HOLY CROSS COLLEGE (AUTONOMOUS)

DEPARTMENT OF AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY

BACHELOR OF AUDIOLOGY AND SPEECH –LANGUAGE PATHOLOGY (BASLP) - SYLLABUS

COURSE PATTERN- BASLP

I SEMESTER

S.No	Code	Title of the Course	Teaching Hours per Week
1.	U17AS1MCT01	B 1.1 Communication Sciences	4
2.	U17AS1MCT02	B1.2 Anatomy and Physiology of Speech and Hearing	4
3.	U17AS1MCT03	B1.3 Clinical Psychology	4
4.	U17AS1MCT04	B1.4 Linguistics and Phonetics	4
5.	U17AS1MCT05	B1.5 Electronics and Acoustics	4
6.	U17AS1MCT06	B1.6 Research Methods and Statistics	4
TOTAL			24

II SEMESTER

S.No	Code	Title of the Course	Teaching Hours per Week
1.	U17AS2MCT07	B2.1 Neurology	4
2.	U17AS2MCT08	B2.2 Otolaryngology	4
3.	U17AS2MCT09	B2.3 Speech-Language Pathology	4
4.	U17AS2MCT10	B2.4 Audiology	4
5.	U17AS2MCT41	Computer Fundamentals	4
6.	U17AS2MCP11	**Practicals** 2.5 Speech-Language Pathology - I	12
7.	U17AS2MCP12	**Practicals** 2.6 Audiology - I	12
TOTAL			44

III SEMESTER

S.No	Code	Title of the Course	Teaching Hours per Week
1.	U09AS3MCT13	B3.1. Articulation & Phonological Disorders	4
2.	U09AS3MCT14	B3.2. Maxillofacial Anomalies	4
3.	U09AS3MCT15	B3.3. Diagnostic Audiology Part-1	4
4.	U09AS3MCT16	B3.4. Rehabilitative Audiology	4
5.	U09AS3MCP17	**Clinical Practicum** B3.5. a) Speech –Language Pathology - II	12
6.	U09AS3MCP18	**Clinical Practicum** b) Audiology - II	12
7.	U09AS3MCT38	B 3.6 Indian Constitution	4
TOTAL			40

IV SEMESTER

S.No	Code	Title of the Course	Teaching Hours per Week
1.	U09AS4MCT19	B4.1. Voice & Laryngectomy	4
2.	U09AS4MCT20	B4.2. Motor Speech Disorders in Children	4
3.	U09AS4MCT21	B4.3. Diagnostic Audiology Part-2	4
4.	U09AS4MCT22	B4.4. Paediatric Audiology	4
5.	U09AS4MCP23	**Clinical Practicum** B4.5. a) Speech –Language Pathology - III	12
6.	U09AS4MCP24	**Clinical Practicum** b) Audiology - III	12
7.	U09AS4MCT39	B 4.6 Environment Studies	4
TOTAL			40

V SEMESTER

S.No	Code	Title of the Course	Teaching Hours per Week
1.	U09AS5MCT25	B5.1. Fluency & its Disorders	4
2.	U09AS5MCT26	B5.2. Motor Speech Disorders in Adults	4
3.	U09AS5MCT27	B5.3. Technology & Amplification Devices for persons with Hearing Impairment	4
4.	U09AS5MCT28	B5.4. Professional Practices in Speech, Language & Hearing including Community Work	4
5.	U09AS5MCP29	**Clinical Practicum** B5.5. a) Speech –Language Pathology - IV	12

6.	U09AS5MCP30	**Clinical Practicum** b) Audiology - IV	12
TOTAL			40

VI SEMESTER

S.No	Code	Title of the Course	Teaching Hours per Week
1.	U09AS6MCT31	B6.1. Neurogenic Language Disorders in Adults	4
2.	U09AS6MCT32	B6.2. Noise Measurements & Hearing Conservation	4
3.	U09AS6MCT33	B6.3. Basic Statistics	4
4.	U09AS6MCT34	B6.4. Scientific Enquiry in Audiology & Speech Language Pathology	4
5.	U09AS6MCP35	**Clinical Practicum** B6.5. a) Speech –Language Pathology - V	12
6.	U09AS6MCP36	**Clinical Practicum** b) Audiology - V	12
TOTAL			40

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COURSE CONTENT
Semester I

B 1.1 Communication Sciences

Hour - 60 **Marks -100**

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

basic concepts in speech, hearing, language and communication basic concepts of hearing sensitivity and acoustics

Part A Speech-Language Pathology

Unit 1: Speech, language and communication

Definitions of speech, language, communication, and their components

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 2: Bases of speech and language

Overview of speech production – speech sub-systems

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 3: Sound intensity and concept of decibel

acoustic energy and power, absolute and relative units – 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 4: Audibility & hearing

Hearing range –intensity and frequency

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 5: Introduction to Audiology and Speech-language Pathology
Part A: Speech and language

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
Audiology – historical aspects, development of instrumentation in audiology
Development of audiology: Indian and global context
Branches of audiology

Scope of audiology

Recommended Reading

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

B1.2 Anatomy and Physiology of Speech and Hearing

Hours - 60 **Marks - 100**

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

- anatomy of the auditory system
- anatomy of the speech mechanism
- physiology of hearing mechanism
- functioning of speech and swallowing mechanism

Unit 1: Introduction

General anatomical terms

Anatomical positions and planes of reference

Cells, tissues and muscles

Muscle connection and joints

Tissue - vascular and neural

Unit 2: Embryology

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

Unit 3: Anatomy and physiology of speech production systems and swallowing

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 4: Anatomy and physiology of external and middle ear

Anatomy of the external ear
Physiology of external ear including localization
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 middle ear muscles
Physiology of Eustachian tube
Middle ear transformer action
Physiology of middle ear muscles

Unit 5: Anatomy and physiology of labyrinth

Anatomy of bony and membranous labyrinth

Macro anatomy of cochlea

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

Recommended Reading

Seikel, J. A., King, D. W., & Drumright, D. G. (2010). Anatomy & Physiology for Speech, Language, and Hearing (4th edition). Delmar, Ceenage Learning, Division of Thomson Learning. NY.

Zemlin, W. R. (2010). Speech and Hearing Science: Anatomy and Physiology:

International Edition (4 edition.). Boston: Pearson.

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.

Kelley, M., Wu, D., & Fay, R. R. (Eds.). (2005). Development of the Inner Ear (2005 edition.). New York: Springer.

B1.3 Clinical Psychology

Hour – 60 **Marks -100**

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 basics of counselling

Unit 1: Introduction to psychology

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 2: Assessment procedures in clinical psychology

Methods in clinical psychology: case history, clinical interviewing, clinical observation, definition and types of psychological testing
Assessment of cognitive functions

Adaptive functions,

Personality

Behavioural assessment

Classification of abnormal behavior

History, need & rationale of classification

Current classificatory system: DSM, ICD

Unit 3: Developmental psychology

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

Social development

Unit 4: Principles of learning and behaviour modification

Learning: meaning, definition and characteristics

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 5: Neuropsychology and its relevance to study of speech

Neuropsychology: introduction and definition

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

Recommended Reading

Morgon C.T., King R.A., Robinson N.M. Introduction to Psychology. Tata McGraw Hill Publishing Co.

Anastasi, A. (1999). Psychological testing, London: Freeman

Baura, M (2004). Human Development and Psychlogy, Rehabiliation Council of India, New Delhi. ISBN: 81-7391-868-6

Coleman J.C. Abnormal Psychology and Modern Life, Taraporevala Sons & Co.
Gregory, R.J. (2000). Neuropsychological and geriatric assessment in Psychological Testing: History, Principles, and Applications (3rd ed.). New York: Allyn & Bacon.
Hurlock, E.B. (1981). Child development. (VI Ed.). Mc Graw Hill International Book Co.

Kline, P. (1993). The Handbook of Psychological Testing. Routledge

Lezak, M., Loring, D.W., and Hannay, H.J. (2004). Neuropsychological Assessment. Fourth Edition. New York: Oxford University Press

Siegal M.G. (Ed). (1987). Psychological Testing from Early Childhood Through Adolescence. International Universities Press.

B1.4 Linguistics and Phonetics

Hour - 60 **Marks -100**

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

different branches and aspects of linguistics

characteristics and functions of language

different branches of phonetics, applied linguistics, and phonology morphology, syntax, semantics, pragmatics acquisition of language and factors affecting it

bi/multilingualism and related issues

Unit 1: Linguistics

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

Unit 2: Phonetics and Phonology

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

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

Unit 3: Morphology, syntax, semantics and applied linguistics

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.

Unit 4: Language acquisition

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

Unit 5: Bi/multilingualism

Introduction to the language families of the world and India

Issues related to second language acquisition & factors influencing it Inter-language theory, language transfer and linguistic interference Differences between first and second language acquisition/learning Bilingualism/Multilingualism

Metaphonology

Writing systems – types of writing

History of writing systems

Indian writing systems

Recommended Reading

Ball & Martin (1995). Phonetics for speech pathology. Delhi: AITBS Publishes, India.

Ball, Rahilly&Tench (1996). The phonetic transcription of disordered speech. San Diego: Singular Publishing Group Inc.

Clark and Yallop (1999). An introduction to phonetics and phonology. Oxford:

Blackwell Publishes Inc.

Karanth, P (2003). Cross-Linguistic study of Acquired Reading Disorders. Sage Publications, New Delhi. ISBN : 0-306-48319-X

Ladefoged, P. (1982). A course in phonetics. New York: Harcourt Brace Jovanorich Inc.

Shriberg & Kent (1982). Clinical phonetics. New York: John Wiley & Sons.

B1.5 Electronics and Acoustics

Hours – 60 **Marks - 100**

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 1: Electronic components and power supply

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

Unit 2: Introduction to acoustics

Vibrations 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 3: Acoustical treatment, transducers and basics of computers

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 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 4: Digital signal processing

Digital signal processing –introduction and need

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 5: Instrumentation in speech and hearing

Introduction to electronic instrumentation in speech and hearing 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

Recommended Reading

Haughton, P., & Haughton, P. M. (2002). Acoustics for Audiologists (1st edition.).

San Diego, Calif: Emerald Group Publishing Limited.

Moser, P. (2015). Electronics and Instrumentation for Audiologists. Psychology Press.

Moser, P. J. (2013). Electronics and Instrumentation for Audiologists. Psychology 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.

Speaks, C. E. (1999). Introduction To Sound: Acoustics for the Hearing and Speech

Sciences (3 edition.). San Diego: Cengage Learning.

Villchur, E. (1999). Acoustics for Audiologists (1 edition.). San Diego, Calif: Delmar Cengage Learning.

B1.6 Research Methods and Statistics

Hours - 60 **Marks - 100**

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 design and execution of research
- ethical guidelines for conducting research

Part A: Research Methods

Unit I: Introduction to research methods

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

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

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

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

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)

Recommended Reading

Dane F. C. (2011). Sampling and Measurement. In Evaluating research: Methodology for people who need to read research. New Delhi: SAGE publication. Field, A. (n.d.). Discovering Statistics Using IBM SPSS (4th ed.). SAGE Publications.

