

# CURRICULUM

## MASTER IN AUDIOLOGY AND SPEECH – LANGUAGE PATHOLOGY



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**REHABILITATION COUNCIL OF INDIA**

(Statutory Body)

Ministry of Social Justice & Empowerment

NEW DELHI-110015

# **SYLLABUS FOR MASTER IN AUDIOLOGY AND SPEECH- LANGUAGE PATHOLOGY**

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I. **Nomenclature** : "MASTER IN AUDIOLOGY AND SPEECH-LANGUAGE PATHOLOGY".

II. **Admission Criteria**

**Master in Audiology and Speech-Language Pathology.**

**Education:** Bachelor's in Audiology and Speech-Language Pathology from any recognized university with minimum pass percentage required as per university norms.

III. **Medium of Instruction** :

English

IV. **Duration of the course** :

**Masters in Audiology and Speech-Language Pathology** :  
2 academic years.

**V. Course Work :**

Each student will pursue the course as in the enclosed course of study.

**VI. Award of Degree:**

The respective universities on successful completion of the requirement will award the degree.

**VII. Criteria for passing:**

Minimum marks for pass in each paper and practicum will be 50%.

**VIII. Attendance:**

Each candidate must have minimum 80% in theory classes and 90% in clinical practicum. Failure to meet the criteria will disqualify the student from attending the university examination of the respective years. The candidate will have to repeat the year, i.e. both theory and clinical practicum will have to be repeated in toto.

**MINIMUM INFRASTRUCTURAL FACILITIES**

		Graduate	Graduate and PG
<b>1.</b>	<b>FACULTY/PERSONNEL</b>		
	For a maximum of 20-25 students (recruitment preferably as per UGC norms)		
a.	Full time		
	Professor or equivalent	-	1
	Reader or equivalent	1	2
	Lecturer	4	6
	Speech Pathologist/Audiologist (Grade I) (Clinical Supervisor)	2	2
	Speech Pathologist/Audiologist (Grade II)	2	4
	Lecturer in Clinical Psychology – Part time	1	1
	Lecturer in ENT – Part time	1	1
	Lecturer in Linguistics – part time	1	1
	Electronic Engineer	1	1
	Ear Mould Technician	1	1
	Librarian/staff	1+1	1+1
b.	Visiting faculty for Anatomy and Physiology	1	1

Designation	Education		Experience		Publications
	Essential	Desirable	Essential	Desirable	
Professor	Ph.D. (Sp&Hg)		10 years teaching experience as Reader in a recognized Institute		Essential
Reader/ Associate Professor	Ph.D. (Sp&Hg) or M.Sc. (Sp&Hg) in the event of Ph.D. candidate not available, the faculty must complete the Ph.D. with 5 years from the date of appointment.		5 years teaching/ research/ clinical experience of graduate and post graduate students		Essential
Lecturer in Clinical Psychology	M.Phil. (Clinical Psychology) or P.G. Diploma in Rehabilitation Psychology	Ph.D. Clinical Psychology	2 years clinical/ research experience	Teaching experience	
Lecturer in E.N.T.	M.S. (ENT)		Two years experience		
Electronic Engineer	B.E. (Electronics) or B.Tech (Electronics)		Two years experience - clinical/ research		

## 2. CLINICAL FACILITIES

Facilities for diagnostic evaluation of speech, language, voice, hearing and associated disorders, both functional and organically based. Patients of all age groups with hearing impairment (conductive, mixed, sensori-neural) due to external and middle ear anomalies due to heredity, acquired hearing loss (syndromic-non syndromic). Speech disorders – functional and organic based; patients with cerebral palsy, cleft palate, laryngectomy, cluttering, language disorders – language delay, aphasia, voice.

Minimum patient population should be two patients per students per day each for diagnostic and therapeutic intervention in the above categories. Clinical facilities could be on or off campus.

## 3. LIBRARY FACILITIES

- a) **Reading room** : Should accommodate at least, 50% of the institution's students and staff i.e. around 60 members. Two reading rooms should be there
  - (i) Reference room with CBTIV and internet provisions
  - (ii) General Reading room
- b) **No. of books** : Books listed for each paper under "essential" should be available.
- c) **No. of Journals:** Minimum of 12 to 15 journals of the following may be prescribed to.
  - (i) JSLHR
  - (ii) Ear and Hearing
  - (iii) Hearing Instruments
  - (iv) Seminars in Hearing
  - (v) Seminars in Speech and Language
  - (vi) LSHSS
  - (vii) J.C.D.
  - (viii) JAISH
  - (ix) JISHA
  - (x) Folio Phoniatica
  - (xi) Journal of Fluency disorders
  - (xii) Phonetic
  - (xiii) Journal of Phonetics
  - (xiv) Journal of child language
  - (xv) Asha Monographs
  - (xvi) Brain and Language
  - (xvii) British Journal of Audiology
  - (xviii) Asia Pacific Journal of Speech-language and Hearing.
  - (xix) IJDR
  - (xx) Journal of Medical speech language pathology
  - (xxi) VOICE (Volta Review Journal)
  - (xxii) NINAD
  - (xxiii) RCI Newsletter

**d) Staff :**

(i) Library and Information Officer – One No.

Qualifications: B.Lib with two years of experience in handling technical library using Information Technology.

(ii) Library Assistants: One

Qualifications: SSLC + Diploma in Library Sciences or SSLC + JOC in Library Sciences.

All the facilities may be increased to meet the requirements in a phased manner.

4. **AUDIOVISUAL INSTRUMENTS:** Such as overhead projector slide projector or other of later technology for classroom use should be available for better understanding.

5. **SPACE (for 20-25 student in a batch) :**

Sr. No.		Size (Sq. Ft.)	Graduate	Graduate and PG
a)	Class Rooms	Size should be adequate to accommodate	3	5
b)	Room for reception where patients are registered.			
c)	Room for case history, Speech Diagnostic Room and Interviews	(10 x 12)	3	5
d)	Speech Lab (Quiet Room) for diagnostic purposes.	(15 x 20)	1	1
e)	Recording room (Sound proof)	(10 x 10)	1	1
f)	Speech Therapy Rooms/ Cabins	(10 x 12)	12 *to accommodate 50% of the students)	12

g)	- Single sound treated room. - Two Room Audiometric suite with control and test room situation. (Sound Proof. ANSI 1977)	(10 x 18)	2	3
h)	Control and test room for hearing aid trial combination purpose.	(10 x 15)	1	1
i)	Earmould Lab	(15 x 20)	1	1
j)	Staff Room	(15 x 20)	1	-
k)	Individual work space (with provision for storage facilities)	(10 x 10)	4	12
l)	Library (Quiet Room)	(30 x 20)	2	2
m)	Hearing aid repair lab		1	1
n)	Principal's Office room		1	1
o)	Sanitary facilities			
p)	Hostels for Man and Women to accommodate at least 50% of the student population.			
q)	Administrative staff room.			

## 6. **EQUIPMENT (MINIMUM REQUIREMENT):**

Sr. No.		Graduate	Graduate and PG
<b>Audiology</b>			
a)	2 channel Diagnostic Audiometer with Accessories such as earphone, ear cushion combination with adjustable headband, B.C. vibrator, transducers like microphone and matching loud speakers	1 for each control + test room combination	1 for each control + test room combination

b)	Portable Audiometer with provision of A.C. and B.C. testing : desirable screening audiometer	1 for each test room	1 more
c)	Clinical Immittance Audiometer (Desk model) with accessories.	2 instruments essential preferably one with screening type for field work.	1 more
d)	Portable/Screening impedance, audiometer	1	1 more
e)	Clinical BSEAR	1	1 more
f)	Otoacoustic emission	1	1 more
g)	Calibration equipment for AC, BC and free field (by possession or access)		
h)	Different types of Hearing Aids of mild moderate and strong categories body level and ear level, canal and spectacle hearing aid (1 each), FM, Digital, Programmable aids, ILS Assistive listening devices.	A representative sample of hearing aids and assistive devices	
i)	IGO and HAT for hearing aid trial and making electroacoustic measurements.	1	1
j)	Stop watch	2	2 more
k)	Oto scope	2	2 more
l)	Proformae		
m)	Auditory training and Screening material		
n)	Ear Mould Lab-fully equipped		

<b><u>Speech Pathology</u></b>			
a)	Speech and Language Tests (Tests for differential diagnosis) (English and local language)		
b)	Proformae		
c)	Speech Therapy material (Indian, Language and English)		
d)	Toys and Books		
e)	Mirrors - size 2' x 3'	4	6
f)	Speech Trainer	1	2
g)	Portable and Digital tape recorders	4	6
h)	Hi-Fi Ampli Deck with speakers and good microphone	1	2
i)	Expirograph/Aerophone	1	1
j)	Computer PC-AT with VGA Color Monitor	1	3
k)	Software for diagnostic/therapeutic use	1	1
l)	EGG	1	1
m)	Stop Watch	2	4
n)	Audio cassettes for training/CDs		
o)	Pitch pipe		
p)	Tongue depressors	3	5

## **FIRST YEAR POST GRADUATE COURSE**

### **OBJECTIVES:**

#### Speech-Language Pathology:

- 1) To acquire comprehensive theoretical concepts for independent practical application with respect to diagnosis and intervention of various communication disorders.
- 2) To develop the skills to plan a project for scientific study.
- 3) To develop skills to make detailed documentation of clinical and theoretical information.

#### Audiology:

The students will be aware of:

- 1) The psychophysical methods of hearing assessment;
- 2) The applications of loudness scaling in Clinical Audiology;
- 3) Methods of measuring differential sensitivity and their clinical applications;
- 4) Pitch, quality/timbre measurements;
- 5) Issues involved in masking and its application;
- 6) Relevance of adaptation, fatigue, temporal perception and binaural hearing in audiological evaluation and management;
- 7) The role of different parts of the auditory system in the perception of the different parameters of sound;
- 8) The anatomy and physiology of the vestibular system.

