

**BANGALORE UNIVERSITY**

**REGULATIONS AND SYLLABUS  
– SEMESTER COURSE from 2014**

**MASTERS OF AUDIOLOGY AND SPEECH –  
LANGUAGE PATHOLOGY (MASLP)**

## MASLP - Masters in Audiology and Speech Language Pathology

<b>Existing</b>		<b>Modified</b>
Internal Assessment marks – 20 Theory paper marks – 80 Total marks - 100		Internal Assessment marks – 30 Theory paper marks – 70 Total marks - 100
No Credit System		4 credits for Core Subjects 2 credits for softcore subjects 8 credits for Clinical Practicum
<b>I SEMESTER</b>		
SH 101	Statistics & Research methods	No Change
SH 102	Technology, Application and Instrumentation in Speech & Hearing	SH 102 is Speech Science & Production
SH 103	Speech, Language Processing	No Change
SH 104	Neuro-cognition and Language	SH 104 Auditory Physiology
SH 105	Speech Science and Production	SH 105 is Technology, Application and Instrumentation in Speech & Hearing ( <i><b>softcore subject</b></i> )
	No Paper	SH 106 Clinical Practicum a) Speech Language Pathology b) Audiology
<b>II SEMESTER</b>		
SH 201	Clinical Linguistics	SH 201 is Voice Disorders and Dysphagia
SH 202	Voice disorders and Dysphagia	SH 202 is Clinical Phonology and Motor Speech Disorders
SH 203	Psychophysics	No Change
SH 204	Auditory Physiology	SH 204 is Neuro Cognition and Language
SH 205	Clinical Practicum (Internal + External)	SH 205 is Clinical Linguistics ( <i><b>softcore subject</b></i> )
	No Paper	SH 106 Clinical Practicum a) Speech Language Pathology b) Audiology

<b>III SEMESTER</b>		
SH 301	Language Acquisition and Language Disorders in Children.	SH 301 Fluency Disorders
SH 302	Clinical Phonology and Motor Speech Disorders	SH 302 is Language Acquisition and Language Disorders in Children.
SH 303	Speech Perception and its Disorders	No Change
SH 304	Diagnostic Audiology	No Change
SH 305	Hearing Devices	SH 305 Clinical Practicum a) Speech Language Pathology b) Audiology
<b>IV SEMESTER</b>		
SH 401	Adult Language Disorders	No Change
SH 402	Fluency Disorders	SH 402 Hearing Devices
SH 403	Advances in Management of Persons With Hearing Disorders	No Change
SH 404	Dissertation	No Change
SH 405	Clinical Practicum (Internal + External)	SH 305 Clinical Practicum a) Speech Language Pathology b) Audiology

## **RULES REGULATIONS AND NORMS FOR MASLP**

### **1.0 Courses offered and duration of the course**

1.1 MASLP (Masters in Audiology and Speech Language Pathology)

1.2 Duration of the course: 4 Semesters / 2 years

**Note:** Each semester shall extend over a minimum period of sixteen weeks.

### **2.0 Eligibility for admission**

2.1 Candidates with a BASLP/BSLPA/B.Sc (Speech and Hearing) degree of any recognized University are eligible for admission to the course with 50%.

2.2 There is no upper age limit for admission to the course.

2.3 Admission shall be made on the basis of university norms

### **3.0 Scheme of Instruction**

3.1 The detailed scheme of examination and paper titles are as given in **Annexure – I**.

3.2 Dissertation in the IV semester shall be in lieu of a paper.

3.3 The syllabus of every paper shall as far as possible, be divided in to five units.

3.4 Candidates shall attend camps/extension programs/educational tour conducted by the institution.

3.5 Hours of instruction (contact hours) per week

Theory: 4 hours per subject per week and soft core subject for 3 hours/per week

Practical: I Year-16 hours per week

II Year-16 hours per week

### **4.0 Attendance**

4.1 Each candidate must have minimum 75% 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 semester and candidate will have to repeat the semester i.e. both theory and clinical practicum in toto.

4.2 If a candidate represents his/her Institution in Sports/NSS/Cultural or any official activities, he/she is permitted to avail to a maximum of 30 days in an academic year based on the recommendation and prior permission of the Head of the Institution.

## **5.0 Medium of Instruction**

5.1 Medium of instruction shall be English.

## **6.0 Appearance for the Examination**

6.1 Candidates on satisfactorily completing a semester shall apply for the examination in all papers prescribed for that semester.

## **7.0 Scheme of Examination**

7.1 There shall be a University Examination at the end of each semester.

7.2 Duration of examination of theory paper of 70 marks shall be for 3 hours.

7.3 In case of theory paper the internal assessment will be for 30 marks, assessed through tests, seminars and other assignments.

## **7.4 Clinical Practicum**

7.4.1 The clinical practicum examinations shall be in the main subjects of study, i.e., in Audiology and Speech-Language Pathology

7.4.2 Clinical practicum is part of all the semesters. Internal assessment and Clinical Practicum examination with respect to all semesters shall be conducted at the end of each semester.

7.4.3 Break up of marks of clinical practicum shall be as follows:

(a) 100 marks are allotted for internal assessment which is awarded on the basis of continuous evaluation of the clinical work of the candidate by the faculty of the departments

(b) 100 marks for Clinical Practicum examination conducted by an External and Internal examiner who shall examine the candidates' clinical skills.

## **7.5 Dissertation work**

7.5.1 There shall be 100 marks for dissertation work. Evaluation of Dissertation shall be similar to that of theory papers

7.5.2 The candidates shall submit four copies of dissertation before the commencement of theory examination of that semester. Candidates who fail to submit their dissertations on or before the stipulated date shall not be permitted to appear for the final semester examination.

## **8.0 Board of Examiners, Valuation**

As per University norms

**9.0 Classification of successful Candidates**

9.1 Minimum for a pass in each paper shall be 40% (exam. proper and internal assessment put together) and 50% in aggregate in each semester.