Hegde M. N. (2010). A course book on Scientific and professional writing for speech language pathology (4thEdition), Singapore: Delmar publication.

Hegde, M. N. (2003). Clinical research in communicative disorders: Principles and

strategies. (3rd Edition), Austin: Pro-ed

Hesse-Biber, S. N. &Leavy, P. (2011). The Ethics of social research. In The Practice of qualitative research. (2nd Edition), New Delhi: SAGE publication.
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

Meline, T. (2010). A research primer for communication sciences and disorders.

Singapore: Pearson publication.

Semester II

B 2.1 Neurology

Hour - 60 **Marks -100**

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
- neural organization –different structures and functions of various systems neurosensory and neuromotor controls in speech, language and hearing mechanisms cerebral plasticity and dominance and its relevance for speech, language and hearing disorders
- various neural diseases, lesions, nutritional and metabolic conditions affecting speech, language and hearing
- basic principles and assessment procedures used in speech, language and hearing disorders associated with neurological conditions
- basic principles and management procedures used in speech, language and hearing disorders associated with neurological conditions

Unit 1: Anatomy and physiology of the nervous system

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 2: Neural organization of speech and hearing processes

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 3: Neural disorders associated with speech and hearing disorders - I

Neural infections – meningitis, encephalitis

Developmental anomalies – spinal cord defects, syringomalacia 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 4: Neural disorders associated with speech and hearing disorders - II

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

Unit 5: Speech-language and swallowing disorders

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

Recommended Reading

Adams, R.D. &Sidman, R.L. (1968). Introduction to neuropathology. New Jersey:

McGraw-Hill.

Bhatnagar, S.C. (2012). Neuroscience for the Study of Communicative Disorders. Lippincott, Williams & Wilkins

Garden, E. (1968). Fundamental of neurology, V Edn., Philadelphia: Sarenders Co.
Webb, W. G., & Adler, R. K. (2008). Neurology for the speech-language pathologist (5th ed.). St. Louis, Mo: Mosby/Elsevier.

Duffy, J. R. (2013). Motor Speech Disorders: Substrates, Differential Diagnosis, and Management (3rd Ed.). University of Michigan, Elsevier Mosby.

B2.2 Otolaryngology

Hour - 60 **Marks -100**

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 and articulatory systems

Unit 1: External and middle ear and their disorders

Clinical anatomy of the ear

Congenital anamolies

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 2: Inner ear and its disorders

Congenital anomalies

Meniere's Disorder

Ototoxicity

Presbyacusis

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 3: Oral cavity and its disorders

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

Inflammatory conditions of the pharynx, tonsils and adenoids

Tumors of the pharynx

Unit 4: Larynx and its disorders

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 tumours of the larynx

Laryngectomy – overview of surgical procedure

Phono surgery and other voice restoration surgeries

Unit 5: Esophagus and its disorders

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 procedures

Recommended Reading

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 Dhingra, P. L. (2013). Diseases of Ear, Nose and Throat (Sixth edition). Elsevier. O'Neill, J.P. and Shah, J.P. (2016). Self-assessment in otolaryngology. Amsterdam: Elsevier

Postic, W.P., Cotton, R.T., Handler, S.D. (1997). Ear trauma. Surgical Pediatric Otolaryngology. New York: Thieme Medical Publisher Inc.

Wackym, A. and Snow, J.B. (2015). Ballenger's otorhinolaryngology head and neck surgery. (18th edition). United States: McGraw-Hill Medical

B2.3 Speech-Language Pathology

Hour – 60 **Marks -100**

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

- different speech and language disorders
- basic concepts and tools required for diagnosing speech and language disorders basics of assessment procedures for speech and language disorders
- basic principles and intervention procedures for speech and language disorders clinical requirements to practice,
- different laws, social-cultural and ethical issues
- identification and prevention of speech and language disorders
- basic principles of providing counselling and guidance to clients and caregivers

Unit 1: Basic concepts and methods of diagnostics

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

Unit 2: Basic concepts and methods of therapeutics

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

Unit 3: Overview of basic assessment and management of speech disorders

Causes of speech disorders

b) 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

Unit 4: Overview of basic assessment and management of language disorders

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

Unit 5: Other issues in practice as a speech - language pathologist

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

Recommended Reading

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.

Hegde, M. N., & Davis, language pathology (4th Learning.

D. (2005). Clinical methods and practicum in speech-ed.). Australia; Clifton Park, NY: Thomson Delmar

Shipley, K. G., & Roseberry-McKibbin, C. (2006). Interviewing and counselling in communicative disorders : Principles and procedures (3rd ed.). Austin, Tex: Pro-Ed. Brookshire, R. H. (2003). Introduction to neurogenic communication disorders (6th ed.). St. Louis, Mo: Mosby.

Hulit, L.M., Marle. R., Kathleen, R. H., & Fowey (2010). Born to Talk. Pearson Communication Science and Disorders Series 5th Ed.

Roth, F. P., & Worthington, C. K. (2005). Treatment resource manual for speech language pathology (3rd ed.). Australia; Clifton Park, NY: Thomson Delmar Learning.

Shipley, K. G., & McAfee, J. G. (2004). Assessment in speech-language pathology: A resource manual (3rd ed.). Australia; Clifton Park, NY: Delmar Learning. Ysseldyke, J. E., & Algozzine, R. (2006). Teaching students with communication disorders : A practical guide for every teacher. Thousand Oaks, Calif.: Corwin Press.

B2.4 Audiology

Hour - 60 **Marks -100**

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

- understand and carryout experiments to measure differential sensitivity loudness and pitch
- take case history, administer the tuning fork tests and interpret the results administer pure tone audiometry including masking on clinical population and appreciate the theoretical back ground of it
- carryout different tests involved in speech audiometry appreciate the theoretical back ground
- carryout subjective calibration and daily listening checks of the audiometer
- get adequate theoretical information necessary to understand concepts involved in objective calibration

Unit 1: Differential sensitivity

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 2: Case history and tuning fork tests

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 3: Pure tone audiometry

a) Classification of audiometers, Parts of an audiometer, characteristics and

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 4: Speech audiometry

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 5: Clinical masking and instrumental calibration

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

Recommended Reading

Durrant, J. D., &Feth, L. L. (2012). Hearing Sciences: A Foundational Approach (1 edition.). Boston: Pearson.

Emanuel, D. C., &Letowski, T. (2008). Hearing Science (1 edition.). Philadelphia: Lippincott Williams and Wilkins.

Gelfand, S. A. (2009). Hearing: An Introduction to Psychological and Physiological Acoustics (5 edition.). London: CRC Press.

Kaplan, H., Gladstone, V. S., & Lloyd, L. L. (1993). Audiometric Interpretation: A

Manual of Basic Audiometry (2 edition.). Boston: Pearson.

Katz, J. (2014). Handbook of Clinical Audiology (7th International edition edition.). Lippincott Williams and Wilkins.

Martin, F. N., & Clark, J. G. (2014). Introduction to Audiology. Boston: Pearson.

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

B2.5 Practicals (Speech-language Pathology) - I

Marks -100

Practicals

Demonstrate normal aspects of speech and analyse 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 analyse 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 analyse 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 counselling of at least 5 different speech and language disorders in children.

Observe the evaluation process and counselling 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.

B2.6 Practicals (Audiology) - I

Marks -100

Practicals

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

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 calibration 20 times and observe objective calibration once

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

SEMESTER III
B 3.1 ARTICULATION AND PHONOLOGICAL DISORDERS

(80+20 marks) **(Total = 64 hrs)**

After studying this paper at the end of the semester, the student should be able to understand the following –

- Development of phonology
- Factors related to articulation and phonological disorders
- Assessment and therapy procedures

Unit 1 **(12 hrs)**

1. Review of phonological development and articulatory mechanism
2. Fundamentals of Articulatory phonetics
3. Definition and types of coarticulation

Unit 2 **(14 hrs)**

1. Transcription methods in perceptual analysis
2. Phonological processes – types, language specific issues, identification and classification of errors.
3. Distinctive features – types, language specific issues, identification of errors and analysis.
4. Acoustic aspects of production and perception of speech sounds; use of spectrograms

Unit 3 **(12 hrs)**

1. Factors related to articulation and phonological disorders:
   - Structural
   - Cognitive – Linguistic
   - Neurological
   - Psychosocial
   - Social
   - Metalinguistic

Unit 4 **(12 hrs)**

1. Assessment procedures: Types of assessment, sampling procedures, scoring procedures, criteria for selection of assessment instruments

2. Assessment of Oral peripheral mechanism
3. Speech sound discrimination, stimulability and oral stereognosis.

4. Analysis and interpretation of data:
   - Intelligibility and severity judgements
   - Normative data

- Error patterns.

5. Characteristics of disordered phonology and differential diagnosis

Unit 5 **(14 hrs)**

1. Intervention: Stages of treatment and measuring improvement, long term goals, short term goals and activities for achieving goals in cases with misarticulation.
2. Issues in maintenance and generalization.
3. Team approach and professional communication (inter, intra professional and client oriented)
4. Approaches to treatment: motokinesthetic, traditional approaches integral stimulation, phonological, distinctive feature, minimal contrast therapy, learning theories, programmed, paired – stimuli.
5. Computerized intervention packages, metaphon therapy

LIST OF BOOKS

Compulsory Reading:

1) Bernthal, J.E. and Bankson, N.W. (1988).Articulation and Phonological Disorders. (3rd Ed.). New Jersey: Prentice Hall Inc.

2) Weiss, C.E., Lillywhite, H.S. and Gordon, M.E. (1980). Clinical Management of Articulation Disorders. St. Louis: C.V. Mosby

3) Creaghead, N.A., Newman, A.W. and Secord, W.A. (1989). Assessment and remediation of articulatory and phonological disorders. (2nd Ed.). New York: Macmillan

Additional/Optional Reading:

4) Johnson, J.P. (1980). Nature and Treatment of Articulation Disorders. Springfield: Charles C. Thomas.

SEMESTER III
B 3.2 MAXILLOFACIAL ANOMALIES

(80+20 marks) **(Total = 64 hrs)**

Objectives:

After studying this paper at the end of the semester, the student should be able to understand the following –

- Identification of orofacial anomalies, and their effect on speech and other functions
- Effectiveness of Velopharyngeal closure and dysfunction
- Assessment and management

CLEFT LIP AND PALATE

Unit 1 **(12 hrs)**

1. Etiological factors
2. Embryology of the Face and Palate
3. Types of Cleft lip and Palate
4. Classification systems
5. Syndromes

Unit 2 **(14 hrs)**

1. Velopharyngeal mechanism- muscles and function; inadequacy, incompetency and insufficiency
2. Speech and Language problems of individuals with Cleft
3. Associated problems of individuals with Cleft

Unit 3 **(12 hrs)**

1. Diagnostic procedures and Instruments used in Assessment of speech in Cleft palate
2. Team Management: Composition, responsibilities and co-ordinator

Unit 4 **(14 hrs)**

1. Treatment concepts
2. Treatment procedures for speech
3. Prosthetic speech appliances for patients with Cleft palate

GLOSSECTOMY and MANDIBULECTOMY

Unit 5 **(12 hrs)**

1. Effect of partial and Total Glossectomy on speech
2. Characteristics of Glossectomy speech
3. Rehabilitation of speech
4. Prosthetic fitting, design, assessment
5. Dysphagia specific to glossectomy and mandibulectomy: assessment and rehabilitation

LIST OF BOOKS

Compulsory Reading:

1) Mc. Williams, B.J., Morris, H.L. and Shelton, R.L. (1984).Cleft Palate Speech (1st Edition). Philadelphia: B.C. Decker Inc.