## COURSE CONTENT

M.Sc. I	Paper Title	Hrs./Wk	Total Marks
<b><u>Speech Pathology:</u></b>			
M 1.1.1	Advances in Speech Sciences.	3 hrs.	80 + 20
M 1.1.2	Perspectives in Fluency and Voice disorders.	3 hrs.	80 + 20
Audiology:			
M 1.2.1	Psychophysics of Audition	3 hrs.	80 + 20
M 1.2.2	Auditory Physiology	3 hrs.	80 + 20
<b><u>Allied Subjects:</u></b>			
M 1.3.1	Linguistics in Clinical Practice/Independent Projects	3 hrs.	80 + 20
M 1.3.2	Advanced Statistics and Research Methods.	3 hrs.	80 + 20

### **CLINICAL PRACTICUM:**

	<b>Internal</b>	<b>Internal + External</b>
Speech Pathology	100	100
Audiology	100	100
Total	200	200

<b>M 1.1.1</b>	<b>:     <u>ADVANCES IN SPEECH SCIENCES</u></b>	<b>(75 hrs.)</b>
1.	Life span changes in speech mechanism including developmental milestones	(3 hrs.)
2.	Physiology of Speech production.	
	a) Respiratory System: Fundamentals of aerodynamics. Aerodynamic events in speech. Passive and active forces in respiratory function. Breathing for speech and song. Speech breathing kinematics and mechanism inferences. Kinematics of the chest wall during speech production.	(6 hrs.)
	b) Laryngeal System: Molecular and cellular structure of vocal tissue. Laryngeal biomechanics, Models of vocal fold vibration (one-mass model, multi-mass model etc.). Co-ordination of respiratory and laryngeal systems in phonation. Control of fundamental frequency, vocal intensity and efficiency. Fluctuations and Perturbations in vocal output.	(6 hrs.)
	c) Articulatory and Resonatory systems. Patterns of velopharyngeal closure, Effects of vowel height on velopharyngeal airway resistance. Oral sensory perception. Orofacial force physiology.	(5 hrs.)
3)	Theories and models of speech production. Closed loop model, Kozhavnikov and Chistovich model, Associative chain model, Wickelgren's model, Mc Neilage's model, Garrett's model, Dell's activating model, Shatuck – Huffnagel's model, Acoustic theory of Speech Production.	(12 hrs.)
4)	Principles, instrumentation and measurement procedures – Digital Filters – FIR and IIR – Basic algorithms – DFT and FFT – short-time analysis – Auto-correlation – Cepstrum – Linear Prediction.	(25 hrs.)
	a) Aerodynamic analysis of speech.	
	b) Acoustic analysis of speech (Fo and Intensity measurement techniques – Jitter and shimmer measurements – Inverse filtering - LTAS.	
	c) Articulation measurements x-ray microbeam and NMR methods – electropalatography.	
	d) Perceptual analysis of speech (including segmental and supra-segmental aspects and speech intelligibility).	
5)	Speech recognition. Speaker identification. Forensic Speech Analysis.	(5 hrs.)

- 6) Speech Analysis and Synthesis – Techniques, limitations and applications. (5 hrs.)
- 7) Application of perceptual and instrumental techniques to analysis of infant cry, vocalizations, babbling and pre-speech vocal skills. Interpretation, Diagnostic and therapeutic significance. (6 hrs.)
- 8) Recent trends in speech science measurement and application. (2 hrs.)

### **LIST OF BOOKS**

#### **ADVANCES IN SPEECH SCIENCES**

##### **Essential :**

- 1) Fundamentals of Speech Synthesis and Speech Recognition. Basic concepts, State of the Art and future challenges. Keller, E. (1994). England: John Wiley and Sons Ltd. ISBN 471 94449.
- 2) A Basic Introduction to Speech Perception. Speech Science Series. Ryalls, J. (1996). California: Singular Publishing Group, Inc. ISBN 56593 – 617 – 5.
- 3) The Acoustics of Speech Communication. Fundamentals, Speech Perception Theory and Technology. Picket, J.M. (1999). USA: Allyn and Bacon. ISBN 0-205-19887-2.
- 4) Speech Science Primer. Physiology, Acoustics and Perception of Speech. 2<sup>nd</sup> Edition. Borden, G.J. and Harris, H.S. (1984). Baltimore: Williams and Wilkins. ISBN 0-683-00942-7.
- 5) Clinical Examination of Voice. Disorders of Communication Series. Hirano, M. (1981). New York: Springer-Verlag Wien. ISBN 3-211-81659-3.
- 6) Clinical Measurement of Speech and Voice. 2<sup>nd</sup> Edition. Baken, R.J. (1996). California: Singular Publishing Group, Inc. ISBN 1-56593-809-7.
- 7) Handbook of Clinical Speech Physiology. Barlow, S.M. with Collaborators, (1999). San Diego: Singular Publishing Group, Inc. ISBN 1-565-93267-6.
- 8) Respiratory Function in Speech and Song. Hixon, T.J. and collaborators. (1991). San Diego: Singular Publishing Group, Inc. ISBN 1-879105-1.

**Additional :**

- 1) Producing Speech: Contemporary Issues for Katherine Stafford Harris. Bell – Berti, F. and Raphael, L.J. (Eds.). (1999). AIP Press, New York. ISBN 1-56396-286-1.
- 2) Readings in Clinical Spectrography of Speech. Baken, R.J. and Daniloff, R.G. (Eds.). (1991). California: Singular Publishing Group, Inc. ISBN 1-879105-04-7.
- 3) Infant Communication: Cry and Early Speech. Murray, T. and Murray, J. (1980). Texas: College Hill Press. ISBN 0-933014-62-7.

**M 1.1.2 : PERSPECTIVES IN DISORDERS OF FLUENCY AND VOICE ( 75 hrs.)**

- A) FLUENCY DISORDERS (37 hrs.)**
- 1) Neurophysiological and neuropsychological bases of normal fluency. (2 hrs.)
  - 2) Neurophysiological bases for the formation of developmental stuttering. Neuropsychological bases for stuttering behaviours (4 hrs.)
  - 3) Different perspectives of stuttering. (15 hrs.)  
Linguistic aspects of stuttering. Auditory processing in stutterers. Auditory feed back and stuttering. Motor processes in stuttering. Laryngeal behaviour in stutterers (VOT, VRT, VTT, STT, Laryngeal muscle activity). Perspectives on stuttering as a motor speech disorder. Articulatory dynamics of stutterers. CNS characteristics in stuttering. Stuttering as a prosodic disorder. Stuttering as temporal processing disorder. Respiratory function in stutterers. Stuttering and anxiety.
  - 4) Theoretical issues in measurement of stuttering. (3 hrs.)  
Treatment outcomes in stuttering – Relapse, Prognosis and maintenance. The nature of recovery Prevention of stuttering.
  - 5) Recent advances in management of stuttering. (6 hrs.)  
Group therapy. PsychoTherapy. Drug Therapy. Behavior Therapy.
  - 6) Neurogenic Stuttering (3 hrs.)
  - 7) Cluttering – Etiology, relationship between cluttering and stuttering. (2 hrs.)  
Treatment of cluttering.
  - 8) Review of current literature and research designs in fluency disorders. (2 hrs.)

<b>B)</b>	<b><u>VOICE DISORDERS</u></b>	<b>(38 hrs.)</b>
1)	Neuroanatomy and Neurophysiology of larynx.	(3 hrs.)
2)	Recent advances in measurement of voice and vocal fold function. Introduction to clinical measurement of voice. EGG, Laryngeal electromyography, Videoscopy, imaging and other techniques. Measurement of resonance. History-taking, and perceptual assessment in voice evaluation.	(7 hrs.)
3)	Brief review of voice disorders in children and adults. Classification. Perceptual, acoustic, aerodynamic and physiological characteristics of pathological voices. (emphasis on voice of transsexual, aging and voice, endocrine disorders, tracheostomized speakers, etc.). Differential diagnosis of voice disorders.	(8 hrs.)
4)	Recent advances in voice therapy including instrumentation, introduction to phonosurgical techniques. Treatment outcome in voice disorders.	(6 hrs.)
5)	Professional voice users – Assessment and management. Improving the professional voice.	(8 hrs.)
6)	Analyzing and comparing different types of alaryngeal speech. Intermediate and advanced stages of teaching alaryngeal speech.	(4 hr.)
7)	Review of current literature and research designs in voice disorders.	(2 hrs.)
8)	Need for psychological approaches to treatment – psychotherapy – definition – types – general principles – applications in disorders of speech and hearing	

### **LIST OF BOOKS**

#### **FLUENCY DISORDERS**

- 1) Nature and Treatment of Stuttering: New Directions. (1985). Curlee, R.F. and Perkins, W.H. California: College – Hill Press, Inc. ISBN 0-85066-566-3.
- 2) The Neuropsychology of Developmental Stuttering. (1994). Hartman, B.T. London: Whurr Publishers Ltd. ISBN 1-897635-46-x.
- 3) A Handbook of Stuttering. (1955). (5<sup>th</sup> Ed.). Bloodstein O. California: Singular Publishing Group, Inc. ISBN 1-56593-395-8.
- 4) Disorders of Fluency. (1989). (2<sup>nd</sup> Ed.). Dalton P. and Hardcastle W.J. London: Whurr. ISBN 1-871381-07-x

- 5) Treatment Efficacy for Stuttering – A Search for Empirical Bases. (1998). Cordes, A.K. and Ingham, R.J. (Eds.). California: Singular Publishing Group. ISBN 1-56593-904-2.
- 6) Clinical Management of Motor Speech Disorders in Children. (1999). Caruso, A.J. and Strand, E.A. (Eds.). N.Y: Thieme. ISBN 0-86577-762-4.
- 7) Clinical Management of Stuttering in Older Children and Adults. (1999). Ham R.E. Maryland: Aspen Publishers, Inc. ISBN 0-8342-1117-3.
- 8) Producing Speech: Contemporary Issues. (1995). Bell-Berti, F. and Raphael, L.J. (Eds.). N.Y: AIP Press. ISBN 1-56396-286-1.
- 9) The Three Dimensions of Stuttering – Neurology, Behavior and Emotion. (2<sup>nd</sup> Ed.). (1999). Logan, R. London: Whurr. ISBN 1-86156-073-7.
- 10) Behavioral Management of Stuttering. (1996). Onslow, M. SanDiego: Singular Publishing Group, Inc. ISBN 1-56593-633-7.

