

**I SEMESTER  
SH 101 STATISTICS AND RESEARCH METHODS**

**(Total hours -64)**

**Objectives**

1. *To orient the student on the basics of statistics, and its application to the field of speech and hearing.*
2. *To enable the student to select and carry out appropriate statistical calculations as required for research in the field of speech and hearing.*
3. *To equip the students with necessary knowledge to be able to interpret the analysed statistical related data to the field of speech and hearing.*
4. *To familiarize the students on the importance and applications of research methods and techniques applicable to the field of speech and hearing.*

**SECTION 1**

**A. STATISTICS**

**UNIT 1 (12 hrs)**

- Statistics – purpose – approach – methods – measures of central tendency – Dependability of these measures – research applications.
- Measures of variability – types and meaning of various measures – research applications.
- Standard score – normal distribution deviations – skewness and Kurtosis – conditions of applications – limitations in interpretation.

**UNIT 2 (12 hrs)**

- Theory of probability – principles and properties of normal distribution – binomial distribution – interpretation of data using the normal probability curve – causes of distribution – deviations from the normal forms.
- Correlation – meaning – coefficient of correlation – linear correlation – product moment correlation – rank correlation, biserial correlation, tetracoric correlation partial and multiple correlations – regression equation.
- Variance – concept – foundations – assumptions – one way classification. ANOVA MANOVA, ANCOVA, MANCOVA.

**UNIT 3 (12 hrs)**

- Item analysis – item pool – its selection – item difficulty item variance – item conduction – time validity – difficulty index.

- Non – parametric statistics – its nature and condition and application – non parametric analysis of variance and measures of association – tests of difference with correlated and uncorrelated data – tests of similarity.
- Selection appropriate statistics methods in the research, receivers operating characteristics

## **SECTION 2**

### **B. RESEARCH METHODS**

#### **UNIT 4 (12 hrs)**

- Methods of research in behavioural sciences – research designs – measuring purpose – principles – needs – applications between group designs and single subject research designs.
- Basic of research – science scientific approach – problems – hypothesis – constructs – variables.
- Types of research- empirical rationale-experimental and export-factor research laboratory experiments - field studies – survey research - fundamental research epidemiology-clinical and applied research.

#### **UNIT 5 (12 hrs)**

- Technique of sampling – sampling and randomness-principles of randomization – random assignment – methods – random sampling-stratified sampling, incidental sampling – purposive samples of one to tone matched sampling – size of sample.
- Measurement – foundations – types – reliability – validity.
- Variance – implication to research – variance control.
- Techniques of equation – experimental and control groups – matching and randomization – advantages, disadvantages and limitations.
- Research designs – various types of group designs – various types of single subject research designs.
- Analysis and interpretation – principles, indices – cross breaks – factor analysis – multivariate statistics – time series analysis.
- The research report – cardinal characteristics – purpose – structure presentation and writing style.

**LIST OF BOOKS**  
**SH 101 STATISTICS AND RESEARCH METHODS**

1. Hegde, M. N. (2006). Clinical Research in Communicative Disorders [2<sup>nd</sup> Edition] Principles and strategies. Signular Publishing.
2. Mary & Grace. Introduction to Clinical Research in Communication Disorders.
3. Pannbacker, M. H., & Middleton, G. F. (1994). Introduction to Clinical Research in Communication Disorders, San Diego: Signular Publishing.
4. Maxwell, D. L., & Satake, E. (1997). Research and Statistical Methods in communicative disorders. Baltimore: Williams and Wilkins.
5. Stein, F., & Cutler, S. K. (1996). Clinical Research in Allied Health and Special Education. San Diego: Signular Publishing Group Inc. 14
6. Portney, L.G. and Walkins, M. P. (1993). Foundations of Clinical Research. Connection: Appleton and Lange. ISBN 0-8385-1065-5
7. Woods, A. Fletcher, P and Hughes, a (1986). Statistics in Language studies. Cambridge: University Press ISBN 0-521-253268.

## **SH 102: TECHNOLOGY - APPLICATION AND INSTRUMENTATION IN SPEECH & HEARING**

**(Total hours -64)**

### **Objectives**

- 1. To orient the student on the technological bases of instrumentation used in the field of speech and hearing.*
- 2. To enable the student to carry out calibration, understand the working principles of instrumentation applicable to the field of speech and hearing*

### **UNIT 1: (12 hrs)**

#### Fundamentals of electronics and computers

1. Basic principle of operation and working of
  - Diodes, Transistors, LED's, LCDs, ICs
  - D. C. Power supplies, A. C. voltage stabilizers and UPS
2. Fundamentals of Digital Electronics
3. Binary number system, Hex code, ASCH code, bit, byte, etc
4. Logic gates, counters, flip-flops etc
5. Fundamentals of computers
6. Block diagram of a computer and its working
7. Hardware, memory devices and other peripherals
8. Operating system languages, application software
9. Programs, flow charts
10. Internet and networking computers and its application in tele-rehabilitation and speech and hearing clinics.

### **UNIT 2: (12 hrs)**

#### Fundamentals of Digital Signal processign and communication system

1. Analogue and digital systems
  - Analogue signal and digital signals
  - Analogue to digital and digital to analogue converters
  - Need and advantages of digital systems and digital signal processign
2. Principles of digital signal processign
  - Digital signal processor – how it works?
  - Basics of IIR and FIR filters and their applications in speech and hearing
3. Fundamentals of communication systems
  - AM transmission and reception and its application in diagnostic equipments
  - FM transmission and reception and its application in FM hearing aids
  - Digital modulation techniques such as delta modulation, PCM,PPM, PWM and their application in speech analysis
  - Satellite communication and its application in tele-rehabilitation

### **UNIT 3: Technology of hearing aids and speech processign and analysis (12 hrs)**

1. Principles and working of
  - Analog, programmable and DSP based hearing aids.
  - Technology of channel separation
  - Techniques of non linear amplification and their implementation in hearing aids
  - Noise reduction using microphone technology
2. Evaluation of hearing aids
  - Electro acoustic characteristics
  - National and international standards
  - Hearing aid evaluation systems
3. Techniques of speech processing and analysis
  - Short time speech analysis techniques, speech coding techniques
  - Voice response system.

**UNIT 4:** (12 hrs)

Biomedical signals and signal processing

1. Principles of generation and calibration of acoustic stimuli
  - Pure tone, tone bursts, clicks, filtered clicks and warble tones
  - Acoustic / physical characteristics of all stimuli
  - Generation, gating and filtering of stimuli
  - Calibration of pure tones
2. Electrodes and transducers
  - Signal acquisition technique from electrodes and transducers
  - Signal processing techniques such as differential amplification
  - Common mode rejection, artefact rejection, filtering, signal averaging, etc.
  - Addition and subtraction of waves

**UNIT 5:** (12 hrs)

Advanced technology for speech language disorders

1. Electro physiological methods in diagnosis
  - Fundamental principles of EEG
  - Fundamental principles of EMG, ENG & EGG
2. Neuro radiological methods in diagnosis
  - Working principles of X-ray imaging, C-Arms, CT Scan etc.
3. Tools/ studies to understand the organisation of speech and language disorders and function
  - Cortical blood flow studies, magnetic resonance imaging
  - Functional MRI
  - Application of tools in studying genetic bases of speech language disorders.
4. Tele-rehabilitation.

## LIST OF BOOKS

### SH 102 Technology - Application and Instrumentation in Speech & Hearing

1. Ainsworth, W.A. (1988). Speech recognition by machine, London Peter Pen prints
2. Ainsworth W. A. (Ed.). (1990). Advances in Speech, Hearing and Language Processign Research Annuals: Vol. 1, London, Jaipress
3. Baber. C., & Noyes. J. M. (1993). Interactive Speech Technology Human latest technique with Application of Speech input output to computers. London Taylor and Francis
4. Bapat (1993). Electronic circuits and syntax, New Delhi: Mc. Graw Hill
5. Beranek (1954). Acoustical Engineering, New York: Mc. Graw Hill
6. Daniloff. R. G. (1985). Speech Sciences: Recent advances. London: Taylor and Francis
7. Gottingen. M. R. S. (Ed.). (1985). Speech and Speaker Recognition, Basel: Kager
8. Grene (1973). Application of Opamps. New York: Mc. Graw Hill
9. Grob (1982). Electronic circuits and applications. London: Mc. Graw Hill
10. Hall. Microprocessor and interfacing programming hardware. New Delhi: Mc. Graw Hill
11. Hall. J. W. (1992) Handbook of Auditory evoked responses. Masschuseettes Allyn & Bausen
12. Haton. J. P. (Eds) (1981) Automatic speech analysis & Recognition. USA. D. Reidel Publishing Company
13. Hawley. M. E. (1977) Speech intelligibility & Speaker Recognition. Pennsylvania Dowden Hutchinson & Ross Inc.
14. Hillburn (1973). Manual of active filter design. New York Mc. Graw Hill
15. Jacobson, J. T (Ed) (1994) Auditory brainstem response. Taylor & Francis. London
16. Johnson (1992) Introduction to digital signal processign. New Delhi. Mc Graw Hill
17. Johnson K & Mullenmin. J. W. (Eds) (1997) Talker Variability in Speech processign San Diego: Academic Press.
18. Jowens, F. (1993) Signal processign of speech. The Macmillan Press. Ltd.
19. Keller. E (Ed) (1994) Fundamentals of Speech Synthesis and Speech Recognition Basic concepts. State of the and future challenges, New York. John Wiley & Sons.
20. Kingsler & Fray (1962) Fundamentals of Acoustics. New York
21. Malvino. A. P. (1979) Electronic principles, New Delhi. Tata McGraw Hill
22. Markowitzm, J. A. (1996) Usign Speech Recognition. New Jersey: Prentice Hall
23. Mathur (1980) Electronic devices. Application and integrated circuits. Delhi: Delhi – Umesh Publications
24. Mathur (1992) Introduction to Microprocessor. New Delhi: Tata McGraw Hill
25. Millman. II (1972) Integrated Electronics. Tokyo McGraw Hill
26. Morgan D. P. & Scofield C.I (1991) Neural Networks and Speech processign. Boston. Kluwer Academic Press.
27. Nakagawa. S & etal (1995) Speech, Hearing and Neural Network Models. Oxford: IOS. Press
28. Nolon, F (1983) The phonetic basis of SPecker recognition; Cambridge. Cambridge University Press
29. Oppenheim & Schafer (1989) Digital signal processign. New Delhi. Prentice Hall of India
30. Potter. R. R. Kopp G. A. & Green. H. G. (1966) Visible Speech. New York. Dover Publications.

31. Rabinet, L. R. & Schaffer. R (1978) Digital processign of speech signals. New Jersey. Prentice Hall Inc.
32. Rabinet & Gold (1989) Theory & applications of digital signal processign. New Delhi. Prentice Hall of India.
33. Rabinette, M. S. & Slanke. L. L. (Eds) (1997) Otoacoustic emissions. Clinical applications Thicme, New York.
34. Ryder (1978) Electronic fundamentals and applications. Integrated and discrete systems. New Delhi. Prentice Hall of India.
35. Sanders D. A. (1993) Management of the hearing handicapped from infants to elderly. Prentice Hall inc. NJ
36. Sawashuma M & Cooper E. S. (1977) Dynamic aspects of speech production. Japan University of Tokyo Press.
37. Shansessy W. D. Computers in communication disorders.

## SH 103 SPEECH LANGUAGE PROCESSING

[64 hours]

### *Objectives*

*To equip the student to understand the basics of various aspects of speech and language processing.*

#### **UNIT 1** (12 hrs)

- Phonetic perception
- Perception of vowels - formants, F0, band width, duration, factors affecting vowel perception, static and dynamic cues, effect of co articulation.
- Consonant perception, cues for different consonants, static and dynamic cues, factors affecting consonant perception, effect of co articulation.