2) Spriesterbach, D. (1968). Cleft palate and Communication. Academic Press, New York

Additional / Optional Reading:

3) Grunwell (1993). Analysis of Cleft palate speech, (Ed.) Whurr publisher. London

4) Kernahan, D.A. and Rosenstein, S.W. (1990). Cleft, Lip and Palate – A System of Management. Maryland (USA): Williams and Wilkins.

5) Appleton, J. and Machin, J. (1995). Working with Oral Cancer. UK: Winslow.

SEMESTER III

B 3.3 DIAGNOSTIC AUDIOLOGY: Part 1

(80+20 marks) **(Total = 64 hrs)**

Unit 1: **(12 hrs)**

Introduction to diagnostic audiology

a) Need for test battery approach in auditory diagnosis and integration of results of audiological tests.

b) Indications for administering audiological tests to identify:

- Cochlear pathology
- Retrocochlear pathology
- Functional hearing loss
- Central auditory processing disorders

Unit 2 **(12 hrs)**

Tests to differentiate between cochlear and retrocochlear pathology

a) ABLB, MLB
b) SISI
c) Tests for adaptation
d) Bekesy Audiometry
e) Brief tone audiometry
f) PIPB function

Unit 3 **(12 hrs)**

Tests to detect pseudohypoacusis

a) Pure tone tests including tone in noise test, Stenger test
b) Speech tests including yes & no
c) Lombard test, Stenger test, lip-reading test, Doefler-Stewert test.
d) Identification of functional hearing loss in children

Unit 4 **(16 hrs)**

Tests to detect central Auditory Disorders

a) Monoaural low redundancy tests

- Filtered speech tests
- Time compressed speech test
- Speech-in-noise test
- SSI with ICM
- Other monaural low redundancy tests

b) Dichotic speech tests

- Dichotic digit test
- Staggered spondaic word test
- Dichotic CV test
- SSI with CCM

- Competing sentence test
- Other dichotic speech tests

c) Binaural interaction tests
- RASP
- BFT (Binaural Fusion Test)
- MLD
- Other binaural interaction tests

d) Temporal ordering tasks
- Pitch pattern test
- Duration pattern tests
- Other temporal ordering tests

Unit 5 **(12 hrs)**

a) Variables influencing central auditory assessment
- Procedural variables
- Subject variables

b) Test findings in subjects with central auditory disorders
- Brainstem lesion
- Cortical and hemispheric lesion
- Interhemispheric dysfunction
- CAPD in children
- CAPD in elderly

LIST OF BOOKS

Compulsory Reading:

1. Jerger, J. (1963). Modern developments in Audiology, New York: Academic Press.
2. Jerger, J. (1987). Diagnostic Audiology: Historical Perspectives, Ear and Hearing, 8 7s-12s
3. Katz, J. et al (Ed.) (1994). Handbook of Clinical Audiology, Baltimore: Williams and Wilkins.
4. Musiek, F.E. and Rintlemann, W.F. (1999). Contemporary Perspective in Hearing Assessment. USA: Allyn & Bacon.
5. Silman S. and Silverman C.A. (1991). Auditory Diagnosis Principles and Application. New York: Academic Press, Inc.

Additional Reading:

1. Martin, F.N (1994), Introduction to Audiology, New Jersey: Prentice Hall.

2. Rupp, Stockdell (1980). Speech Protocols in Audiology, New York: Grune & Stratton.

3. Keith, R.M. (Ed.). (1981). Central Auditory Dysfunction. New York: Grune & Stratton.

4. Musiek, and Baran, J.A. (1987). Central Auditory Assessment: Thirty years of challenge and change. Ear and Hearing 3, 225-355.

5. Pinherio, H.L. Kusiek, F.E. (Eds) (1985). Assessment of Central Auditory Dysfunction Foundations and Correlates. Baltimore: Williams and Wilkins.

6. Willsford J.A. (1987), Handbook of Central Auditory Processing Disorders in Children. Drando, Grune & Stratton.

7. Feldman, A.S., & Willber, L.A. (Eds), (1976), Acoustic Impedance, Immittance: Measurement of Middle Ear Function, Baltimore: Williams & Wilkins.

8. Popelka, B.R. (Ed) (1981). Hearing Assessment with acoustic reflex. New York: Grune and Stratton.

9. Jacobson, J.T. (Ed) (1985). Auditory Brain Stem Response. Taylor and Francis, London.

SEMESTER III

B 3.4 REHABILATIVE AUDIOLOGY

(80+20 marks) **(Total = 64 hrs)**

Unit 1 **(10 hrs)**

1. Speech reading
   (a) Definitions
   (b) Need
   (c) Visibility of speech sounds – audio visual perception vs. visual perception
   (d) Visual perception of speech by the hard of hearing
   (e) Tests for speech reading ability, including Indian tests
   (f) Speech reading activities

2. Factors influencing speech reading
   (a) Methods of training: analytical vs. synthetic; (including speech tracking)
   (b) Individual and group training

Unit 2 **(16 hrs)**

1. Auditory learning
   (a) Definition and historical background
   (b) Role of audition in speech and language development in normal children and its application in education of the hearing impaired.
   (c) Factors in auditory training: motivation of the case, intelligence, age, knowledge of progress, etc.
   (d) Auditory Verbal Therapy
   (e) Methods of auditory training
   (f) Auditory training activities
   (g) Communicative strategies
   (h) Individual vs. group auditory training

Unit 3 **(10 hrs)**

Management of hearing impaired individuals with special needs
   (a) Management of multiple handicapped hearing impaired children (MHHI)
   (b) Management of children with central auditory processing problems
   (c) Rehabilitation of hearing impaired – elderly population

Unit 4 **(12 hrs)**

Assistive Listening Devices (ALDs)
- Classification based on auditory, visual & tactile stimulation
- Classification based on alerting devices Vs devices for speech perception.
- Selection of ALDs.

Unit 5 **(16 hrs)**

1. Implantable Devices
   - Middle Ear Implants and BAHA (Bone Anchored Hearing Aid)
   - Cochlear Implants
   - Brainstem Implants

   Components, Candidacy, Advantages and Complications of the same.

2. Utility of technology/devices in the management of tinnitus, hyperacusis.

LIST OF BOOKS

Compulsory Reading:

Skinner HW (1988), Hearing aid evaluation, Prentice Hall, Englewood Cliffs, NJ.

Pollack M (1980) Amplification for the hearing impaired. Grune and Stratton: NY.

Clark, G.M., Cowan, R.S.C. & Dowell, R.C. (1997). Cochlear Implantation for Infants & Children: Advances. Singular Publishing Group Inc.

Additional Reading:

Loavenbruck All and Madell IR (1981), Hearing aid dispensing for audiologists: A guide for clinical service. New York: Grune and Stratton.

Bess et al (1981). Amplification in Education, Alexander Graham Bell Association for the Deaf, Washington.

Hull, R.H. (1982). Rehabilitation Audiology, New York: Grune and Stratton.

Donnelly K (1974), Interpreting hearing aid technology, CC, Thomas, Springfield.

Markides A (1977) Binaural hearing aids, Academic Press Inc., London.

Hodgson HR and Skinner (PH) (1977, 1981), Hearing aid Assessment and use in audiologic habilitation, Williams and Wilkins, Baltimore.

Cooper (1991), Practical aspects of Audiology: Cochlear implants: A practice guide. Whurr Publisher, London.

Mueller HG, Hawkins DB., Northern JL. (1992), Probe microphone measurements: Hearing aid selection and assessment, Singular publishing group. Inc., California.

BIS, ANSI & IEC Specifications

SEMESTER III

B 3.5 CLINICAL PRACTICUM (a) Speech – Language Pathology - II

At the end of Semester III, the student should be able to carry out the following –

1. Carry out informal and formal assessment procedures for the following aspects of speech and language (from a normal child sample)

i)Pre-linguistic skills

Non-verbal communication

Child directed speech

ii) Semantics

Syntax and morphology

Pragmatics

iii)Phonological process and its analysis

Speech intelligibility

Transcription of the sample in IPA should be done.

2. Use scales / tests for evaluation and treatment of Childhood communication disorders, Articulation and Phonological Disorders, Maxillofacial anomalies:
   - Northwest Syntax Screening Test
   - Bankson's Language Screening Test
   - Test for Examining Expressive Morphology
   - Autistic Behaviour Composite Checklist and Profile
   - Linguistic Profile Test
   - Tests for learning Disability
   - Screening Test for Developmental Apraxia of Speech
   - Articulation assessment tests in different Indian languages
   - Other Indian tests and materials available

3.
   i) Perceptual analysis of 5 normal and 5 abnormal articulation samples
   ii) Analysis and marking of cleft
   iii) Nasalence measurements in normal and cleft palate speech

4. Planning and executing therapy for a minimum of 5 clients (including children and adults with articulation disorders, cleft palate, glossectomy, mandibulectomy) for approximately 5 sessions each and preparation of the following:
   - Carry out baseline evaluation
   - Preparation of pre therapy reports
   - Provide guidelines for home-based intervention in the form of home training programs/modules for the above mentioned disorders

Making appropriate referrals and preparing sample referral letters to various professionals connected with the above mentioned disorders
Know various centers available for rehabilitation (local, national, international)

5. Counseling parents of children and adults with articulation disorders, cleft lip and palate, glossectomy and mandibulectomy

6. Maintaining audio samples used for the practical analysis

7. Maintaining clinical dairy.

SEMESTER III
B 3.5 CLINICAL PRACTICUM (b) Audiology - II

At the end of Semester **III**, the student should be exposed to and be able to carry out the following:

1. Be familiar with instrumentation for speech audiometry, immittance audiometry, sound field-testing.

2. Carryout complete pure tone audiometry (with AC/BC, unmasked/masked), interpretation of audiograms, identifying indicators for special/further diagnostic testing, writing case review (25 cases)

3. Speech Audiometry: Be familiar with speech test material in at least two Indian languages, master live voice presentation and recorded test presentation, administer SAT, SRT, SIS, MCL, UCL, PI-PB function test.

4. Collect speech audiometry test materials in Indian languages.

5. Carryout speech audiometry on 10 normal subjects, and 20 cases with conductive hearing loss, sensorineural hearing loss and functional hearing loss. Interpretation of speech audiometry results.