### **VOICE DISORDERS**

- 1) Vocal Fold Physiology – Frontiers in Basic Science. (1993). Titze, I.R. (Ed.). San Diego: Singular Publishing Group, Inc. ISBN 1-879105-86-1.
- 2) Principles of Voice Production. (1994). Titze, I.R. NJ: Prentice Hall, Inc. ISBN 0-13-717893-x.
- 3) Neurolaryngology: Recent Advances. (1991). Hirano, M; Kirchner, J.A. and Bless, D.M. (Eds.). California: Singular Publishing Group, Inc. ISBN 1-879105-19-5
- 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. ISBN 0-89640-276-2
- 5) Medical Speech-Language Pathology – A Practitioner’s Guide. (1998). Johnson, A.F. and Jacobson, B.H. NY: Thieme. ISBN 0-86577-688-1
- 6) Clinical Measurement of Speech and Voice. (1996). Baken, R.J. California: Singular Publishing Group, Inc. ISBN 1-56593-809-7
- 7) Professional Voice – The Science and Art of Clinical Care. (1991). Sataloff, R.T. NY: Raven Press. ISBN 0-88167-737-X.
- 8) Clinical Manual for Laryngectomy and Head and Neck Cancer Rehabilitation. (1993). Casper, J.K. and Colton, R.H. California: Singular Publishing Group, Inc. ISBN : 1-879105-61-6

### **PSYCHOTHERAPY**

1. Psychotic Disorders in Children and Adolescents – Robert L. Findling S. Charles Schulz, Javad H. Kashani, Elena Harlan. Volume 44 – Developmental Clinical Psychology and Psychiatry. 2001 SAGE Publication, Inc. Thousand Oaks, London, New Delhi.
2. Introduction to Counselling and Psychotherapy. Edited by Stephen Palmer. 2000 First Publication, SAGE Publications, London, Thousand Oaks, New Delhi.

<b>M.1.2.1</b>	<b><u>PSYCHOPHYSICS OF AUDITION</u></b>	(75 hrs)
1)	<b>PSYCHOACOUSTICS – REVIEW:</b> Psychophysical Methods – Classical and Modern psychophysical methods.	(3 hrs)
2)	<b>THEORY OF SIGNAL DETECTION:</b> Basic concepts - application of signal detection theory/neural networks.	(8 hrs)
3)	<b>LOUDNESS:</b> Absolute Threshold of Hearing. MAP & MAF in air and water. Loudness level, Loudness scaling - ordinal (Phon) and ratio (Sone), Need, applications. Fechner's Law, Steven's Power Law and their derivation. Effect of time, frequency and bandwidth. Role of cochlea, auditory nerve & CNS. Role of acoustic reflex. Temporal integration. Loudness of complex sounds/tones. Loudness growth. Parameters of loudness. Psychophysical power law, recruitment in normal ears, relationship between loudness and pitch.	(10 hrs)
4)	<b>PITCH:</b> Factors affecting pitch perception (intensity, frequency, duration), Pitch scales (ordinal and ratio) Equal pitch contours. Pitch of complex tones. Pitch of missing fundamental and periodicity pitch. Theories of pitch perception. Abnormalities in pitch perception. JND for frequency. Effects of phase on the pitch of complex sounds.	(8 hrs)
5)	<b>DIFFERENTIAL SENSITIVITY FOR FREQUENCY AND INTENSITY AND TIME :</b> Absolute and Relative differential sensitivities, Methods for measuring differential sensitivity, Weber's Law, Clinical applications.	(8 hrs)
6)	<b>PERCEPTION OF QUALITY/TIMBRE AND COMPLEX TONES:</b> Factors affecting perception of timbre. Helmholtz's theory of quality, Ohm's acoustical Law. Beats, aural harmonics and combination tones.	(8 hrs)

- 7) **MASKING AND CRITICAL BAND CONCEPT:** (8 hrs)
- Masking -types, psychophysical tuning curves. Critical band concept. Critical Band Vs Critical ratio. Methods of measurement of critical band. Concept of auditory filters, frequency resolution, masking and excitation pattern, central and non-simultaneous masking, two-tone suppression.

- 8) **ADAPTATION :** (8 hrs)  
 Definition, Adaptation Vs Fatigue, Methods of studying adaptation, Stimulus parameters affecting adaptation, Neuro-physiological process in adaptation.  
 Fatigue: Definition, NITTS, TLS, (Temporary Loudness shift) PTS.
- 9) **TEMPORAL PERCEPTION :** (4 hrs)  
 Temporal aspects of hearing, Temporal integration in sensitivity and loudness. Effect on Pitch and DL, Time-intensity trade, gap detection, Temporal DL
- 10) **BINAURAL HEARING :** (10 hrs)  
 Sensitivity (absolute and differential), loudness & pitch. Temporal dimension in binaural hearing. Binaural phenomenon - beats, rotating tones, time separation pitch. Time-intensity trade, Masking level difference. Localization vs Lateralization, Factors affecting localization, Neuro-physiological process. Clinical application of localization. Binaural phenomenon, Binaural fusion of pulsed stimuli, stereophonic effect, JND for dichotic phase.

### LIST OF BOOKS

#### PSYCHOPHYSICS OF AUDITION

1. Stevens, S.S. and Warshofsky, F. (1971). Sound and Hearing. Netherlands: Time Inc.
2. Dallos, P. (1973). Auditory Periphery: Biophysics and Physiology. New York: Academic Press
3. Davis, H. and Silverman S.R. (Eds.). (1978). Hearing and Deafness. 4<sup>th</sup> Ed. New York: Holt, Rinehart and Winston.
4. Evans, E.F. and Wilson, J.P. (1977). Psychophysics and Physiology of Hearing. London: Academic Press.
5. Gelfand, S.A. (1990). Hearing: An Introduction to Psychological Acoustic. (2<sup>nd</sup> Eds.). New York: Marcel Dekker.
6. Gullick, W.L. (1971). Hearing Physiology and Psychophysics. New York: Oxford University Press.
7. Yost, W.A. and Neilsen, D.W. (1985). Fundamentals of Hearing. 2<sup>nd</sup> Ed. New York: C.B.S. College Publishing.

8. Gullick, W.L., Gescheider, G.A. and Frisina, R.A. (1989). Hearing: Physiological Acoustics, Neural Coding and Psychoacoustics. Oxford Univ. Press.
9. Speaks, C.E. (1996). Introduction to Sound: Acoustics for the Hearing and Speech Sciences. San Diego: Singular Publishing Group Inc.
10. Yost A.W. (1994). Fundamentals of Hearing. California: Academic Press Inc.
11. Stuart, R and Howell, D. (1991). Signal and Systems for Speech and Hearing. California: Academic Press Inc.
12. Warren, R.M. (1999). Auditory Perception - A New Analysis and Synthesis. U.K.: Cambridge University Press.
13. Littler, J.S. (1965). Physics of the Ear. Oxford: Pargammon Press.
14. Busser, P., Imbert, M. and Kay, R.H. (1992). Audition. Cambridge: MIT press.

### **JOURNALS:**

- Ear and Hearing
- Hearing Research
- JAR
- JSHR
- Scandinavian Audiology

### **M 1.2.2 AUDITORY PHYSIOLOGY (75 hrs)**

- 1) **EXTERNAL EAR - ANATOMY and PHYSIOLOGY** (6 hrs)  
Phylogeny and ontogeny of development.  
Role of pinna and external auditory meatus, Resonance and diffraction properties.
- 2) **MIDDLE EAR-ANATOMY & PHYSIOLOGY** (10 hrs)  
Phylogeny and ontogeny of development.  
Middle ear impedance matching transformer action, Acoustic and non-acoustic reflexive pathways, Eustachian tube function.

- 3) **COCHLEA - ANATOMY** (10 hrs)  
 Phylogeny and ontogeny of development.  
 Macro & Micro-anatomy including cochlear fluids, blood supply, innervation.
- PHYSIOLOGY**  
 Cochlear mechanics - basilar membrane mechanics - Historical and current status, Cochlear electrophysiology, Cochlear potentials-their generation and properties, Cochlear transduction, Otoacoustic emission, Other recent advances.
- 4) **AUDITORY NERVE - ANATOMY** (10 hrs)  
 Structure and tonotopic organization.  
 Physiology: Neurotransmitters in the auditory system: type of synapses, Neurotransmitters Vs Neuro-modulators, properties and functions of neurotransmitters. Afferent & efferent neurotransmitters. Electrophysiology - Action potential generation, properties, Stimulus coding in auditory nerve. Frequency, intensity and temporal coding, Single nerve and compound tuning curves.
- 5) **THEORIES OF HEARING** (8 hrs)  
 Critical Evaluation
- 6) **CENTRAL AUDITORY PATHWAYS** (8 hrs)  
 Afferent (Ascending) pathway and anatomy and tonotopic organization in central auditory system.
- PHYSIOLOGY**  
 Neuro-physiology of the central auditory pathway, stimulus coding at various levels in the CANS.
- 7) **AUDITORY CORTEX** (8 hrs)  
 Anatomy and tonotopic organization of the primary and secondary auditory area. Neuro-physiology of auditory area.
- 8) **EFFERENT PATHWAYS - ANATOMY** (7 hrs)  
 Function of efferent Pathways. Effect on cochlear physiology and auditory nerve and C.N. perception of auditory stimulus, protective function.
- 9) **VESTIBULAR SYSTEM - ANATOMY & PHYSIOLOGY** (8 hrs)  
 - Afferent vestibular pathways  
 - Physiology of human balance functions

