edition, John Wiley & Sons Ltd.
2. Weiner, B. I. & Otto, K. R. (2013). The Handbook of Forensic Psychology, 4th Edition, John Wiley & Sons, Inc.
3. Bartol, R. C. & Bartol, M. A. (2016). Current Perspectives in Forensic Psychology and Criminal Behaviour, 4th Edition, SAGE Publication, Inc.
4. Griffith, H. E. E., Norko, A. M., Buchanan, A., Baranoski, V. M. & Zonana, V. H. (2016). Bearing Witness to Change; Forensic Psychiatry and Psychology Practice, CRC Press, Taylor & Francis Group.
5. Bartol, R. C. & Bartol, M. A. (2019). Introduction to Forensic Psychology: Research and Application, 5th Edition, SAGE Publication Ltd.

Course Outcomes:

1. Demonstrate knowledge of historical and theoretical foundations of forensic sciences
2. Formulate an understanding of offender profiling and psychological aspects of legal proceedings
3. Analyze victim investigations and psychological support
4. Evaluate the psychological evidence regarding memory and methods involved in techniques
5. Apply the skills learnt from criminal and civil applications

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H						M		H		H	H		
CO 2	H	H				H	M				H			
CO 3		H		M		M				H			M	
CO 4	H	M		H					M		M			
CO 5						M	M			H	M			

Practicum and Assessment – II

Semester – II

Hours of Instruction/Week: 6

23MCPC11

Credit Points: 4

Course Objectives: To enable students to

1. Appraise the subject in a phenomenological background
2. Apply skills in diagnosis
3. Practice the conduction of physiological experiments

Unit 1: Psychological Assessment for Children 25 hours

Comprehensive Test of Non Verbal Intelligence, Eating Disorder Inventory, Revised Children's Manifest Anxiety Scale

Unit 2: Psychological Assessment for Children with Special Needs 25 hours

CAARS/ADHDT, Vineland Social Maturity Scale, Conduct Disorder Scale, VABS

Unit 3: Psychological Assessment for Parents, Children, Teachers and Caregivers 15 hours

Parenting Stress Index, PGI Well Being Measure, Parenting Scale, IPAT Depression Scale, Hamilton Rating Scale for Depression

Unit 4: Psychological Assessment for Cognitive Abilities 10 hours

Cognitive Style Inventory, Y BOCS, Y – B, Tic and Tourette, RPFT

Unit 5: Mental Dispositions 15 hours

PGI Memory Scale/Child Version, Stroop Neuropsychological Screening Test, RIBT, TAT/CAT, SCT, Wechsler Memory Scale, WISCONSIN Card Sorting Test

Total Hours 90

Reference Books:

1. Myers, A. & Hamen, C. (2012). Experimental Psychology, 7th Edition, Cengage Learning.
2. Sharma, R. & Sharma, R. (2006). Experimental Psychology, 3rd Edition, Atlantic Publishers.
3. Martin, D. W. (2008). Doing Psychology Experiment, 7th Edition, Thomson Learning Academic Resource Center.

Course Outcomes:

1. Apply the psychological assessment for children
2. Practice the various psychological assessments for children with special needs
3. Appraise the psychological assessment for parents, teachers and caregivers
4. Analyze the assessments for cognitive abilities
5. Evaluate the assessments of memory and Brain Dysfunction

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1		H	M	H										H
CO 2		M	H	H										H
CO 3		M	H	H										H
CO 4		M	H	H										H
CO 5		H	H	H										H

Minor Research Project

Semester – II
23MCPC12

Hours of Instruction/Week: 1
Credit Points: 2

Course Objectives: To enable students to

1. Apply Research Methodology to practice
2. Emphasize on action research
3. Spread scientific knowledge through presentations and publication

Course Outcomes:

1. Apply the concepts of research and its methodologies identify appropriate research topics
2. Practice select and define appropriate research problem and parameters
3. Compose a project proposal
4. Organize and conduct research
5. Write a project report with good APA style for scholarly writing

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1			H	M	M			H			M			M
CO 2			H	M	M			H			M		M	M
CO 3			H		M			H			M	M		
CO 4			H	M	M			H			M	M		
CO 5			H	M				H			M		M	

Introduction to Clinical Psychology

Semester – III
23MCPC13

Hours of Instruction/Week: 4
Credit Points: 4

Objectives: To enable students to

1. Understand the Philosophical Background of Clinical Psychology
2. Describe the key contributions of major figures in the history of clinical psychology
3. Understand how historical trends and events have influenced the development of Clinical Psychology as a scientific discipline
4. Comprehend the ethical considerations in Clinical Psychology

Unit 1: Historical and Philosophical Roots of Psychology

12 hours

Understanding Science, History, and Philosophy; Psychology and Science; Persistent questions in Psychology and Approaches/Methods for answering the questions: Mind Body, Nativism - Empiricism, Mechanism - Vitalism, Reason Non Reason, Objectivity - Subjectivity, Origin of Human Knowledge, Problem of the Self.

Unit 2: Influence of Greeks and Romans

12 hours

The Ancient World, the Early Greek Philosophers, Greek Medicine: Hippocrates, The Relativity of Truth, Plato, Aristotle, Rome and the Middle Ages, Stoicism, Epicureanism, Neo Platonism, Christianity - The Early Leaders, The Dark Ages, Islamic and Jewish Influences, Renaissance Science and Philosophy.