6. Carryout holistic audiological assessment for differential diagnosis (Cochlear & Retro cochlear):
   Routine pure tone & speech audiometry
   Administering special tests using pure tone: Tone Decay Test, STAT, SISI, ABLB, MLB, SPAR, Test for functional hearing loss.

Educational Audiology

1. Note the speech and language characteristics of those with hearing impairment
2. Management of individuals with post-lingual hearing impairment

3. Role-play activities for teaching language to the hearing impaired.

4. Prepare schedules for educational placement of 5 hearing impaired children having different hearing capacities.

5. Counsel parents regarding educational placement of the hearing impaired.

SEMESTER III
B 3.6 INDIAN CONSTITUTION

(80+20 marks) **(Total = 64 hrs)**

(Syllabus for compulsory paper for all undergraduate degree courses in III semester)

Unit 1: Indian Constitution: Its Philosophy and Framing

- The constituent Assembly
- Preamble, Fundamental Rights and Fundamental Duties
- Directive Principles of State Policy
- Amendment and Review of the Constitution

Unit 2: The Union & State Legislature

- Union Parliament
- State Legislature
- Law-making process
- Committee System

Unit 3: The Union & State Executive

- The President of India
- The Prime minister and Council of Ministers
- The State Governor, Chief Minister and Council of Ministers
- Coalition Government

Unit 4: The Judiciary

- The Supreme Court of India
- Judicial Review
- Writs
- Judicial Activism and Public Interest Litigation

Unit 5: Issues

- Indian Federalism
- Human Rights and Environmental Protection
- Reservation and Social Justice
- Secularism

LIST OF BOOKS

1. D.D. Basu : Introduction to the Constitution of India
2.Granville Austin : India's Constitution – Cornerstone of a Nation

3.Granville Austin : Working of a Democratic Constitution - The Indian Experience
4. J. C. Johari : Indian Government and Politics Vol. 1 & 2
5. J.R. Siwach : Dynamics of Indian Government & Politics
6. D.C. Gupta : Indian Government & Politics
7. M.V. Pylee : India's Constitution
8. H.M. Rajasekhar : Bharatha Sarkara mattu Rajkiya
9. M.P. Bhuvaneshwara Prasad : Bharathiya Samvidhana Parichaya
10. S.K. Kabburi : Bharata Samvidhana
11. K.J. Suresh : Bharata Samvidhana
12. D.T. Deve Gowda : Bharata Sarkara mattu Rajkiya
13. Lohitashwa : Bharata Samvidhana

SEMESTER IV

B.4.1 VOICE AND LARYNGECTOMY

(80+20 marks) **(Total = 64 hrs)**

Objectives:

After studying this paper at the end of the semester, the student should be able to understand the following –

- Characteristics of voice and its disorders
- Laryngeal abnormalities
- Assessment and Management

Unit 1 **(14 hrs)**

1. Characteristics of normal voice: Physiological, acoustical and aerodynamic correlates
2. Development: Birth to senescence; including age-related changes
3. Theories of phonation
4. Classification of abnormal voice
5. Voice disorders in other conditions:
   - Voice disorders related to resonatory problems
   - Voice problems in conditions like Cerebral palsy, Hearing impaired, mentally retarded, Cleft lip and palate
   - Voice problems in Endocrine disorders

Unit 2 **(12 hrs)**

1. Etiology, incidence, prevalence, signs and symptoms of:
   - Organic voice disorders: Laryngeal cancer also to be included here
   - Non-organic voice disorders: eg: Functional disorders (Psychosomatic-Functional aphonia and physiological- voice abuse)
   - Congenital voice disorders
   - Neurological voice disorders

Unit 3 **(12 hrs)**

1. Evaluative procedures and Instrumentation for:
   - Invasive procedures – endoscopic procedures
   - Non-invasive (Acoustic, perceptual, aerodynamic, Electro Glotto Gram, Inverse filtering procedures)
2. Comparison of normal and abnormal voice patterns based on the above procedures

Unit 4 **(14 hrs)**

Laryngectomy:

- Types and characteristics of laryngectomy surgery

- Assessment of a laryngectomee and associated problems
- Management of a laryngectomee: a) Esophageal speech: anatomy, candidacy, different types of air intake procedures, speech characteristics of esophageal speech; b) Tracheo-esophageal speech: anatomy, candidacy, different types of TEP, fitting of prosthesis, speech characteristics, complications in TEP; c) Artificial larynx: different types, selection of artificial larynx, speech characteristics; d) Pharyngeal speech, buccal speech, ASAI speech, gastric speech; e) Pre and postoperative counseling

Unit 5 **(12 hrs)**

1. Medical/Surgical procedures in the treatment of voice disorders
2. Voice therapy – various techniques
3. Professional voice users: Definition, types, characteristics, importance of vocal hygiene and professional voice care

LIST OF BOOKS

Compulsory Reading:

1) Boone, D.R. & McFarlane, S. C (1994): The Voice and Voice Therapy. (Fifth Ed.). Englewood Cliffs, Prentice-Hall, Inc. New Jersy.

2) Prater, R.J. and Swift, R.W. (1984): Manual of Voice Therapy. Little, Brown and Co, Boston.

3) Andrews . M.L. (1995): Manual of Voice treatment, Singular publishing group, San Diego.

4) Doyle, P C (1994) Foundation of voice and speech rehabilitation following laryngeal cancer. Singular publishing group. San Diego.

Additional/Optional Reading:

5) Brown. W.M.s. and others (1996) (ed): Organic voice disorders. Singular publishing group, Sandiego.

6) Joseph, C Stemple Leble, E Glaze, Bernick K Gerdeman. Clincial voice pathology. Theory & Management (II Edition)

7) Aronson, A.E. (1990): Clinical Voice Disorders, New York: Thieme, Inc.

8) Greene, M.C.L. and Mathieson, L. (1989): The Voice and Its Disorders. Whurr publications, London.

9) Case, J.L. (1991): Clinical Management of Voice Disorders, Pro-Ed, Austin.

10) Fawcus, M. (Ed.) (1991): Voice Disorders and Their Management. Singular Publishing. Group. San Diego

11) Salmon, S.J. and Mount, K.H. (Eds.) (1991): Alaryngeal Speech Rehabilitation. Prof-Ed. Austin.

12) Keith, R L & Darley (III Edition) Laryngectomee rehabilitation. Pro. Ed.Austin

SEMESTER IV
B 4.2 MOTOR SPEECH DISORDERS IN CHILDREN

(80+20 marks) **(Total = 64 hrs)**

Objectives:

After studying this paper at the end of the semester, the student should be able to understand the following –

- Characteristics of motor speech disorders
- Types of Cerebral palsy, Apraxia and other conditions
- Assessment and Management

Unit 1 **(12 hrs)**

1. Introduction to neuromotor organization and sensorimotor control of speech
    - Motor areas in cerebral cortex, motor control by subcortical structures, brainstem, cerebellum and spinal cord.
    - Central nervous system and peripheral nervous system in speech motor control.
    - Centrifugal pathways and motor control
    - Neuromuscular organization and control
    - Sensorimotor integration
    - Introduction to motor speech disorders in children- Dysarthria and Developmental apraxia of speech

Unit 2 **(12hrs)**

1. Cerebral palsy
    - Definition, causes and classification
    - Neuromuscular development in normals and children with cerebral palsy
    - Reflex profile
    - Associated problems
    - Speech and language problems of children with cerebral palsy
    - Assessment of speech in children with cerebral palsy- objective and subjective methods
    - Differential diagnosis of cerebral palsy
    - Management: Introduction to different approaches to neuromuscular education (Bobath, Phelps and the others); Speech rehabiliatation in cerebral palsy- Verbal approaches: vegetative exercises, oral sensorimotor facilitation techniques, compensatory techniques- correction of respiratory, phonatory, resonatory and articulatory errors; Team approach to rehabilitation; Neurosurgical techniques for cerebral palsy

Unit 3 **(12 hrs)**

1. Different types of Cerebral palsy:
    - Disorders of muscle tone: Spasticity, rigidity, flaccidity, atonia
    - Disorders of movement: Hyperkinesias and dyskinesias- Ballismus, tremor, tic disorder, myoclons, athetosis, chorea, dystonia, hypokinesias
    - Disorders of coordination- Ataxia

2. Syndromes with motor speech disorders- Examples:
    - Juvenile progressive bulbar palsy
    - Congenital supranuclear palsy
    - Guillain- Barre syndrome
    - Duchenne muscular dystrophy

Unit 4 **(14 hrs)**

1. Apraxia of speech in children or developmental apraxia of speech
    - Definition
    - Description: verbal and non-verbal apraxia
    - Differential diagnosis- dysarthria and other developmental disorders
    - Management of developmental apraxia of speech- Facilitation techniques for oral motor movements, speech therapy techniques, generalization of speech

Unit 5 **(14 hrs)**

1. Application of augmentative and alternative (AAC) communication methods in developmental dysarthrias and developmental apraxia of speech:
    - Symbol selection
    - Techniques
    - Assessment for AAC
    - Training communication patterns,
    - Effective use of AAC

LIST OF BOOKS

Compulsory Reading:

Crary, M.A. (1993). Developmental Motor Speech Disorders. Singular Publishing group Inc. Whurr publishers. San Diego. California

Caruso, F. J. and Strand, E. A. (1999). Clinical Management of Motor Speech Disorders in Children. New York: Thieme.

Love, R.J. and Webb, W.G. Butterworth. (1986). Neurology for Speech-Language Pathology. (2nd ed.)

Additional/Optional Reading:

Minifie, N.R. Williams Heinemann. (1974). (2nd Ed.) Handling the Young Cerebral Palsied Child at Home. Medical Books.

Cogher, L., Savage, E. and Smith, M.T. Cerebral Palsy: The child and the Young Person. (1992). Eds. London: Chapman and Hall Medical.

Hardy, J. (1983). Cerebral Palsy. Remediation of Communication
Disorder Series by F.N. Martin. Englewood Cliffs, Prentice Hall Inc.

Rosenthal. S., Shipp and Lotze. Dysphagia and the child with developmental disabilities.

SEMESTER IV

B 4.3 DIAGNOSTIC AUDIOLOGY: Part 2

(80+20 marks) **(Total = 64 hrs)**

Unit 1 **(14 hrs)**

Immittance evaluation

a) Introduction
b) Principle of immittance evaluation, Instrumentation
c) Tympanometry – tynapnometric peak pressure, Static immittance, gradient/tympanometric width
d) Reflexometry - Ipsilateral and contralateral acoustic reflexes, special tests
e) Clinical application of immittance evaluation
f) Immitance evaluation in the paediatric population

Unit 2 **(14 hrs)**

Auditory brainstem response

a) Introduction and classification of AEPs including ASSR (80 Hz)
b) Instrumentation
c) Test procedure
d) Factors affecting auditory brainstem responses
e) Interpretation of results and clinical application
f) ASSR, Tone burst ABR

Unit 3 **(14 hrs)**

Middle and long latency auditory evoked potentials

a) Test procedure for MLR, LLR, MMN, P 300, ASSR (40 Hz)
b) Factors affecting middle, long latency evoked potentials (including MMN & P300)
c) Interpretation of results and clinical application

Unit 4 **(10 hrs)**

Otoacoustic emissions

a) Introduction and classification of OAEs
b) Instrumentation
c) Measurment of OAE procedure
d) Interpretation of results and clinical application

Unit 5 **(12 hrs)**

Electronystagmography

a) Introduction and need for electronystagmography
b) Subtests in electronystogmography
c) Interpretation of test results and clinical applications

d) Findings in the paediatric population

Other vestibular tests

a) VEMP
b) EMG
c) Glycerol test etc.