## LIST OF BOOKS

### AUDITORY PHYSIOLOGY

1. Sahley, T.L., Nodas, R. H. and Musiek, F.E. (1997). Efferent Auditory System: Structure and Function. San Diego: Singular Publishing Group, Inc.
2. Berlin, C. (Ed). (1984). Hearing Science, San Diego, California: College Hill Press.
3. Berlin, C. (Ed). (1996). Hair cells and Hearing Aids. London: Singular Publishing Group
4. Dallos, P. (1973). Auditory Periphery: Biophysics and Physiology. New York: Academic Press
5. Durrant, J. D. and Lovrinic, J. H. (1995). Bases of Hearing Science, 3<sup>rd</sup> ed., Baltimore: Williams and Wilkins.
6. Evans, E.F. and Wilson, J.P. (1977). Psychophysics and Physiology of Hearing, London: Academic Press.
7. Gelfand, S.A. (1990). Hearing: An Introduction to Psychological Acoustic 2<sup>nd</sup> Ed. New York: Marcel Dekker.
8. Gullick, W.L. (1971). Hearing Physiology and Psychophysics. New York: Oxford University Press.
9. Moore, B.C.J. (1982). An Introduction to Psychology of Hearing, 2<sup>nd</sup> Ed. London: Academic Press.
10. Moore, B. C. J. (Ed). (1995). Hearing. San Diego, California; Academic Press.
11. Pickles, J. D. (1992). An introduction to Physiology of Hearing. New York: Academic Press.
12. Tobias J. V. (Ed). (1970). Foundation of Modern Auditory Theory, Vol. I. New York: Academic Press.
13. Tobias, J. V. (Ed.). (1972). Foundations of Modern Auditory Theory, Vol. II. New York: Academic Press.
14. Yost, W.A. and Nilesen, D.W. (1985). Fundamentals of Hearing. 2<sup>nd</sup> Ed. New York: C.B.S. College Publishing.
15. Gullick, W.L., Gescheider, G.A. and Frisina, R.A. (1989). Hearing: Physiological Acoustics, Neural Coding and Psycho-acoustics. New York: Oxford Univ. Press.
16. John, F. and Santos, S. (Eds.). (1989). Physiology of the Ear. New York: Academic Press.

17. Yost A.W. (1994). Fundamentals of Hearing. California: Academic Press Inc.
18. Aitkin, L. (1990). Auditory Cortex: Structural and Functional Basis of Auditory perception. London: Chapman & Hall.
19. Keidel, W.D. and Neff, W.D. (Eds). (1975). Auditory System. Handbook of Sensory Physiology. Vol. 1 & 2. New York: Springer Verlag.
20. Kahane. J.C. and Folkins. J. G. (1984). Atlas of Speech and Hearing Anatomy. Ohio: Charles Merrill Publishers.
21. Moller. A.R. (1983). Auditory Physiology. New York: Academic Press.
22. Musiek. F.E. and Hoffman. D.W. (1990). An introduction into the functional neurochemistry of the auditory system. Ear and Hearing, 11 (6). 395 - 402.
23. Musiek F. E. (1986). Neuroanatomy, Neuro physiology and Central Auditory assessment. Part I. Brain stem. Ear and Hearing.7. 202 - 219.
24. Museik F. (1986). Neuroanatomy, Neuro physiology and Central Auditory Assessment. Part II. The Cerebrum. Ear and Hearing .7. 349 - 358.
25. Museik F. (1986). Neuro anatomy, neuro physiology and Central Auditory Assessment. Part III. Corpus Collosum and Efferent Pathways. Ear and Hearing. 7. 349 - 358.
26. Zemlin W.R. (1988). Speech and Hearing Sciences. Anatomy and Physiology. New Jersey: Prentice Hall.
27. Altschuler, R.A. and Hoffman, D.W. (1986). Neurobiology of Hearing- The Cochlea. New York: Academic Press.
28. Busser, P., Imbert M. and Kay, R.H. (1992). Audition. Cambridge: MIT Press.

## **JOURNALS**

- Ear and Hearing
- Hearing Research
- Hearing Research
- JAR
- JSHR
- Scandinavian Audiology

**M 1.3.1 : LINGUISTICS IN CLINICAL PRACTICE/INDEPENDENT PROJECTS ( 75 hrs.)**

- 1) Fundamentals of Linguistics for clinicians: (12 hrs.)
  - a) Terminologies and concepts of linguistics: Linguistic dichotomies – selection and combination – competence and performance – Langue and Parol etc.
  - b) Semantic relationships: associations, fields and features – categories, complexes and retrieval
  - c) Pragmatics: Theoretical issues – Deixis and anaphora – Definiteness – Discourse (focus on understanding normal and disordered language)
- 2) Psycholinguistics and language acquisition - Issues involved in language acquisition - Motherese - Second language acquisition - Language acquisition in bi - and multi - lingual environments. (12 hrs.)
- 3) Language and Thought. Their relationship and dependency in language acquisition. (5 hrs.)
- 4) Neurolinguistics – Language and the brain – Localization – Left brain – right brain differences – Coding and decoding – Neuroanatomical and Neurophysiological bases of language learning and dysfunction – Linguistic and Psycho-neurolinguistic models of language pathology. (15 hrs.)
- 5) Scope of clinical linguistics –
  - a) Linguistics and assessment of speech language impairment (12 hrs.)

Speech production - Speech perception - Phonology - Syntactic assessment – Semantics - Pragmatics - Prosody - Determining speech intelligibility using segmental, phonological, prosodic and electropalatography studies - Linguistic profiling for language impairments.
  - b) Application of linguistics to the study of speech-language impairments - Acquired aphasia - stuttering - developmental language disorders - developmental speech disorders and acquired neurogenic disorders. (12 hrs.)
  - c) Application of psycholinguistics to intervention. Theoretical issues and clinical applications. (5 hrs.)
- 6) Review of current literature and research designs in clinical linguistics (2 hrs.)

## LIST OF BOOKS

### LINGUISTICS IN CLINICAL PRACTICE

#### Essential:

- 1) Linguistics in Clinical Practice. Grundy, K. (2<sup>nd</sup> Ed.). (1995). Whurr Publishers. ISBN 1-897635-52-4.
- 2) Advances in Applied Psycholinguistics Vol. 1 and 2. Disorders of First Language Development and Reading, Writing and Language learning. Rosen berg, S. (Ed.). (1987). Cambridge University Press. ISBN 0-521-31732 – 0 V.1: Paper Back, ISBN 0-521-31733-9 V.2: Paper Back.
- 3) Theoretical Linguistics and Disordered Language. Ball, M.J. (Ed.). (1988). London: Croom Helm. ISBN 0-7099-5012-8.
- 4) Pragmatics of Language. Clinical Practice Issues. (Ed.). Gallagher, T.M. (1991). Singular Publishing Group, Inc. ISBN 1-879105-10-1.
- 5) Case Studies in Clinical Linguistics. (Ed.). Perkins, M. and Howard, S. (1995). UK: Whurr Publication. ISBN 1-897635-75-3.
- 6) Linguistics and Aphasia: Psycholinguistic and Pragmatic Aspects of Intervention. Lesser R. and Milroy L. (1993). Longmann. ISBN 0-582-02221-5
- 7) The clinician's guide to linguistic profiling of language impairment. Ball, M.J. (1992). Great Britain: Far Communication Ltd. ISBN 0-9514728-8-7.

#### Additional:

- 1) Child Language and Developmental Dysphasia – Clahsen, H. Studies in Speech Pathology and Clinical Linguistics. (1988). Amsterdam: John Benjamins Publishing Co. ISBN 90-272-4332-8.
- 2) First and Second Language Phonology. Yavas M. (Ed.). (1994). San Diego: Singular Publishing Group. ISBN 1-56593-167-X.

**M 1.3.2 : ADVANCE STATISTICS AND RESEARCH METHODS**

**(75 hrs)**

**A. Statistics:**

- 1) Statistics – purpose – approach-method-measures of central tendency-dependability of these measures-research applications.
- 2) Measures of variability – types and meaning of various measures – research applications.
- 3) Standard scored – I scores – normal distribution deviations – skewness and kurtosis – conditions of applications – limitations in interpretation.
- 4) 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.
- 5) Correlation – meaning – coefficient of correlation – linear correlation – product – moment correlation – rank correlation, biserial correlation, tetrachoric correlation partial and multiple correlation – regression equation.
- 6) Variance – concept – foundations – assumptions – one way classification. ANOVA, MANOVA, ANCOVA, MANCOVA.
- 7) Item analysis – item pool – its selection – item difficulty item variance – item conduction – time validity – difficulty index.
- 8) 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.
- 9) Selection appropriate statistical methods in the research.

**B. Research Methods:**

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

- 4) Techniques 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.
- 5) Measurement – foundations – types – reliability – validity
- 6) Variance – Implication to research – variance control.
- 7) Techniques of equation - experimental and control groups – matching and randomization – advantages, disadvantages and limitations.
- 8) Research designs – poor designs, good designs – various types of group designs – various types of single subject research designs.
- 9) Analysis and interpretation – principles, indices – cross – breaks – factor analysis – multivariate statistics – time series analysis.
- 10) The research report – cardinal characteristics – purpose – structure presentation and writing style.

## **LIST OF BOOKS**

### **ADVANCE STATISTICS AND RESEARCH METHODS**

#### **Essential:**

- 1) Clinical Research in Communicative Disorders. (2nd Edition). Principles and Strategies. M.N. Hegde.
- 2) Introduction to Clinical Research in Communication Disorders. Mary and Grace.
- 3) Pannbacker, M.H. and Middleton, G.F. (1994). Introduction to Clinical Research in Communication Disorders. San Diego: Singular Publishing. ISBN 1-56593 – 219-6.
- 4) Maxwell, D.L. and Satake, E. (1997). Research and Statistical Methods in Communication Disorders. Baltimore: Williams and Wilkins, ISBN 0-683-05 655-7.
- 5) Stein, F. and Cutler, S.K. (1996). Clinical Research in Allied Health and Special Education. San Diego: Singular Publishing Group Inc. ISBN 1-56593-631-0.

**Additional:**

- 1) Portney, L.G. and Walkins, M.P. (1993). Foundations of Clinical Research. Connecticut: Appleton and Lange. ISBN 0 –8385-1065-5.
- 2) Woods, A., Fletcher, P. and Hughes, A. (1986). Statistics in Language Studies. Cambridge: University Press. ISBN 0-521-253268.