Unit 3: Evolution of Clinical Psychology

12 hours

Origins of the Field, Early Pioneers - Tuke, Pinel, Tod, Dix. Witmer and the creation of Clinical Psychology Assessment, Diagnostic Issues, Origins of Psychotherapy, The influence of War on Clinical Psychology, Development of Professionalism in Clinical Psychology, Use of Scientific Research Methods - Empirical Tradition, Measurement of Individual Differences - Psychometric Tradition, Classification and Treatment of Behaviour Disorders - Clinical Tradition.

Unit 4: Ethical Issues in Clinical Psychology

12 hours

Ethical Decision Making – Defining Ethical Behaviour - Professional Commitment to Ethical Standards of Practice – Legal Facts and Ethics – Code of Conduct - Practice Guidelines for Clinical Psychology - APA Ethical Principles of Psychologist and Code of Conduct – Steps to Ethical Decision Making – Ethics in Clinical Assessments and Clinical Research – Contemporary Ethical Issues.

Unit 5: Current Trends and Future of Clinical Psychology

12 hours

Changes in the Health Care System – Professional Training – Encompassing Multiculturalism - Technological Advancement in Clinical psychology - Prescription Privileges - Advances in

Positive Psychology – Spirituality and Clinical psychology – Interdisciplinary Practice – Trends in Clinical Training – Outreach, Mental Health Act 2017 and Allied and Healthcare Act 2021- Right of persons with Disabilities- RCI Regulations.

Total Hours 60

References

1. Hergenhahn, B.R. & Henley, T. B. (2013). An Introduction to the History of Psychology, Seventh Edition, Cengage Learning, Australia.
2. Kramer, G. P., Bernstein, D. A. & Phares, V. (2014) Introduction to Clinical Psychology, Eighth Edition, Pearson, Boston.
3. Pomerantz, A. M. (2017). Clinical Psychology Science, Practice and Culture, Fourth Edition, Sage Publications, Los Angeles.
4. Linden, W. & Hewit, P. L. (2018). Clinical Psychology, A Modern Health Profession, Second Edition, Routledge, New York.
5. APA Ethical Principles of Psychologist and Code of Conduct (2017). <https://www.apa.org/ethics/code/ethics-code-2017.pdf>
6. Zur, O. (2007). Boundaries in Psychotherapy, Ethical and Clinical Explorations, American Psychological Association, Washington DC.

Course Outcomes

1. Understand the Historical and Philosophical Roots of Clinical Psychology
2. Comprehend the Greek Philosophical and Roman Contributions to Clinical Psychology
3. Trace the professional evolution of Clinical Psychology as a separate entity and address the individual contributions of various researchers in creating the field as a distinct profession
4. Understand the Ethical Codes of Psychological conduct
5. Adapt and evolve the future trends of Clinical Psychology in Training, Practice and Research.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H				M						M		M	
CO 2	H					M	M			M	H		H	M
CO 3	H					M				M				
CO 4				M			H	H	H	M		H		H
CO 5		H	M	H	H	H	H	M	M	H	H	H	H	H

Clinical Neuropsychology

Semester – III

Hours of Instruction/Week: 4

23MCPC14

Credit Points: 5

Objectives

1. To understand the History and Concepts of Neuropsychology and its assessment
2. To analyze the Structural Elements of Neuropsychology
3. To diagnose Neuro developmental and adult disorders of neuropsychology
4. To elucidate the Cerebrovascular Disorders
5. To identify the Management and Coping Strategies of Neuropsychological Disorders

Unit 1: History of Neuropsychology

15 hours

History, Origin - Development of Neuropsychological Assessment - Qualitative and Quantitative Perspectives of neuropsychological assessment - Basic Anatomy, Elements of Neurology, Methods of study of Research in Neuropsychology -Anatomical Methods, Chemical Methods, Stereotaxic Surgery, Micro-Electrode Studies, Oscilloscope, Polygraph, Scanning Methods and Ethical Issues in Research - Recent Trends in Neuropsychological Assessment.

Unit 2: Structural Elements of Neuropsychology

12 hours

Major Structures and Functions, Spinal Cord, Brain: Forebrain, Midbrain, Hindbrain, Cerebral Cortex, Temporal, Parietal and Occipital Lobes; Prefrontal Cortex - Central Nervous System - Peripheral Nervous System - Neural Transmission and its Perspectives Lobe Syndromes

Unit 3: Neuropsychological Disorders

12 hours

Neuro Developmental Disorders- Autism, ADHD, Intellectual Disability, Down's Syndrome, Rhett's Syndrome, Fragile X, Cerebral Palsy, Meningitis and Related Disorders. Adult Neuropsychological Disorders - Schizophrenia, Substance Abuse Disorders, Major Affective Disorders and Anxiety disorders, PTSD.