LIST OF BOOKS

Compulsory Reading:

1. Jerger, J. (1963). Modern developments in Audiology, New York: Academic Press.
2. Jerger, J. (1987). Diagnostic Audiology: Historical Perspectives, Ear and Hearing, 8 7s-12s
3. Katz, J. et al (Ed.) (1994). Handbook of Clinical Audiology, Baltimore: Williams and Wilkins.
4. Musiek, F.E. and Rintlemann, W.F. (1999). Contemporary Perspective in Hearing Assessment. USA: Allyn & Bacon.

Additional Reading:

1. Martin, F.N (1994), Introduction to Audiology, New Jersey: Prentice Hall.

2. Silman S. and Silverman C.A. (1991). Auditory Diagnosis Principles and Application. New York: Academic Press, Inc.

3. Rupp, Stockdell (1980). Speech Protocols in Audiology, New York: Grune & Stratton.

4. Keith, R.M. (Ed.). (1981). Central Auditory Dysfunction. New York: Grune & Stratton.

5. Musiek, and Baran, J.A. (1987). Central Auditory Assessment: Thirty years of challenge and change. Ear and Hearing 3, 225-355.

6. Pinherio, H.L. Kusiek, F.E. (Eds) (1985). Assessment of Central Auditory Dysfunction Foundations and Correlates. Baltimore: Williams and Wilkins.

7. Willsford J.A. (1987), Handbook of Central Auditory Processing Disorders in Children. Drando, Grune & Stratton.

8. Feldman, A.S., & Willber, L.A. (Eds), (1976), Acoustic Impedance, Immittance: Measurement of Middle Ear Function, Baltimore: Williams & Wilkins.

SEMESTER IV

B 4.4 PEDIATRIC AUDIOLOGY

(80+20 marks) **(Total = 64 hrs)**

Unit 1 **(12 hrs)**

a) Development of human auditory system
   Basic embryology
   Embryology of the auditory system
   Relevance of the information with special reference to syndromes

b) Development of auditory behaviour
   Prenatal hearing
   New born hearing
   Auditory development from 0-2 years

Unit 2 **(14 hrs)**

a) Early identification of hearing loss – need with specific reference to conductive and sensorineural hearing loss.
b) Screening for hearing loss using high risk registers
c) Behavioural screening tests: Stimuli, procedures, recording of response, interpretation of results and validation of results
d) Concept of universal hearing screening

Unit 3 **(12 hrs)**

a) Objective screening tests: Immittance, Evoked potentials, OAE,
b) School Screening – Objective: Screening for hearing sensitivity, screening for middle ear effusion. Need, criteria, instrumentation.
c) Individual and group screening / Mass media screening tests
d) Importance of follow-up.

Unit 4 **(16 hrs)**

a) Hearing testing in neonates and infants:
   Behavioural Observation Audiometry (BOA)
   Conditioning techniques including CORA, VRA and its modifications, TROCA, Play audiometry.

b) Speech Audiometry in children
   Tests & material used to obtain:
      Speech Detection Threshold (SDT)
      Speech Recognition Threshold (SRT)

Speech recognition tests including VASC, WIPI, NuChip, Glendonald Auditory Screening Procedure (GASP), Early Speech Perception Test (EST), Speech tests developed in India.

Factors affecting speech audiometry results in children BC speech audiometry

Unit 5 **(10 hrs)**

Functional hearing loss in children
Signs/symptoms
Tests

b) Central Auditory Processing Disorders in children
Signs/symptoms
Screening tests

LIST OF BOOKS

Compulsory Reading:

Northern, J.L. and Downs, M.P. (1991). Hearing in children. 3rd Ed. Baltimore: Williams and Wilkins.

Additional Reading:

Davis, J.H., and Hardick, E.J. (1981). Rehabilitative Audiology for children and adults, New York: John Wiley and Sons.

Erber, N.P. (1982), Auditory Training, Washington: A.G. Bell Association for deaf.

Fulton, R.L. and Lloyd, L.L. (1975), Auditory assessment of the difficult to test, Baltimore: Williams and Wilkins, Co.

Gerber, S.E. (1982). Audiometry in infancy. New York: Grune and Stratton.

Gerber, S.E., and Mencher., S.T. (1978). Early diagnosis of hearing loss, New York, Grune and Stratton.

Ling, D. (1978). Speech and hearing impaired child. Washington: Alexander Graham Bell Association for the deaf.

Martin, F.N. (1978). Paediatric Audiology, New Jersey: Prentice Hall.

Sanders, D. A. (1993). Management of hearing handicap: Infants to elderly. 3rd Ed. New Jersey: Prentice Hall.

SEMESTER IV

B 4.5 CLINICAL PRACTICUM (a) Speech – Language Pathology - III

At the end of Semester **IV**, the student should be able to carry out the following –

Carry out informal and formal assessment procedures for the following aspects of speech in 10 clients with voice disorders, laryngectomy, cerebral palsy and developmental apraxia of speech

i) Perceptual analysis of pitch, loudness and quality of voice

ii) Instrumental analysis of voice – F_o and related measures, amplitude and related measures, CTAS, EGG, maximum phonation duration, s/z ratio, vital capacity, mean airflow rate, analysis and professional voice

iii) Diagnosis of voice disorders

iv) Proformae for cerebral palsy, diagnosis of cerebral palsy

v) Analysis of developmental apraxia of speech

vi) Planning, writing and executing therapy in 5 cases with voice disorders, laryngectomy, cerebral palsy and developmental apraxia of speech

vii) Counseling in the above speech disorders

viii) Record maintenance

SEMESTER IV

B 4.5 CLINICAL PARACTICUM (b) Audiology - III

At the end of Semester **III & IV**, the student should be exposed to and be able to carry out the following:

1. Be familiar with instrumentation for speech audiometry, immittance audiometry, sound field-testing.

2. Carryout complete pure tone audiometry (with AC/BC, unmasked/masked), interpretation of audiograms, identifying indicators for special/further diagnostic testing, writing case review (25 cases)

3. Speech Audiometry: Be familiar with speech test material in at least two Indian languages, master live voice presentation and recorded test presentation, administer SAT, SRT, SIS, MCL, UCL, PI-PB function test.

4. Collect speech audiometry test materials in Indian languages.

5. Carryout speech audiometry on 10 normal subjects, and 20 cases with conductive hearing loss, sensorineural hearing loss and functional hearing loss. Interpretation of speech audiometry results.

6. Carryout holistic audiological assessment for differential diagnosis (Cochlear & Retro cochlear)

7. Routine pure tone & speech audiometry

8. Administering special tests using pure tone: Tone Decay Test, STAT, SISI, ABLB, MLB, SPAR, Tests for functional hearing loss.

9. Carryout Immittance Audiometry (minimum of 5 cases) – PVT, Tympanometry, Acoustic Reflex testing (ipsi & contra). Interpret the findings taking into consideration the ENT reports.

10. Carry out Auditory Brainstem Response (ABR) & Oto-Acoustic Emissions (OAE) –

- Preparation of the patient
- Informing the patient/caregiver with respect to the procedure
- Electrode montage
- Conduct the procedure with respect to test protocol (5 cases each)
- BC-ABR, Tone burst ABR

Educational Audiology

1. Note the speech and language characteristics of those with hearing impairment
2. Management of individuals with hearing impairment – both children and adults
3. Role-play activities for teaching language to the hearing impaired.
4. Prepare schedules for educational placement of 5 hearing impaired children having different hearing capacities.
5. Counsel parents regarding educational placement of the hearing impaired.

Paediatric Audiology

1. Informal screening – purpose, materials used, noise makers, their spectral characteristics, procedure (5 normal & 5 hearing impaired children)
2. Sound field testing: BOA, VRA, Play audiometry (5 cases each)
3. Observe auditory response based on video clippings or live case testing.

LIST OF BOOKS

Compulsory Reading:

Northern, J.L. and Downs, M.P. (1991). Hearing in children. 3rd Ed. Baltimore: Williams and Wilkins.

Additional Readings:

Davis, J.H., and Hardick, E.J. (1981). Rehabilitative Audiology for children and adults, New York: John Wiley and Sons.

Erber, N.P. (1982), Auditory Training, Washington: A.G. Bell Association for deaf.

Fulton, R.L. and Lloyd, L.L. (1975), Auditory assessment of the difficult to test, Baltimore: Williams and Wilkins, Co.

Gerber, S.E. (1982). Audiometry in infancy. New York: Grune and Stratton.

Gerber, S.E., and Mencher., S.T. (1978). Early diagnosis of hearing loss, New York, Grune and Stratton.

Ling, D. (1978). Speech and hearing impaired child. Washington: Alexander Graham Bell Association for the deaf.

Martin, F.N. (1978). Paediatric Audiology, New Jersey: Prentice Hall.

Sanders, D. A. (1993). Management of hearing handicap: Infants to elderly. 3rd Ed. New Jersey: Prentice Hall.