**10.0 Provisions for Repeaters**

As per University norms

**11.0 Award of Grace marks**

As per University norms

**Annexure – 1**  
**MASLP (Audiology & Speech Language Pathology) Semester Scheme**  
**Scheme of Examination**

Sem No	Paper No.	Title of the Paper	No. of Hrs per week	Exam Duration (in Hrs)	Marks for			Credits
					IA	Theory	Total	
I Sem Core Subjects	SH 101	Statistics & Research Methods in Speech Language and Hearing	4	3	30	70	100	4
	SH 102	Speech Science & Production	4	3	30	70	100	4
	SH 103	Speech Language Processing	4	3	30	70	100	4
	SH 104	Auditory Physiology	4	3	30	70	100	4
Soft Core	SH 105	Technology Application & Instrumentation in Speech Hearing	3	3	30	70	100	2
Clinical Practicum	SH106	Clinical Practicum a) Speech language Pathology b) Audiology	16	6	50 50	50 50	200	8
					<b>250</b>	<b>450</b>	<b>700</b>	<b>26</b>
II Sem Core Subjects	SH 201	Voice Disorders & Dysphagia	4	3	30	70	100	4
	SH 202	Clinical Phonology & Motor Speech Disorders	4	3	30	70	100	4
	SH 203	Psychophysics	4	3	30	70	100	4
	SH 204	Neuro Cognition & Language	4	3	30	70	100	4
Soft Core	SH 205	Clinical Linguistics	3	3	30	70	100	2
Clinical Practicum	SH 206	Clinical Practicum a) Speech language Pathology b) Audiology	16	6	50 50	50 50	200	8
					<b>250</b>	<b>450</b>	<b>700</b>	<b>26</b>
III Sem Core Subjects	SH 301	Fluency Disorders	4	3	30	70	100	4
	SH 302	Language Acquisition & Language Disorders in Children	4	3	30	70	100	4

	SH 303	Speech Perception and its Disorders	4	3	30	70	100	4
Elective	SH 304	Diagnostic Audiology	4	3	30	70	100	4
Clinical Practicum	SH305	Clinical Practicum a) Speech language Pathology b) Audiology	16	6	50 50	50 50	200	8
					<b>220</b>	<b>380</b>	<b>600</b>	<b>24</b>
Sem No			No. of Hrs per week	Exam Duration (in Hrs)	Marks for			Credits
	Paper No.	Title of the Paper			IA	Theory	Total	
IV Semester Core Subjects	SH 401	Adult Language Disorders	4	3	30	70	100	4
	SH 402	Hearing Devices	4	3	30	70	100	4
	SH 403	Advances in Mgmt of persons with Hearing Disorders	4	3	30	70	100	4
	SH 404	Dissertation	8	3	30	70	100	4
	SH 405	Clinical Practicum a) Speech language Pathology b) Audiology	16	6	50 50	50 50	200	8
					<b>220</b>	<b>380</b>	<b>600</b>	<b>24</b>

**Course content as stipulated by Rehabilitation Council of India, New Delhi**



**MASLP (Masters in Audiology and Speech Language Pathology)**

Subjects	Paper	Instructions hrs/week	Duration of Exam (Hrs)	Marks			Credits
				IA	Exam	Total	
<b>a) I/II Semester of the Postgraduate Program</b>							
Core Subjects	4T	4x4	4x3	4x30	4x70	4x100	4x4
	Clinical Practicum	1x16	1x6	1x100	1x100	1x200	1x8
Soft Core	1T	1x3	1x3	1x30	1x70	1x100	1x2
<b>Total of credits per semester</b>							<b>26</b>
<b>b) III Semester of the Postgraduate Program</b>							
Core Subjects	3T	3x4	3x3	3x30	3x70	3x100	3x4
	Clinical Practicum	1x16	1x6	1x100	1x100	1x200	1x8
Elective/Open Elective	1T	1x4	1x3	1x30	1x70	1x100	1x4
<b>Semester Total of Credits</b>							<b>24</b>
<b>c) IV Semester of the Postgraduate Program</b>							
Core Subjects	3T	3x4	3x3	3x30	3x70	3x100	3x4
	Clinical Practicum	1x16	1x6	1x100	1x100	1x200	1x8
	Project work	8	Dissertation Evaluation	1x30	1x70	1x100	1x4
<b>Semester Total of Credits</b>							<b>24</b>
<b>Program Grand Total of Credits</b>							<b>100</b>

## I SEMESTER

### SH 101 STATISTICS AND RESEARCH METHODS IN SPEECH-LANGUAGE AND HEARING

(30+70 marks)

(52 Hours)

#### 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 Hours)

- 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

(10 Hours)

- Theory of probability – principles and properties of normal distribution – binominal 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

(10 Hours)

- 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**

**(10 Hours)**

- 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**

**(10 Hours)**

- 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.
- Ethical issues of research (UNCRPD article 31)

## LIST OF BOOKS

### **SH 101 STATISTICS AND RESEARCH METHODS IN SPEECH-LANGUAGE AND HEARING**

Hegde, M. N. (2006). Clinical Research in Communicative Disorders [2<sup>nd</sup> Edition] Principles and strategies. Singular Publishing.

Mary & Grace. Introduction to Clinical Research in Communication Disorders.

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

Maxwell, D. L., & Satake, E. (1997). Research and Statistical Methods in communicative disorders. Baltimore: Williams and Wilkins.

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

Portney, L.G. and Walkins, M. P. (1993). Foundations of Clinical Research. Connection: Appleton and Lange. ISBN 0-8385-1065-5

Woods, A. Fletcher, P and Hughes, A (1986). Statistics in Language Studies. Cambridge: University Press ISBN 0-521-253268.

## **SH 102 SPEECH SCIENCE AND PRODUCTION**

**(30+70 marks)**

**[52 Hours]**

### **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 Hours)**

- 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**

**(10 Hours)**

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

### **UNIT 3**

**(10 Hours)**

- 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**

**(10 Hours)**

- 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**

**(10 Hours)**

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

**LIST OF BOOKS**  
**SH 102: SPEECH SCIENCE AND PRODUCTION**

Baer, T et al., (Eds) (1991). Laryngeal function in phonation and respiration. Singular Publishing Group, San Diego.

Baken, R.J and Daniloff, R.G. (1991). Reading in Clinical spectrography of speech. Singular Publishing Group, San Diego.

Code, C. & Ball, M. (1984). Experimental Clinical Acoustics. College Hill Press. Houston.

Kent, R.D., & Read, C. (1992). Acoustic analysis of speech. Singular Publishing Group, San Diego.