Unit 4: Cerebrovascular Disorders

11 hours

Traumatic Brain Injury, Infections, Epileptic Seizure Disorder, Dementia, Delirium, Alzheimer's Disease, Parkinson's Disorder, Metabolic Disorders, Autoimmune Disorders, Pain Disorders, Amnesia and its types, Multiple Sclerosis, Neurological Impairment

Unit 5: Intervention and Management

10 hours

Medical Interventions, Therapeutic Interventions, Life Style Modifications, Coping with the Disorder, Management of Impairment, Overall Health Models, Rehabilitation of Neuropsychological Disorders

Total Hours 60

References

1. Morgan, J. E. & Ricker, J. H. (2018). Textbook of Clinical Neuropsychology, Routledge, New York.
2. Parsons, M. W., & Hammeke, T. A. (2014). Clinical Neuropsychology: A Handbook for Assessments, American Psychological Association
3. Walsh K. (2008). Neuropsychology, New Delhi: B.I. Churchill Livingstone Pvt. Ltd

Course Outcomes

1. Comprehend the History and Concepts of Neuropsychology and its Assessment.
2. Evaluate the Structural Correlates of Neuropsychology
3. Understand the Neuro Developmental and Adult Disorders of Neuropsychology
4. Evaluate the Cerebrovascular Disorders and its Implications
5. Implement the Management and Coping Strategies of Neuropsychological Disorders

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	M	H		H										
CO 2		H			M	H					M			
CO 3		H			M	H					H	H		H
CO 4		H			M	H					H	H		H
CO 5				M		H	H				H			H

Psychotherapy-II

Semester - III
23MCPC15

Hours of Instruction/Week: 4
Credit Points: 5

Objectives: To enable students to

1. To understand the Techniques of Psychotherapy
2. To explicate the non linear thinking methods of Psychotherapy
3. Illustrating the various techniques of Psychotherapies
4. To outline the contemporary psychotherapies
5. To understand the basics of other psychotherapies

Unit 1: Introduction **12 hours**

Techniques of Counselling and Psychotherapy, the Three Dimensions of Learning to be a Master Therapist, Developmental Process, Five Errors of Communication, The Analytic Self.

Unit 2: Advanced Non Linear Thinking **12 hours**

Advanced Non Linear Thinking, Double Binds, The Socratic Method, First and Second Order Change, Deliberate Practice, Expertise and Creativity.

Unit 3: Therapeutic Techniques **10 hours**

Basic Therapy, Metaphor Therapy, Creative Therapy, Projective Therapy, Classic Therapy.

Unit 4: Fourth Wave in Psychotherapy **14 Hours**

New age Psychotherapies – Mindfulness Based Cognitive Therapy - Metacognitive Therapy – Acceptance and Commitment Therapy – Dialectic Behaviour Therapy – Emotion Freedom Techniques. Psychotherapy for specific conditions – PTSD, Grief- Eye Movement Desensitization and Reprocessing

Unit 5 - Other Psychotherapies **12 Hours**

An overview - Emotion focused therapy - Couple therapy - Hypnosis - Play Therapy - Group Therapy - Sex therapy.

Total Hours 60

References

1. Mozdierz, G.J., Peluso, P. R. & Lisiecki, J. (2014). Advanced Principles of Counseling and Psychotherapy - Learning, Integrating, and Consolidating the Non Linear Thinking of Master Practitioners, Routledge Publishers, New York.
2. Conte, C. (2009). Advanced Techniques for Counseling and Psychotherapy”, Springer Publishing Company, New York.

3. Carpinelo. S. (2004). Grief Counselling Resource Guide: A Field Manual, New York State Office of Mental Health.
4. Craig, G. (2011). The EFT Manual, Sixth Manual, Energy Psychology Press.

Course Outcomes:

1. Understand the techniques of counselling
2. Explore techniques of psychotherapy
3. Analyze the case studies
4. Understand the basics of other psychotherapies
5. Understand the contemporary psychotherapies

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1									H			M	M	H
CO 2							H		H		H	H	H	H
CO 3				H		H	H		H		M	H	H	M
CO 4					M		H				M			H
CO 5				H	H		H		H	M	H	H	H	H

Child Psychopathology

Semester - III
23MCPC16

Hours of Instruction/Week: 4
Credit Points: 5

Objectives: To enable students to

1. To understand the key concepts in Child Psychopathology
2. To delineate the diagnostic issues and Prognosis
3. To explain the DSM perspectives on PTSD
4. To understand etiology of Childhood Disorders

Unit 1: Introduction to Child Psychopathology **12 hours**

Significance of Child Psychopathology, Epidemiological Considerations, Key Concepts in Child Psychopathology, Defining Child Psychopathology, Approaches to the Classification and Diagnosis of Child Psychopathology, Issues in Classification, The Developmental Psychopathology Perspective, General Theories of Child Psychopathology

Unit 2: Conduct and Oppositional Defiant Disorders **12 hours**

Description of Disorders, Common Comorbidities, Definitional and Diagnostic Issues, Developmental Course and Prognosis, Epidemiology, Risk and Protective Factors, An Overarching Theoretical Framework for Possible Developmental Pathways, Current Issues and Future Directions.

Unit 3: Childhood PTSD **12 hours**

DSM Perspectives on PTSD, The Stress Response System, Developmental Course and Prognosis, Other Results of Exposure to Trauma, Risk and Protective Factors.