#### **UNIT 2** (12 hrs)

- Spoken word recognition- Word under noise, filtered, truncated words, lexical decision, word spotting, phoneme triggered lexical decision, speeded repetition of words, continuous speech, tokens embedded in words and non words, rhyme monitoring, word monitoring, cross modal priming Issues

#### **UNIT 3** (12 hrs)

- Stages and word recognition -lexical concept, lexical access, phonological encoding, production.
- The input to the lexicon-lexical access from spectra, constraints of temporal structure- Cohort models, interactive models of spoken word recognition – Logogen model lexical and phonetic processing-phonetic characterization task, phoneme restoration studies, phoneme monitoring task, sentence and word processing, Neighborhood activation model.

#### **UNIT 4** (12 hrs)

- Visual word recognition - models and theories; word and non-word naming, acquired dyslexia and role of phonology in word recognition.
- Sentence comprehension and processing of components of language - parallel and serial models of processing, modularity and information sources, and accounts of parsing, parsing issues, and ambiguity in parsing, strategies for disambiguation. Reference and anaphora. Discourse comprehension and expression.



## **UNIT 5 (12 hrs)**

- Sentence processing – basic capacities for perceiving phonetic contrasts - native language contrasts, foreign language contrasts, coping with variability in speech signal.
- Role of memory and attention
- Prosodic organization in native language
- Related developments in speech perception
- Processing of phonological, morphological, syntactic, semantic and pragmatic aspects of language.

### **LIST OF BOOKS**

#### **SH 103: SPEECH LANGUAGE PROCESSING.**

1. Arbib, M.A., Caplan, D., & Marshall, J.C., (Ed) (1982). Neural Models of Language Processes, Academic Press, New York.
2. Durrand, J., and Laks, B., (Ed) (1999). Phonetics, Phonology and Cognition. Oxford University press, US.
3. Hardcastle, W.J., & Laver, J., (Ed) (1999). The Handbook of Phonetic Sciences. Blackwell Publishers, Oxford.
4. Kroeger, R.P., (2004). Analyzing Syntax. Cambridge University Press, UK.
5. O' Shaughnessy, D., (2<sup>nd</sup> Edition) (2001). Speech Communication, Human and Machine. Universities Press, India.
6. Saeed, I.J., (1997). Semantics. Blackwell Publishers, Massachusetts. 20

## SH 104 NEURO-COGNITION AND LANGUAGE (64 hrs)

### **Objectives**

1. To equip the student to understand the theoretical basis of neurobiological attributes as related to speech, language and hearing abilities.
2. To enrich the knowledge related to cognition and language processing.

### **UNIT 1: (12 hrs)**

#### **Neuroanatomical correlates**

- Anatomy of the Central Nervous system
- Focus on speech, language and hearing related areas; cerebral hemispheres, cerebellum, cranial nerves, brainstem, spinal cord (surface as well as deep structures) and circuits, pathways and blood supply to Central Nervous system.
- Neuronal organization (area as well as function) in human beings and animals.

### **UNIT 2: (12 hrs)**

#### **Neurophysiological correlates**

- Concepts and studies related to : Hemispheric lateralization, Hemispheric Asymmetry
- (Structural + Functional) cerebral plasticity, cerebral maturation & its significance in development.
- Physiology of nerve conduction, Types of synapses, Types of neurotransmitters, Synthesis and activation of neurotransmitters; neurotransmitters in normal and disordered population.
- Neuroanatomical organization in bilinguals and multi-linguals.

### **UNIT 3 –(12 hrs)**

#### **Neurological investigative procedures**

- Neurohistological procedures, Radiological imaging, Magnetic imaging (MRI, FMRI, MEG), Electrophysiological procedures (evoked potentials, EEG, EMG etc), Imaging of brain metabolism (RCBF, SPECT, PET etc), CSF studies, Behavioural measures (Dichotic listening) Tachistoscopic presentation, Dichaptic studies etc)

### **UNIT 4: (12 hrs)**

#### **Neurobiology of Ageing**

- Neuroanatomical changes with aging, structural changes, morphological changes, microscopic anatomic changes, neurochemical changes.

- Neurophysiological changes with aging: cerebral blood flow, EEG changes, Evoked Potential changes, Sleep studies.

## **UNIT 5: (12 hrs)**

### **Neurocognition**

- Neurocognitive models
- Role of attention and memory – STM, LTM
- Other processes – Abstraction, Reasoning, Logical aspects, organization, planning and executive processes

### **LIST OF BOOKS**

#### **SH 104: NEURO-COGNITION AND LANGUAGE**

1. Arbib, M.A., Caplan, D., & Marshall, J.C., (Ed) (1982). Neural Models of Language Processes, Academic Press, New York.
2. Gerber, S.E., (Ed) (1995). The Handbook of Genetic Communicative Disorders. Academic Press, California.
3. Kirshner, S.H., (Ed) (1995). Handbook of Neurological Speech And Language Disorders. Marcel Dekker Inc, New York.
4. Kolb, B & Wishaw, Q.I., (W.H. Freeman & Company). Fundamentals of Human Neuropsychology.
5. Kuehn, Lemme, & Baumbartner, (Ed) (1989). Neural Bases of Speech, Hearing, and Language. Bodton, College-Hill Press.
6. Lecours, A. et al., (1982). Aphasiology. Tindall. London.
7. Miller, J.L., & Eimas, P.D., (Ed) (1995). Speech, language and Communication. Academic Press, New York.
8. Ripich, D., (Ed) (1991). Handbook of Geriatric Communication Disorders. Pro-ed Inc, Texas.
9. Stevenson, R.E., Schwartz, C.E., & Shroer, R.J., (2000). X-Linked Mental Retardation. Oxford University Press, New York.
10. Whitaker, A.H., & Stemmer, B., (Ed) (1998) Handbook of Neurolinguistics. Academic Press, US.

## **SH 105 SPEECH SCIENCE AND PRODUCTION [64 hrs]**

### ***Objectives***

- 1. To equip the student with theoretical knowledge and operational skills required for understanding the speech production mechanism.*
- 2. To sensitize the students on various methods of analysis of various parameters of speech.*

### **UNIT 1 (12 hrs)**

- Physiology of speech – physiology of respiration, purpose of respiration, description of respiratory movements, types of respiration, methods of respiratory analysis
- Physiology of laryngeal function – muscles of larynx, laryngeal movement.
- Neurophysiological bases of speech – neuromotor mechanism of the articulatory, phonatory and respiratory systems, electrophysiology of larynx

### **UNIT 2 (12 hrs)**

- Acoustics of speech – Acoustic theory of speech production, Acoustic phonetics, Basics, acoustics of vowels and consonants, review and state of the art.

### **UNIT 3 (12 hrs)**

- Spectrography – various types of spectrograms, spectrographic cues for vowels and consonants, identification of place, manner, voicing and aspiration using wide band bar type spectrogram.
- Application of spectrography in basic and applied research.
- Speech analysis in forensic sciences.
- Speech synthesis by analysis
- Speech recognition and speaker identification

### **UNIT 4 (12 hrs)**

- Infant cry – History, studies on infant cry analysis, features of infant cry, spectrographic patterns of normal cry and cry in clinical population
- Analysis of laughter, features of laughter, spectrographic patterns of laughter.

## **UNIT 5 (12 hrs)**

- Aerodynamics of speech production, Upper airway dynamics, lower airway dynamics. Aerodynamics of vowels, aerodynamics of consonants: stops, fricatives and nasals.

### **LIST OF BOOKS SH 105 SPEECH SCIENCE AND PRODUCTION**

1. Baer, T et al., (Eds) (1991). Laryngeal function in phonation and respiration. Singular Publishing Group, San Diego.
2. Baken, R.J and Daniloff, R.G. (1991). Reading in Clinical spectrography of speech. Singular Publishing Group, San Diego.
3. Code, C. & Ball, M. (1984). Experimental Clinical Acoustics. College Hill Press. Houston.
4. Kent, R.D., & Read, C. (1992). Acoustic analysis of speech. Singular Publishing Group, San Diego.
5. Keller E. (1994) Fundamentals of Speech synthesis and speech recognition Basic concepts, state of the art and future challenges John Wiley and Sons New York
6. Kent R.D & Read C 1995. The acoustic analysis of speech, A.I.T.B.S Publishers &
7. Lass, N.J (1976). Contemporary issues in experimental phonetics. Academic Press, New York.
8. Liberman, P., & Blustein, S. ( 1988). Speech Physiology, speech perception and Acoustic phonetics. Cambridge University press. Cambridge.
9. Murry, T. & Murry, J (1980). Infant communication: Cry and early speech. College – Hill Press, Houston.
10. Nolon, F. (1983). The phonetic basis of speaker recognition. Cambridge. University press, Cambridge.
11. Potter, R.K., Kopp, G.A., & Green, H.G. (1966). Visible speech. Dover Publications, New York.

**II SEMESTER**  
**SH 201 CLINICAL LINGUISTICS [64 hrs]**

**Objectives**

1. *To equip the student to understand the linguistic basis of different speech language disorders.*
2. *To train the students to record, analyse and transcribe clinical samples*

**UNIT 1 (12 hrs)**

- Language acquisition, semantics, syntax pragmatics, theoretical issues, theoretical issues, Deixis and anaphora, definiteness, discourse [focus on understanding normal and disordered language].

**UNIT 2 (12 hrs)**

- Neuro linguistics – Language and the brain – localization – left brain - right brain differences – coding and decoding – Neuro anatomical and Neuro physiological bases of language learning and dysfunction – linguistic and Psycho – neuro linguistic models of language pathology

**UNIT 3 (12 hrs)**

- Psycho linguistics and language acquisition – issues involved in language acquisition – motherese / Child directed speech – second language acquisition – language acquisition in bi- and multi-lingual environments.

**UNIT 4 (12 hrs)**

- Issues in Socio-linguistics-Standard and Non-standard Dialects, Regional and Social Dialects Stylistic Variation of Language, Gender and Language, Registers, Creole, Pidgins, relation between language culture, religion, politics etc. Language Deficiency.

**UNIT 5 (12 hrs)**

- Multilingual and cultural issues. A brief introduction to the major language families of the world – Language Families and Major Languages of India. Linguistic Determinism Linguistic relatively, Sapir-Whorf Hypothesis. Cultural diversity of India, Cultural issues in Verbal and non-verbal communication. Multicultural and multilingual issues in Rehabilitation with special reference to India.

**LIST OF BOOKS**  
**SH 201: CLINICAL LINGUISTICS**

1. Crystal,D.,(1981). Clinical Linguistics. Wien, Springer-Verlag.
2. Geoffrey Finch (1997) How to Study Linguistics. Palgrave Macmillan
3. Grundy,K.,(1981).Linguistics in Clinical practice. Whurr Publishers Ltd. London.
4. Grunwell,O.,(1975). The Phonological Analysis of Articulation Disorders. BJDC,10,31-42.
5. Lawrence D Shriberg & Raymong D Kent ( 2003).Clinical Phonetics .Pearson Education Inc.
6. Perkins,M., & Howard,S.,(ED) ( 1995). Case Studies In Clinical Linguistics. Whurr Publishers Ltd. London.
7. Reni Dirven & Marjolijn Verspoar. Cognitive Exploration of language & Linguistics (2004).John Benjamin Publishing Company.
8. Ziegler,W., & Deger,K.,(1998). Clinical Phonetics and Linguistics. Whurr Publishers Ltd. London.
9. Whitaker, A.H., & Stemmer, B., (Ed) (1998) Handbook of Neurolinguistics. Academic Press, US.