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

Kent R.D & Read C 1995. The acoustic analysis of speech, A.I.T.B.S Publishers & Lass, N.J (1976). Contemporary issues in experimental phonetics. Academic Press, New York.

Liberman, P., & Blustein, S. ( 1988). Speech Physiology, speech perception and Acoustic phonetics. Cambridge University press. Cambridge.

Murry, T. & Murry, J (1980). Infant communication: Cry and early speech. College – Hill Press, Houston.

Nolon, F. (1983). The phonetic basis of speaker recognition. Cambridge. University press, Cambridge.

Potter, R.K., Kopp, G.A., & Green, H.G. (1966). Visible speech. Dover Publications, New York.

## SH 103 SPEECH LANGUAGE PROCESSING

**(30+70 marks)**

**(52 Hours)**

### Objectives

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

### UNIT 1

**(12 Hours)**

- 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

**(10 Hours)**

- 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

**(10 Hours)**

- 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, Neighbourhood activation model.

### UNIT 4

**(10 Hours)**

- 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, accounts of parsing, parsing issues, and ambiguity in parsing, strategies for disambiguation. Reference and anaphora. Discourse comprehension and expression.

## UNIT 5

(10 Hours)

- 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.

Arbib, M.A., Caplan, D., & Marshall, J.C., (Ed) (1982). *Neural Models of Language Processes*, Academic Press, New York.

Durrand, J., and Laks, B., (Ed) (1999). *Phonetics, Phonology and Cognition*. Oxford University press, US.

Hardcastle, W.J., & Laver, J., (Ed) (1999). *The Handbook of Phonetic Sciences*. Blackwell Publishers, Oxford.

Kroeger, R.P., (2004). *Analyzing Syntax*. Cambridge University Press, UK.

O' Shaughnessy, D., (2<sup>nd</sup> Edition) (2001). *Speech Communication, Human and Machine*. Universities Press, India.

Saeed, I.J., (1997). *Semantics*. Blackwell Publishers, Massachusetts.



## SH 104 AUDITORY PHYSIOLOGY

(30+70 marks)

(52 Hours)

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

(10 Hours)

- 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, repair, regeneration & protection
- Proteins in the cochlea
- Pathophysiology & perception

- Repair, regeneration, protection in the cochlea
- Theories of hearing
  - Historical aspects
  - Place theory – resonance & non-resonance
  - Frequency theory

**UNIT 3 – Auditory nerve**

**(10 Hours)**

- 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 - Brain stem**

**(10 Hours)**

- 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 – Auditory cortex**

**(10 Hours)**

- 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 104 AUDITORY PHYSIOLOGY**

Berlin C.I; Weyand T.G (Eds) 2003 – The Brain & sensory plasticity: Language acquisition and hearing. Thomson/Delmer Learning

Bellies T.J 2003 – Assessment & Management of central auditory processing disorders in the educational setting from science to practice. Singular Publishing Group. USA

Ehret G. Romand R (Eds) 1997: The central auditory system. Oxford University Press, New York

McPherson D.L 1996 – Late potentials of the auditory system. Singular Publishing Group. Inc

Palmer A.R; Rees A; Summerfield A Q; Meddis R (Eds) 1998, Psychophysical & Physiological advances in hearing. Whurr Publishers Ltd, London

Parks T.N; Rubel E.W; Fay R.R; Popper A.N (Eds) 2004. Plasticity of the auditory system. Springer, New York

Popper A.N; Fay R.R (Eds) 1992: The mammalian auditory pathway: Neurophysiology. Springer – Verlag, N.Y.

Rerben E.W; Popper A.N; Fay R.R (Eds) 1998. Development of the Auditory System. Springer – Verlag, N.Y.

Sahley T.L; Nodar R.H; Musiek F.E 1997, Efferent auditory system structure and function - Singular Publishing Group. USA

Syka. J(Ed) 1997 – Acoustical signal processing in the central auditory system  
Plenum Press

Wada. H; Tukasade T; Ikeda. K; Ohyama K; Koiki T (Eds) 2000. Recent developments in auditory machines World Scientific Publishing Co.

Webster D.B; Popper A.N; Fay R.R (Eds) 1992. The Mammalian Auditory Pathway – Neuroanatomy Springer – Verlag, N.Y

Auw. W.L., Popper.A.N. Fay.R.R (Ed) 2000: Hearing by whales & Dolphins.  
Springer- Venlag, New York, USA.

Berlin.C.I. (Ed) 1996: Hair cells & Hearing aids, Singular Publishing group. Inc.USA.

Bekey.G.V. (1960): Experiments in hearing McGraw-Hill Book Company.

Dallos.P. Popper.A.W., Fry.R.R (Ed) 1996: The Cochlea, Springer-Venlag, New York, USA.

Davis (1990): Hearing, Washington University.

Durant, J.D & Lovrinic.J.H (1977): Bases of hearing Sciences. Williams & Wilkins

**SH 105: TECHNOLOGY - APPLICATION AND INSTRUMENTATION IN  
SPEECH & HEARING**

**(30+70 marks)**

**(42 Hours)**

**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: Fundamentals of electronics and computers**

**(10 Hours)**

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: Fundamentals of Digital Signal processing and communication system (8 Hours)**

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 processing
2. Principles of digital signal processing
  - 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 processing and analysis**

**(8 Hours)**

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.
    - Speaker recognition system and speech recognition system
    - Speech synthesis methods

**UNIT 4: Biomedical signals and signal processing**

**(8 Hours)**

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 application
  - Common mode rejection, artifact rejection, filtering, signal averaging, etc.
  - Addition and subtraction of waves

**UNIT 5: Advanced technology for speech language disorders**

**(8 Hours)**

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 organization 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 105 TECHNOLOGY - APPLICATION AND INSTRUMENTATION IN SPEECH & HEARING