Unit 4: Neuro Developmental Disorders - Intellectual Disabilities **12 hours**

Definitional and Diagnostic Issues, Situational and Conceptual Factors, Developmental Course and Prognosis, Theories, Etiology, Dual Diagnosis - Presence of Both ID and Mental Health Disorders, Current Issues and Future Directions in Practice and Research: Some Examples.

Unit 5: Infants and Children at Risk for Disorder - Child Maltreatment **12 hours**

Historical Context, Types of Child Maltreatment, Developmental Course and Psychopathology, Disorders in Adulthood, Theoretical Framework Linking Child Psychopathology and Maltreatment, Etiology, Overview of Adult and Child Characteristics.

Total Hours 60

References

1. Mash, E. J. & Barkley, R. A. (2014). Child Psychopathology, Third Edition (The Guilford Press, New York, London), ISBN 978-1-4625-1668-1
2. [https://pdf.zlibcdn.com/dtoken/19d19a8d464169175ff108001ce12d24/Child_Psychopathology,_Third_Edition_by_Eric_J._Ma_2753559_\(z-lib.org\).pdf](https://pdf.zlibcdn.com/dtoken/19d19a8d464169175ff108001ce12d24/Child_Psychopathology,_Third_Edition_by_Eric_J._Ma_2753559_(z-lib.org).pdf)

Course Outcomes:

1. Understand the significance of child psychopathology
2. Analyze DSM criteria for various disorders
3. Diagnose a disorder
4. Analyze Neuro developmental disorders - Intellectual disabilities
5. Study the etiology and understand prognosis aspects

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1		H		H		H					H	M		H
CO 2				M		H			M		H	H		H
CO 3				H		H					H	H		H
CO 4		H		H		H					H	H		H
CO 5	H	H		M		H	M				M	H		H

Academic Writing and Research Skills

Semester – III
23MCPC17

Hours of Instruction/Week: 4
Credit Points: 4

Objectives: To enable students to

1. Introduce the domain of academic writing to the students
2. To identify and practice the elements, style and language of academic writing
3. To practice and engage in various forms of academic writing
4. To develop an ability to write in scientific style

Unit 1: Introduction to Academic Writing

12 hours

Understanding Academic Writing – Types of Articles and Papers – The Research Idea - Evaluating Sources for Academic Work - Accessing Google Scholar - Broadening and Narrowing the Search - Search Engines for Academic Materials at the Library – Online Sources - Finding Relevant Sources – Paraphrasing – Quotations - Plagiarism – SOP Writing.

Unit 2: Writing a Research Proposal for Dissertation and Grant

12 hours

Type of Proposals – Planning for the Proposal – Steps in Proposal Writing – Choosing a Topic – Drafting a Proposal – Reviewing the Proposal – Revising and Editing the Proposal – Identifying Grant Providers – Types of Funders – Budget – Partnerships – Presentations.

Unit 3: Styles of Academic Writing

12 hours

Guidelines and Rules in Academic Writing – Introduction to Style and Formatting Guidelines from the American Psychological Association (APA), Specific Guidelines Pertaining to In-text Citations - Structures of Academic Courses – References – Formatting – Ensuring Accuracy of Scientific Findings – Ethical Compliance.

Unit 4: Forms of Academic Writing

12 hours

Abstract Writing - Summarization; Review of Literature; Scientific Poster Presentations; Reflective, Analytic and Descriptive Reports; Book Review; Film Review; Tables and Graphs in Academic Courses; Experiential Learning as Assessment Strategies: Individual/Group Presentations on Forms and Issues in Academic Writing; Classroom Assignments in Generating Abstracts, Posters and Reviews.

Unit 5: Qualitative and Quantitative Report Writing

12 hours

Reporting Standards for Qualitative and Quantitative Research – Need for Journal Article Reporting Standards (JARS) – Qualitative Story Telling: Methodological Integrity – Describing the Enquiry, Results and Discussion, Reporting a Qualitative Meta Analysis: Key Features - Mixed Method – Quantitative Research – Steps – JARS Quant – Importance of Methodology – Research Design – Statistical Analysis – Interpreting Results – Discussions – Future Trends.

Total Hours 60

References

1. Bailey, S. (2011). Academic Writing: A Handbook for International Students, 3rd Edition, New York: Routledge.
2. Publication Manual of the American Psychological Association (7th Ed.), (2020), Washington, DC: American Psychological Association
3. Levitt. H. M . (2018). Reporting Qualitative Research in Psychology: How to Meet APA Journal Article Reporting Standards. American Psychological Association, Washington DC
4. Cooper, H. (2020.) Reporting Quantitative Research in Psychology: How to Meet APA Journal Article Reporting Standards. American Psychological Association, Washington DC
5. Lida, P., Ruegg. R., De Boer, M., Araki. N. & Agnello. M. F. (2020). The Concise Handbook APA, 7th Edition, Information Age Publishing, USA.
6. Murra, R. & Moor, S. (2006). The Handbook of Academic Writing: a Fresh Approach, McGraw Hill Publishing Co., England.
7. Gajda, R. & Tulinkangas, R. (2005). Getting the Grant. How Educators Can Write Winning Proposals and Manage Successful Projects. Association for Supervision and Curriculum Development, USA.