**CLINICAL PRACTICUM IN SPEECH LANGUAGE PATHOLOGY**

**Objectives:**

At the end of the year the student will be able to:

- 1) Acquire skills to put the theoretical concepts into practical application.
- 2) Develop proficiency in administering special tests.
- 3) Develop proficiency in independently carrying out a case study.
- 4) Develop skills to envisage a project in a particular sphere of activity.
- 5) To develop skills in documentation.

**Clinical Practicum Work:**

- 1) To independently carryout assessment for various communication disorders.
- 2) To independently carryout intervention program effectively.
- 3) To develop skills in documenting diagnostic and intervention information.
- 4) To develop proficiency in instrumental assessment and interpretation.
- 5) To plan and execute a program for clinical use / public education in a particular sphere including appropriate material.
- 6) To present a comprehensive case study utilizing relevant theoretical concepts.

## CLINICAL PRACTICUM IN AUDIOLOGY

1. Calibration of audiometer. Rise-decay time. Measurement, distortion measurement, calibration of warble tone.
2. Preparation of case reports.
3. Knows to
  - select appropriate diagnostic test,
  - administer ABR Independently,
  - interpret test profile,
  - design simple experiments with the help of supervisor.
4. Independently carryout hearing aid evaluation using functional gain measures including (1) selection and administration of appropriate test procedures (2) select hearing aids (3) make appropriate recommendations.
5. Measuring electro- acoustic characteristics of hearing aid as per the established standards for :
  - Body level hearing aids
  - Ear level (behind the ear) hearing aid
  - Hearing aids with AVC Circuit
6. Preparation of speech reading lessons and activities for auditory training
7. Necessary instrumentation for recording calibration tone, tape recording with noise.

## SECOND YEAR POST GRADUATE COURSE

### OBJECTIVES:

#### Speech:

- 1) To develop skills to critically evaluate diagnosis and intervention of various communication disorders.
- 2) To develop skills to critically evaluate and review literature and research in the field of speech language pathology.
- 3) To plan and carry out research under supervision and present a dissertation.

#### Audiology:

At the end of the course, the students should be able to do the following:

1. Understand the acoustics of speech, theories of speech perception, methods used to study speech perception.
2. Understand the perception of speech through visual, tactile and cochlear implant modes.
3. Know the methods of predicting and measuring speech intelligibility, factors affecting speech intelligibility
4. Understand the issues involved in the perception of speech in the hard of hearing & knows the relevance of the same in their evaluation and management.
5. Understand the issues in processing of phonological, morphological, syntactic, semantic and pragmatic aspects of language.
6. Trouble shoot, maintain and calibrate audiological (diagnostic as well as rehabilitative) instruments, aids & appliances;
7. Undertake hearing screening by opting for appropriate tool/s and technique/s for various populations.
8. Prepare comprehensive audiological evaluation reports after undertaking the indicated evaluations incorporating the non-audiological reports for various types of disorders.
9. Hearing assessment (diagnostic and rehabilitative) of special population such as deaf-blind, MR, cerebral palsied others.
10. Hearing assessment and management of cases with Central Auditory Processing Disorders.
11. Evaluation of patients with Vestibular disorders, tinnitus and functional hearing loss.
12. Selection of appropriate amplification for infants/children, adults, geriatric population. Evaluation of the amplification systems.
13. Identifying patients for implantable aids their assessment and post-implant management.
14. Guide the patients for their overall rehabilitation i.e. auditory speech/language training educational placement.
15. Aware of the process, care and issues in disability evaluation and certification.

## COURSE CONTENT

M.Sc. II	Paper Title	Hrs./Wk	Total Marks
<b><u>Speech Pathology:</u></b>			
M 2.1.3	Advances in Language Acquisition and Developmental Language Disorders.	3 hrs	80 + 20
M 2.1.4	Advances in Adult Language Disorders.	3 hrs	80 + 20
M 2.1.5	Clinical Phonology and Neuro-motor Speech Disorders.	3 hrs	80 + 20
<b><u>Audiology:</u></b>			
M 2.2.3	Speech Perception.	3 hrs	80 + 20
M 2.2.4	Seminars in Diagnostic Audiology.	3 hrs	80 + 20
M 2.2.5	Seminars in Management of the Hearing Impaired.	3 hrs	80 + 20

### **Dissertation**

### **CLINICAL PRACTICUM:**

	<b>Internal</b>	<b>Internal + External</b>
Speech Pathology	100	100
Audiology	100	100
Total	200	200

**M 2.1.3 : ADVANCES IN LANGUAGE ACQUISITION AND CHILDHOOD ( 75 hrs.)  
LANGUAGE DISORDERS**

- 1) Critical review of current theories of language acquisition and its applications to assessment and intervention. (6 hrs.)
- 2) Overview of neuroanatomical and neurophysiological correlates of language acquisition. (4 hrs.)
- 3) Models of language processing (Lichtheim's model, Logogen model, Microgenetic model). (5 hrs.)
- 4) Overview of : (15 hrs.)
  - 1) Word recognition and production - Spoken, Visual.
  - 2) Sentence Comprehension and production.
  - 3) Processing of phonological, morphological, syntactic, semantic and pragmatic aspects of language
  - 4) Information processing skills.
- 5) Memory in communication and communication disorders. (10 hrs.)  
Short term memory, working memory, and their importance in language processing. Serial and long-term memory. Visuospatial perception, motion perception. Attention – Types of attention, Development of attention.
- 6) Language development in exceptional circumstances: extreme deprivation, bilingual language exposure, twins, visual handicap, Williams syndrome (disassociation between language and cognitive functions), Hearing loss, Dyspraxia, Learning disabilities, Dysphasia, Acquired childhood aphasia. (10 hrs.)
- 7) Contemporary concepts and issues in Autism, SLI and LLD. (6 hrs.)
- 8) Cross-cultural considerations in assessment and management of developmental language disorders. (4 hrs.)
- 9) Specific assessment and intervention approaches for various developmental language disorders. (10 hrs.)
- 10) Reading, Spelling and Writing Disorders. Neurobiology of reading and writing. Phonological Awareness and Reading. Evaluation. Treatment approaches. (5 hrs.)
- 11) Counseling – meaning, scope – principles of counseling – types of counseling – individual, group and family, parental, vocational, educational, rehabilitative – behavioral counseling in the context of speech, language disorders.
- 12) Special psychotherapies – play therapy, group therapy, family therapy, psychodrama – intensive psychotherapy, brief psychotherapy to children with speech and language disorders.



1. Testing and Assessment in Counselling Practice, 2<sup>nd</sup> Edition – Edited by – C. Edward Watkins, JR., Vieki L. Campbell. 2000 by Lawrence Erlbaum Associates, Publishers Mahwah, New Jersey, London.
2. Counselling People with Communication Problems – Peggy Dalton – 1994 – SAGE Publications, London, Thousand Oaks, New Delhi.
3. Introduction to Counselling and Psychotherapy. Edited by Stephen Palmer. 2000 First Publication, SAGE Publications, London, Thousand Oaks, New Delhi.
4. Introduction to Counselling Skills – Richard Nelson – Jones – 2000 SAGE Publications Ltd., London, Thousand Oaks, New Delhi.

**M 2.1.4 : ADVANCES IN ADULT LANGUAGE DISORDERS ( 75 hrs.)**

- 1) Neurological Examination – Cranial nerve examination, motor examination, reflexes. (3 hrs.)
- 2) Neurological Tests and neuroimaging procedures (EEG, EMG, CT Scan, MRI, Transcranial Doppler Ultra-sonography, PET). Applications to communication disorders. (2 hrs.)
- 3) Neurobehavioural Testing (Attention, Arousal, Memory, Affect, Visuospatial function, Language, Praxis, Gnosis). (3hrs.)
- 4) Neurophysiology of aphasia and related disorders. Language and Cerebral dominance. Connectionist explanation of Aphasia. Lesion size, lesion location and aphasia syndrome. Speech-language and the brain. (3 hrs.)
- 5) Assessment and Diagnosis in Neurocommunication disorders. (10 hrs.)  
General Principles, Testing of verbal comprehension, non-verbal skills, verbal expression, functional communication. Test interpretation. Testing right hemisphere function. Assessing the bilingual client.
- 6) Different perspectives in aphasia. (10 hrs.)
  - Linguistic investigations of aphasia, semantic studies, phonological studies.
  - Pragmatics and aphasia (including discourse ability).
  - Aspects of bilingual aphasia.
  - Aphasia in the illiterate.
- 7) Advances in aphasia rehabilitation. (10 hrs.)
  - Psychosocial aspects and sociolinguistic perspectives.
  - Pragmatic approaches to aphasia rehabilitation.
  - Rehabilitation of the bilingual aphasic.
  - Assessment of treatment efficacy in aphasia.

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|-----|---|----------|
| 8)  | Acquired reading and writing disorders.   | (5 hrs.) |
| 9)  | Behavioral and Cognitive symptoms of right hemisphere brain damage. Treatment of patients with right hemisphere brain damage. Prognosis, treatment efficacy and outcome.  | (5 hrs.) |
| 10) | Dementia and communication. Causes of dementia, Types of dementia (Cortical, subcortical, vascular, metabolic, toxic etc.). Language changes in dementia. Senile dementia. Bilingual dementia. Assessment and diagnosis. Treatment. Long-term management. | (5 hrs)  |
| 11) | Traumatic Brain Injuries. Penetrating and Non penetrating injuries. Secondary consequences of TBI, Assessment of TBI patients, Rehabilitation of TBI patients, Treatment outcome.   | (3 hrs.) |
| 12) | Characteristics, Assessment, Intervention and Issues in<br>- Primary Progressive aphasia<br>- Sub-cortical aphasias<br>- Schizophasia   | (6 hrs.) |
| 13) | Alternative and Augmentative Communication for the language disordered.   | (5 hrs.) |
| 14) | Review of current literature and research designs in neurogenic language disorders.   | (5 hrs.) |

### **LIST OF BOOKS**

#### **ADVANCES IN 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 Practitioner's Guide. (1998). Johnson, A.F. and Jacobson, B.H. NY: Thieme. ISBN 0-86577-688-1.