SEMESTER IV
B 4.6 ENVIRONMENTAL STUDIES

(80+20 marks) **(Total = 64 hrs)**

Unit 1: 2 hrs

The multidisciplinary nature of environmental studies Definition, scope and importance

Unit 2: 8 hrs

Natural Resources
Renewable and non-renewable resources
Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams' benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture , fertilizer-pesticide problems, water logging, salinity, case studies

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification

Role of an individual in conservation of natural resources
Equitable use of resources for sustainable lifestyles

Unit 3: 6 hrs

Eco Systems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following Ecosystem:

Forest ecosystem
Grassland ecosystem
Desert ecosystem
Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 4: 8 hrs

Biodiversity and its conservation
Introduction – Definition, genetic, species and ecosystem
diversity Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical, esthetic and option values
Biodiversity at global, national and local levels
India as a mega diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts Endangered and endemic species of India
Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity

Unit 5: 8 hrs

Environmental Pollution
Definition
Causes, effects and control measures of:-
a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid waste management: causes, effects and control measures of urban and industrial wastes
Role of an individual in prevention of pollution Pollution case studies
Disaster management: floods, earthquakes, cyclone and landslides

Unit 6: 7 hrs

Social issues and the environment
From unsustainable to sustainable development
Urban problems related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people, its problems and concerns, case studies
Environment ethics, issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies
Wasteland reclamation
Environment Protection Act

Air (Prevention and Control of Pollution) Act.
Water (Prevention and control of pollution) Act
Wild life protection Act
Forest conservation Act
Issues involved in enforcement of environment legislation
Public awareness

Unit 7: 6 hrs

Human population and the Environment
Population growth, variation among nations
Population explosion, family welfare programme
Environment and human health
Human rights
Value education
HIV/AIDS
Women and child welfare
Role of information technology in environment and human health
Case studies

Unit 8: 19 hrs

Field Work
Visit to local area to document environmental assets- river/forest/grassland/ hill/mountain
Visit to local polluted site urban/rural/industrial/agricultural
Study of common plants, insects, birds
Study of simple ecosystems pond, river, hill slopes etc. (field work equal to 5 lecture hours)
Each student has to submit a field report on any one of above topics which forms the basis for evaluation of field work for – 25 marks

LIST OF BOOKS

Agarwal.K.C 2001 Environmental Biology. Nidi Publ.Ltd.Bikaner

Bharucha Erach. The Biodiversity of India, Mapin Publishing Pvt. Ltd, Ahmedabad – 380 013, India email: mapin@iccnel.net (R)

Brunner R.C 1989, Hazardous Waste

Cark R.S Marine Pollution, Clanderson Press Oxford (TB)

Cunningham, W.P. Cooper, T H Gorhani, E & Hepworth, M.T 2001 Environmental Encyclopedia, Jaico Publ. House, Mumbai 1196 p

De A.K. Environmental Chemistry, Wiley Eastern Ltd

Down to Earth, Centre for Science and Environment (R)

Gleiek H.P 1993. Water in crisis. Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute. Oxford Univ. Press 473 p

Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)

Heywood, V.H & Watson. R.T 1995. Global Biodiversity Assessment, Cambridge Univ. Press 1140p

Jadhav H & Bhosale V.M. 1995, Environmental Protection and laws, Himalaya Pub. House, Delhi 284 p

Mekinney M.L. & Schocl, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition 639p

Mhaskar A.K, Matter Hazardous, Techno-Science Publication (TB)

Miller T.G Jr. Environmental Science, Wadsworth Publishing Co. (TB)

Odum, E.P 1971. Fundamentals of Ecology, W.B. Saunders Co. USA,574p

Rao M.N & Datta A.K. 1987. Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd 345p

Sharma B.K 2001. Environmental Chemistry. Goel Publ. House, Meerut

Survey of the Environment. The Hindu (M)

SEMESTER V
B 5.1 FLUENCY AND ITS DISORDERS

(80+20 marks) **(Total = 64 hrs)**

Objectives:

After studying this paper at the end of the semester, the student should be able to understand the following –

- Characteristics and types of Fluency disorders
- Theories of stuttering
- Assessment and Management

Unit 1 **(10 hrs)**

1. Fluency: Definition, disfluencies and dysfluencies, review of development of fluency, factors influencing the development

2. Definitions of intonation, stress and rhythm- Development of intonation, rhythm, stress – their implications to therapy

3. Measures of fluency and other prosodic aspects

Unit 2 **(12 hrs)**

1. Stuttering: definition, nature, incidence and prevalence
2. Normal non fluency; primary stuttering; secondary stuttering
3. Development of stuttering
4. Cluttering and neurogenic stuttering

Unit 3 **(12 hrs)**

Theories of stuttering: organic vs. functional; cerebral dominance; diagnosogenic and learning theories; demand-capacity model

Unit 4 **(14 hrs)**

1. Assessment of stuttering: Clinical observation, subjective and objective assessment, administration of tests, recording, transcription, analysis and diagnosis.
2. Associated problems: speech and language, psychological etc.
3. Differential diagnosis of developmental stuttering, neurogenic stuttering, cluttering, normal non fluency, spasmodic dysphonia

Unit 5 **(16 hrs)**

1. Prevention: specific issues in children and adults including management of stress and anxiety.

2. Therapy; rationale; prolongation; shadowing; habit rehearsal technique, DAF, masking, shock therapy, desensitization, timeout, airflow and modified airflow technique; sequence of therapy procedures
3. MIDVAS
4. Transfer and maintenance
5. Measurement of progress; naturalness rating
6. Relapse and recovery

LIST OF BOOKS

Compulsory Reading:

Curlee and Perkins (Ed.). (1985): Nature and treatment of stuttering. Taylor and Francis, London.

Silverman, F.H. (1992). Stuttering and other fluency disorders. Prentice Hall, Inglewood Cliffs.

Peter and Guitar (1991). Stuttering- An integrated approach to its nature and treatment

Additional/Optional Reading:

Bloodstein, O. (1993): Stuttering. Allyn and Bacon, Boston.

Fawcus, M. (1995): Stuttering. Whurr Publishers, London.

Mark Onslow (1996) Behavioural management of stuttering. Singular Publishing Group Inc.

SEMESTER V
B 5.2 MOTOR SPEECH DISORDERS IN ADULTS

(80+20 marks) **(Total = 64 hrs)**

Objectives:
After studying this paper at the end of the semester, the student should be able to understand the following –

- Characteristics and types of dysarthria and apraxia in adults
- Dysphagia and other neurogenic conditions
- Assessment and Management

Unit 1 **(16 hrs)**

1. Definition and classification of dysarthria in adults.
2. Types of dysarthria in adults.
3. Neurogenic disorders learning to dysarthria in adults:

- Vascular disorders – dysarthria following strokes, CVA, cranial nerve palsies and peripheral nerve palsies.
- Infection condition of the nervous system – eg. Meningitis, polyneuritis and neuro syphilis.
- Traumatic conditions – Traumatic brain injury and dysarthria
- Toxic conditions – dysarthria due to exogenic and endogenic causes.
- Degenerative and demyelinating conditions – multiple sclerosis, Parkinson's disease, motor neuron diseases, Amyotrophic lateral sclerosis.
- Genetic conditions – Huntington's chorea, Guillian – Barre syndrome.
- Others leading to dysarthria – Anoxic conditions, metabolic conditions, idiopathic conditions and neoplasm.

Unit 2 **(12 hrs)**

1. Assessment of dysarthria:

- Instrumental analysis: Advantages and disadvantages of instrumental analysis of speech in dysarthria.
- Physiological and Electrophysiological methods
- Acoustics
- Perceptual analysis – measures, standard tests and methods, speech intelligibility assessment scales, advantages and disadvantages of perceptual analysis of speech in dysarthria.

2. Differential diagnosis of dysarthria from functional articulation disorders, apraxia of speech, aphasia and allied disorders.

Unit 3 **(12 hrs)**

1. Management of dysarthria :

- Medical, surgical and prosthetic approaches
- Speech therapy
  - Facilitatory approaches: Vegetative exercises, Oral sensori motor facilitation techniques
  - Compensatory approaches – correction of respiratory, phonatory, articulatory and prosodic errors.
  - Strategies to improve intelligibility of speech.

Unit 4 **(12 hrs)**

1. Apraxia of speech in adults

- Definition of verbal and nonverbal apraxia of speech
- Different types, characteristics and classification
- Assessment of apraxia of speech – standard tests and scales, subjective methods and protocols
- Management of apraxia of speech – different approaches
- Improving intelligibility of speech.

Unit 5 **(12 hrs)**

1. Dysphagia:

- Definition
- Neuro Physiology of swallow in children and adults
- Phases of normal swallow
- Etiology of swallowing disorders in children and adults
- Assessment and Intervention – Specific management techniques, Medical and Surgical issues in dysphagia.

LIST OF BOOKS

Compulsory Reading:

Motor Speech disorders - A Treatment guide. (1991). Dworkin, P.J. St. Louis: Mosby Year Book. Inc.

Motor Speech Disorders: Substrates, Differential diagnosis and Management. (1995). Duffy, J. R. St. Louis: Mosby.

Additional/Optional Reading

Working with Swallowing Disorders. Langley. J. U.K.: Winslow

Acquired Speech and Language disorders - A Neuroanatomical and Functional

Neurological Approach. (1994). Murdoch, B.E. London: Chapman and Hall.

Neurology for Speech-Language Pathology. (1986). (2nd ed.) Love, R.J. and Webb, W.G. Butterworth

SEMESTER V

B 5.3 TECHNOLOGY & AMPLIFICATION DEVICES FOR PERSONS WITH HEARING IMPAIRMENT

(80+20 marks) **(Total = 64 hrs)**

PART A:

Unit 1 **(10 hrs)**

(Operational characteristics, types and specifications -No design aspects. Concepts and block diagrams only)

1. Basics of electricity & electronics - Direct and alternating current, DC Power supplies, voltage stabilizers, Passive circuit elements, transistors. Linear and digital Integrated circuits, microprocessors. Micro computers and Computers. Filters, Linear and non-linear Amplifiers and Oscillators, Amplifier power and distortion
2. Basics of digital signal processing – Analog signal, digital signal, A to D and D to A conversion, Basic concept of Digital Signal Processing and its implementation, How does a DSP based system work? Application- DSP based hearing aids.

Unit 2 **(12 hrs)**

1. Microphones as transducers. Velocity microphones. uni-directional microphones Microphone impedance and sensitivity. Loudspeakers as transducers. Structure of a dynamic loudspeaker. Air suspension. Baffles and enclosures. Horn speakers. Multi-speaker systems. Loudspeaker Efficiency, Loudspeaker power and distortion. Recording and Reproduction of sound. Recording characteristics. Dynamic Range, Stereophonic recording. Magnetic tape recording and playback. Tape speed and frequency response, Bias and equalization, Tape noise, Digital Tape recording, CD ROM recording

2. Measuring Instruments - Multi-meter. Cathode ray oscilloscope. Sine wave generator. Function Generator, Frequency counter, Measuring microphones, Sound Level Meter, Integrated Sound Level Meter, Artificial ear, Artificial Mastoid, Couplers, Hearing aid test box, Measurement of different types of sound

PART B:

Unit 3 **(16 hrs)**

a) Historical development of hearing aids
Non-electrical hearing aids Electric hearing aids

b) Basic elements of hearing aids: Microphone, Amplifier, Receiver, Cords, Batteries

c) Directional hearing aids, modular hearing aids
Routing of signals, head shadow / baffle / diffraction effects Output limiting: Peak clipping, compression

Extended low frequency amplification, frequency transposition (Bone anchored hearing aid, Master Hearing aids)

d) Recent advances in hearing aids
- Signal processing in hearing aids – BILL, TILL, PILL
- Programmable and digital hearing aids
- Signal enhancing technology

Unit 4 **(12 hrs)**

Electroacoustic Characteristics & measurements for hearing aids

a) Instrumentation & Analysis of Electroacoustic characteristics of all types of hearing aids.
b) Measurement of standard & specification of hearing aids according to ISI, IEC and ANSI
c) Interpretation of the analysis

Unit 5 **(14 hrs)**

Hearing Aid selection

a) Pre-selection factors: Ear to be fitted, monoaural vs. binaural hearing aids, type of receiver, style of hearing aid.
b) Prescriptive & comparative procedure
c) Functional gain & insertion gain methods: Instrumentation, prescription formulae, Articulation Index, Speech-spectrum (banana), merit & demerits of each.
d) Hearing aids for conductive hearing loss, congenital malformation, chronic middle ear disorders
e) Hearing aids for infants/children/multiple handicapped
f) Hearing aids for adults & geriatrics: recruiting ears, poor word recognition scores (WRS)
g) Hearing aids for the sightless
h) Procuring hearing aids under various schemes of the Government of India / State