Course Outcomes

1. Understanding the concepts related to different types of Academic Writing
2. Writing a Research Proposal for dissertation or to get Grant
3. Understanding the guidelines and rules in Academic Writing given by APA
4. The various forms of Academic Writing explained
5. Deliberating the reporting standards in Qualitative and Quantitative Report Writing

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1			H											
CO 2														
CO 3						H		H	M			H	H	
CO 4			H	H	H			M				H	H	
CO 5			M					H	M					

CBT for Common Psychiatric Disorders

Semester – III
23MCPC18

Hours of Instruction/Week: 4
Credit Points: 5

Objectives: To enable students to

1. Understand history and theories of CBT
2. Delineate case studies and plan intervention
3. Develop individualistic techniques and apply them with accuracy

Unit 1: CBT – An Overview

12 hours

History and Timeline of Advancements - Exploring the Basics - Beck's Cognitive Triad – Recognizing Problematic Thinking Patterns – Cognitive Errors – Theories of Cognitive Therapy

Unit 2: CBT for Depression and Anxiety

12 hours

Content of Therapy- Symptoms in Different Population - Relapse - Pharmacological Support and CBT - Brief Interventions Predictions of Better Response in Client - Culturally Appropriate CBT for the Anxiety Disorders – Role of the Family - Case Analysis

Unit 3: CBT for Eating Disorders and Schizophrenia

12 hours

Eating Disorders - Content of Therapy - Group CBT - Treating Refractory Eating Disorders - Role of the Family - Case Studies Schizophrenia – Early Intervention - CBT Vs Non Specific Psychosocial Intervention - Generalization to Clinical Settings and Stepped Care - Case Studies

Unit 4: CBT for Substance Related Disorders and Bipolar Disorder

12 hours

Substance Related Disorders - Understanding Symptoms and Effects Across Life Span - Comparison with Other Psychological Therapies - Bipolar Disorder - Self Help and CBT – Outcome Predictors – Concurrent Disorders and CBT - Case Studies

Unit 5: Other Psychological Disorders - CBT and Working with Clients

12 hours

CBT for Mood Disorders - Stress Disorders - Developmental Disorders Orienting the Client to CBT - Goal and Agenda Setting – Homework - Framing and Working with Worksheets - Identification of Maladaptive Thoughts and Beliefs - Behavioural Action - Problem Solving – Relaxation - Closure to Treatment.

Total Hours 60

References

1. Gregoris, S. & Stefan, G.H. (2013). CBT for Anxiety Disorders, John Wiley & Sons Ltd., UK
2. Julian, S. & Matthew, Q. (2007). Cognitive Behaviour Therapy. Centre for Applied Research in Mental Health and Addictions (CARMHA), Library and Archives, Canada.
3. Cully, J. A. & Teten, A. L. (2008). A Therapist's Guide to Brief Cognitive Behavioral Therapy, Department of Veterans Affairs, South Central MIRECC, Houston.

Course Outcomes:

1. Understand the basics of CBT
2. Explore various techniques under CBT approach
3. Analyze principles of CBT and apply it to plan interventions
4. Compare CBT with other interventions and understand its efficacy
5. Equip with skills required to work with CBT

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H				M	H	H		H		H	H	M	H
CO 2	H			M		M	H		H	M	H	H		H
CO 3	M			M		H	H		H		H	H		H
CO 4				M		H	H		H		H	H		H
CO 5					M		H					H	M	H

Case Analysis and Presentation

Semester – III
23MCPC19

Hours of Instruction/Week: 1
Credit Points: 4

Objectives: To enable students to

1. Develop knowledge in Diagnostic Methods
2. Understand case study as a research method
3. Apply the analysis and presentation skills
4. Implement ethics in clinical settings

Unit 1: Introduction to Case Studies

3 hours

Understanding Case Study Approach - Childhood Disorders - Mood Disorders - Anxiety Disorders - Personality and Dissociative Disorders - Other Adult Disorders

Unit 2: Diagnosis and Case Analysis

3 hours

Diagnostic Statistical Manual V - International Classification of Diseases and Related Health Problems (ICD) 11 - Prognosis, Treatment Plan and Outcomes

Unit 3: Case Presentation

3 hours

Essential Skills – Rapport – Empathy - History Taking - Mental Status Examination - Developing Delivery Skills - Managing Presentation Anxiety - Case Discussion with Relevant Case Work Team

Unit 4: Documentation and Record Maintenance

3 hours

Case History - Case Mapping - Referral and Follow-up Schedules - Intervention Planning - Case Report Writing and Maintenance

Unit 5: Ethics in Case Analysis and Presentation

3 hours

Maintenance, Dissemination and Disposal of Confidential Records of Professional and Scientific Work Discussing the Limits of Confidentiality -Recording - Minimizing Intrusions on Privacy DisCOsures - Consultations - Use of Confidential Information for Didactic or Other Purposes

Total Hours 15

References

1. William O'Donohue & Scott O Lilienfeld .(2013). Case Studies in Clinical Psychological Science: Bridging the Gap from Science to Practice . Oxford University Press. Newyork.
2. American Psychiatric Association (2013). Diagnostic and Statistical Manual of Mental Disorders (5th Ed.).
3. World Health Organization (WHO) (1993). The ICD - 10 classification of Mental and Behavioural Disorders.
4. American Psychological Association (2017). Ethical Principles of Psychologists and Code of Conduct.