- Ainsworth, W.A. (1988). Speech recognition by machine, London Peter Pen prints
- Ainsworth W. A. (Ed.). (1990). Advances in Speech, Hearing and Language Processing Research Annuals: Vol. 1, London, Jaipress
- Baber. C., & Noyes. J. M. (1993). Interactive Speech Technology Human latest technique with Application of Speech input output to computers. London Taylor and Francis
- Bapat (1993). Electronic circuits and syntax, New Delhi: Mc. Graw Hill
- Beraneck (1954). Acoustical Engineering, New York: Mc. Graw Hill
- Daniloff. R. G. (1985). Speech Sciences: Recent advances. London: Taylor and Francis
- Gottingen. M. R. S. (Ed.). (1985). Speech and Speaker Recognition, Basel: Kager
- Greme (1973). Application of Opamps. New York: Mc. Graw Hill
- Grob (1982). Electronic circuits and applications. London: Mc. Graw Hill
- Hall. Microprocessor and interfacing programming hardware. New Delhi: Mc. Graw Hill
- Hall. J. W. (1992) Handbook of Auditory evoked responses. Masschusettes Allyn & Bausen
- Haton. J. P. (Eds) (1981) Automatic speech analysis & Recognition. USA. D. Reidel Publishing Company
- Hawley. M. E. (1977) Speech intelligibility & Speaker Recognition. Pennsylvania Dowden Hutchinson & Ross Inc.
- Hillburn (1973). Manual of active filter design. New York Mc. Graw Hill
- Jacobson, J. T (Ed) (1994) Auditory brainstem response. Taylor & Francis. London
- Johnson (1992) Introduction to digital signal processing. New Delhi. Mc Graw Hill
- Johnson K & Mullenmin. J. W. (Eds) (1997) Talker Variability in Speech processing San Diego: Academic Press.
- Jowens, F. (1993) Signal processing of speech. The Macmillan Press. Ltd.

Keller. E (Ed) (1994) Fundamentals of Speech Synthesis and Speech Recognition Basic concepts. State of the and future challenges, New York. John Wiley & Sons.

Kingsler & Fray (1962) Fundamentals of Acoustics. New York

Malvino. A. P. (1979) Electronic principles, New Delhi. Tata McGraw Hill

Markowitzm, J. A. (1996) Using Speech Recognition. New Jersey: Prentice Hall

Mathur (1980) Electronic devices. Application and integrated circuits. Delhi: Delhi –Umesh Publications

Mathur (1992) Introduction to Microprocessor. New Delhi: Tata McGraw Hill

Millman. II (1972) Integrated Electronics. Tokyo McGraw Hill

Morgan D. P. & Scofield C.I (1991) Neural Networks and Speech processing. Boston. Kluwer Academic Press.

Nakagawa. S & etal (1995) Speech, Hearing and Neural Network Models. Oxford: IOS. Press

Nolon, F (1983) The phonetic basis of Speaker recognition; Cambridge. Cambridge University Press

Oppenheim & Schaffer (1989) Digital signal processing. New Delhi. Prentice Hall of India

Potter. R. R. Kopp G. A. & Green. H. G. (1966) Visible Speech. New York. Dover Publications.

Rabinet, L. R. & Schaffer. R (1978) Digital processing of speech signals. New Jersey. Prentice Hall Inc.

Rabinet & Gold (1989) Theory & applications of digital signal processing. New Delhi. Prentice Hall of India.

Rabinette, M. S. & Slanke. L. L. (Eds) (1997) Otoacoustic emissions. Clinical applications Thicme, New York

Ryder (1978) Electronic fundamentals and applications. Integrated and discrete systems. New Delhi. Prentice Hall of India.

Sanders D. A. (1993) Management of the hearing handicapped from infants to elderly. Prentice Hall inc. NJ

Sawashuma M & Cooper E. S. (1977) Dynamic aspects of speech production. Japan University of Tokyo Press

Shansessy W. D. Computers in communication disorders.

## **SH 106: CLINICAL PRACTICUM – I SEMESTER**

### **SPEECH LANGUAGE PATHOLOGY**

**(50+50 marks)**

1. Should be able to carry out informal and formal assessments for various aspects of language like phonology, syntax, semantics, pragmatic and plan therapy.
2. Should be able to carry out assessment and therapy for various disorders for fluency including transcription and acoustic and acoustic analysis of dysfluent speech
3. Should be able to analyze perceptually various disorders of Suprasegmentals using rating scales and acoustically transcribe them appropriately.
4. Research Proposal submission on any speech language disorders in clinics and case discussions.

### **AUDIOLOGY**

**(50+50 marks)**

1. To give practical basis for interpretation of test results and test battery approach in different conditions
2. To test minimum 10 pediatric population using various test batteries available (VRA, BOA and other physiologic tests)
3. To test in 5 difficult to test population



**II SEMESTER**  
**SH 201 VOICE DISORDERS AND DYSPHAGIA**

**(30+70 marks)**

**(52 Hours)**

**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 Hours)**

- 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**

**(10 Hours)**

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 assessing 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 using instruments)
- Measurement of vocal fold vibration - invasive procedures - stroboscopy, videokymography; noninvasive procedures - EGG, inverse filtering.

**UNIT 3**

**(10 Hours)**

- 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.
- Medical & surgical intervention in voice disorders (botox, Teflon injection, collagen tissue, phonosurgery).
- Voice rehabilitation: Principles, types of approaches, environmental modifications, psycholinguistic & holistic approaches, quality of life, estimate studies.

#### **UNIT 4**

**(10 Hours)**

- 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**

**(10 Hours)**

- 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 201 VOICE DISORDERS AND DYSPHAGIA**

Vocal Fold Physiology – Frontiers in Basic Science [1993]. Titze, I.R. [ed] San Diego: Singular Publishing Group, Inc.

Principles of Voice Production [1994] Titze, I. R. NJ: Prentice Hall, Inc.

Neurolaryngology: Recent Advances [1991] Hirano, M. Kirchner, J. A. and Bless, D. M. {Eds] California: Singular Publishing Group, Inc.

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.

Medical Speech-Language Pathology – A Practitioner’s Guide [1998] Johnson, A. F. and Jacobson, B H NY: Thieme, Inc.

Clinical Measurement of Speech and Voice [1996] Baken, R J California: Singular Publishing Group, Inc.

Professional Voice – The Science and Art of Clinical Care [1991] Sataloff, R T NY: Raven Press.

Clinical Manual for Laryngectomy and Head and Neck Cancer Rehabilitation [1993]. Casper, J. K. and Colton, R. H. California: Singular Publishing Group, Inc.

Atlas of Laryngoscopy [2007]. Sataloff. R. T. Eller, R. T. and Hawkshaw, M. California: Plural Publishing, Inc.

Voice and Voice Therapy [2005] Boone, D R Mc Farlane S C and Von Berg S. L Boston: Allyn and Bacon.