## SH 202 VOICE DISORDERS AND DYSPHAGIA [64 hrs]

### **Objectives**

- 1. To equip the student to understand the characteristics, diagnosis and rehabilitation aspects of voice and related disorders.*
- 2. To equip the student to understand the characteristics, diagnosis and rehabilitation aspects of swallowing disorders*

### **UNIT 1 (12 hrs)**

- Vocal fold physiology, neurophysiology of the larynx, vibratory modes of vocal folds.
- Models of vocal fold vibration – one mass model, two mass model, multiple mass model, EGG Model, simple Unitary mass model, triangular Unitary mass model.
- Development of the vocal fold
- Mechanical properties of the vocal fold vibration (stress strain relation, whip like motion, effects of impact stress).
- Issues related to professional voice and its care

### **UNIT 2 (12 hrs)**

Recent advances in measurement, assessment and management of voice and its disorders

- Voice Evaluation; perceptual and instrumental.
- Aerodynamic tests - vital capacity, mean airflow rate, maximum duration of sustained blowing.
- Tests for assessign functions of the resonatory system; acoustic analysis, psychoacoustic evaluation and tests for laryngeal measurements (model frequency, frequency range, F0 perturbation, intensity, intensity range, Amplitude perturbation, glottogram, harmonic analysis) and other measures (LTAS, nasality measurements etc usign instruments)
- Measurement of vocal fold vibration - invasive procedures - stroboscopy, videokymography; noninvasive procedures - EGG, inverse filtering.

### **UNIT 3 (12 hrs)**

- Pathophysiological changes in different voice disorders.
- Acoustic, aerodynamic and perceptual aspects of pathological voices
- Paediatric voice disorders
- Effects of ageing in voice



- Neurogenic voice disorders- Differential diagnosis and management.
- Endocrinal Voice disorders and voice disorders related to transsexuals.

#### **UNIT 4 (12 hrs)**

- Laryngectomy
- Pathophysiology of larynx
- Treatment-medical, surgical and therapeutic (including radiation therapy, chemo therapy, pre-postoperative counseling)
- Rehabilitation team of laryngectomee.
- Considerations in rehabilitation – adjustment to disability, reaction to alaryngeal speech etc
- Acoustical, perceptual and physiological aspects of alaryngeal speech
- Factors influencing intelligibility of alaryngeal speech

#### **UNIT 5 [12 hrs]**

- Dysphagia – Anatomical & Maturational considerations, Role of respiration. Physiology of suck- swallow- breath sequence, overview of phases of swallowing, Development of feeding skills, Alternate methods of nutritional intake.
- Disorders of swallowing in children and adults
- Etiological classification: Medical, GI tract, respiratory, CNS/PNS damage, cardiac effects, structural, abnormalities and iatrogenic.
- Assessment – Clinical examination, subjective evaluation of swallow function, feeding skills, GERD. Objective methods - Radiological and Instrumental evaluation
- Multidisciplinary management of dysphagia - Issues and concerns, Medical and Non-medical treatment.

### **LIST OF BOOKS SH 202 VOICE DISORDERS AND DYSPHAGIA**

1. Vocal Fold Physiology – Frontiers in Basic Science [1993]. Titze, I.R. [ed] San Diego: Singular Publishing Group, Inc.
2. Principles of Voice Production [1994] Titze, I. R. NJ: Prentice Hall, Inc.
3. Neurolaryngology: Recent Advances [1991] Hirano, M. Kirchner, J. A. and Bless, D. M. {Eds] California: Singular Publishing Group, Inc.
4. Diagnosis and Treatment of Voice Disorders [1995], Rubin J. S. Sataloff R. T. Korovin, G. S and Gould, W. J. NY:IGAKU-SHOIN Medical Publishers, Inc.
5. Medical Speech-Language Pathology – A Practioner’s Guide [1998] Johnson, A. F. and Jacobson, B H NY: Thieme, Inc.
6. Clinical Measurement of Speech and Voice [1996] Baken, R J California: Singular Publishing Group, Inc.

7. Professional Voice – The Science and Art of Clinical Care [1991] Sataloff, R T NY: Raven Press.
8. Clinical Manual for Laryngectomy and Head and Neck Cancer Rehabilitation [1993]. Casper, J. K. and Colton, R. H. California: Singular Publishing Group, Inc.
9. Atlas of Laryngoscopy [2007]. Sataloff. R. T. Eller, R. T. and Hawkshaw, M. California: Plural Publishing, Inc.
10. Voice and Voice Therapy [2005] Boone, D R Mc Farlane S C and Von Berg S. L Boston: Allyn and Bacon.
11. Laryngeal Electromyography [2006] Satalof, R. T. Mandel S, Abaza, M California: Plural Publishing, Inc.
12. Vocal Care in Medical Setting [1997] Koschkee, D. L. Rammage, L. California: Plural Publishing Group, Inc.

### **DYSPHAGIA**

13. Bruce E Murdoch, Deborah G Theodoros, 2001, Traumatic Brain Injury: Associated Speech Language and Swallowing Disorders, Singular Publishers.
14. Michael E Groher, 1992, Dysphagia: Diagnosis and Management, 2<sup>nd</sup> Edition, Butterworth – Heinemann, USA.
15. Kim Coxbin – Lewis, Julie M Liss, Kellie L, Sciortino 2005, Clinical Anatomy and Physiology of the swallow mechanism, Thomson Delmar Learning, USA.

## SH 203 – PSYCHOPHYSICS [64 hrs]

### **Objectives**

1. To equip the student with acoustical and psycho acoustical parameters of speech
2. To familiarize the students on psycho acoustic approaches to measurement and analysis.

### **UNIT 1 (12 hrs)**

- Theory of signal detection,
- Concept and application including ROC
- Methods in psychophysics- classical & adaptive
- MAP & MAF underwater hearing, relation to calibration Loudness perception, equal loudness level contours loudness and loudness level, scaling
- Factors affecting loudness, Theories, models of loudness
- Weber's Law, Differential sensitivity for intensity, absolute and relative DL,
  - Loudness perception in pathological ears, recruitment, dynamic range, loudness adaptation
- Florentine theory of softness imperceptions,
- Relevance in clinical Audiology

### **UNIT 2 (12 hrs)**

- Critical band concept,
- equivalent rectangular band concept,
- frequency resolution, excitation pattern,
- Masking, PTC, usign simultaneous and non simultaneous maskers, central masking, pulsation threshold, profile analysis, MDI
- Clinical application

### **UNIT 3 (12 hrs)**

- Temporal perception,
- Temporal acuity, temporal DL, temporal order,
- Gap detection (in broad band noise, in narrow band noise, sinusoid) temporal integration
- Duration discrimination
- Temporal modulation transfer function
- Factors affecting temporal perception
- Clinical application.
  - Adaptation and fatigue,
  - Levels of adaptation & physiology
- Methods to study
- Parameters affecting
- Clinical applications
- Path physiology of fatigue

#### **UNIT-4 (12 hrs)**

- Pitch perception, factors affecting
- Ohm's law, Neurophysiologic basis
- Theories and models, consonance
- Dissonance, pitch of complex tones
- Differential sensitivity for frequency, Absolute and relative DLF's, methods to study,
- Timbre perception - Factors affecting
- Object perception – Object identification, , auditory scene analysis,
- Clinical application

#### **UNIT 5 (12 hrs)**

- Binaural hearing
- MLD
- Lateralization, binaural integration, binaural advantage
- Binaural DLF, DLI, DLT, squelch, beats, rotating tones
- Time intensity trade
- Durlach and Jeffress models
- Clinical application
- Space perception
- Localization
- Minimal audible angle
- Role of pinna
- Cone of confusion
- Monaural localization and Clinical application

### **LIST OF BOOKS SH 203 PSYCHO PHYSICS**

1. Yost, WA & Neilson DW – “Fundamentals of Hearing” Holt Rinehart & Winston 1977
2. Yost; W.A Popper A. N, Fay R.R – “Human Psychophysics” – Springer Verlag – 1993
3. Gelfand. S A “Hearing, An Introduction to Psychological & Physiological acoustics” Marcel Dekker Inc. 1990 & 1981
4. Pickles, J.O “An Introduction to the physiology of hearing” Academic Press London, 1984
5. Zwicker E. Fastl H. “Psychoacoustics – Facts & Models” Springer – 1999
6. Durrant – Lovrinic 1997 “Basics of Hearing Sciences” – Williams & Wilkins 3<sup>rd</sup> Edition
7. Maore B C J (Eds) 1995 Hearing – Academic Press, San Diego
8. Gullick W.C 1971. Hearing Physiology & Psychophysics, Oxford University Press N.Y
9. Palmer A.R. Rees A, Summerfield AQ Meddis K “Psychophysical and physiological advances in hearing – Whurr Publication 1998
10. Syka Joel. “Acoustical Signal Processign in the Central Auditory System” Plenum Press 1997.
11. Bekersy G.Von “Experiments in Hearing” Mc Graw Hill 1960

12. Hanghton Piter "Acoustics for Audiologists" Academic Press 2002
13. Warren R.M 1999. Auditory Perception-A new Analysis and synthesis U
14. Rosenthal DF & Okiano H G "Computational Auditory Scene Analysis" Lawrence Erlbaun Associates, Publishers 1998.
15. Hawkins H L, Mc Muller TA, Popper A N, Fay R R "Auditory Computation" Springer Verlag 1996.
16. Yost "Directional Hearing" – Wiley 2000
17. Hirsh S K, Eldredge DH, Hirsh F J & Silverman R. "Hearing & Davis". Washington University Press 1976. K: Cambridge University Press, U.K.

## SH 204 AUDITORY PHYSIOLOGY [64 hrs]

### **Objectives**

1. *To equip the student to understand the physiological basis of auditory system, inter-relation and dependency of structure and function with nervous system.*

### **UNIT 1 (12 hours)**

#### 1) External ear:

- Anatomy & Physiology of lower animals and humans. Role of Pinna &
  - external auditory meatus in hearing. Resonance properties of external ear & auditory canal
- Non auditory physiology of external ear
- Developmental changes
- Application to clinical audiology
- Temporal bone anatomy - role in hearing

#### 2) Middle ear:

- Anatomy & Physiology.
- Middle ear transformer action
- impedance
- Acoustic and non acoustic reflex pathways
- Anatomy and physiology of the Eustachian tube

### **UNIT 2 –(12 hrs)**

#### Cochlea: Anatomy in lower animals and humans

- Macro & Microanatomy
- Blood supply
- Innervations
- Cochlear fluids – origin, absorption, composition, dynamics and functions
- Cochlear models

#### Physiology of the Cochlea

- Modes of bone conduction
- Cochlear mechanics – basilar membrane mechanics - historical and current status
- Cochlear transduction
- Cochlear electrophysiology
- Cochlear non-linearity-two tone suppression, otoacoustic emission & other recent advances
- Proteins in the cochlea
- pathophysiology & perception
- Repair, regeneration, protection in the cochlea
- Theories of hearing

- Historical aspects Place theory – resonance & non-resonance ,Frequency theory , Travelling wave theory , Other recent advance like motor theory etc

### **UNIT 3 – (12 hrs)**

#### Auditory nerve

- Structure and tonotopic organization
- Structure and contents of internal auditory meatus
- Refractory period, adaptation, firing rates, types of responses
- Electrophysiology – action potential, generation and properties
- Stimulus coding, frequency, intensity, time, complex signals, speech
- Non linearity

#### Vestibular System

- Anatomy and physiology of vestibular structures and vestibular nerve
- Integration of senses in balance
- Vestibule ocular reflex
- Vestibule spinal reflex

### **UNIT 4 - (12 hrs)**

#### Brain stem

- Anatomy of CN, types of cells distribution
- Anatomy of SOC, LL,IC,MGB
- Non classical pathway
- Tonotopic organization
- Neurophysiology at different levels
- Localization
- Stimulus coding, neurotransmitters
- Medial and lateral efferent effect on cochlear physiology ,Auditory Nerve and CN  
Plasticity

### **UNIT 5 –(12 hrs)**

#### Auditory cortex

- Anatomy and tonotopic organization of primary and secondary auditory areas and efferent pathways, neurotransmitters
- Neurobiological relationship between auditory cortex and other areas
- Neurophysiology of auditory areas
- Stimulus coding – frequency, intensity and time
- Role of auditory cortex in localization
- Plasticity