LIST OF BOOKS

Compulsory Reading:

1. Skinner HW (1988), Hearing aid evaluation, Prentice Hall, Englewood Cliffs, HJ.

2. Pollack M (1980) Amplification for the hearing impaired. Grune and Stratton, NY.
3. Basic Electronics: A text-lab manual; Paul B Zbar, Albert, P. Malvino. (5^{th} Edn), Mc Graw Hill Inc, (1983)

Additional Reading:

1. Loavenbruck All and Madell IR (1981), Hearing aid dispensing for audiologists: A guide for clinical service. New York: Grune and Stratton.
2. Bess et al (1981). Amplification in Education, Alexander Graham Bell Association for the Deaf, Washington.
3. Hull, R.H. (1982). Rehabilitation Audiology, New York: Grune and Stratton.
4. Donnelly K (1974), Interpreting hearing aid technology, CC, Thomas, Springfield.
5. Markides A (1977) Binaural hearing aids, Academic Press Inc., London.
6. Hodgson HR and Skinner (PH) (1977, 1981), Hearing aid Assessment and use in audiologic habilitation, Williams and Wilkins, Baltimore.
7. Cooper (1991), Practical aspects of Audiology: Cochlear implants: A practice guide. Whurr Publisher, London.
8. Mueller HG, Hawkins DB., Northern JL. (1992), Probe microphone measurements: Hearing aid selection and assessment, Singular publishing group. Inc., California.
9. ANSI & IEC Specifications

SEMESTER V

B 5.4 PROFESSIONAL PRACTICES IN SPEECH AND HEARING

(80+20 marks) **(Total = 64 hrs)**

Objectives:

After studying this paper at the end of the semester, the student should be able to understand the following –

- Epidemiology of speech, language and hearing disorders
- Service delivery and CBR issues
- Legislative support for rehabilitation
- Documentation and ethical issues

Unit 1 **(14 hrs)**

1. Epidemiology of speech, language and hearing disorders
2. Environmental, Social, Economic implications and preventive education
3. Levels of prevention: Primary, Secondary, Tertiary
4. Survey, prevalence, Incidence and its implication in planning
5. Health promotion, specific protection, early diagnosis and treatment of a high risk infant, Disability limitation, Educational and Vocational rehabilitation

Unit 2 **(12 hrs)**

1. Approaches to service delivery: Institution based, Camp based, Community based and Role of NGOs
2. Review of services in India
3. Integration of Disabled into the community and ICF 2001

Unit 3 **(12 hrs)**

1. Duties and responsibilities of SLP in various settings
2. Professional ethics for SLPs, Code of Ethics, Right to Education Act, Industrial Employment Act
3. Interacting with allied professional and community health workers

Unit 4 **(14 hrs)**

1. Planning services for the communication disordered population: Philosophy, planning, establishment of services for communication disorders- infrastructure, budget, staffing, equipment, furniture, policy making, record keeping, proposal writing.
2. Strategies for awareness, public education and information (Camps, Print and audiovisual media, Surveys. Radio broadcasts, street plays).
3. Empowering parents, persons with disabilities and the community; Skill transfer to DHLS, parents; grass-root level workers, teachers and health workers

Unit 5 **(12 hrs)**

1. Legislative support for rehabilitation- Rehabilitation Council of India Act (1992), Persons With Disability Act (1995), National Trust Act for Autism, CP, MR and Multiple Disabilities (1999), Environmental Act, Consumer Protection Act, Right To Information Act.

2. The professional as a witness; documentation; handling legal issues

LIST OF BOOKS

Compulsory Reading:

Baquer, A. & Sharma, A. (1997). Disability: Challenges Vs Responses. CAN publications.

Kundu, C.L., Status of Disability in India, (2000 & 2003) Ed. Kundu, C.L., RCI

Narsimhan, M.C. & Mukherjee, A.K. (1986). Disability a Continued Challenge: Delhi willey eastern.

WHO (2001). International classification of Functioning, Disability and Health. Geneva: WHO

Professional Issues in Speech-Language Pathology and Audiology - A Text book. (1994). Lubinski R. and Frattali C. California: Singular Publishing Group

Additional/Optional Reading:

Administration and Management of Programs for Young Children. (1995) Shoemaker, C. J. New Jersey : Prentice Hall Inc.

Management of Child Development Centres. (1993) Hildebrand, V. (3rd Ed.). MacMillan Publishing Company.

SEMESTER V

B 5.5 CLINICAL PRACTICUM (a) Speech – Language Pathology - IV

At the end of Semester **V**, the student should be able to carry out the following –

a) Analysis of fluency in 2 normal samples and 2 patients with stuttering / cluttering, neurogenic stuttering (percent disfluency), rate of speech, effort, naturalness, various types of disfluencies)

b) Use of SSI, SPI, and fluency tests

c) Assessment of 2 patients with dysarthria / apraxia / dysphagia using tests

d) Planning, writing, and executing therapy with 10 patients with stuttering / cluttering / neurogenic stuttering / dysarthria / apraxia / disphagia

e) Use of AAC in at least 1 patient

f) Counseling patients with the above disorder

g) Record maintenance

h) Presenting a case in clinical conference

SEMESTER V

B 5.5 CLINICAL PRACTICUM (b) Audiology - IV

At the end of Semester **V**, the student should be able to carry out the following –

Hearing Aid Trial Postings:

1. Hearing aid trial: pre-selection of hearing aids, styles, EAC, other issues, inspection of ear moulds. Functional gain method (10 children & 10 adults). Concept of speech banana, aided audiogram.

2. Observing Real Ear Insertion Gain measurement (10 cases)

3. Pre-selection based on audiological evaluations (10 cases)

4. Hearing Aid trials:
    a. Functional gain, REIG, other methods with monoaural fitting, binaural fitting, Programmable hearing aid – Analog Digital
    b. Explaining the benefits of hearing aid to the patient/caregiver

5. Counselling patients/caregivers regarding hearing aids – Care, maintenance, adjustments, tips to caregivers regarding acceptance of hearing aids (5 children & 5 adults). Binaural amplification and its uses.

6. Electro-acoustic evaluation of hearing aids (body level & ear level), with and without ear moulds. Equipment for analysis. Calibration of hearing aid analyser.

7. Models and makes available in the market, their EAC, cost of hearing aids, its suitability to various audiogram configurations, age etc.

8. Specification sheets – BIS, ANSI, IEC with respect to hearing aids.

9. Administration of Self (Help) assessment scales.

10. Fitting hearing aids for sloping hearing loss.

Rehabilitation Audiology

1. Role-playing activities for speech reading, communication strategies and auditory learning.

2. Compile activities on management of deaf-blind children.

3. Compile activities on management of children with central auditory processing disorders.

4. Compile information on cochlear implants regarding candidacy, cost, places where it is done and rehabilitation of cases, in Indian contexts.

Diagnostic Audiology/Noise/Rehabilitative Technology:

1. Holistic audiological assessment for differential diagnosis:
    a. Speech: PI/PB Function, Stenger, BC Speech
    b. Noise: SAL, SPIN, (10 cases)
    c. Immittance audiometry: Basic tests, Acoustic Reflex Decay, Eustachian Tube function, SPAR
2. Compiling reports for the above.
3. Testing multiple handicapped children

4. Compile information on cochlear implants reg. candidacy, cost, places where it is done and rehabilitation of cases.

5. Calibration of pure tone audiometry (AC, BC, Speech)

6. Noise measurement and attenuation measurement of ear protection devices.

SEMESTER VI

B 6.1 NEUROGENIC LANGUAGE DISORDERS IN ADULTS

(80+20 marks) **(Total = 64 hrs)**

Objectives:

After studying this paper at the end of the semester, the student should be able to understand the following –

- Brain and language relationship
- Aphasic and non-aphasic conditions
- Assessment and management

Unit 1 **(12 hrs)**

1. Neural bases of language: Neuroanatomical, neurophysiological and neurochemical correlates for language function
2. Pathophysiology of neurological lesions affecting speech and language including concepts of recovery, reorganization and relearning
3. Theoretical considerations in neurogenic language disorders: Competence Vs Performance; loss Vs Interference, Regression hypothesis, multilingualism, Uni-dimensional Vs multidimensional breakdown

Unit 2 **(12 hrs)**

1. Definitions of Aphasia
2. Etiologies: CVA, vascular supply to brain, Blood Brain Barrier , trauma etc.
3. Classification of aphasia based on anatomical, linguistic and psycholinguistic aspects
4. Clinical features: Linguistic, pyscho-social, neuro-behavioural
5. Associated problems in aphasia: their definition, classification and clinical features

Unit 3 **(14 hrs)**

1. General and specific neurological examination procedures (higher functions, cranial nerves, motor and sensory systems, reflexes and fundus)
2. Neurological investigations: Electrophysiological (Electro Encephalo Gram, Evoked potentials) and imaging (Computerized Tomography, Magnetic Resonance Imaging)
3. Assessment of speech, language and cognitive behaviour of adults with a language-based disorder: Informal and formal test procedures(Western Aphasia Battery, Boston Diagnostic Aphasia Examination, Boston Naming Test, Minnesota Test for Differential Diagnosis of Aphasia, Porch Index of Communicative abilities, Functional Communication Profile, Token Test, Revised Token Test, Bilingual Aphasia Test, MAE and others; Indian tests and adaptations.

Unit 4 **(14 hrs)**

1. Other language disorders in adults: Introduction, Etiology, clinical profile, assessment and management

- Subcortical aphasias
- Traumatic Brain Injury

- Right Hemisphere Damage Disorder
- Primary Progressive Aphasia
- Language disorders in Dementia
- Schizophasia
- Acquired dyslexias
- Metabolic disorders
- Aphasias in illiterates, sign language users, bilinguals / multilinguals and others.

2. Differential diagnosis of Adult Neurogenic disorders

Unit 5 **(12 hrs)**

1. Intervention: Prognostic indicators, Spontaneous recovery; General principles of therapy; specific techniques (Melodic Intonation therapy, Visual Action therapy, Schuell's Auditory stimulation, Thematic language stimulation and others)

2. Team approach; Group therapy; Family support-preparing family, friends and colleagues on what to expect and how to deal with aphasic as a person;Counseling regarding role of family; Individual counselling and spouse and family counselling

3. AAC

LIST OF BOOKS

Compulsory Reading:

Understanding Aphasia. (1993). Goodglass, H. Academic Press Inc.

Davis, G. A. (1993). A Survey of Adult Aphasia and Related Language Disorders Prentice Hall Inc.

Chapey, R. (1994). (Ed). Language Intervention Strategies in Ault Aphasia. Williams and Wilkins Publication

Additional/Optional Reading:

Speech and Language Evaluation in Neurology: Adult Disorders. (1985). Ed. Darby, J. K. Grune and Stratton Inc.