Course Outcomes:

1. Understand the uses of case study method
2. Recognize the structural background of case analysis
3. Analyzing the clinical cases
4. Summarize the documenting procedures
5. Apply skills and ethics

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1				H		H	H		H		H	H	H	H
CO 2				H		M	H		M		H	H	H	M
CO 3				H			H		H		H	H		H
CO 4					H		H							H
CO 5												H	H	H

Contemporary Healing Techniques: Alternative Indian Healing Practices

Semester – III
23MCPC20A

Hours of Instruction/Week: 3
Credit Points: 2

Objectives: To enable students to

1. To understand and Mental Health and Healing Practices as a harmonizing theoretical frameworks for overall management of wide spectrum of mental health problems
2. To acquire knowledge on philosophical and logical foundations of Healing Practices
3. To evaluate the best ways in which Asian Healing Practices has integrated with Western Medicine
4. Understand the mental health issues from Indian context and perspective

Unit 1: Introduction to Complementary and Alternative Medicine

9 hours

Science and Scientific Reasoning in Healing; Origin and Relevance of CAM; Concepts, Causes, Classification, Diagnosis and Treatment of Health & Illness in Ayurveda. Contemporary Naturopathic Medicine

Unit 2: Nature of Illness

9 hours

Causes and Symptoms of Illness, Effects and Alternative Healing Methods: Origin, Benefits and Description for Alternative Treatments. Philosophical Foundations ; Problematizing the Notion of Mental Illness ; Various Conceptions of Mental Illness. Three Energetics, Manual Healing, Body Work, and Yoga. Issues and Challenges in Integrative Medicine.

Unit 3: History of Ancient Indian Psychology

9 hours

The Social and Philosophical Context, A Journey back to the Roots: Psychology in India - Psychological Ideas in the Vedas and their Relevance, On the Vedic Symbolism in the Light of Sri Aurobindo. Indian Psychological thought in the Age of Globalization.

Unit 4: Psychology of Emotions: Some Cultural Perspective

9 hours

Cultural Variations in the Components of Emotions - Emotions in the Indian Thought. Typology of Emotions - The Concepts of Bhāva and Rasa. Mind Body Therapies and Stress. Stress Reduction and Relaxation Therapies. Dynamic Energetic Healing. REIKI – Self Healing Reiki - Symbols, Attunements and Techniques -Success and Peace

Unit 5: Healing and Curing: Traditional Healers and Healing

9 hours

South Asian (Indian) Traditional Healing: Siddha, Unani, Ayurveda, Shamanic, and Sahaja Therapy. Pranic Healing – Acupuncture and Acupressure, Reiki. Mental Health and Healing Practices. Art and Movement Based Therapies. Body Mind Relationship according to Tantras. Meditation. AYUSH: Ayurveda, Yoga, Unani, Siddha and Homeopathy.zs

Total Hours 45

References

1. Ramakrishna Rao, K. & Paranjpe, A. C. (2016). Psychology in the Indian Tradition, Springer New Delhi.
2. Micozzi, M. S. (2015). Fundamentals of Complementary and Alternative Medicine, Fifth Edition, Saunders's Elsevier Inc.
3. Longe, J. L. (2005). The Gale Encyclopedia of Alternative Medicine, Second Edition, Thomson Gale
4. Cornelissen, R. M., Misra, G. & Varma, S. (2011). Foundations of Indian Psychology - Theories and Concepts, Volume 1, Pearson Education, South Asia
5. Brockman, H. (2006). Dynamic Energetic Healing: Integrating Core Shamanic Practices with Energy Psychology Applications and Process Work Principles, Columbia Press.
6. Emerson, B. (2001). Self Healing Reiki Freeing the Symbols, Attunements and Techniques. Frog Ltd.
7. Rand, W. L. (1998). Reiki for a New Millennium, Vision Publications.
8. Sui, C. K. (1987). Miracles Through Pranic Healing. Institute for Inner Studies. Publishing Foundation India Pvt. Ltd. Bangalore.
9. Delatte, P. (2013). Five Point Touch Therapy: Acupressure for the Emotional Body. Healing Arts Press, Rochester, Vermont, Toronto, Canada.
10. Rubin, J. A. (2010). Introduction to Art Therapy. Routledge. Taylor & Francis.
11. Chaiklin, S & Wengrower, H. (2009). The Art and Science of Dance/Movement Therapy. Life Is Dance. Routledge Taylor & Francis. New York, London.

Course Outcomes

1. To understand and incorporate Indian Concept of Complementary and Alternative Medicine in Mental Health and Healing Practices as a harmonizing theoretical frameworks
2. Alternative treatment - Biological and/or religious perspectives, socio-cultural beliefs and practices etc. for overall management of wide spectrum of mental health problems
3. Define the concepts and explain the philosophical and logical foundations of Indian Healing Practices
4. To understand the Psychology of emotions, philosophical and logical foundations of Indian dynamic Energetic Healing Practices
5. To enlighten on the Traditional Healers and Healing Methods in India

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1		M					M		M			M	M	M
CO 2	H	H		M		H	H				H	H	H	H
CO 3	H			M						H	H			
CO 4									H		H			
CO 5						M					H			