**LIST OF BOOKS**  
**SH 204 Auditory Physiology**

1. Berlin C.I; Weyand T.G (Eds) 2003 – The Brain & sensory plasticity: Language acquisition and hearing. Thomson/Delmer Learning
2. Bellies T.J 2003 – Assessment & Management of central auditory processign disorders in the educational setting from science to practice. Signular Publishing Group. USA
3. Ehret G. Romand R (Eds) 1997: The central auditory system. Oxford University Press, New York
4. McPherson D.L 1996 – Late potentials of the auditory system. Signular Publishing Group. Inc
5. Palmer A.R; Rees A; Summerfield A Q; Meddis R (Eds) 1998, Psychophysical &
6. Physiological advances in hearing. Whurr Publishers Ltd, London
7. Parks T.N; Rubel E.W; Fay R.R; Popper A.N (Eds) 2004. Plasticity of the auditory
8. system. Springer, New York
9. Popper A.N; Fay R.R (Eds) 1992: The mammalian auditory pathway:
10. Neurophysiology. Springer – Verlay, N.Y.
11. Rerben E.W; Popper A.N; Fay R.R (Eds) 1998. Development of the Auditory System.
12. Springer – Verlay, N.Y.
13. Sahley T.L; Nodar R.H; Musiek F.E 1997, Efferent auditory system structure and
14. function - Signular Publishing Group. USA
15. Syka. J(Ed) 1997 – Acoustical signal processign in the central auditory system
16. Plenum Press
17. Wada. H; Tukasade T; Ikeda. K; Ohyama K; Koiki T (Eds) 2000. Recent
18. developments in auditory machines World Scientific Publishing Co.
19. Webster D.B; Popper A.N; Fay R.R (Eds) 1992. The Mammalian Auditory Pathway –
20. Neuroanatomy Springer – Verlag, N.Y
21. Auw. W.L., Popper.A.N. Fay.R.R (Ed) 2000: Hearing by whales & Dolphins.
22. Springer- Venlag, New York, USA.
23. Berlin.C.I. (Ed) 1996: Hair cells & Hearing aids, Signular Publishing group. Inc.,
24. USA.
25. Bekesy.G.V. (1960): Experiments in hearing McGraw-Hill Book Company.
26. Dallos.P. Popper.A.W., Fry.R.R (Ed) 1996: The Cochlea, Springer-Venlag, New
27. York, USA.
28. Davis (1990): Hearing, Washington University.
29. Durant, J.D & Lovrinic.J.H (1977): Bases of hearing Sciences. Williams & Wilkins.



## SH 205 SCIENTIFIC WRITING AND APA STYLE (30 HRS)

**Objectives:** *At the end of this course, students should be able to:*

- 1) *Distinguish different types of research, their audiences and how research material might be effectively presented*
- 2) *Prepare scientific and technical papers, and presentations.*
- 3) *Format documents and presentations to optimize their visual appeal when viewed in-press, as a podcast or audio/video file form at on the internet, or through personal presentations to an audience*
- 4) *Effectively use features of Microsoft Office to create eye-catching professional documents and presentations.*
- 5) *Effectively use features of Microsoft Word, Powerpoint, and Excel to create professional looking tables, graphs and figures.*
- 6) *Accept constructive criticism and use reviewers' comments to improve quality and clarity of written reports and presentations.*

### Unit 1 (3 Hrs)

Introduction

- Research – definition
- Research communication
- Types of scientific communication

### Unit 2( 5 Hours)

- Scientific Literature
- Searching the scientific literature
- Usign the UTM library
- Usign online search engines
- What is a refereed journal?
- Plagiarism and how to avoid it

### Unit 3 (5 Hours)

- Constraints in scientific writing
- Organization of scientific writing
- Preparing outlines
- Standard formats for scientific papers, research projects and theses

### Unit 4 (5 Hours)

- Creating a literature review
- Preparing other sections of a research report (abstract, introduction, materials and methods, results and discussion, conclusions)

- Including and summarizing research data

### **Unit 5 (4 Hours)**

- Scientific writing style
- First-person vs. Third-person; Passive vs. active voice,
- Word usage
- Grammar
- Use of footnotes

### **Unit 6 ( 5 Hours)**

Use of references Within the text

Making reference list

Revision of the scientific paper

### **Unit 7 (1 Hour)**

Usign Computer technology:

Microsoft Word:Formatting (including margins, tabs, indents, justification, etc) ,Usign the table feature ,Creating tables of content

Microsoft Excel :Creating tables, charts, graphs

Poster presentation: Organization and formats for posters, Usign Microsoft powerpoint, Designing and preparing slides for an oral presentation

### **Unit 8 (2 Hours)**

APA Guidelines

## **LIST OF BOOKS SH 205 SCIENTIFIC WRITING AND APA STYLE**

1. Alley, M. (1996). *The Craft of Scientific Writing*. Springer
2. APA guidelines: retrieved from <http://web.calstatela.edu/library/guides/3apa.pdf>
3. Barzilay, R. and Lapata, M. (2008). Modeling Local Coherence: An Entity Based Approach , *Computational Linguistics Journal* 34(1)
4. Bem, D. J. (2003). Writing the Empirical Journal Article , in Darley, Zanna, & Roediger (Eds.) *The Complete Academic: A Practical Guide for the Beginning Social Scientist*, 2nd Edition , Washington DC: American Psychological Association.
5. Berg, B. L. (1998). Designing Qualitative Research (excerpts on constructing a literature review), in Berg, B. L. *Qualitative Research Methods for the Social Sciences: Third Edition* , Boston: Allyn & Bacon
6. Berg, B. L. (1998). Writing Research Papers: Sorting the Noodles from the Soup, in Berg, B. L. *Qualitative Research Methods for the Social Sciences: Third Edition* , Boston: Allyn & Bacon

7. Bestgen, Y. (2006). Improving Text Segmentation Using Latent Semantic Analysis: A Reanalysis of Choi, Wiemer-Hastings, and Moore (2001), *Computational Linguistics Journal*.
8. Choi, F., Wiemer-Hastings, P., & Moore, J. (2001). Latent Semantic Analysis for Text Segmentation , in *Proceedings of EMNLP*.
9. Day A. Robert (1998). How to Write & Publish a Scientific Paper: 5th Edition: Gold Beach Distributors .
10. Greenberg, S. and Buxton, B. (2008). Usability Evaluation Considered Harmful (Some of the time).
11. Teufel, S. & Moens, M. (2002). Summarizing Scientific Articles: Experiments with Relevance and Rhetorical Status , *Computational Linguistics Journal* , Vol 28, No. 1.

## SH 206 AUDITORY VERBAL TECHNIQUES (30 HRS)

**Objectives:** At the end of the course, students should be able to

- 1) *describe the history and development of auditory verbal therapy*
- 2) *understand the rationale, principles, strategies, techniques and procedures in auditory verbal method of teaching.*
- 3) *develop skills to practice AVT to facilitate normal integration of hearing impaired children*
- 4) *provide support to parents in an auditory verbal setting*
- 5) *develop skills in writing an auditory verbal treatment plan, and*
- 6) *understand the history and development of auditory verbal Teaching and its implications*

### Unit 1: (7 Hours )

History, Philosophy and Principles of AVT

- History of Auditory Verbal Practice and contributions of the pioneers
- Principles and procedures of Auditory Verbal Training
- Pre-requisites of Auditory Verbal Training and the factors that affect the outcomes

### Unit 2:( 7 Hours)

The auditory verbal treatment plan

- Base line assessment and short term goals based on normal development
- Age appropriate activities and instructional material for AVT sessions
- Listening strategies and Techniques of AVT
- Analysis of language samples to evaluate outcomes

### Unit 3: (8 Hours)

Listening skills development and assessments

- Stages of auditory hierarchy and sequential planning through hierarchy of listening skills
- Importance and need for assessments in four areas of audition, language, speech and cognition
- Formal and informal assessment of functional listening skills and the use of six sounds test
- Test results to make recommendations to parents about management of their child with deafness/ hard of hearing including development of auditory skills

### Unit 4:(6Hours)

The auditory verbal therapy plan

- Planning long- and short-term goals: Working with babies below the age of two years
- The importance of signing

- Importance of neural plasticity subsequent to auditory stimulation
- Recognition of red flags and action plan

### **Unit 5: (2 Hours)**

The role of parents in Auditory Verbal Technique

The role of parents in auditory verbal plan and the team approach

Coaching Parents during the session and to encourage participation

Transfer of goals from therapy to home

## **LIST OF BOOKS SH 206 AUDITORY VERBAL TECHNIQUES**

1. Estabrooks W. (2006) Auditory Verbal Therapy and Practice, AG Bell Association for the Deaf and Hard of Hearing, Inc.
2. E. Cole, C. Flexer (2007) Children with Hearing :Loss Developing Listening and Talking Birth to Six, Plural Publishing
3. Estabrooks W. (1998) Cochlear Implants for Kids, AG Bell Association for the Deaf and Hard of Hearing, Inc.
4. Estabrooks W. & Marlowe J, The Baby is Listening, A G Bell Association for the Deaf and Hard of Hearing, Inc, Washington DC
5. Pollack D.(1970) Educational Audiology for the Limited Hearing Infant, Charles C. Thomas
6. Simser, J. (1993) Auditory-Verbal Intervention: Infants and Toddlers, Volta Review 95(3), 217-229
7. D. Ling AG Bell (1989). Foundations of Spoken Language for Hearing-Impaired Children
8. D. Ling and A. Ling AG Bell. (1978). Aural Habilitation: The Verbal Foundations of Learning in Hearing-Impaired Children
9. Estabrooks, W. (1994) Auditory Verbal Therapy for Parents and Professionals, A.G. Bell Association for the deaf and hard hearing
10. Flexer, C. (1994) Facilitating Hearing and Listening in Young Children. Singular Publishing Group, Inc. San Diego

## **SH 207 TINNITUS AND HYPERACUSIS (30 HRS)**

### *Objectives:*

- 1. Complete a tinnitus evaluation independently and interpret the results.*
- 2. Counsel the patient on findings, impressions, and appropriate recommendations.*
- 3. Implement tinnitus management approaches that utilize directive counseling and sound therapy devices.*
- 4. Identify considerations for implementation of a tinnitus management program within a private practice setting.*

### **Unit 1( 2 Hours)**

Principles of tinnitus diagnosis

### **Unit 2 (7 Hours)**

- Tinnitus evaluation
- Comprehensive case history
- Neurophysiological model of tinnitus and its application in assessment and remediation
- Psychoacoustic tinnitus measurements
- Subjective questionnaires

### **Unit 3(7 Hours)**

Management of Tinnitus – disciplinary & interdisciplinary procedures (7 hours)

- Counselling
- Cognitive behavioural therapy
- Habituation and tinnitus retraining therapy
- Hearing aid and tinnitus instruments
- FDA approved tinnitus therapies
- Sound therapy, maskers and home masking devices
- Importance of nutrition
- Complimentary therapies
- Stress management

### **Unit 4(10 Hours)**

- Hyperacusis (4 hours)
- Development of tinnitus support groups, integrating a tinnitus program into an audiology practice (2 hours)
- Case studies in assessment (4 hours)

## **LIST OF BOOKS**

### **SH207TINNITUS AND HYPERACUSIS**

1. Tyler, R. (2000) *Tinnitus Handbook*
2. Andersson, G. et al. (2005) *Tinnitus : a multidisciplinary approach*
3. Tyler, R. (2005) *Tinnitus Treatment: Clinical Protocols*
4. jastreboff, P.J. (1995). Tinnitus as a phantom perception: theories and clinical implications. In Vernon, J. and Moeller, A.R. *Mechanisms of Tinnitus*. Boston, MA: Allyn & Bacon.

