

**BACHELOR OF AUDIOLOGY AND SPEECH – LANGUAGE  
PATHOLOGY (BASLP)**

**ANNUAL SCHEME**

**REGULATIONS, NORMS, SCHEME OF EXAM  
AND CURRICULUM**

**REHABILITATION COUNCIL OF INDIA**

**(Statutory body under Ministry of Social Justice & Empowerment)**

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**2009**

## **RULES REGULATIONS & NORMS FOR BASLP**

### **1. Nomenclature:**

Approved nomenclature of the course shall be – BACHELOR OF AUDIOLOGY AND SPEECH – LANGUAGE PATHOLOGY – Abbreviated as BASLP

### **2.1 Duration of the course:**

The course shall be of 4 academic years including 1 year of internship.

**2.2** As far as possible each academic year of the BASLP course will commence, latest by, July and will end by April each year.

**2.3** At the end of each academic year there shall be examinations, followed by 3 weeks of vacation for students.

OR

**2.2 and 2.3** will be as per the rules of respective universities.

### **3.0 Eligibility for admission**

The candidate applying for admission to BASLP course should have passed 10+2 examination or equivalent / two years of Pre-University/Pre-Degree examination conducted by the Pre University Board of Education of Government of respective State, and further,

b) The applicant/candidate should have studied:

Physics, Chemistry & Biology / Mathematics / Computer Science / Statistics / Electronics / Psychology

c) At the time of entry/admission to the first year of BASLP course the candidate should be of age 17 years or above OR as per rules of the respective universities with regard to the entry age.

d) Lateral entry to 2<sup>nd</sup> year of BASLP is permitted for candidates who meet the following criteria:

i) Successfully passed Diploma in Hearing-Language-Speech (DHLS) revised course from any RCI recognized training institute with Science background as specified under 3 (b)

ii) Two years of work experience in the field.

iii) A maximum of 3 seats can be admitted on merit basis as super numerary to total intake permitted by RCI and respective affiliating University. For candidates who have successfully passed the pre-revised DHLS course recognized by RCI with 2 years of work experience, 3 month short course approved by RCI and entrance test will be the requirement.

**4.0 Coursework:** As given for each academic year in the annexures.

**5.0 Attendance:**

Each candidate should put in at least 75% of attendance in Theory class & 75% attendance in Clinical Practicum in each academic year. Failure to put in/meet the required attendance by any student render him/her disqualified to appear in the University exams. The candidate who will not be able to take the exam for want of attendance will be declared as failed and will have to repeat the exam subsequently by putting in required attendance. Shortage of attendance can be condoned in genuine cases of absenteeism as per rules and guidelines of respective universities.

**6.1 Criteria for passing:**

Minimum marks required to pass in each Theory paper, Internal Assessment & Clinical Practicum, separately, will be 40% and 50% in aggregate of all.

**6.2 Question Paper Pattern:**

Objective type questions and Essay Questions – in accordance with the specifications from the respective universities. Questions and marking should be according to specifications followed by respective affiliating university.

**6.3 Grading:**

40 – 49%	Pass Class
50 – 59%	Second Class
60 – 74%	First Class
75% and above	Distinction

OR

As per rules of the respective universities.

**6.4 Carry over passing:**

Each paper should be successfully completed within 3 successive attempts including the first one or as per the rules of the affiliating university.

Provision of grace marks and declaration of results to be carried out based on rules and norms followed at respective universities.

**7.0 Internship:**

Internship of one academic year duration (10 months) will start after the candidate completes the required courses and appears for final year examination OR as per the rules of the respective universities.

**8.0 Award of Degree:**

The respective university will award the degree and issue the certificate after a candidate successfully completes the required University examinations and the compulsory Internship. No candidate will be awarded the degree before completion of Internship.

**9.0 Norms for Minimum Infrastructural Facilities:**

<b>1.</b>	<b>Faculty/Personnel</b>	<b>BASLP (20 seats)  (Column 1)</b>	<b>BASLP (20 + 20 seats)  (Column 2)</b>	<b>BASLP + MASLP (20 + 10 seats)  (Column 3)</b>	<b>BASLP + MASLP/ M.Sc. (Aud.)/M.S c. (SLP) (40 + 15 seats)  (Column 4)</b>	<b>M.Sc (Aud.)/M.Sc. (SLP) as addition to BASLP (40 seats) and MASLP (15) with 10 seats for each specialized M.Sc  (Column 5)</b>
a.	Full time					
	Professor			1 Professor or 2 Readers	1 Professor or 3 Readers	1 Professor or 1 Reader in each PG specialization in addition to that given in Column 4
	Reader or equivalent	1	1	1	1	1
	Lecturer	3	3 + 1	5	6	+2 in addition to that given in Column 4
	Speech Pathologist/Audiologist (Grade I) (Clinical Supervisor)	1	1 + 2	4	6	+2 in addition to that given in Column 4
	Speech Pathologist/Audiologist (Grade II)	2	2 + 1	2	4	4
	Lecturer in Clinical Psychology – Part time	1	1	1	1	1
	One Medical faculty as per requirement of the paper – Part time	1	1	1	1	1
	Lecturer in Linguistics – part time	1	1	1	1	1
	Electronic Engineer	1	1	1	1	1
	Ear Mould Technician	1	1	1	1	1
	Librarian/staff	1+1	1+1	1+1	1+1	1+1
b.	Visiting faculty for Anatomy and Physiology	1	1	1	1	1