Psycho Oncology and Hospice Care

Semester – III
23MCPC20B

Hours of Instruction/Week: 3
Credit Points: 2

Objectives

1. To understand the theoretical perspectives of psycho oncology
2. To identify and familiarize with practical issues and concepts
3. To encourage students to use the psycho-diagnostic tools whenever applicable
4. To acquaint the trainee on different interventions of psychosocial

Unit 1: Introduction

9 hours

Cancer: Diagnosis and Management – Emergence of Psycho oncology – Psychosomatic and Cancer: Psychodynamic Approach – Systematic Approach – Biopsychosocial Perspectives - Psychobiological Model of Cancer – Behavioural and Psychological Factors in Cancer Risk – Psychological Issues related to Site of Cancer – Life Change Approach to Psycho oncology - Ethical Issues in Oncology - Psychosocial Implications in Cancer Patients

Unit 2: Neuropsychological Assessment and Psychological Problems

9 hours

Clinical Neuropsychology: Historical Background – Goals of Assessment – Neuropsychological Evaluation Procedures – Neurological Tests by Domain – Role of Neuropsychological Assessment in Cancer Patients – Neuro-cognitive Effects of Anticancer Treatment - Psychosocial and Psychiatric Disorders: Adjustment Disorder – Suicide – Anxiety Disorder – Delirium – Substance Use Disorder – Post Traumatic Disorder Stress Disorder Associated with Cancer Diagnosis and Treatment - Psychological Issues for the Family

Unit 3: Child with Cancer

9 hours

Cancer in Children: Comprehensive and Family Centered Psychosocial Care in Pediatric Oncology – Quality of Life in Children with Cancer – Psychiatric Impact of Childhood – Complementary and Alternative Medicine – Creative Psychosocial Interventions – Palliative Cancer for Children with Advanced Cancer – Death and Bereavement.

Unit 4: Psychosocial Interventions

9 hours

Procedures for Psychosocial Distress – Brief Crisis Counselling – Psycho educational Interventions – Group Therapies: Support Group – Tele Counselling – Mediation - Spiritual and Religious Coping with Cancer – Family Therapy: Improving and Factors Influencing Quality of Life - Rehabilitation - Staff Support and Training in Psycho oncology - Establishing a Psycho oncology Unit in a Cancer Center

Unit 5: Palliative and Terminal Care**9 hours**

Doctor and Patient Relationship – Training and Experience of Oncologist – Role of Psychiatrist or Psychologist – Partnership with Patient - Nursing Care – Hospice and Home Care – Canadian Virtual Hospice – Training of Psychologists and Psychiatrists in Palliative Care - Treatment: Radiotherapy – Chemotherapy – Background of Traditional Medicine – Complementary Therapies – Grief and Bereavement.

Total Hours 45**References**

1. Guex, P. (1994). An Introduction to Psycho-Oncology, Revised 1st Edition, Routledge, London & New York
2. Cristina, A. M. & James, R. P. (2008). Cognition and Cancer, Cambridge University Press
3. Kreitler, S., Ben-Arush, M. W. & Martin, A. (2012). Pediatric Psycho-Oncology: Psychosocial Aspects and Clinical Interventions, 2nd Edition, Wiley-Blackwell; A John Wiley & Sons Ltd
4. Grassi, L. & Riba, M. (2012). Clinical Psycho-Oncology: An International Perspective, 1st Edition, Wiley-Blackwell; A John Wiley & Sons Ltd.
5. Jimmie C. H., William S. B., Phyllis B. J., Matthew J. L. & McCorkle, R. (2015). Psycho-Oncology, 3rd Edition, Oxford University Press

Course Learning Outcome

1. Delineate the range of psychosocial issues that occur in oncology
2. Develop skills in the areas of communication, psychosocial assessments and management
3. Explore cancer development and treatment to the provision of psychosocial support
4. Apply diagnostic methods and screen individuals
5. Recognize with diagnostic challenges and modalities commonly used in palliative care and Psycho oncology

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H	M				M				H	M			
CO 2												H	H	H
CO 3		H				H				H		H	H	H
CO 4				H		H	H			H	H	M	H	H
CO 5							M			H	H	M	H	H

Internship

Semester – III
23MCPC21

Hours of Instruction/Week: -
Credit Points: 2

Objectives: To enable students to

1. Integrate knowledge and training in dealing with people
2. Examine the knowledge and executing it in reality
3. Relate theory and practice

Course Outcomes:

1. Apply counselling process, techniques, and significant therapies in the relevant domains
2. Formulate enhanced counselling programmes
3. Write a internship report

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1				M		M	H		H			H	H	H
CO 2				H			H		H		M	H	H	H
CO 3					H			H	H			H	H	H

Clinical Internship

Semester – IV
23MCPC22

Hours of Instruction/Week: 9
Credit Points: 2

Objectives: To enable students to

1. Develop attitudinal, cognitive and technical skills in handling patients compassionately
2. Demonstrate the ability to achieve advanced levels of practice in clinical assessment, diagnosis and treatment
3. Help provide counselling in an ethical, legal and professional manner

Course Outcomes:

1. Apply counselling process, techniques, and significant therapies in the relevant domains
2. Formulate enhanced counselling programmes
3. Write a internship report

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1				M		M	H		H			H	H	H
CO 2				H			H		H		M	H	H	H
CO 3					H			H	H			H	H	H