## **SH 208 PROFESSIONAL VOICE USE (30 Hours)**

### **Unit 1 (5 hrs)**

#### **Overview**

- Development of larynx and the voice
- Gross and Microscopic anatomy of larynx
- Physiology of phonation
- Laryngeal Neurophysiology
- Age and Voice

### **Unit 2 (8 Hours)**

- Professional voice users- types , Acting voice, Signing voice , voice of call centre people etc
- Benign vocal fold pathologies
- The common types of vocal complaints and their aetiologies of professional voice users
- Environmental factors affecting professional voice users
- Psycho social effects of voice problem in professional voice users (8 hrs)

### **Unit 3 (10 Hours)**

- Case history, interview and voice handicap assessment
- Laryngeal examination and visualizations
- Evaluation of voice outcomes and quality of life
- Perceptual attributes and assessment
- Acute assessment of professional voice users

### **Unit 4 (3 Hours)**

- Medications: positive and negative impact on voice
- Voice therapy for benign vocal fold pathologies in signers and actors
- Treatment of vocal abuse
- Consequences of voice rest
- Surgical anatomy , planning and consent
- Treatment outcomes in professional voice users



**LIST OF BOOKS**  
**SH 208 PROFESSIONAL VOICE USE**

1. Diagnosis and Treatment of Voice Disorders [1995], Rubin J. S. Sataloff R. T. Korovin, G. S and Gould, W. J. NY:IGAKU-SHOIN Medical Publishers, Inc.
2. Principles of Voice Production [1994] Titze, I. R. NJ: Prentice Hall, Inc.
3. Professional Voice – The Science and Art of Clinical Care [1991] Sataloff, R T NY: Raven Press.
4. Clinical Measurement of Speech and Voice [1996] Baken, R J California: Singular Publishing Group, Inc.

## **SH 209 ALARYNGEAL SPEECH AND DYSPHAGIA MANAGMENT**

**(30 HOURS)**

### **Unit 1(3 Hours)**

- Aetiology and types : head and neck cancers
- surgical and nonsurgical management of cancer

### **Unit 2(5 Hours)**

- Types and characteristics of laryngectomy surgery
- Anatomical changes following laryngectomy
- Post surgical concern- breathing, swallowing, speech
- Assessment of laryngectomee and associated problems , Pre & post-operative counselling

### **Unit 3(7 Hours)**

- Types of Alaryngeal speech: principle, candidacy, types, characteristics, advantages and disadvantages.
- Artificial larynx, Esophageal, Pharyngeal speech, buccal speech, ASAI speech, gastric speech
- Tracheo-esophageal speech(TEP): Voice prostheses, Surgical consideration in TEP, Timing of TEP, Trouble shooting TEP, Complications of TEP.

### **Unit 3(6 Hours)**

Overview of dysphagia and assessment procedures

- Anatomy and neurophysiology of normal swallowing process in children and adults
- Development of feeding skills
- Swallowing disorders: aetiologies, classification and symptoms
- Assessment (Formal and Informal) of dysphagia in children and adults
- Screening
- Subjective evaluation
- Instrumental evaluation- interpretation of results
- Guidelines for evaluation of specific patient groups

### **Unit 4(6 Hours)**

Management and treatment of swallowing disorder in children and adults

- Surgical and non surgical management of dysphagia
- Direct and indirect therapy approaches
- Complications of oropharyngeal dysphagia

- Dysphagia management of head and neck cancer.
- Multidisciplinary management of dysphagia - Issues and concerns

### **Unit 5 (3 Hours)**

- Evidence based practice in rehabilitation of dysphagia and laryngectomy
- Need of record keeping, Report writing: referral letters, consultation replies, progress notes, discharge summaries
- Ethical issues

### **LIST OF BOOKS**

#### **SH 209 ALARYNGEAL SPEECH AND DYSPHAGIA MANAGMENT**

1. Langley. J. Working with Swallowing Disorders. U.K.: Winslow
2. Casper, J. K. and Colton, R. H.(1993). Clinical Manual for Laryngectomy and Head and Neck Cancer Rehabilitation California: Singular Publishing Group, Inc.
3. Murdoche. B., Theodoros D.G.(2001). Traumatic Brain Injury: Associated Speech Language and Swallowing Disorders, Singular Publishers.
4. Groher M.E.(1992). Dysphagia: Diagnosis and Management, 2nd Edition,
5. Heinemann B., Coxbin K. – Lewis, Liss J. M., Sciortino K. L. (2005), Clinical Anatomy and Physiology of the swallow mechanism, Thomson Delmar Learning, USA
6. Dikeman,K. J.. Kazandjian M. J.( 2003). Communication and Swallowing Management of Tracheostomized and Ventilator ...

**SH210 CLINICAL PRACTICUM – I & II SEMESTERS**  
**SPEECH LANGUAGE PATHOLOGY [15 hrs/week]**

***Objectives***

- 1. The student should be able to assess, diagnose, plan and execute therapy for children and adults with various communication disorders.*
- 2. To maintain clinical record.*

1. Assessment of 10 clients with voice / dysphagic disorders.
2. Use of instrumentation in 10 clients with voice / dysphagic disorders.
3. Plan and execute therapy in 5 clients with voice / dysphagic disorders.
4. Maintain clinical records.

**AUDIOLOGY [15 hrs/week]**

***Objectives***

- 1. To give practical bases for interpretation of test results and test battery approach in different conditions and relate it to structural anatomy, physiology and alterations in diseased auditory mechanism.*
1. To test a minimum of 10 cochlear hearing loss cases using test battery approach.
2. To test 10 clients of retro cochlear pathology using special and conventional auditory test battery
3. To prescribe and set hearing aid in at least 10 clients (5 children and 5 adults) as per their hearing need.

### III SEMESTER

## SH 301 LANGUAGE ACQUISITION AND LANGUAGE DISORDERS IN CHILDREN

[64 hrs]

### *Objectives*

- 1. To equip the student with thorough knowledge of acquisition of language.*
- 2. To equip the student to differently diagnose various child language disorders.*
- 3. To understand the current advances in assessment and intervention for child language disorders.*

### **UNIT 1** [12 hrs]

Critical review of current theories of language acquisition and its applications to assessment and intervention. Overview of genetic, neuro anatomical and neurophysiological correlates of language development.

### **UNIT 2** [12 hrs]

Language development in exceptional circumstances extreme deprivation, bilingual language acquisition, visual handicap, Mental retardation, Williams's syndrome, hearing loss, language learning disabilities and dysphasia and acquired childhood aphasia.

### **UNIT 3** [12 hrs]

Contemporary concept and issues in Autism Spectrum disorders, SLI, and LD.

### **UNIT 4** [12 hrs]

- Cross cultural consideration in assessment and management of developmental language disorders
- Specific assessment and intervention approaches for various developmental language disorders

### **UNIT 5** [12 hrs]

Dyslexia, Neurobiology of reading and writing, Metalinguistics - Phonological awareness, reading etc. Evaluation and treatment approaches.

## LIST OF BOOKS

### **SH 301 LANGUAGE ACQUISITION AND LANGUAGE DISORDERS IN CHILDREN**

1. Intervention Planning for Children with Communication Disorders – A Guide for clinical practicum and professional practice (1994). Prentice – Hall, Inc. New Jersey.
2. Cross Cultural Perspective in Language Assessment and Intervention. Topics in Language Disorder series. Butler, K.G. (1994). U.S.A.: Aspen Publication.
3. Differential Diagnosis in Speech Language Pathology – Philips, B.J. and Scello, D. (1998). Butterworth- Heinemann,
4. Language Development in Exceptional Circumstances. Bishop, D and Mogord, K. (EDs.) (1993). U.K.: Erlbaum Associates Ltd., Publishers
5. Language Disorders: A functional Approach to Assessment and Intervention. Owens, R.E. (Jr.) (1991). U.S.A.: Macmillan Publishing Company
6. Development disorders of language (2<sup>nd</sup> ed.) Adams, c., Browns, B and Edwards, M (1999). London: Whurr Publishers Ltd.
7. Evaluating Theories of Language - Evidence from disordered communication. Dodd, B., Campbell. R. and Worrall, L (Eds). (1996). London: Whurr Publishers.
8. Childhood language disorders in contest – infancy through adolescence. Allyn and Bacon, Boston. Nelson, N.W. (1998).

## SH 302 CLINICAL PHONOLOGY AND MOTOR SPEECH DISORDERS

[64 hrs]

### **Objectives**

1. To equip the student with knowledge as required for theoretical and practical understanding of disorders of phonology, specific requirements in different languages and different disorders.
2. To train the student in differential diagnosis and management of motor speech disorders.

### **UNIT 1 [12 hrs]**

- Phonological processes- review and recent advances, different types, its analysis, phonological process patterns in various communication disorders, International Phonetic Alphabet transcription.
- Phonological awareness - development, assessment and clinical implications. Recent studies.
- Phonotactics and metalinguistic abilities in phonological disorders.
- Co-articulation – nature, definitions and kinds. Models – feature based, syllabic and allophonic based, target based, phonologically based.
- Physiological studies on co-articulation- effects of co-articulation (position and juncture effect, transition effect, direction effect); Co-articulation in Speech Disorders.

### **UNIT 2 (12 hrs)**

- Application of phonological theories in evaluation and management of phonological disorders
- Metaphon theory and therapy
- Management of co-articulation in speech disorders and remediation.

### **UNIT 3 (12 hrs)**

- Neurophysiology and functional development of sensori-motor control
- Sensory motor processing in speech / correlates of oral sensori-motor dynamics – (a) Neural substrates and findings in dysarthria and apraxia.

### **UNIT 4 [12 hrs]**

- Recent advances in diagnosis, assessment and management of Dysarthria

### **UNIT 5 [12 hrs]**

- Recent advances in diagnosis, assessment and management of Apraxia.

### **LIST OF BOOKS**

#### **SH 302 - CLINICAL PHONOLOGY AND MOTOR SPEECH DISORDERS**

1. Perspectives in applied phonology. (1997). Hodson, B.W and Edwards, M.L. Mayland: An Aspen Publication.
2. Clinical phonology. Assessment of articulation disorders in children and adults. (1996) Klein, E.S. California: singular publishing group Inc.
3. Phonological theory and the misarticulation child. ASHA monographs. (1984). ( number 22 Ed) Elbert, M Dinnsen, D.A. and Weismer, G.
4. Phonological disability in children (2<sup>nd</sup> edition) studies in disorders of communication. (1989) Ingram. Cole and Whurr Limited.
5. Clinical management of motor speech disorders in children. (1999). Caruso. F.J. and Strand, E.A. New York: Thieme.
6. Motor speech disorders – A treatment guide. (1991). Dworkin, P.J. St. Louis: Mosby Year Book. Inc.
7. Clinical management of Neurogenic communication disorder. (1985). Johns, D.E. Boston: Allyn Bacon.
8. Motor speech disorders: substrates, Differential diagnosis and management. (1995). Duffy, J.R. St. Louis: Mosby
9. Neuromotor speech disorders – nature, assessment and management. (1998). Cannito, M.P., Yorkston, K.M. and Beukelman, D.R.
10. Evaluation and treatment of swallowing disorders. (1983). Logemann, J.
11. Medical Speech Language Pathology: a practitioner's Guide. (1998). Johnson, A.F. and Jacobson, B.H. NY: Thieme
12. A.F. and Jacobson, B.H. NY: Thieme



## **SH 303 SPEECH PERCEPTION AND ITS DISORDERS [64 hrs]**

### ***Objectives***

- 1. To sensitize the student on normal and abnormal attributes of perception of speech.*
- 2. To familiarize the students on differences in perceptual attributes in clients with auditory disorders.*

### **UNIT 1 (12 hrs)**

- Theories and models of speech perception (motor, neurological, auditory, acoustic, analysis by synthesis and TRACE)
- Basic Issues in speech Perception-linearity, segmentation. Lack of invariance. Variability or perceptual constancy in speech. Invariant feature and cue based approaches.
- Speech processing in the auditory system. Overview of the anatomy of the auditory system, peripheral and central mechanisms in the analysis of speech – place representation, intensity model, multistage representation and categorical perception.