- 4) Aspects of Bilingual Aphasia. (1995). Paradis, M. (Ed.). Great Yarmouth: Galliard (Printers) Ltd. ISBN 0-08-0425704
- 5) Pragmatics in Neurogenic Communication Disorders. (1998). Paradis, M. Great Yarmouth: Galliard (Printers) Ltd. ISBN 0-08-043065-1.
- 6) Linguistic Investigations of Aphasia. (2<sup>nd</sup> Ed.). (1989). Lesser, R. London: Whurr. ISBN 1-870332-77-6.
- 7) Right Hemisphere Communication Disorders: Theory and Management. (1995). Tompkins, C.A. California: Singular Publishing Group, Inc. ISBN 1-56593-176-9.
- 8) Dementia – A Clinical Approach. (2<sup>nd</sup> Ed). (1992). Cummins, J.L. and Benson, D.F. US: Butterworth – Hienemann. ISBN 0-7506-9065-8.
- 9) Pragmatic Approaches to Aphasia Therapy. (1994) Carlomagno, S. London: Whurr. ISBN 1-870332-94-6.

**M 2.1.5 : CLINICAL PHONOLOGY AND NEUROMOTOR SPEECH DISORDERS ( 75 hrs.)**

**A) CLINICAL PHONOLOGY**

- 1) An overview of clinical phonology. From articulation to clinical phonology. Medical and Linguistic models. (2 hrs.)
- 2) Critical overview of current theories of phonology. (3 hrs.)
- 3) Phonological Awareness: Linking speech and literacy problems. (4 hrs.)
- 4) Disorders of phonology in different clinical populations. (6 hrs.)
- 5) Overview and recent developments in evaluation of phonology. (7hrs.)
- 6) Treatment Practices (6 hrs.)
  - Traditional and Phonological Intervention.
  - Motor Vs Cognitive learning.
  - Procedures based on minimal pairs.
  - Procedures based on Imagery.
- 7) Current literature and research designs in clinical phonology. (2 hrs.)

**B) NEUROMOTOR SPEECH DISORDERS**

- 1) Neurophysiology and functional development of motor control. (3 hrs.)

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|-----|---|-----------|
| 2)  | Assessment Procedures. Perceptual, Acoustic, and aerodynamic analysis. Formal and Informal tests. (Structural, oro-sensory examination, non-speech, speech). Electromyography and speech imaging. | (10 hrs.) |
| 3)  | Review of different types of dysarthria and apraxia   | (8 hrs.)  |
| 4)  | Differential diagnosis of motor speech disorders: dysarthria, apraxia and secondary to hearing loss.  | (2 hrs.)  |
| 5)  | Prognostic issues and treatment procedures for the different types of dysarthrias.  | (5 hrs.)  |
| 6)  | Treatment of developmental dysarthria, apraxia and phonological disorders with motor speech involvement.  | (4 hrs.)  |
| 7)  | Future needs in treatment outcome and efficacy research in motor speech disorders   | (3 hrs.)  |
| 8)  | AAC : overview of AAC for motor speech disorders.   | (2 hrs.)  |
| 9)  | Current literature and research designs in neuromotor speech disorders.   | (2 hrs.)  |
| 10) | Dysphagia   |           |
|     | 1. Issues in pediatric feeding and swallowing.  | (2 hrs.)  |
|     | 2. Neurogenic swallowing disorders. Causes, symptoms and clinical types. Assessment. Intervention.  | (4 hrs.)  |

## **LIST OF BOOKS**

### **CLINICAL PHONOLOGY AND NEUROMOTOR SPEECH DISORDERS**

#### **Essential :**

- 1) Perspectives in Applied Phonology. (1997). Hodson, B.W and Edwards, M.L. Maryland: An Aspen Publication. ISBN 0-8342-0881-4.
- 2) Clinical Phonology. Assessment of Articulation Disorders in Children and Adults. (1996). Klein, E.S. California: Singular Publishing Group, Inc. ISBN 1-56593-602-7.

- 3) Phonological Theory and the Misarticulating Child. ASHA Monographs. (1984). (Number 22 Ed.) Elbert, M., Dinnsen, D.A. and Weismer, G. ISBN 0066-071X.
- 4) Phonological Disability in Children. (2<sup>nd</sup> Ed.). Studies in Disorders of Communication. (1989) Ingram. Cole and Whurr Limited. ISBN 1-871381-05-3.
- 5) Clinical Management of Motor Speech Disorders in Children. (1999). Caruso, F. J. and Strand, E. A. New York: Thieme. ISBN 86577 – 7624 (TNY). ISBN 3-13-111381-2 G.T.V.
- 6) Motor Speech disorders - A Treatment guide. (1991). Dworkin, P.J. St. Louis: Mosby Year Book. Inc. ISBN 155664-223-7.
- 7) Clinical Management of Neurogenic Communication Disorders. (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. ISBN 0-86577-688-1.

**Additional :**

- 1) Targetting Intelligible Speech. A Phonological approach to remediation. (1983) Hodson B.W. and Paden E.P. California: College Hill Press. ISBN 0-933014-28-7.
- 2) Developmental Speech Disorders. Clinical Issues and Practical Implications. (Ed.). (1990). Grunwell, P. UK. ISBN: 0-443-03992-5.
- 3) The Nature of Phonological Disability in Children. (1981). Grunwell P. London: Academic Press Inc. ISBN 0-12-305250-5.

**M 2.2.3 : SPEECH PERCEPTION**

**( 75 hrs)**

- 1) Introduction to speech perception, Acoustics of speech in relation to production. Coding of speech in the auditory pathway. (5 hrs)
- 2) Theories of speech perception : Acoustic theory, Neurological theories, motor theory, Analysis by Synthesis, Quantum theory. (8 hrs)

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|-----|---|---------|
| 3)  | Methods used to study speech perception: Analysis by Synthesis, Parametric Synthesis, Articulatory synthesis.   | (8 hrs) |
| 4)  | A) Perception of vowels and consonants in infants and adults<br>B) Effects of co-articulation on speech perception  | (6 hrs) |
| 5)  | Perception of speech through the visual and tactile modes and through cochlear implants   | (6 hrs) |
| 6)  | Dichotic listening : Definition, theories, factors affecting, application to speech and hearing   | (6 hrs) |
| 7)  | Short term memory and speech perception. Stages of memory, Theories of short-term memory, perception of consonant and vowels, in short term memory.   | (8 hrs) |
| 8)  | Speech intelligibility<br>a) Methods of predicting and measuring speech intelligibility<br>b) Factors influencing speech intelligibility<br>c) Application to speech and hearing  | (8 hrs) |
| 9)  | Perception of speech in the hard of hearing - Vowels, consonants, Coarticulation, supra-segmentals. Perception of speech through visual and tactile modality, through cochlear implants. Speech perception in adverse listening conditions - comparison of normal Vs hearing impaired | (6 hrs) |
| 10) | Information processing skills<br>a) Sequential processing skills<br>b) Simultaneous processing skills   | (6 hrs) |
| 11) | a) Word recognition - spoken - visual<br>b) Sentence comprehension<br>c) Processing of phonological morphological syntactic, semantic and pragmatic aspects of language.  | (8 hrs) |

### **LIST OF BOOKS**

#### **SPEECH PERCEPTION**

1. Keller, E. (1994). Fundamentals of Speech Synthesis and Speech Recognition-Basic Concepts, State of the Art and Future Challenges. New York: John Wiley and Sons.
2. Kuhl, P.K. (1980). Infant Speech Perception: Reviewing Data on Auditory Category Formation. In P.L. Levinson and C. Sloan (Eds). Auditory Procession and Language-Clinical and Research Perspectives. New York: Grune & Stratton.
3. Kuhl, P.K. (1979). The perception of speech in early infancy. In N. Lass (Ed). Speech and language Advances in basic research and practice. Vol. I. New York: Academic Press.

4. Kuhl, P.K. (1982). Perceptual constancy of speech-sound categories. In G.H. Yeni-Konoshian, J.F. Kavanaugh and C. Ferguson (Eds.) *Child Phonology*, Vol. 2, Perception, New York: Academic Press.
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<b>M 2.2.4 :</b>	<b><u>SEMINARS IN DIAGNOSTIC AUDIOLOGY</u></b>	<b>( 75 hrs.)</b>
1)	<b>Audiological Diagnostic Instruments :</b> Procurement, installation, calibration and Maintenance.	(6 hrs)
2)	<b>Hearing Screening :</b> Definition, justification/need for screening types/techniques of Screening, Sensitivity, Specificity, Cost-benefit analysis, Screening procedures with regard to Indian context. Limitations and benefits of screening. Implications with regard to prevention of hearing loss. Issues of abortion, genetic counseling, hearing conservation programs, public awareness programs. Community based prevention approaches. Efforts of WHO and Government of India	(6 hrs)
3)	<b>Audiological ( Puretone, speech &amp; immittance audiometry, Evoked potentials &amp; OAE) and Histopathological findings in :</b> i) External ear and middle ear diseases ii) Meniere's diseases iii) Acoustic neuroma iv) NIHL and Acoustic Trauma v) Ototoxicity vi) Presbycusis vii) Sudden hearing loss viii) Hearing loss of vascular origin ix) Hearing loss associated with systemic diseases x) Hereditary deafness - syndromes - advances in genetics xi) Auditory neuropathy	(10 hrs)
4)	<b>Non - Audiological tests in the diagnosis of auditory disorders:</b> i) Radiological techniques ii) ENG iii) CT Scan iv) Caloric Tests v) Other	(8 hrs)
5)	<b>Assessment of Auditory Disorders in Special Population :</b> Such as deaf-blind, MR, Autism, cerebral palsy, Specific language disorders, attention deficient disorder, hyperacusis.	(6 hrs)
6)	<b>Central Auditory Disorder ;</b> Theoretical basis, Classifications, conditions in which CAPD exist in adults and in children, behavioral tests, objective tests, co-relation of audiological with non audiological findings in CAPD, influences of linguistic variation in assessment.	(8 hrs)
7)	<b>Evaluation of patients with vestibular disorders:</b> Harmful effects of vibration on balance mechanism.	(6 hrs)