Research Project

Semester – IV

Hours of Instruction/Week: 21

23MCPC23

Credit Points: 8

Objectives: To enable students to

1. Determine the purpose of the study with assumed outcomes
2. Initiate relevant intervention to meet the challenges on research
3. Validate the result outcomes with societal needs

Course Outcomes:

1. Describe the research process and the principle activities, skills and ethics associated with the research process
2. Practice select and define appropriate research problem and parameters
3. Compose a project proposal
4. Organize and conduct research using various interventions
5. Write a project report with good APA style for scholarly writing.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1			H	H		H		H					M	
CO 2			H		M			H			M		H	H
CO 3			H		H			H			M		M	
CO 4			H	H		H	H	H		M	M			M
CO 5			M	H	M				H		M	M	M	M

**Department of Psychology
(Interdisciplinary Course)
Positive Psychology**

Semester – II

Hours of Instruction/Week: 4

21 MCPI01

Credit Points: 4

Course Objectives: To enable students to

1. Delineate the major theories of personality
2. Enhance personal growth and development
3. Facilitate self actualization

Unit 1: Happiness

15 hours

Positive Emotions - Positive and Negative Affectivity – Happiness - Measuring Happiness - The Effects of Happiness - Causes of Happiness - Culture and Happiness - Optimizing Well Being - Relationships and Happiness - Physical State and Happiness - Productivity and Happiness - Recreation and Happiness - Evolutionary Perspectives or Obstacles to Happiness - Happiness Enhancement

Unit 2: Flow

10 hours

Intrinsic Motivation - Signature Strengths – Meta Motivational States and Reversal Theory – Flow – Implications – Controversies

Unit 3: Hope, Optimism and Emotional Intelligence

15 hours

Positive Illusions - Self Deception – Optimism – Hope - Expectations and Risk Homeostasis Theory - Optimism, Hope and Health - The Neurobiology of Optimism and Hope - Emotional Intelligence: Ability or Personality Trait - Enhancing Emotional Intelligence in Adulthood - Development of Emotional Competence.

Unit 4: Giftedness, Creativity and Wisdom

10 hours

Giftedness, Creativity and Wisdom - Implications and Controversies.

Unit 5: Positive Traits, Motives and Self

10 hours

Trait Theories of Personality and Personal Strengths - Motives as Personal Strengths - Positive Self - Self as Object and Agents - Self Esteem - Self Efficacy - Coping Strategies - Assessing Coping - Defense Mechanism

Total Hours 60

Reference Books:

1. Carr, A. (2008). Positive Psychology. The Science of Happiness and Human Strategies. Routledge Publications.
2. Synder, G. R. & Lopez, S. J. (2008). “Positive Psychology”, Sage Publication.

Course Outcomes:

1. Identify and classify positive emotions, measuring emotions and effects and obstacles of happiness
2. Delineate and evaluate intrinsic motivation, Meta Motivational States and Reversal Theory, flow and its implication
3. Recognize and appraise the neurobiology of Hope, Optimism and Emotional Intelligence
4. Identify and classify Giftedness, Creativity and Wisdom
5. Predict and analyze Positive Traits, Motives and Self –efficacy

**Department of Psychology
(Multidisciplinary Course)
Emotional Intelligence**

**Semester – III
21MCPM01**

**Hours of instruction/week: 2
Credit Points: 2**

Course Objectives: To enable students to

1. Develop self-awareness and self-management of personal emotions
2. Review ways to advance personal emotional intelligence
3. Recognize emotions in others and its consequences on behaviour

Unit 1: Emotional Intelligence

5 hours

Introduction - EQ Makes a Difference in Life - Definition of EQ - Being Emotionally Intelligent - Acquiring EQ - EQ Helps in Professional Success - Myths about EQ.

Unit 2: Emotional Intelligence and Personality

5 hours

The Relationship Between EQ and IQ - Origin of Emotions - Consequences of Low and High EQ

Unit 3: Developing EQ

10 hours

Early Life Experiences, EQ Develops with Maturity - Emotions can be Unlearned - Examples of EQ Development - Emotional Skills for Managers Recognizing Emotions - Empathizing Others - Developing High Self Esteem - Managing Emotional Upset - Being an Emotional Winner - Act of Influencing People Personality Trait. Enhancing Emotional Intelligence in Adulthood - Development of Emotional Competence

Unit 4: Emotions in Real Life

5 hours

Managing Stress, Anger, Jealousy, Fear, Anxiety, Frustrations and Depression. Recognizing and overcoming unhealthy emotions using psychotherapeutics

Unit 5: Enhanced Emotional Experience

5 hours

Learning Emotional Skills for Survival. Healthy Emotions such as Happiness, Hope, Optimism, Humour, and Well being

Total Hours 30

Reference

1. Carr, A. (2008). "Positive Psychology". The Science of Happiness and Human Strengths", Routledge Publications.

Course Outcomes:

1. Delineate and apply emotional intelligence
2. Identify the relationship between emotional intelligence and personality
3. Evaluate the emotional skills of managers, managing emotional upset and enhancing emotional intelligence in adulthood
4. Assess giftedness, creativity and wisdom
5. Indicate and assess Positive Traits, Motives and Self efficacy