### **UNIT 2 (12 hrs)**

#### Speech intelligibility and perception of supra-segmentals

1. Methods: Subjective (perceptual tests), Objective (Articulation Index, Speech intelligibility index. Speech transmission index)
2. Comparison of two methods
  3. Factors influencing – stimulus based, subject based, transmission based factors
4. Clinical application – in evaluation , rehabilitation and research
5. Perception of segmental and supra-segmental cues through
  - a. The visual modality
  - b. The tactile modality

### **UNIT 3 (12 hrs)**

1. Perception of vowels, semivowels, and diphthongs in individuals with hearing impairment
2. Perception of consonants in individuals with a hearing impairment
3. Effect of type, degree and audiogram configuration in perception of vowels and consonants

4. Speech perception through hearing aids using signal enhancing features
4. Dichotic listening- Theories, Factor affecting, Clinical application
5. Infant Perception, perception of consonants and vowels, suprasegmentals in infants, comparison of adult and infant perception, universality in perception, word perception, lexical neighbourhood.

#### **UNIT 4 (12 hrs)**

1. Perception of segmental and suprasegmental cues through cochlear implants
  - a. Effect of number of channels,
  - b. Effect of coding strategy,
  - c. Effect of implant model
  - d. Effect of number of electrodes and stimulation rate
2. Perception of segmental and suprasegmental cues through auditory brainstem implants
3. Perception of segmental and suprasegmental cues through Middle ear implant and BAHA
4. Comparison of perception through different devices

#### **UNIT 5 (12 hrs)**

1. Speech perception in noise (Effect of types of noise, different signal-to-noise ratio, different degrees of hearing impairment )
  - a. Effect on children, adults, geriatrics, peripheral hearing impairment, (C)APD
2. Effect of reverberation on speech perception - Effect of different levels of reverberation times, Degrees of hearing impairment.
4. Combined effect of noise and reverberation
5. Effect of non-native accent on speech perception
6. Short term memory and speech perception, stages of memory, theories, perception of consonants and vowels in short term memory, animal perception, consonant and vowel perception,
7. Animal versus human perception.

**LIST OF BOOKS**  
**SH 303 SPEECH PERCEPTION AND ITS DISORDERS**

1. Ainsworth W.A(1976) Mechanism of Speech Recognition, International series in natural philosophy. Vol. 85, Oxford: Pergamon Press
2. Ainsworth W.A(1990) Advances in Speech, hearing and language processign Vol. 1, London Jai Press Ltd.
3. Berlin C(1984) (Ed.) Hearing Science. San Diego: College-Hill Press
4. Borden G.J and Harris K.S(1980). Speech Science primer: Physiology, acoustics and perception of speech, London: Williams and Wilkins
5. Cohen,A & Nooteboom, S.G (Eds) (1975) Structure and process in speech perception. New York: Springer-Verlag
6. Clark G.M, Cowan R.S C and Richard C D(1997) : Cochlear Implantation for infants and Children –Advances, Singular publishing Group, London.
7. Fant , G; Speech acoustics Phonetics – Klumer Academic Publication 2004
8. Gold & Morgan N “Speech & Audiological Processign. “Wiley & Son Inc. 2000
9. Goodman J.C and Nusbaum(1994) (Eds) The development of speech perception: The transition from speech sounds to spoken words, MIT Press London
10. Hardcastle & Laver J. “The Handbook of Phonetic Sciences” Blackwell Publishers Ltd. 1997 (Delgutte)
11. Hish. S.K; Eldredge. D.H. Hish .J; Silveman S.R. & Davis 1976 “Hearing” Washington University Press”
12. Lass N.J (Ed) 1976. Contemporary issues in experimental phonetics. Academic Press N.Y
13. Mendel, L.L., & Danheur, L.J., (Ed) (1997). Audiologic Evaluation and Management and Speech Perception Assessment. Singular Publishing Inc, CA.
14. Nakagawa S Shikanok K, Tohkura. Y (1995) Speech hearing and neural network models. Ohmshia IOS Press Amsterdam
15. Pisoni D 2005 “Handbook of Speech Perception” Blackwell Publishing Ltd U.S.A
16. Pickett JM, Ravolie SG (1979) Feature Discrimination by persons with sensorineural impairment, in B Lindblom and S. Ohman EDs “Frontiers of Speech Communication Research, AP Londons.
17. Sanders. D.A 1977. Auditory Perception of Speech – An introduction to principle & problems,
18. Schrveda MR “Speech & Speaker Recognition” Karger 1985
19. Schouten MEH 1992. The Auditory processign of speech from sounds to sounds. Morten de Grugter. Berlin
20. Tatham M & Mortin K “ Development in Speech Synthesis” Wiley – 1998
21. The XIIIth International congress of phonetic sciences – Stockholm 13 – 19 August 1995, Volumes 1 – 4.

## SH 304 DIAGNOSTIC AUDIOLOGY [64 hrs]

### Objectives

1. To familiarise the student on auditory manifestations of different disorders and clinical features exhibited.
2. To give theoretical rationale for various auditory tests and their findings in different auditory pathology, correlating different auditory and non auditory findings in different disorders.

### UNIT 1 [12 hrs]

1. Installation and calibration Audiological diagnostic instruments
2. Hearing screening
  - Cost benefit analysis
  - Sensitivity vs specificity,
  - Efforts of WHO and Govt of India,
  - Genetic counseling,
  - Public awareness programs
3. OAE
  - Origin, classification, principles in recording of OAEs,
  - Protocols for infants, protocols for cochlear pathology
  - Contralateral suppression
  - Interpretation
  - Factors affecting
  - Clinical application

### UNIT 2 (12 hrs)

1. Immittance
  - Principle and instrumentation
  - Tympanometry – low and high frequency tympanometry, Single and multi component, Multiple frequency tympanometry, Variables effecting tympanometry
  - Reflexometry – Auditory reflexes (AR), non-auditory reflexes, adaptation of auditory reflexes, ARLT, reflex averaging, reflex sensitization, temporal summation of acoustic reflex, binaural summation of AR
  - Factors affecting measurement,
  - Application of Immittance
  - Acoustic reflectometry- principles and application

### UNIT 3 (12 hrs)

1. Early AEP – ECOCHG, ABR, SN 10, FFR, ASSR
  - Generators
  - Principles of recording
  - Factors affecting recording / interpretation

- Correlation with FMRI, PET
- Electrical ABR
- Clinical disorders

2. MLR and LLRs, MMN, P300, N400, T complex

- Generators
- Principles of recording
- Factors affecting recording/interpretation including PAM and applications
- Correlation with FMRI, PET
- Electrical LLR
- Clinical disorders

**UNIT 4** (12 hrs)

1. Pathophysiological and audiological findings in different pathologies related to

- External and middle ear diseases,
- Blast, barotraumas, NIHL
- Meniere's disease,
- Acoustic neuroma,
- Auditory dysynchrony,
- Ototoxicity,

1. Tests to evaluate tinnitus and hyperacusis

**UNIT 5** (12 hrs)

Nonaudiological tests in diagnosis of auditory disorders

Auditory disorders in those with multiple problems, (C)APD

Comprehensive report writing,

Audiologist as a witness, medico-legal aspects legislations related to field of audiology

Audiological practice in rural areas

Audiological practice in ENT, Neurological set-ups

**LIST OF BOOKS**  
**SH 304 DIAGNOSTIC AUDIOLOGY**

1. Berlin C. I (Ed) 1996 – Hair cells & hearing aids. Singular Publishing group, London
2. Hood.L.J (1998) Clinical applications of the auditory brainstem response Singular Publishing group Inc. U.S.A
3. Hall J. W III (1992) Handbook of Auditory evoked responses. Allyn & Bacon U.S.A
4. Jacobson J.T (Ed) 1994. Principles & Applications in Auditory evoked potentials Allyn & Bacon U.S.A
5. Katz J (Ed) Volume I – V Handbook of clinical audiology, Lippincott, Williams, Wielkins U.S.A
6. Ms Phenson L.D 1995 – Late potentials of the auditory system Singular publishing group
7. Rintelman W.F 1991 – Hearing Assesment, Allyn & Bacon U.S.A
8. Robinette M.S, Glatlke T.J (Eds) 1997. Otoacoustic emissions; Clinical Applications. Thieme N.Y
9. Sahley T.L Nodar R.H; Musiek F.F 1997: Efferent Auditory system: Structure& function. Singular Publishing group Inc.
10. Wiley T.L Fowler C.G 1997; Acoustic Immittance measures in clinical audiology: A primer Singular Publishing group Inc

## SH 305 HEARING DEVICES [64 hrs]

### **Objectives**

1. To familiarise the students on various types of devices and advances in technology with respect to amplificatory and implantable devices.
2. To sensitize students in selection strategies and tuning, critically review appropriateness of selected device for the client.

### **UNIT- 1 (12 hrs)**

1. Hearing aids, components
2. Classification
3. Principles of analogue, programmable, digital hearing aids, signal enhancing technology
4. EAC
5. Outcome measures
6. Ear moulds – types and modifications

### **UNIT- 2 (12 hrs)**

1. Selection of special features in hearing aids with reference to specific clients
2. Tinnitus maskers and their utility

### **UNIT- 3 (12 hrs)**

1. ALDs:
  - Types: Auditory based, Visual based and Tactile based ALDs
  - Recent advances in technology, EAC measurements and accessories

### **UNIT- 4 (12 hrs)**

1. Cochlear implant
  - Description, types, designs and features
  - Surgical procedure and biological safety in brief
  - Speech processing strategies
  - Assessment strategies
  - Post operative measurement – NRT, ESRT, EABR
  - Mapping
  - Outcomes

### **UNIT- 5 (12 hrs)**

1. Middle ear implant, BAHA, Brainstem implant
  - Description
  - Selection
  - Assessment
  - Management
  - Outcome.

**LIST OF BOOKS**  
**SH 305 - Hearing Devices**

1. Clark G.M; Cowan B.S; Dowel R.C 1997. Cochlear Implantation for infants and children: Advances Singular Publishing group Inc
2. Mueller H.G; Hawkins D; Northern C.J 1992. Probe microphone measurements; Hearing aid selection and assessment Singular Publishing group Inc
3. Hersh M.A; Johnson M.A. 2003 – Assistive technology for the hearing impaired, Deaf and deaf blind, Springer, London
4. Sandlin E.R (Ed) 1995, Handbook of hearing aid amplifications. Volume 1. Theoretical & technical considerations Singular Publishing group Inc, London
5. Sandlin E.R (Ed) 1995, Handbook of hearing aid amplifications. Volume II. Clinical considerations and fitting practices. Singular Publishing group Inc, London
6. Studenbaker G.A; Hochberg I 1993. Acoustical factors affecting hearing aid performance. 2<sup>nd</sup> edition Allyn & Bacon U.S.A
7. Velente M 1994 Strategies for selecting and verifying hearing aid fittings Thieme N. Y
8. Velente M 1996 Hearing aids standards, options and limitations, Thieme N.Y



**IV SEMESTER**  
**SH 401 ADULT LANGUAGE DISORDERS [64 hrs]**

**Objectives**

1. To equip the student to understand advances in brain and language relationship
2. To familiarize the student with respect to advances in assessment and management of various language disorders in adults.

**UNIT 1 [12 hrs]**

- Neurophysiology of aphasia and related disorders. Language and cerebral dominance. Connectionist explanation of aphasia. Lesion size, lesion location and localization syndromes. Speech language and the brain
- Assessment and diagnosis in Neuro communication disorders. General principle. Testing of verbal comprehension, non verbal skills, verbal expression, and functional communication. Test interpretation, testing right hemisphere function and assess the bilingual client,
- Different perspectives on aphasia, (linguistic, neurological, cognitive etc), pragmatics. Aspects of bilingual aphasia in illiterates and sign language users.

**UNIT 2 [12 hrs]**

- Advances in aphasia rehabilitation, (psychological sociolinguistic and pragmatic approaches) and treatment efficacy
- Acquired reading and writing disorders

**UNIT 3 [12 hrs]**

Dementia and communication. causes, types and language changes, assessment treatment and long term management

**UNIT 4 [12 hrs]**

Traumatic brain injury, consequences of TBI, cognitive-linguistic issues in communication assessment, rehabilitation outcomes.