Laryngeal Electromyography [2006] Satalof, R. T. Mandel S, Abaza, M California: Plural Publishing, Inc.

Vocal Care in Medical Setting [1997] Koschkee, D. L. Rammage, L. California: Plural Publishing Group, Inc.

**DYSPHAGIA**

Bruce E Murdoch, Deborah G Theodoros, 2001, Traumatic Brain Injury: Associated Speech Language and Swallowing Disorders, Singular Publishers.

Michael E Groher, 1992, Dysphagia: Diagnosis and Management, 2<sup>nd</sup> Edition, Butterworth – Heinemann, USA.

Kim Coxbin – Lewis, Julie M Liss, Kellie L, Sciortino 2005, Clinical Anatomy and Physiology of the swallow mechanism, Thomson Delmar Learning, USA.

## **SH 202 CLINICAL PHONOLOGY AND MOTOR SPEECH DISORDERS**

**(30+70 marks)**

**(52 Hours)**

### **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 Hours)**

- 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.
- \* Phonological process and phonological awareness, articulation disorders in individuals with cleft lip and palate

### **UNIT 2**

**(10 Hours)**

- Application of phonological theories in evaluation and management of phonological disorders
- Metaphon theory and therapy
- Management of co-articulation in speech disorders and remediation, management of articulation in individuals with cleft lip and palate.
- Treatment practices – Traditional & Phonological intervention.
- Motor vs cognitive learning

### **UNIT 3**

**(10 Hours)**

- 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**

**(10 Hours)**

- Recent advances in diagnosis, assessment and management of Dysarthria (child and adult).

#### **UNIT 5**

**(10 Hours)**

- Recent advances in diagnosis, assessment and management of Apraxia.
- Future needs in treatment outcome efficacy research in motor speech disorders.
- AAC overview, Merits and demerits of various system.
- AAC intervention

### **LIST OF BOOKS**

#### **SH 202 - CLINICAL PHONOLOGY AND MOTOR SPEECH DISORDERS**

Perspectives in applied phonology. (1997). Hodson, B.W and Edwards, M.L. Mayland: An Aspen Publication.

Clinical phonology. Assessment of articulation disorders in children and adults. (1996) Klein, E.S. California: singular publishing group Inc.

Phonological theory and the misarticulation child. ASHA monographs. (1984). ( number 22 Ed) Elbert, M Dinnsen, D.A. and Weismer, G.

Phonological disability in children (2<sup>nd</sup> edition) studies in disorders of communication. (1989) Ingram. Cole and Whurr Limited.

Clinical management of motor speech disorders in children. (1999). Caruso. F.J. and Strand, E.A. New York: Thieme.

Motor speech disorders – A treatment guide. (1991). Dworkin, P.J. St. Louis: Mosby Year Book. Inc.

Clinical management of Neurogenic communication disorder. (1985). Johns, D.E. Boston: Allyn Bacon.

Motor speech disorders: substrates, Differential diagnosis and management. (1995). Duffy, J.R. St. Louis: Mosby

Neuromotor speech disorders – nature, assessment and management. (1998). Cannito, M.P., Yorkston, K.M. and Beukelman, D.R.

Evaluation and treatment of swallowing disorders. (1983). Logemann, J.

Medical Speech Language Pathology: a practitioner's Guide. (1998). Johnson, A.F. and Jacobson, B.H. NY: Thieme

## SH 203 – PSYCHOPHYSICS

**(30+70 marks)**

**[52 Hours]**

### 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 Hours)**

- Theory of signal detection,
- Concept and application including ROC  
Methods in psychophysics- classical & adaptive
- MAP & MAF, application to calibration, underwater hearing, 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

**(10 Hours)**

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

### UNIT 3

**(10 Hours)**

- 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**

**(10 Hours)**

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**

**(10 Hours)**

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
- Clinical application

## LIST OF BOOKS

### SH 203 PSYCHO PHYSICS

- Yost, WA & Neilson DW – “Fundamentals of Hearing” Holt Rinehart & Winston 1977
- Yost; W.A Popper A. N, Fay R.R – “Human Psychophysics” – Springer Verlag – 1993
- Gelfand. S A “Hearing, An Introduction to Psychological & Physiological acoustics”  
Marcel Dekker Inc. 1990 & 1981
- Pickles, J.O “An Introduction to the physiology of hearing” Academic Press London,  
1984
- Zwicker E. Fastl H. “Psychoacoustics – Facts & Models” Springer – 1999
- Durrant – Lovrinic 1997 “Basics of Hearing Sciences” – Williams & Wilkins 3<sup>rd</sup> Edition
- Maore B C J (Eds) 1995 Hearing – Academic Press, San Diego
- Gullick W.C 1971. Hearing Physiology & Psychophysics, Oxford University Press N.Y
- Palmer A.R. Rees A, Summerfield AQ Meddis K “Psychophysical and physiological  
advances in hearing – Whurr Publication 1998
- Syka Joel. “Acoustical Signal Processing in the Central Auditory System” Plenum Press  
1997.
- Bekersy G.Von “Experiments in Hearing” Mc Graw Hill 1960
- Hanghton Piter “Acoustics for Audiologists” Academic Press 2002
- Warren R.M 1999. Auditory Perception-A new Analysis and synthesis U  
Rosenthal DF & Okiano H G “Computational Auditory Scene Analysis” Lawrence  
Erlbaun Associates, Publishers 1998.
- Hawkins H L, Mc Muller TA, Popper A N, Fay R R “Auditory Computation” Springer  
Verlag 1996.
- Yost “Directional Hearing” – Wiley 2000
- Hirsh S K, Eldredge DH, Hirsh F J & Silverman R. “Hearing & Davis”. Washington  
University Press 1976. K: Cambridge University Press, U.K.



**SEMESTER II**  
**SH 204 NEURO-COGNITION AND LANGUAGE**

**(30+70 marks)**

**(52 Hours)**

**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: Neuroanatomical correlates**

**(12 Hours)**

- 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: Neurophysiological correlates**

**(10 Hours)**

- 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 multilinguals.