Acquired Speech and Language Disorders. (1994). Murdoch, B. E. London: Chapman and Hall.

Aphasia and Related Language Disorders. (1990). LaPointe, L. L. Theime Medical Publishers.

SEMESTER VI

B 6.2 NOISE MEASUREMENTS AND HEARING CONSERVATION

(80+20 marks) **(Total = 64 hrs)**

Unit 1: **(14 hrs)**

a) Noise in the environment and effects of noise: Definition of noise
Sources – community, industrial, music, traffic and others Types – steady & non-steady.

b) Auditory effects of noise exposure

- Historical aspects
- TTS and recovery patterns
- PTS
- Histopathological changes
- Effect of noise on communication, Speech Interference Level (SIL), Articulation Index (AI)
- Perceived Noise in dB (PN dB), Perceived Noise Level (PNL), Effective Perceived Noise Level (EPNL), Noise Criteria (NC) curves, Noise Reduction Rating (NRR), Signal to Noise Ratio (SNR)

c) Non-auditory effects of noise exposure
Physiological/Somatic & psychological responses, stress and health, sleep, audio-analgesia effects on CNS and other senses
Effects of noise on work efficiency and performance

Unit 2: **(14 hrs)**

Audiometry in NIHL
Puretone audiometry:

- Base line and periodic monitoring tests, high frequency audiometry, brief tone audiometry, correction for presbyacusis
- Instrumentation: Manual audiometer, automatic audiometer
- Testing environment
- High frequency audiometry

Speech audiometry:
Speech discrimination tests with and without the presence of noise Filtered speech tests and time compressed speech tests
Social Adequacy Index

Other audiological evaluations:

- Impedance audiometry
- ERA
- OAE
- Tests for susceptibility

Unit 3: **(12 hrs)**

Noise & vibration measurement

- Instrumentation and procedure for indoor and outdoor measurement of ambient noise, traffic noise, aircraft noise, community noise and industrial noise.

Unit 4: **(12 hrs)**

Hearing conservation:
Need for hearing conservation program, steps in hearing conservation program Ear protective devices: (EPDs)

- Types: Ear plugs, ear muffs, helmets, special hearing protectors, merits and demerits of each
- Properties of EPDs: Attenuation, comfort, durability, stability, temperature, tolerance
- Evaluation of attenuation characteristics of EPDs.
- Toughening

Unit 5: **(12 hrs)**

Legislations related to noise:

- Damage Risk Criteria (DRC) – definition, historical aspects, use of TTS and PTS, information in establishing DRC, - Committee on Hearing Bioacoustics & Biomechanics (CHABA), Air Force Regulation (AFR 160-3), American Academy of Ophthalmology & Otolaryngology (AAOO), ASA-Z 24.5, Damage risk contours, Walsh – Healey Act, Occupational Safety & Health Act (OSHA), Environmental Protection Agency (EPA), Indian noise standards.

- Claims for hearing loss: Fletcher point eight formula, AMA method, AAOO formula, California variation in laws, factors in claim evaluation, variations in laws and regulations, date of injury, evaluation of hearing loss, number of tests.

- Indian studies/acts/regulations, American acts.

LIST OF BOOKS

1. Bruel, and Kjaer, (1982), Noise Control - Principles and practices.

2. Harris, C.M. (Ed.2), Handbook of Noise Control New York: McGraw-Hill.
3. Kryter, K.D. (1970). The effects of noise on Man. New York: Academic Press.
4. Tempest, N (1985). The Noise Handbook. London: Assessment Press.
5. Sataloff, R.T. (1987). Occupational hearing loss. Marcel Dekker, Inc.
6. Trivedi, P.R. and Gurudeep Raj (1992). Noise Pollution, 1st Ed. New Delhi: Akashdeep Publishing House.
7. BIS Specifications - List attached
    - IS Specifications - Noise Measurements.
    - IS:7194-1973 Specification for assessment of noise exposure during work for hearing conservation purposes.
    - IS:9167-1979 Specification for ear protectors.

- IS:6229-1980 Method for measurement of real-ear protection of hearing protectors any physical attenuation of earmuffs.
- 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.
- IS:9989-1981 Assessment of noise with respect to community response.
- IS:10399-1982 Methods for measurement of noise emitted by Stationary road vehicles.

SEMESTER VI
B 6.3 BASIC STATISTICS

(80+20 marks) **(Total = 64 hrs)**

Objectives:

After studying this paper at the end of the semester, the student should be able to understand the following –

1) The basics of statistics and its relevance to the field of speech and hearing
2) Carryout calculations of data related to basic statistical operations
3) Interpret statistical results at basic level and make inferences

Unit 1 **(12hrs)**

Introduction to statistics: Its importance in behavioural sciences; descriptive statistics and inferential statistics; usefulness of quantification in behavioural sciences; application to speech and hearing

Unit 2 **(12hrs)**

Measures: scales of measurement; nominal, ordinal, interval and ratio scales

Data collection: classification of data- class intervals, continuous and discrete measurement, drawing frequency curve, drawing inference from a graph

Unit 3 **(12hrs)**

Measurement of central tendency: Need, types- mean, median, mode; working out theses measures with illustrations

Measures of variability: Need, types of range, deviation- average deviation, standard deviation, variance; interpretation

Unit 4 **(14hrs)**

Normal distribution: general properties of normal distribution; theory of probability; illustration of normal distribution; area under normal probability curve

Variants from the normal distribution: skewness, kurtosis; their quantitative measurement; Introduction to non-parametric statistics

Unit 5 **(14hrs)**

Correlation: Historical contribution; meaning of correlation; types of correlation-product-moment correlation, content correlation, rank correlation etc

Standard error sampling distribution; Type I and Type II errors, Y2, ‘t’ and ‘F’-tests; Methods of significance of differences between means and their interpretation and probability levels-small samples, large samples

LIST OF BOOKS

Compulsory Reading:

1) Maxwell, D.L. and Satake, E. (1997). Research and Statistical Methods in Communication Disorders. Baltimore: Williams and Wilkins

2) Woods, A., Fletcher, P. and Hughes, A. (1986). Statistics in Language Studies. Cambridge: University Press.

SEMESTER VI
B 6.4 SCIENTIFIC ENQUIRY IN AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY

(80+20 marks) **(Total = 64 hrs)**

Objectives:

After studying this paper at the end of the semester, the student should be able to understand the following –

- Need for scientific enquiry
- Basics of research in speech and hearing
- Documentation of research

Unit 1 **(12 hrs)**

1. Scientific status of speech language pathology and audiology
2. Speech language pathology and audiology as a behavioural science
3. Need for scientific enquiry in speech language pathology and audiology
4. Choosing a research problem
5. Formulation of research question
6. Statement of research question
7. Formulation of hypothesis
8. Types of hypotheses

Unit 2 **(12 hrs)**

1. Parameters for scientific research in speech language pathology and audiology:
   - Identification of variables and the types
   - Types of data and its nature
   - Measurement procedures in speech language pathology and audiology
   - Instrumental and behavioural measures, and recording procedures

Unit 3 **(12 hrs)**

1. Sampling methods: types, methods of data collection
2. Application of the above with hypothetical illustrations

Unit 4 **(14 hrs)**

1. Introduction to research methods and designs: Ex post-facto, experimental, standard group comparisons, evaluation research etc
2. Application of these to clinical population and community research

Unit 5 **(14 hrs)**

1. Documentation of research: Reporting research-organization, analysis and presentation of data
2. Components of research article, report writing style
3. Ethics of research in behavioural sciences
4. Qualities of a researcher/scientific clinician

LIST OF BOOKS

Compulsory Reading:

1) Hegde, M.N. Clinical Research in Communicative Disorders- Principles and Strategies. (1994) (2nd Edition). Pro-ed.

2) Pannbacker, M.H. and Middleton, G.F. (1994). Introduction to Clinical Research in Communication Disorders. San Diego: Singular Publishing.

Additional/Optional Reading:

3) Stein, F. and Cutler, S.K. (1996). Clinical Research in Allied Health and Special Education. San Diego: Singular Publishing Group Inc.

4) Portney, L.G. and Walkins, M.P. (1993). Foundations of Clinical Research. Connecticut: Appleton and Lange.

SEMESTER VI

B 6.5 CLINICAL PRACTICUM (a) Speech – Language Pathology - V

At the end of Semester **VI**, the student should be able to carry out the following –

a) Assessment of 5 clients with aphasia / autism / LD /TBI / RHD using relevant tests

b) Planning, writing and executing therapy for 5 patients with apraxia / autism / LD / TBI / RHD

c) Presenting a case in clinical conference

d) Counseling in the above patients

e) Record maintenance

SEMESTER VI
B 6.5 CLINICAL PRACTICUM (b) Audiology - V

At the end of **VI** Semester, the student should be able to carry out the following –

Hearing Aid Trial Postings:

1. Hearing aid trial: pre-selection of hearing aids, styles, EAC, other issues, inspection of ear moulds. Functional gain method (10 children & 10 adults). Concept of speech banana, aided audiogram.

2. Observing Real Ear Insertion Gain measurement (10 cases)

3. Pre-selection based on audiological evaluations (10 cases)

4. Hearing Aid trials:
    a. Functional gain, REIG, other methods with monoaural fitting, binaural fitting, Programmable hearing aid – Analog Digital
    b. Explaining the benefits of hearing aid to the patient/caregiver

5. Counselling patients/caregivers regarding hearing aids – Care, maintenance, adjustments, tips to caregivers regarding acceptance of hearing aids (5 children & 5 adults). Binaural amplification and its uses.

6. Electro-acoustic evaluation of hearing aids (body level & ear level), with and without ear moulds. Equipment for analysis. Calibration of hearing aid analyser.

7. Models and makes available in the market, their EAC, cost of hearing aids, its suitability to various audiogram configurations, age etc.

8. Specification sheets – BIS, ANSI, IEC with respect to hearing aids.

9. Administration of Self (Help) assessment scales.

10. Fitting hearing aids for sloping hearing loss.

Rehabilitation Audiology

1. Role-playing activities for speech reading, communication strategies and auditory learning.
2. Compile activities on management of deaf-blind children.
3. Compile activities on management of children with central auditory processing disorders.
4. Compile information on cochlear implants regarding candidacy, cost, places where it is done and rehabilitation of cases, in Indian contexts.

Diagnostic Audiology/Noise/Rehabilitative Technology:

1. Holistic audiological assessment for differential diagnosis:
    a. Speech: PI/PB Function, Stenger, BC Speech
    b. Noise: SAL, SPIN, (10 cases)
    c. Immittance audiometry: Basic tests, Acoustic Reflex Decay, Eustachian Tube function, SPAR

2. Compiling reports for the above.

3. Testing multiply handicapped children

4. Compile information on cochlear implants reg. candidacy, cost, places where it is done and rehabilitation of cases.

5. Calibration of pure tone audiometry (AC, BC, Speech)

6. Noise measurement and attenuation measurement of ear protection devices.

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