**UNIT 5 [12 hrs]**

Other adult language disorders (characteristic assessment, intervention and issue in primary progressivephasias, sub cortical aphasia, schizophasia and RHD.

**LIST OF BOOKS**  
**SH 401 ADULT LANGUAGE DISORDERS**

1. An Introduction to Neurogenic Communication Disorders (4<sup>th</sup> Ed.) (1992). Brookshire, R.H. St.Louis: Mosby Year Book. ISBN 0-8151-1295-5
2. Aphasia (1988). Rose, F.C. Whurr, R. and wyke, M.A.(Eds.) London : Whurr. ISBN 1-870332-66-0
3. Medical Speech-Language Pathology: A Practioner's Guide. (1998). Johnson, A.F. and Jacobson, B.H. NY:Theime. ISBN 0-86577-688-1
4. Aspects of Bilingual Aphasia (1995). Paradis,M.(Ed)Great Yarmouth; Galliard (Printers) Ltd. ISBN 0-08-425704
5. Pragmatics in Neurogenic Communication Disorders. (1998). Paradis,M.(Ed)Great Yarmouth; Galliard (Printers) Ltd. ISBN 0-08-043065-1
6. Linguistic Intervention in Aphasia. (2<sup>nd</sup> Ed.) (1969). Lesser, R.London; Whurr. ISBN 1-870332-77-6
7. Right hemisphere Communication Disorders: Theory and Management (1995).
8. Tompkins,C.A California: Signular Publishing Grou, Inc. ISBN 1-56593-176-9
9. Dementia – A Clinical Approach. (2<sup>nd</sup> Ed.).(1992). Cummins, J.L. and Benson: Whurr. ISBN 1-870332-94-6

## **SH 402 FLUENCY DISORDERS (64 hrs)**

### ***Objectives***

- 1. To equip the student regarding various aspects related to the diagnosis, management and maintenance of skills to overcome dysfluencies in various disorders.*

### **UNIT 1 (12 hrs)**

- Dimensions of fluent speech- review, recent advances and findings
- Factors affecting fluent speech.
- Theoretical constructs in fluency development.

### **UNIT 2 (12 hrs)**

- Perspectives in fluency disorders (developmental, childhood and adult)
- Neuro anatomical, neurophysiologic aspects of fluency disorders.
- Linguistics, auditory processing, articulatory dynamics, laryngeal dynamics, prosodic, speech motor control viewpoints in stuttering.

### **UNIT 3 (12 hrs)**

- Nature, characteristics, differential diagnosis, and current status of:
  - Normal Non fluency
  - Cluttering
  - Neurogenic stuttering
  - Drug-Induced stuttering

### **UNIT 4 (12 hrs)**

- Assessment and diagnosis.
- Severity of stuttering –theoretical foundations and methods
- Efficacy measurements in stuttering therapy

### **UNIT 5 (12 hrs)**

- Spontaneous recovery
- Prevention, relapse of stuttering and related issues
- Review of therapy in stuttering and recent advances in evidence based management of children and adults with stuttering.
- Efficacy and outcome measures of stuttering therapy

**LIST OF BOOKS**  
**SH 402: FLUENCY DISORDERS**

1. Bloodstain, o., (1993), Stuttering, Allyn and Bacon, Boston.
2. Curlee & Perkins., (1995), Nature and treatment of shuttering: New directions
3. Curlee (1993). Stuttering and related disorders of fluency, Thieme Medical Publishers,
4. New York.
5. Curlee, R.F. & Siegel, g.m. (2 Edn) (1996). Nature and treatment of stuttering. Allyn and
6. Bacon, Boston.
7. Fawcus, M., (1995), Stuttering. Whurr Publishers, London.
8. Lass, N.J. (Ed) (1979). Speech and Language advances in basic research and practice.
9. Academic Press, New York, Vol 1-9.
10. Perkins, W.L. (1992). Stuttering prevented. Whurr Publishers, London.
11. Schwartz, H.D. (1999). A primer for stuttering therapy. Allyn and Bacon, Boston.
12. Starkweather, D., (1987). Fluency and stuttering. Prentice-Hall, New Jersey
13. Weiss (1964). Cluttering. Prentice-Hall, New Jersey.

## SH 403 ADVANCES IN MANAGEMENT OF PERSONS WITH HEARING DISORDERS

[64 hrs]

### **Objectives**

- 1. To train the student to evaluate and learn specific needs of the client, need for amplification / assistive devices, educational, vocational and psychosocial and communicative demands.*
- 2. To prepare the student for programs and intervention strategies as per the different needs of the clients.*
- 3. To equip the student to critically review application of task analysis, program learning techniques wherever required in management of the clients.*

### **UNIT 1 (12 hrs)**

1. Habilitation of infants and children with hearing impairment
  - Early intervention programs
  - Importance (effect of auditory deprivation and role of auditory plasticity), rationale, Role of care givers
  - Process of informed decisions regarding: selection of method of rehabilitation, choice of amplification, language issue, selection of educational options
  - Alternate modes of intervention: CBR, correspondence programs, distance mode intervention, telepractices
  - Outcome measures
  - Audit of facilities in India
  - Formal education: Pre-school, School, College and vocational training programs
  - Role of audiologist in formal education
  - Technological needs in formal education

### **UNIT 2 (12 hrs)**

1. Management of special groups in respect to amplification / implantable devices, placements and role of caregivers
  - Children and adults with multiple handicap (deaf-blind, neuro-motor, cognition problems, reading-writing problems)
  - Outcome measures
  - Management of children, adults, and geriatrics in respect to amplification/implantable devices, role of caregivers
  - Mild-to-moderate hearing loss, unilateral hearing loss
  - Sudden hearing loss, progressive hearing loss, fluctuating hearing loss
  - Psychosocial measures, Assertiveness training
  - Communication strategies
  - Outcome measures

### **UNIT 3 (12 hrs)**

#### **1. Management of tinnitus**

- Application of audiological findings in management of tinnitus
- Neurophysiological model
- Techniques of management including tinnitus retraining therapy
- Amplification and maskers
- Counselling

#### **2. Management of hyperacusis**

- Application of audiological findings in management of tinnitus
- Neurophysiological model
- Techniques of management including tinnitus retraining therapy
- Counselling

### **UNIT 4 (12 hrs)**

#### **1. Legislations related to education issues of persons with hearing impairment**

- International declarations (such as Biwako millennium framework, Salamanca statement)
- National acts / policies / schemes (such as PWD act, National Trust Act, Sarva Shiksha Abhiyan, DPEP scheme, ADIP scheme)
- Measures to implement legislations, schemes, policies
- Role of audiologist

### **UNIT 5 (12 hrs)**

#### **1. Management of CAPD cases:**

- Choice of management based on audiological test results,
- Environmental modifications,
- Devices.
- Auditory perceptual training,
- Communications strategies,
- Cognitive\language management,
- Measuring outcomes

## LIST OF BOOKS

### SH 403 ADVANCES IN MANAGEMENT OF PERSONS WITH HEARING DISORDERS

1. Alpiner J.G (Ed) 1982 – Handbook of Adult Rehabilitative Audiology – 2<sup>nd</sup> Edition. William & Welkins U.S.A
2. Alpiner J.G; McCarthy P.A(Ed) 1993 – Rehabilitative Audiology Children & Adults William & Welkins U.S.A, William & Welkins 2000, 3<sup>rd</sup> Edition
3. Hull R.H (Ed) 2001 – Aural Rehabilitation – serving children and adults, 4<sup>th</sup> edition, Singular Publishing Group Inc
4. Luxon L.M (Ed) 2001 – Davies R.A (Eds) 1997 – Handbook of vestibular rehabilitation, Whurr Publisher Ltd, London
5. Sanders D.A 1971 – Aural Rehabilitation Prentice Hall, Inc, U.S.A
6. Tye Murray. N 1998 – Foundations of Aural Rehabilitation Singular Publishing Group , Inc, U.S.A
7. Tye Murray. N 2005 – Foundations of Aural Rehabilitation in Children and Adults & their family members (2<sup>nd</sup> edition) Thomson Delmar Learning Newyork
8. Vernon J.A; Moller A.R (Ed) 1995: Mechanisms of tinnitus, Allyn & Bacon, U.S.A

## **SH 405 PROFESSIONAL ETHICS AND RESPONSIBILITIES (30 HOURS)**

### **Objectives:**

*The student should be able to*

- 1) *Should be able to understand the need for professionalism during clinical practise*
- 2) *Should be able to practice the profession by following the code of ethics stipulated.*

### **Unit 1: (5 Hours)**

- Introduction: professional, professionalism,
- Evolution of the profession of speech and hearing in the world and in India

### **Unit 2: ( 6 Hours)**

- Code of ethics, Responsibilities and scope of practice as stated by ASHA
- Code of Ethics, Responsibilities and scope of practice as stated by ISHA

### **Unit 3( 6 Hours)**

- Professional practices to maintained during Diagnostic and therapeutic practices as an Audiologist, Speech Language Pathologist.

### **Unit 4(12 Hours)**

- Multi- disciplinary team approach: need, ethics to be maintained, role of each professional in the team
- Team members and their role in the diagnosis and management of all the communication disorders
- Need for referral, formulation of referral letter.

### **LIST OF BOOKS**

#### **SH 405 PROFESSIONAL ETHICS AND RESPONSIBILITIES**

1. Irwin D. l., Pannbacker M., , Powell T.W., . Vekovius G.T.,(2006). Ethics for Speech-Language Pathologists and Audiologists: An Illustrative Casebook
2. Pannbacker m.(1996). Ethical practices in speech-language pathology and audiology
3. Resnick D. M.(1993). Professional Ethics for audiologists and speech-language pathologists



## **SH 406 GENETICS (30 HOURS)**

### *Objectives:*

- *Evaluate pedigree information to identify inheritance patterns and estimate risk factors for individuals within the family.*
- *Construct pedigrees using appropriate symbols.*
- *Compose a research paper using appropriate genetic terminology to describe current genetic tools and disorders*
- *Judge when to make appropriate referrals for genetic counseling.*
- *Assess the environmental interaction with the genome in communication disorders*

### **Unit 1(6 Hours)**

Introduction, Survey, Rationale Role of Clinician in Genetic Referral

### **Unit 2 (10 hours)**

- Basic Laws of Inheritance
- Multifactorial Inheritance
- Mitochondrial Inheritance
- Examination of Pedigrees

### **Unit 3(5hours)**

- Behavioral Genetics & Learning Disorders

### **Unit 4(4 hours)**

- Ethics. Legal & Social Implications

### **Unit 5(5 hours)**

- Prenatal Diagnosis/Genetic Counselling

## **LIST OF BOOKS**

### **SH 406 GENETICS**

1. Shprintzen, Robert J. (2001). Syndrome Identification for Audiology: an illustrated PocketGuide. Singular/Thomson Learning.
2. Shprintzen, Robert J. (2000). Syndrome Identification for Speech-Language Pathology: an illustrated PocketGuide. Singular/Thomson Learning.

### **SH 407 VESTIBULAR ASSESSMENT AND BALANCE EVALUATION ( 30 HOURS)**

#### **Unit 1 (8 hrs)**

Anatomy and physiology of vestibular system. Vestibular apparatus, utricle, saccule, semicircular canals, vestibular pathway and reflex.

#### **Unit 2 (8 hrs)**

Pathologies related to vestibular system and balance and their medical diagnosis and treatment. Educate individuals on potential causes and effects of vestibular loss.