**UNIT 3 – Neurological investigative procedures**

**(10 Hours)**

- 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: Neurobiology of Ageing**

**(10 Hours)**

- 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: Neurocognition**

**(10 Hours)**

- Neurocognitive models
  - Role of attention and memory – STM, LTM
  - Other processes – Abstraction, Reasoning, Logical aspects, organization, planning and executive processes
  - Assessment:- formal and informal, tests of cognitive processes with reference to language function in children and adults, tests, scale and profiles of assessment
  - Children – tests of everyday attention, stroops, digit span paced signal attention, Ross Information, processing assessment, cognitive, linguistic protocol
  - Software for cognitive assessment, ITPA
- 
- Adult (attention, letter or colour cancellation, letter discrimination)
  - Memory (Digit forward, backward)
  - Naming, problem solving, organization
- 
- Cognitive linguistic quick test
- Clinical evaluation of language function (PPVT, WAIS, PICA, etc)
- Tests for cognitive prerequisite for language function
- 
- Cognitive linguistic assessment protocol

## LIST OF BOOKS

### SH 204: NEURO-COGNITION AND LANGUAGE

Arbib,M.A., Caplan,D., & Marshall, J.C., ( Ed) ( 1982). Neural Models of Language Processes, Academic Press, New York.

Gerber,S.E., ( ED) ( 1995). The Handbook of Genetic Communicative Disorders. Academic Press, California.

Kirshner, S.H., (ED) ( 1995). Handbook of Neurological Speech And Language Disorders. Marcel Dekker Inc, New York.

Kolb,B & Wishaw,Q.I., ( W.H. Freeman & Company). Fundamentals of Human Neuropsychology.

Kuehn, Lemme, & Baumbartner,( Ed) (1989). Neural Bases of Speech, Hearing, and Language. Bodton, College-Hill Press.

Lecours, A. et al., (1982). Aphasiology. Tindall.London.

Miller,J.L., & Eimas, P.D., ( Ed) ( 1995). Speech, language and Communication. Academic Press, New York.

Ripich.D.,( Ed) ( 1991). Handbook of Geriatric Communication Disorders. Pro-ed Inc, Texas.

Stevenson,R.E., Schwartz ,C.E., & Shroer,R.J.,( 2000).X-Linked Mental Retardation. Oxford University Press, New York.

Whitaker, A.H., & Stemmer, B., (Ed) (1998) Handbook of Neurolinguistics. Academic Press, US.

## SH 205 CLINICAL LINGUISTICS

**(30+70 marks)**

**(42 Hours)**

### 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

**(10 Hours)**

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

### UNIT 2

**(8 Hours)**

- 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

**(8 Hours)**

- 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

**(8 Hours)**

- 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

**(8 Hours)**

- 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 205: CLINICAL LINGUISTICS**

Crystal,D.,(1981). Clinical Linguistics. Wien, Springer-Verlag.

Geoffrey Finch (1997) How to Study Linguistics. Palgrave Macmillan

Grundy,K.,(1981).Linguistics in Clinical practice. Whurr Publishers Ltd. London.

Grunwell,O.,(1975).The Phonological Analysis of Articulation Disorders. BJDC,10,31-42.

Lawrence D Shriberg & Raymong D Kent ( 2003).Clinical Phonetics .Pearson Education Inc.

Perkins,M., & Howard,S.,(ED) ( 1995). Case Studies In Clinical Linguistics. Whurr Publishers Ltd. London.

Reni Dirven & Marjolijn Verspoar. Cognitive Exploration of language & Linguistics (2004).John Benjamin Publishing Company.

Ziegler,W., & Deger,K.,(1998). Clinical Phonetics and Linguistics. Whurr Publishers Ltd. London.

Whitaker, A.H., & Stemmer, B., (Ed) (1998) Handbook of Neurolinguistics. Academic Press, US.

## **SH 206 CLINICAL PRACTICUM – II SEMESTER**

### **SPEECH LANGUAGE PATHOLOGY**

**(50+50 marks)**

1. Should be able to analyze perceptually, acoustically & physiologically different voice disorders
2. Use of instruments for analysis like LTAS, Cepstral etc.
3. Able to correlate acoustic & perceptual findings with stroboscopy and IDL results
4. Analyze aerodynamic parameters of voice and plan therapy
5. Plan and execute therapy for voice disorder due to Laryngectomy independently.

### **AUDIOLOGY**

**(50+50 marks)**

1. To test minimum 10 clients with cochlear hearing loss using special test and test battery approach.
2. To test minimum 10 clients with Retro Cochlear Pathology with special test and test battery approach
3. To prescribe and set hearing aid for atleast 10 clients (5 children/5 adults) as per their hearing needs.

**III SEMESTER  
SH 301 FLUENCY DISORDERS**

**(30+70 marks)**

**(52 Hours)**

**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 Hours)**

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

**UNIT 2**

**(10 Hours)**

- 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**

**(10 Hours)**

Nature, characteristics, differential diagnosis, and current status of:

- Normal Non fluency
- Cluttering
- Neurogenic stuttering
- Drug-Induced stuttering

**UNIT 4**

**(10 Hours)**

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

**UNIT 5**

**(10 Hours)**

- 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 out come measures of stuttering therapy

## **LIST OF BOOKS**

### **SH 301: FLUENCY DISORDERS**

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



## SH 302

### LANGUAGE ACQUISITION AND LANGUAGE DISORDERS IN CHILDREN

(30+70 marks)

(52 Hours)

#### 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

(10 Hours)

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

(10 Hours)

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, ADHD (language development in all disorders in terms of linguistic, pragmatics, prosody, behavioural and literacy characteristics).

#### UNIT 3

(10 Hours)

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

#### UNIT 4

(10 Hours)

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

#### UNIT 5

(10 Hours)

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

## **LIST OF BOOKS**

### **SH 302**

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

Intervention Planning for Children with Communication Disorders – A Guide for clinical practicum and professional practice (1994). Prentice – Hall, Inc. New Jersey.

Cross Cultural Perspective in Language Assessment and Intervention. Topics in Language Disorder series. Butler, K.G. (1994). U.S.A.: Aspen Publication.

Differential Diagnosis in Speech Language Pathology – Philips, B.J. and Scello, D. (1998). Butterworth- Heinemann,

Language Development in Exceptional Circumstances. Bishop, D and Mogord, K. (EDs.) (1993). U.K.: Erlbaum Associates Ltd., Publishers

Language Disorders: A functional Approach to Assessment and Intervention. Owens, R.E. (Jr.) (1991). U.S.A.: Macmillan Publishing Company

Development disorders of language (2<sup>nd</sup> ed.) Adams, c., Browns, B and Edwards, M (1999). London: Whurr Publishers Ltd.