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| 8)  | <b>Tinnitus:</b> Condition associated with tinnitus, types of tinnitus, tinnitus evaluation.  | (6 hrs) |
| 9)  | <b>Non-organic hearing loss.</b>  | (8 hrs) |
| 10) | <b>Comprehensive reporting</b> of audiological findings. Audiologist as a witness in medico-legal cases.  | (3 hrs) |
| 11) | <b>Audiological practice</b> in rural areas, Pediatric set up, Otolaryngological setup, Neurological setup, Industrial setup, School setup. Audiologist as a Private Practitioner. Role and scope of Forensic Audiologist. Medico-legal aspects. Legislations related to the field of Audiology | (8 hrs) |

### LIST OF BOOKS

#### SEMINARS IN DIAGNOSTIC AUDIOLOGY

1. Alford, B.R. and Jerger, S. (Ed) (1993). Clinical Audiology: The Jerger Perspective. San Diego: Singular Publishing Group, Inc.
2. Biswas, A. (1995). Clinical audio-vestibulometry for otologists and neurologists. Bombay: Bhalani Publishing House.
3. Hall, J. W. and Mueller, H.G. (1997) Audiologists' Desk Reference Volume 1: Diagnostic Audiology Principles, Procedures and Protocols, San Diego: Singular Publishing Group.

4. Hayes, D and Northern J.L. (1996). *Infants and Hearing*, San Diego: Singular Publishing Group
5. Luxon, L.M. and Davis, R.A. (Eds.). (1997). *Handbook of vestibular rehabilitation*. San Diego: Singular Publishing Group, Inc.
6. Mencher, G.T., Gerber, S.E. and McCombe, A. (1997). *Audiology and Auditory Dysfunction*. Boston: Allyn and Bacon.
7. Mendel L.L. and Danhaurer, J.L. (1997). *Audiologic evaluation and management and speech perception assessment*. San Diego: Singular Publishing Group, Inc.
8. Musiek, F. E., Baran, J. A. and Pinherio, M.L. (1994). *Neuroaudiology: Case studies*, San Diego: Singular Publishing Group.
9. Roland, P.S., Marple, B.F. and Meyerhoff, W.L. (1997). *Hearing loss*. New York: Thieme.
10. Ross R. J. (1996). *Roeser's Audiology Desk reference: A guide to the Practice of Audiology*. New York: Thieme
11. Sataloff. R.T. and Sataloff, J. (1993) *Hearing Loss*. New York: Marcel Dekker.
12. Soucek, S. and Michaels, L. (1990). *Hearing Loss in the Elderly: Audiometry, Electrophysiologic and Histopathologic aspects*. London: Springer-Verlang.
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15. Ferraro. J. A. (1997). *Laboratory exercises in auditory evoked potentials*. San Diego: Singular Publishing Group, Inc.
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17. Jacobson, J.T. (Ed). (1985). *Auditory Brainstem Response*. London: Taylor and Francis.
18. McPherson, L.D. (1995). *Late potentials of the auditory system*, London: Singular Publishing Group.
19. Katz J. (Eds.) (1994). *Handbook of clinical audiology*. Baltimore. Williams & Wilkins.
20. Popelka G.R. (1981). *Hearing assessment with the acoustic reflex*. New York. Grune & Stratton.
21. Robinette M. S. and Glattke T.J. (Eds.). (1997). *Otoacoustic emissions. Clinical applications*. New York : Thieme.
22. Jerger, J. (1973). *Modern Developments in Audiology*. New York: Academic Press

23. Katz, J. Stecker, N.A. and Henderson, D. (Eds.). (1992). Central auditory processing: A transdisciplinary view. St. Louis. Mosby year book.
24. Rintleman, W.F. (2000). Hearing Assessment. Boston : Allyn and Bacon
25. Silman, S. and Silverman, C.A. (1991). Auditory diagnosis: Principles and Applications. San Diego: Academic Press.
26. Wiley, T.L. and Fowler, C.G. (1997). Acoustic immittance measures in clinical audiology:A primer. San Diego: Singular Publishing Group, Inc.
27. Dunn, H.H., Dunn, D.R. and Harford, E.R. (1995). Audiology Business and practice management. San Diego: Singular Publishing Group, Inc.
28. Katz, J. Stecker N. A. and Henderson, D (Eds). Central auditory processing: A transdisciplinary view. St. Louis: Mosby Year Book..
29. Schow, L.R, and Nerbonne, A.M. (1989). Perspectives in Audiology series. 2<sup>nd</sup> Ed. Boston: Allyn and Bacon.
30. Recent Journals including:
  - Audiology and Neurootology
  - Ear and Hearing
  - Journal of the Acoustical Society of America
  - Journal of Speech - language hearing research
  - Scandinavian Audiology
  - Seminars in hearing

**M 2.2.5 : SEMINAR IN MANAGEMENT OF THE HEARING IMPAIRED ( 75 hrs.)**

- 1) Definitions and classifications of the persons with hearing impairment (2 hrs)
- 2) Needs of the hearing impaired : (3 hrs)
  - a) Infants & children
  - b) Adults
  - c) Geriatric population  
(Communication, social, educational, economic and vocational needs)
- 3) Principles of Amplification. Analysis of Amplification Devices. (10 hrs)  
Coupler-gain. Real ear gain. Standards for Hearing aid EAC. Critical evaluation on Indian standards. Hearing aid selection. Procedures including SII (AI), Real ear aided performances, Comparison of various prescriptive formulae, considerations in prescribing: a) Ear level Vs body level aids, b) Digital & programmable Vs analog hearing aids. c) Monaural Vs binaural aids d) bone receiver aids.
- 4) Assistive Listening Devices, Tactile Devices, Alarm Devices: (4 hrs)  
candidates, components & assessment of benefit and the aid.
- 5) Ear mould review, types, preparation, selection, modification and current trends. (4 hrs)
- 6) Implantable Devices for the Hearing Impaired: i) Bone anchored aids, ii) Middle ear implants iii) Cochlear implants iv) Brainstem implants. Candidacy, components and assessment of benefit for each type listed. (10 hrs)  
Cochlear Implants : Types design and features, Speech processor and strategies,  
Post - operative mapping and follow – up
- 7) Audiological Rehabilitation Programs for infants and children. (8 hrs)  
Hearing aid selection, adjustments of hearing aids, acceptance of hearing aids. Auditory training, pre auditory training assessment - Speech perception Tests. Critical evaluation of various methods of auditory training, speech reading and other communication strategies.

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| 8)  | Therapeutic Consideration:<br>Purpose of Language: Communication, Education, Entertainment.<br>Language for Pre-school hearing impaired child - Verbal, Sign or bilingualism? Effect of conductive loss on language development.<br>Parent-Infant Programs.                               | (8 hrs) |
| 9)  | Educational Placement: Options available. Means/medium of communication in the class room. Controversies over different approaches. Choice of placement. Design and acoustics of classrooms for the hearing impaired.   | (8 hrs) |
| 10) | Management of CAPD Cases: Choice of management based on audiological test results, environmental modification, devices. Auditory perceptual training, communication strategies, cognitive/language management, recording improvement in therapy.  | (8 hrs) |
| 11) | Audiological Rehabilitation Programs for adults and geriatrics. Hearing aid adjustment, selection of Assistive Listening Devices. Speech reading and other communication strategies. Occupational noise exposure, DRC, provision of EPDS. Factors to be considered for selection of EPDS. | (6 hrs) |
| 12) | Process, care and issues in disability evaluation and certification, Implications. Counter Test, high and low predictability words (5PIN test), MAC test etc.   | (4 hrs) |
| 13) | Counseling – meaning, scope – principles of counseling – types of counseling – individual, group and family, parental, vocational, educational, rehabilitative – behavioral counseling in the context of hearing impairment.  |         |
| 14) | Special psychotherapies – play therapy, group therapy, family therapy, psychodrama – intensive psychotherapy, brief psychotherapy to children with hearing impairment.  |         |

### **LIST OF BOOKS**

#### **SEMINAR IN MANAGEMENT OF THE HEARING IMPAIRED**

1. Markides, A. (1977). Binaural Hearing Aids. London: Academic Press.
2. Richard, M. W. (1999). Auditory Perception - A new analysis and synthesis. UK: Cambridge University Press.
3. Goodman, J.C. and Nusbaum. (Eds). (1994). The Development of Speech Perception: The Transition from Speech Sounds to Spoken Words. London: A Bradford Book, The MIT Press

4. Kent R.D. and Read C. (1995). *The Acoustic Analysis of Speech*. New Delhi: A.I.T.B.S. Publishers and Distributors.
5. Crowder, R.G. (1990). *The Role of Auditory Memory in Speech Perception and Discrimination*. SR 621 P. 187-205. *Statue Report on Speech Research*, Haskins Laboratories, New Haven, Conn.
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7. Schouten, M.E.H (1992). (Ed). *The Auditory processing of Speech- From Sound to Words*. Berlin: Mouton de Gruyter.
8. Parasnis, I. and Samar, V.J. (1982). *Visual Perception of Verbal Information by deaf people*. In D.G. Sims, G.G. Walter and R.L. Whitehead (Eds). *Deafness and Communication*. Baltimore: Williams and Wilkins.
9. Owens E. and Kessler D.K. (1989). (Eds.) *Cochlear Implants in Young Deaf Children*. Boston: College-Hill Publication, Little, Brown and Company.
10. Plant, G. and Spens, K. E. (1995) (Ed). *Profound Deafness and Speech Communication*. London: Whurr Publishers Ltd.,
11. Revoile, S. G. and Pickett, L.M. (1982). *Speech Perception by the Severely Hearing Impaired*. In D.G. Sims, D.G. Walter and R.L. Whitehead (Eds). *Deafness and Communication*. Baltimore: Williams and Wilkins.
12. Sanders, D.A. (1982). *Aural Rehabilitation. A Management Model*. (2<sup>nd</sup> Ed.). New Jersey: Prentice-Hall, Inc.
13. Summerfield, A.Q. (1983). *Audio-Visual Speech Perception, lip reading, and Artificial Stimulation* : In M.E. Lutman, M.P. Haggard (Eds.). *Hearing Science and Hearing Disorders*. London: Academic Press.
14. Tyler, R.S. (1993). Ed. *Cochlear Implants- Audiological Foundations*. San Diego: Singular Publishing Group, Inc. (Chapters 4 & 5).
15. Balley, P. J. (1983). *Hearing for Speech: The Information Transmitted in Normal Impaired and Speech*. In M.E. Lutman and M.P., Haggard (Eds.), *Hearing Science and Hearing Disorders*. London: Academic Press.
16. Clark, G.M. Cowan, R.S.C. And Richard, C.D. (1997). *Cochlear Implantation for Infants and Children*. *Advances*, London: Singular Publishing Group, Inc.
17. Cooper, H. (1991). (Ed). *Cochlear implants- A practical guide*. London: Whurr Publishers Ltd.
18. De Filippo, C.L. (1982). *Tactile perception*. In D.G. Sims, G.C. Water and R.L. Whitehead. (Eds.). *Deafness and communication*. Baltimore: Williams & Wilkins.