#### **Unit 3 (8 hrs)**

Diagnostic test of vestibular system and their interpretation: Caloric test, Rotational test, ENG, VNG, VEMP etc

#### **Unit 4 (6 hrs)**

Determination of candidacy for vestibular and balance rehabilitation therapy to persons with vestibular and balance impairments  
Referring to other professions

## **LIST OF BOOKS**

### **SH 407 VESTIBULAR ASSESSMENT AND BALANCE EVALUATION**

#### **Compulsory Reading:**

1. Jacobson, G.P. & Shepard, N.T. (2008). Balance function assessment and management. San Diego: Plural Publishing.

#### **Additional/ Optional Reading:**

2. Myers, B. L. (2011). Vestibular learning manual. San Diego: Plural Publishing

## SH 408 AUTISM SPECTRUM DISORDERS (30 HOURS)

### Objective:

1. To equip the student with thorough knowledge of the nature of the disorder.
2. To equip the student to diagnose and profile their communicative behaviors..
3. To understand the current advances in assessment and intervention.

### Unit-1 2 hours)

Understanding the Autism Spectrum: Neurobiological Considerations

- Characteristics shared across the autism spectrum
- The neurological underpinnings of the disorder

### Unit -2 ( 5 hours)

Profile of communication, Behaviour Regulation, Social Interaction, Play behaviour & Joint Attention in Individuals with ASD

- Profile of communication and social interaction in Individuals with ASD
- Profile of Behaviour Regulation, & Joint Attention in Individuals with ASD
- Play behaviour in children with ASD
- Role of joint attention, social interaction and play behaviour in development of communication in individuals with ASD

### Unit 3 (7 hours)

Understanding the Social-Emotional Development, Executive Function & Theory of Mind of Children & Adolescents with ASD

- The features of social-emotional development in children & adolescents with ASD.
- Use of Functional-Emotional Assessment Scale to assess the social-emotional development of children with ASD
- The role of executive function & Theory of mind in the social, behavioral experiences of children and adolescents with ASD

### Unit 4(7hours)

Early Identification & Assessment

- Red flags in children with ASD.
- Role of family members, professionals in early identification
- Formal & Informal Assessment by SLP
- Tools used in the assessment of children & adolescents suspected of ASD
- Importance of play-based assessment

## **Unit 5 (9 hours)**

- Factors involved in the selection of intervention strategies that meet a child's goals and the Importance of a Team approach in the management of individuals with ASD
- Interventions that Support Language & Social Communication in Children with ASD- Milieu Teaching, Minimal Speech approach
- Parent Mediated Intervention- SCERT Model, Floor time
- Peer Mediated Intervention
- Alternative and Augmentative communication in children with ASD-PECS, Visual Schedules
- Significance of Evidence-based decisions to select interventions

## **LIST OF BOOKS**

### **SH 408 AUTISM SPECTRUM DISORDERS**

#### **REFERNCES**

1. Baltimore, MD: The John Hopkins University Press. Lord, C., Risi,S., DiLavore, P. S., Shulman, C., Thurm, A., & Pickles, A. (2006). Autism from 2 to 9 years of age. *Arch Gen Psychiatry*, 63, 694-701.
2. Bauman, M. L., & Kemper, T. L. (2005). Structural brain anatomy in autism: What is the evidence? In M. L. Bauman & T. L. Kemper (Eds.), *The neurobiology of autism-2nd edition* (pp. 121-135).
3. Carter, A. S., Davis, N. O., Klin, A., & Volkmar, F. R. (2005). Social development in autism. In F. R. Volkmar, R. Paul, D. Cohen & A. Klin, *Handbook of autism and pervasive developmental disorders-3rd edition* (pp. 312-334). Hoboken, NJ: John Wiley & Sons.
4. Coonrod, E. E., & Stone, W. L. (2005). Screening for autism in young children. In F. R. Volkmar, R. Paul, D. Cohen & A. Klin, *Handbook of autism and pervasive developmental disorders-3rd edition* (pp. 707-729). Hoboken, NJ: John Wiley & Sons.
5. Diehl, S. F. (2003). The SLP's role in collaborative assessment and intervention for children with ASD. *Topics in Language Disorders*, 23 (2), 95-115.
6. Fombonne, E. (2005). Epidemiological studies of pervasive developmental disorders. In F.R. Volkmar, R. Paul, D. Cohen & A. Klin, *Handbook of autism and pervasive developmental disorders-3rd edition* (pp.42-69). Hoboken, NJ: John Wiley & Sons.
7. Kasari, C., Chamberlain, B., & Bauminger, N. (2001). Social emotions and social relationships: Can children with autism compensate? In J. A. Burack, T. Charman, N. Yirmiya, & P. R. Zelazo (Eds.), *The development of autism: Perspectives from theory and research* (pp. 309-324). Mahwah, NJ: Lawrence Erlbaum Associates.

**SH 409 AUGMENTATIVE AND ALTERNATIVE COMMUNICATION (AAC)  
( 30 HOURS)**

*To train the student to evaluate and learn specific needs of the client, need for assistive devices, educational, vocational and psychosocial and communicative demands.*

*2. To prepare the student for programs and intervention strategies as per the different needs of the clients.*

*3. To equip the student to critically review application of task analysis, program learning techniques wherever required in management of the clients.*

**Unit 1 (10 hours)**

- AAC – Introduction/overview
- Myths and facts about AAC
- AAC system components- Symbols, classification of symbols, Symbol sets – Standardized and non-standardized, selection of systems, techniques for communication, techniques for training, selection of modes, partnership issues and generalization,

**Unit 2 (15 hours)**

- Assessment and decision making - Assessment for AAC candidacy, choosing an appropriate system and technique, training communication partners
- Vocabulary selection/language and oral/motor considerations and general intervention principles in different types of speech-language disorders.
- Team approach in the implementation of AAC
- AAC intervention for children & adults with communication disorders – Type specific selection considerations, generalization of learning and effective use of AAC

**Unit 3 (5 hours)**

- Processing of signals, signs & symbol sets in normal and AAC users.
- Relevance of electronics and computers – AAC Applications in rehabilitation of various communication disorders

## LIST OF NOOKS

### SH 409 AUGMENTATIVE AND ALTERNATIVE COMMUNICATION (AAC)

1. Beukelman, D. & Mirenda, P. (2005). Augmentative and alternative communication: Supporting children & adults with complex communication needs (3rd ed.). Baltimore: Paul H. Brookes Publishing Company. ([www.pbrookes.com](http://www.pbrookes.com))
2. Beukelman, D.R., Yorkston, K.M. and Dowden.(1985) Communication augmentation - A case book of clinical management. Taylor and Francis, London.
3. Enderby, P. (Ed.) (1987). Assistive communication aids. For the speech impaired. Churchill Livingstone Inc, New York.
4. Glennen, S.L. and Decoste, D.C. (1997). Handbook of augmentative and alternative communication. Singular Publishing Group Inc, San Diego, London.
5. Lloyd, L., Fuller, D., & Arvidson, H. (1997). Augmentative and alternative communication: A handbook of principles and practices. Needham Heights, MA: Allyn & Bacon. ([www.abacon.com](http://www.abacon.com))
6. Musselwhite, C.R. and Louis, K.W.(1988). Communicative programming for person with severe handicaps, Vocal and augmentative strategies. Pro-Ed, Texas.
7. Silverman, F.H. (1980). Communication for the speechless. Prentice Hall Inc.
8. Tetzohner, F.H. and Jansen, M.H. (Eds.) (1996). Augmentative and alternative communication – European perspectives. Singular Publishing Group Inc, San Diego, California.
9. Vander Heiden, G. and Grilley, K. (Ed.)(1978). Non-verbal communication techniques and aids for the severely physically handicapped. University Park Press, New York.
10. Webster J.G. (Ed.). (1995). Electronic devices for the communication handicapped. Chapman and Hall, London.

**SH 410 CLINICAL PRACTICUM – III & IV SEMESTER  
SPEECH LANGUAGE PATHOLOGY**

**Objectives**

- Should be able to diagnose and manage various communication disorders
  
- 1. Should assess 10 clients with childhood language disorders / Adult language disorders/Fluency disorders / Motor speech disorders.
- 2. Should offer speech language therapy for at least 10 clients with childhood language disorders / Adult language disorders / Fluency disorders/ Motor speech disorders.

**AUDIOLOGY**

**Objectives**

- Should be able to diagnose and manage individuals having auditory disorders

Carry out :

1. Appropriate tests on at least 10 clients having cochlear / retro cochlear / auditory dyssynchrony
2. (C)APD tests on at least 5 clients
3. Multi frequency tympanometry on at least 5 clients
4. ASSR on at least 5 clients
5. MMN / LLR on at least 2 clients
6. Calibration of immittance and ABR
7. Selection of digital / programmable hearing aids for at least 10 clients
8. Rehabilitation programs for clients having tinnitus and hyperacusis

Students should also be exposed to cochlear implant mapping.

# INDIAN SIGN LANGUAGE

## Indian Sign language 1

(30 hours)

### Theory

#### Introduction to Deafness and Sign Language

##### Unit 1: The Nature of sign language

15 hours

- 1.1 Sign language is NOT the same all over the world.
- 1.2 Sign language does NOT lack grammar.
- 1.3 Sign language is NOT dependent on spoken language.
- 1.4 Sign language is NOT a “language of the hands” only.
- 1.5 Sign language has not been invented by hearing people to help deaf people.
- 1.6 No sign language are better than any other sign language.
- 1.7 Sign codes for spoken languages (Signed English, Signed Hindi etc.) are NOT better than Indian Sign Language.

### Practicals

UNIT	GRAMMAR	• TOPICS	HOURS
1	Special statements	Greetings Describing people and objects (Adjectival predicates) Pronouns	15

## Indian Sign language 2

(30 hours)

### Theory

#### Unit 1: Perspectives on sign language usage

6 hours

- Effective communication with deaf people: Becoming a good signer
- Deafness and society: Use sign language for inclusion in society

### Practicals

UNIT	GRAMMAR	• TOPICS	HOURS
1	Simple with question words	Family and relations Common objects (clothing, household, etc) Plants	12 hours
2	Questions with question words	Interrogatives Places People and professions Actions	12 hours



**Indian Sign language 3****30 hours**

Theory

Unit 1: Perspectives on sign language usage

6 hours

- Understanding deaf culture: Aspects of deaf people, culture and communication
- History of deafness and sign language in India

Practicals

UNIT	GRAMMAR	• TOPICS	HOURS
1	Revision Communicative expressions	Topics talking about the time	15
2	Negative sentences Finger spelling (alphabet)	Food (vegetables, fruits, beverages, etc.) Opposites	15

**Indian Sign language 4****30 hours**

Theory

Unit 1: Perspectives on sign language usage

4 hours

- Characteristics of good interpreters

Practicals

UNIT	GRAMMAR	• TOPICS	HOURS
1	Negative commands Negative responses to offers/suggestions Finger spelling (use)	Calendar (week/month/year) Colours Place names	22
2	Numbers Measures	Talking about money Animals	22

**Indian sign language 5**

30 hours

Theory

Unit 1: Oralism, total communication and bilingualism

10 hours

- Oralistic approach (speech therapy, lip reading)
- Evaluation of oralism

Practicals

UNIT	GRAMMAR	• TOPICS	HOURS
1	Revision Use of space, perspective and role play	Body & Health Deafness and Disability Abstract concepts	20

**Indian sign language 6****30 hours**

Theory

Unit 1: Oralism, total communication and bilingualism

10 hours

- Manual communication systems (Pidgin sign, Signed English/Hindi, Indian Sign Language)
- Evaluation of manual communication systems

Practicals

UNIT	GRAMMAR	• TOPICS	HOURS
1	Relations in actions	Verbs Expressign movement Talking about language	20

**Indian sign language 7****30 hours**

Unit 1: Basic concepts of interpreting

10 hours

- Categories/techniques of interpreting
- Interpreter-client relationships

Practicals

UNIT	GRAMMAR	• TOPICS	HOURS
1	Possession	Geometrical shapes Talking about the workplace Environment (earth and sky)	20

**Indian sign language 8****30 hours**

Theory

Unit 1: Basic concepts of interpreting

10 hours

- Professional attitudes and ethics
- Particulars of sign language interpreting

Practicals

UNIT	GRAMMAR	HOURS
1	Interpreting sessions in small meetings	10
2	Taking classes to Deaf students in sign language	10