Evaluating Theories of Language - Evidence from disordered communication. Dodd, B., Campbell. R. and Worrall, L (Eds). (1996). London: Whurr Publishers.

Childhood language disorders in contest – infancy through adolescence. Allyn and Bacon, Boston. Nelson, N.W. (1998).

## SH 303 SPEECH PERCEPTION AND ITS DISORDERS

(30+70 marks)

(52 Hours)

### 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

(10 Hours)

- 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

(10 Hours)

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

(10 Hours)

1. Perception of vowels, semivowels, and diphthongs in individuals with hearing impairment
2. Perception of consonants in individuals with 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
5. Dichotic listening- Theories, Factor affecting, Clinical application
6. 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**

**(10 Hours)**

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**

**(10 Hours)**

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.
3. Combined effect of noise and reverberation
4. Effect of non-native accent on speech perception
5. 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,
6. Animal versus human perception.

## LIST OF BOOKS

### SH 303 SPEECH PERCEPTION AND ITS DISORDERS

Ainsworth W.A(1976) Mechanism of Speech Recognition, International series in natural philosophy. Vol. 85, Oxford: Pergamon Press

Ainsworth W.A(1990) Advances in Speech, hearing and language processing Vol. 1, London Jai Press Ltd.

Berlin C(1984) (Ed.) Hearing Science. San Diego: College-Hill Press

Borden G.J and Harris K.S(1980). Speech Science primer: Physiology, acoustics and perception of speech, London: Williams and Wilkins

Cohen,A & Nooteboom, S.G (Eds) (1975) Structure and process in speech perception. New York: Springer-Verlag

Clark G.M, Cowan R.S C and Richard C D(1997) : Cochlear Implantation for infants and Children –Advances, Singular publishing Group, London.

Fant , G; Speech acoustics Phonetics – Klumer Academic Publication 2004

Gold & Morgan N “Speech & Audiological Processing. “Wiley & Son Inc. 2000

Goodman J.C and Nusbaum(1994) (Eds) The development of speech perception: The transition from speech sounds to spoken words, MIT Press London

Hardcastle & Laver J. “The Handbook of Phonetic Sciences” Blackwell Publishers Ltd. 1997 (Delgutte)

Hish. S.K; Eldredge. D.H. Hish .J; Silveman S.R. & Davis 1976 “Hearing” Washington University Press”

Lass N.J (Ed) 1976. Contemporary issues in experimental phonetics. Academic Press N.Y

Mendel, L.L., & Danheur, L.J., (Ed) (1997). Audiologic Evaluation and Management and Speech Perception Assessment. Singular Publishing Inc, CA.

Nakagawa S Shikanok K, Tohkura. Y (1995) Speech hearing and neural network models. Ohmshia IOS Press Amsterdam

Pisoni D 2005 “Handbook of Speech Perception” Blackwell Publishing Ltd U.S.A

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 London.

Sanders. D.A 1977. Auditory Perception of Speech – An introduction to principle & problems,

Schrveda MR "Speech & Speaker Recognition" Karger 1985

Schouten MEH 1992. The Auditory processing of speech from sounds to sounds. Morten de Grugter. Berlin

Tatham M & Mortin K "Development in Speech Synthesis" Wiley – 1998

The XIIIth International congress of phonetic sciences – Stockholm 13 – 19 August 1995, Volumes 1 – 4.

## SH 304 DIAGNOSTIC AUDIOLOGY

(30+70 marks)

(52 Hours)

### Objectives

1. To familiarize 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

(10 Hours)

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

(10 Hours)

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**

**(10 Hours)**

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**

**(10 Hours)**

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**

**(10 Hours)**

- 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

Berlin C. I (Ed) 1996 – Hair cells & hearing aids. Singular Publishing group, London  
Hood.L.J (1998) Clinical applications of the auditory brainstem response Singular  
Publishing group Inc. U.S.A

Hall J. W III (1992) Handbook of Auditory evoked responses. Allyn & Bacon U.S.A  
Jacobson J.T (Ed) 1994. Principles & Applications in Auditory evoked potentials  
Allyn & Bacon U.S.A

Katz J (Ed) Volume I – V Handbook of clinical audiology, Lippincott, Williams,  
Wielkins U.S.A

Ms Phenson L.D 1995 – Late potentials of the auditory system Singular publishing  
group

Rintelman W.F 1991 – Hearing Assesment, Allyn & Bacon U.S.A

Robinette M.S, Glatlke T.J (Eds) 1997. Otoacoustic emissions; Clinical Applications.  
Thieme N.Y

Sahley T.L Nodar R.H; Musiek F.F 1997: Efferent Auditory system: Structure&  
function. Singular Publishing group Inc.

Wiley T.L Fowler C.G 1997; Acoustic Immittance measures in clinical audiology: A  
primer Singular Publishing group Inc

## **SH 305 CLINICAL PRACTICUM – III SEMESTER**

### **SPEECH LANGUAGE PATHOLOGY**

**(50+50 marks)**

#### **Objectives**

- Should be able to diagnose and manage various communication disorders
- 1. Should assess 10 clients with Childhood language disorders/Motor Speech Disorders
- 2. Should offer speech language therapy for at least 10 clients with Childhood language disorders / Motor Speech Disorders.
- 3. Plan and execute minimum of 5 group therapy sessions for any communication disordered group (For individuals with Autism; toddlers with hearing impairment)

### **AUDIOLOGY**

**(50+50 marks)**

#### **Objectives**

- Should be able to diagnose and manage individuals having Auditory Disorders

Carry out:

1. Appropriate tests on at least 10 clients having Cochlear/Retrol Cochlear/Auditory Dyssynchrony.
2. Multifrequency tympanometry on at least 5 clients
3. ASSR on at least 5 clients
4. Calibration of Immittance and ABR
5. Selection of Digital/programmable hearing aids for at least 10 clients

Students should also be exposed to cochlear implant mapping

**IV SEMESTER**  
**SH 401 ADULT LANGUAGE DISORDERS**

**(30+70 marks)**

**(52 Hours)**

**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 Hours)**

- 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 assessing the bilingual client,
- Different perspectives on aphasia, (linguistic, neurological, cognitive etc),
- pragmatics. Aspects of bilingual aphasia in illiterates and sign language users.
- Neurological tests and neuro imaging procedures (EMG, CT, MRI, EEG,
- Ultrasound, PET, Transcortical Doppler, etc)
- Application to communication disorders

**UNIT 2**

**(10 Hours)**

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

**UNIT 3**

**(10 Hours)**

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

**UNIT 4**

**(10 Hours)**

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

**UNIT 5**

**(10 Hours)**

- Other adult language disorders (characteristics, assessment, intervention and issue in primary progressive aphasia, sub cortical aphasia, schizophasia and RHD.
- AAC for the language disordered.