19. Erber, N. P. (1982). Auditory Training. Washington D.C: A.G. Bell Association for the Deaf. (Chapter 2).
20. Ling D. (1976). Speech and the hearing impaired child - theory and practice. Washington: The Alexander Graham Bell Association for the Deaf.
21. Miller, J.L. and Eimas, P.D. (1995). (Eds.). Speech, language and communication. New York: Academic Press.
22. Bellis, T.J. (1996). Assessment and management of central auditory processing disorders in the educational setting - from science to practice. London: Singular Publishing Group, Inc.
23. Chermak, G.D. and Musiek, F.E. (1997). Central Auditory processing disorders - New Perspectives, San Diego: Singular Publishing Group, Inc.
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25. Valente, M (1996) Hearing Aid standards, options and limitations. New York: Thieme Medical Publishers, Inc.
26. Willeford, J. A., Burleigh, J.M. (1985). Handbook of CAPD in children. Orlando:Grune & Stratton Inc.
27. Studebaker, G.A. and Hochberg, I. (1993). Accoustical factors affecting hearing aid performance. 2<sup>nd</sup> Ed. Boston: Allyn & Bacon.
28. Summers R.I. (1992). Tactile aids for the hearing impaired. London: Whurr Publishers.
29. Valente, M. (1994). Strategies for selecting and verifying hearing aid fittings. New York: Thieme Medical Publishers.
30. Davis, J.M. and Hardick, E.J. (1981). Rehabilitative audiology for children and adults. Canada: John Wiley and sons, Inc.
31. Flexer, C (1994). Facilitating hearing and listening in young children. San Diego: Singular Publishing Group, Inc.
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33. Levitt, H, Pickett, J.M. and Houde, R.A. (1980). Sensory aids for the hearing impaired. New York: IEEE Press Inc.

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36. Sanders, A, D, (1982). Aural rehabilitation-A management model. 2<sup>nd</sup> Ed. New Jersey. Prentice-Hall, Inc.
37. Sandlin, E.R. (1994). Understanding digitally programmable hearing aids. Boston: Allyn & Bancon.
38. Sandlin, E. R. (Ed.). (1995). Handook of hearing aid amplification - Clinical considerations and fitting practices. Vol. II. San Diego: Singular Publishing Group, Inc.
39. Sandlin, E. R. (Ed.). (1995). Handbook of hearing aid amplification - theoretical and technical considerations Vol. I. San Diego: Singular Publishing Group, Inc.
40. Stokes, J. (Ed.). (2000). Hearing impaired infants: Support in the first 18 months London: Whurr publishers.
41. Clark, G.M. Cowan, B.S. and Dowell, R.C. (1997). Cochlear implantation for infants and children: Advances. San Diego:Singular Publishing Group, Inc.
42. Owens, E., Kessler, K.D. (Edrs.) (1989). Cochlear implants - in young deaf children. Boston: Little Brown & Co.
43. Narasimhan N.C. and Mukherjee, A.K. (1986). Disability - a continuing challenge, Bangalore: Wiley Eastern Ltd.
44. Pandey, R and Advani, L. (1995). Perspectives in disability and rehabilitation, New Delhi: Vikas publication house.
45. Status of the disability in India 2000, RCI Publications.

### **COUNSELING**

1. Testing and Assessment in Counselling Practice, 2<sup>nd</sup> Edition – Edited by – C. Edward Watkins, JR., Vieki L. Campbell. 2000 by Lawrence Erlbaum Associates, Publishers Mahwah, New Jersey, London.
2. Counselling People with Communication Problems – Peggy Dalton – 1994 – SAGE Publications, London, Thousand Oaks, New Delhi.
3. Introduction to Counselling and Psychotherapy. Edited by Stephen Palmer. 2000 First Publication, SAGE Publications, London, Thousand Oaks, New Delhi.
4. Introduction to Counselling Skills – Richard Nelson – Jones – 2000 SAGE Publications Ltd., London, Thousand Oaks, New Delhi.

## **CLINICAL PRACTICUM IN SPEECH-LANGUAGE PATHOLOGY**

### **Objectives:**

At the end of the year the student will be able to:

- 1) Handle special clinical population for group therapy.
- 2) Acquire proficiency in counseling clients and families.
- 3) Acquire skills in imparting information to student groups.
- 4) To develop skills in presentation of research papers.

### **Clinical Practicum Work:**

- 1) Plan and execute minimum of 5 group therapy sessions for any communication disordered group (aphasics / autistic / stutterers / voice disorders / hearing impaired toddlers).
- 2) To develop proficiency in planning and executing counseling / guidance sessions for groups of caregivers / clients.
- 3) To take up one specific topic as a teaching assignment for graduates.
- 4) To present a journal article in a students' forum.
- 5) To demonstrate ability to function as an independent clinician.

## **CLINICAL PRACTICUM IN AUDIOLOGY**

- 1) The operation of all the equipment's used for evaluation and calibration.
- 2) Thorough in administration and interpretation of all special tests.
- 3) Explanation of atypical findings and differentiation between artifacts and atypical findings
- 4) Trouble shoot the audiometer and ability to rectify independently.
- 5) Be familiar with recording and interpreting auditory evoked potentials such as MLR, LLR and P 3000 Evaluate and trouble shooting of hearing aids.

- 6) a) Be able to suggest ways of modifying electroacoustic output of hearing aids to suit the needs of the patient.  
b) Have knowledge in and assist in carrying out insertion gain measurement.
- 7) Counseling the client/parent/regarding home training/hearing aid care/speech reading and auditory training.
- 8) Trouble shooting of hearing aids. To apply knowledge of electroacoustics for classification of hearing aids and recommendation for different types of patients.

In addition to clinical examination, evaluation and management in terms of choice is specificity of the procedures used, they shall comply with the following specific requirements.

- 1) Preparing audio-cassettes for (i) increasing public awareness with respect to profession (ii) counseling of the case & or SOPs.
- 2) Comparison of behavioral and biophysical evaluation of hearing on two normal individuals and one each of conductive and sensori-neural loss.
- 3) Comparison of psychoacoustic and objective evaluations of hearing aids in two individuals (one child and one adult with hearing impairment).
- 4) Improving public awareness in the profession by paying visits to schools talking to X and XII Standard students regarding the profession and orienting other professional groups i.e. pediatricians neurologists, GP etc.
- 5) Screening programs in schools.
- 6) One detailed report (in a format for journal publication) in one of the following categories (I) Diagnostic (II) Hearing Aid Evaluation (III) Other Rehabilitative Management.

**APPENDIX A (1)**

**SCHEME OF CURRICULUM FOR FIRST YEAR POST GRADUATE COURSE**

Sr. No.	Subject Code	Subject	Credits (clock hours) (Minimum required)	Scheme of the Examination			
				Duration of the paper	Main Exam.	Marks I.A	Total Marks
1.	M 1.1.1	Advances in Speech Sciences.	75	3 hrs	80	20	100
2.	M 1.2.1	Perspectives in Fluency and Voice disorders.	75	3 hrs	80	20	100
3.	M 1.2.1	Psychophysics of Audition.	75	3 hrs	80	20	100
4.	M 1.2.2	Auditory Physiology.	75	3 hrs	80	20	100
5.	M 1.3.1	Linguistics in Clinical Practices/ Independent Projects	75	3 hrs	80	20	100
6.	M 1.3.2	Advance Statistics and Research Methods.	75	3 hrs	80	20	100
7.		Clinical Work (Speech Pathology)	250	Practical & Oral	100	100	200
8.		Clinical Work (Audiology)	250	Practical & Oral	100	100	200

## APPENDIX A (2)

### SCHEME OF CURRICULUM FOR SECOND YEAR POST GRADUATE COURSE

Sr. No.	Subject Code	Subject	Credits (clock hours) (Minimum required)	Scheme of the Examination			
				Duration of the paper	Main Exam.	Marks I.A	Total Marks
1.	M 2.1.3	Advances in Language Acquisition and Developmental Language Disorders.	75	3 hrs	80	20	100
2.	M 2.1.4	Advances in Adult Language Disorders.	75	3 hrs	80	20	100
3.	M 2.1.5	Clinical Phonology and Neuromotor Speech Disorders.	75	3 hrs	80	20	100
4.	M 2.2.3	Speech Perception.	75	3 hrs	80	20	100
5.	M 2.2.4	Seminar in Diagnostic Audiology	75	3 hrs	80	20	100
6.	M 2.2.5	Seminar in Management of the Hearing Impaired.	75	3 hrs	80	20	100
7.		Dissertation					
8.		Clinical Work (Speech Pathology)	250	Practical & Oral	100	100	200
9.		Clinical Work (Audiology)	250	Practical & Oral	100	100	200