## LIST OF BOOKS

### SH 401 ADULT LANGUAGE DISORDERS

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

Aphasia (1988). Rose, F.C. Whurr, R. and Wyke, M.A.(Eds.) London : Whurr. ISBN 1-870332-66-0

Medical Speech-Language Pathology: A Practitioner's Guide. (1998). Johnson, A.F. and Jacobson, B.H. NY:Thieme. ISBN 0-86577-688-1

Aspects of Bilingual Aphasia (1995). Paradis,M.(Ed)Great Yarmouth; Galliard (Printers) Ltd. ISBN 0-08-425704

Pragmatics in Neurogenic Communication Disorders. (1998). Paradis,M.(Ed)Great Yarmouth; Galliard (Printers) Ltd. ISBN 0-08-043065-1

Linguistic Intervention in Aphasia. (2<sup>nd</sup> Ed.) (1969). Lesser, R.London; Whurr. ISBN 1-870332-77-6

Right hemisphere Communication Disorders: Theory and Management (1995). Tompkins,C.A California: Singular Publishing Group, Inc. ISBN 1-56593-176-9

Dementia – A Clinical Approach. (2<sup>nd</sup> Ed.)(1992). Cummins, J.L. and Benson: Whurr. ISBN 1-870332-94-6

## SH 402 HEARING DEVICES

(30+ 70 marks)

(52 Hours)

### Objectives

1. To familiarize 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 Hours)

- Hearing aids, components
- Classification
- Principles of analogue, programmable, digital hearing aids, signal enhancing technology
- EAC
- Outcome measures
- Ear moulds – types and modifications

### UNIT- 2

(10 Hours)

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

### UNIT- 3

(10 Hours)

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

### UNIT- 4

(10 Hours)

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

(10 Hours)

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

## LIST OF BOOKS

### SH 402 - Hearing Devices

Clark G.M; Cowan B.S; Dowel R.C1997. Cochlear Implantation for infants and children: Advances Singular Publishing group Inc

Mueller H.G; Hawkins D; Northern C.J 1992. Probe microphone measurements; Hearing aid selection and assessment Singular Publishing group Inc

Hersh M.A; Johnson M.A. 2003 – Assistive technology for the hearing impaired, Deaf and deaf blind, Springer, London

Sandlin E.R (Ed) 1995, Handbook of hearing aid amplifications. Volume 1. Theoretical & technical considerations Singular Publishing group Inc, London

Sandlin E.R (Ed) 1995, Handbook of hearing aid amplifications. Volume II. Clinical considerations and fitting practices. Singular Publishing group Inc, London

Studenbaker G.A; Hochberg I 1993. Acoustical factors affecting hearing aid performance. 2<sup>nd</sup> edition Allyn & Bacon U.S.A

Velente M 1994 Strategies for selecting and verifying hearing aid fittings Thieme N. Y

Velente M 1996 Hearing aids standards, options and limitations, Thieme N.

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

**(30+70 marks)**

**(52 Hours)**

**Objectives**

1. To train the student to evaluate and learn specific needs of the client, need for amplificatory / 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 Hours)**

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**

**(10 Hours)**

1. Management of special groups with 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 with 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**

**(10 Hours)**

#### 1. Management of tinnitus

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

#### 2. Management of hyperacusis

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

### **UNIT 4**

**(10 Hours)**

#### 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**

**(10 Hours)**

#### 1. Management of individuals with Central Auditory Processing Disorders:

- 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

Alpiner J.G (Ed) 1982 – Handbook of Adult Rehabilitative Audiology – 2<sup>nd</sup> Edition.  
William & Welkins U.S.A

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

Hull R.H (Ed) 2001 – Aural Rehabilitation – serving children and adults, 4<sup>th</sup> edition,  
Singular Publishing Group Inc

Luxon L.M (Ed) 2001 – Davies R.A (Eds) 1997 – Handbook of vestibular rehabilitation,  
Whurr Publisher Ltd, London

Sanders D.A 1971 – Aural Rehabilitation Prentice Hall, Inc, U.S.A

Tye Murray. N 1998 – Foundations of Aural Rehabilitation Singular Publishing Group ,  
Inc, U.S.A

Tye Murray. N 2005 – Foundations of Aural Rehabilitation in Children and Adults &  
their family members (2<sup>nd</sup> edition) Thomson Delmar Learning New York

Vernon J.A; Moller A.R (Ed) 1995: Mechanisms of tinnitus, Allyn & Bacon, U.S.A

## **SH 404: DISSERTATION**

**(30+70 marks)**

### **SH 405 CLINICAL PRACTICUM – IV SEMESTER**

#### **SPEECH LANGUAGE PATHOLOGY**

**(50+50 marks)**

##### **Objectives**

- Should be able to diagnose and manage various communication disorders
- 1. Should assess 10 clients with Adult language disorders/Fluency disorders
- 2. Should offer speech language therapy for at least 10 clients with Adult language disorders / Fluency disorders.
- 3. Plan and execute minimum of 5 group therapy sessions for any communication disordered group (For individuals with Aphasia /Stuttering/ (Article 3,7,21,24,26)

#### **AUDIOLOGY**

**(50+50 marks)**

##### **Objectives**

- Should be able to diagnose and manage individuals having Auditory Disorders

Carry out:

1. (C)APD tests on at least 5 clients
2. MMN / LLR on at least 2 clients
3. Calibration of immittance and ABR
4. Rehabilitation programs for clients having tinnitus and hyperacusis

Students should also be exposed to cochlear implant mapping (Article 3,7,21,24,26)

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