**NOTE :**

1. Minimum of 2 faculty members in core areas will be required for giving recognition for the first year.

2. Before the commencement of second academic year one more lecturer must be appointed.
3. Before the commencement of third academic year one Reader must be appointed.
4. Only on completion of three batches of BASLP, an Institution becomes eligible to increase the intake provided infrastructure is increased as per laid down norms of RCI. Institute will be eligible to apply for starting MASLP course after the 1<sup>st</sup> batch of BASLP passes out, i.e; after 4 years of starting BASLP course subject to recommendation of Inspection Team/Visiting Expert.
5. In case of Professor not being available, 2 Readers are appointed to accommodate research guidance and administrative work.
6. All reservations in admission will apply as per Govt. rules for aided and Govt. institutions. The infrastructure will have to be enhanced as per the the seats getting increased under reservation policy.

Designation	Qualification		Experience		Publications
	Essential	Desirable	Essential	Desirable	
Professor	Ph.D. (Sp & Hg)		10 years teaching experience in the field		Essential
Reader/ Associate Professor	Ph.D. (Sp & Hg) or M.Sc. (Sp&Hg) with equivalent work by publications and research	Ph.D. (Sp. & Hg)	5 years of teaching / research/ clinical experience with graduate/ post graduate courses		Essential
Lecturer/ Assistant Professor	M.Sc.(Sp& Hg)	Ph.D. (Sp& Hg)	2 years clinical / research experience	Teaching experience	
Speech Pathologist/ Audiologist Grade I	M.Sc. (Sp& Hg)				
Speech Pathologist/ Audiologist Grade II	B.Sc. (Sp& Hg)	M.Sc. (Sp& Hg)			

### 9.1. Clinical Facilities

Facilities for diagnostic evaluation of speech, language, voice, hearing and associated disorders, both functional and organically based. Clients of all age groups with hearing impairment and clients with speech and language disorders.

Load and variety of clients should be commensurate with number of courses conducted and also to meet the clinical practicum requirement of each year of the course.

**9.2. Library Facilities:**

Library should accommodate at least, 30% of the institution’s students and staff total strength. Library should have internet and photocopying facilities.

- a) **Reading room :** 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:** There should be atleast 5 most essential journals (2 each in Speech & Audiology and 1 general) for BASLP and 8 at MASLP levels (4 each for Speech & Audiology).
- 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.

**9.3. Audiovisual Instruments:** Appropriate instruments as per No. and level of course should be provided.

**9.4. SPACE:**

Sr. No.		Size (Sq. Ft.)	Graduate	Graduate and PG
a)	Class Rooms	Size should be adequate to accommodate (9 sq. ft. per student)	Half the No. of total batches/ course (Min. 2 class room)	Half the No. of total batches/ course  (Additional 1 room for each PG

				course)
b)	Room for reception where patients are registered.			
c)	Room for case history, Speech Diagnostic Room and Interviews	(6 x 6)	5 for 20 intake and 8 for 40 intake	With one PG course 12 and with each additional PG 2 extra
d)	Speech Lab (Quiet Room) for diagnostic purposes.	(15 x 20)	1	1+1
e)	Recording room (Sound proof)	(10 x 10)	1	1
f)	Speech Therapy Rooms/ Cabins	(6 x 6)	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)	For 20 intake one room and for 40-two rooms	For each of PG program i.e., MASLP –one room extra
h)	Room for hearing aid trial combination purpose.	(10 x 15)	1	1+1
i)	Earmould Lab	(15 x 20)	1	1
j)	Staff Room	As per staff strength (min size 15x20)	1	-
k)	Individual work space (with provision for storage facilities)	(10 x 10)	4	12
l)	Hearing aid repair lab	(10 x 10)	1	1
m)	Principal's Office room	(12 x 16)	1	1
n)	Sanitary facilities	As per requirement separate facilities for girl and boy students and staff		
o)	Hostels for Men and Women to accommodate at least 50% of the student population.			

p)	Administrative staff room.			
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**9.5. 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	1+1 and for Audiology specialization course one extra
b)	Portable Audiometer with provision of A.C. and B.C. testing : desirable screening audiometer	1 for each batch	1 + 1
c)	Clinical Immittance Audiometer (Desk model) with accessories.	2 instruments essential preferably one with screening type for field work. For 40 – three are required	1 more for MASLP and extra one for M.Sc. (Audio.)
d)	Portable/Screening impedance, audiometer	1	1 + 2
e)	Clinical BSEAR	1	1 + 1 (For M.Sc. [Audio.] stacked ABR and VEMP) are additions]
f)	Otoacoustic emission	1	1 more (one screening and two table models)
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	Software programs for HAT



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	UV Labs for Soft mould for PG course	

<b>Speech Pathology</b>			
a)	Speech and Language Tests (Tests for differential diagnosis) (English and local language)	As per course requirement	As per course requirement
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+1 (for M.Sc – SLP)
j)	Computer PC-AT with VGA Color Monitor	1	3
k)	Software for diagnostic/therapeutic use	1	1
l)	Endostroscope	-	One for M.Sc (SLP)

m)	EGG	1	1
n)	Stop Watch	2	4
o)	Audio cassettes for training/CDs		
p)	Pitch pipe		
q)	Tongue depressors	3	5

### **10 Guidelines for implementation of internship for BASLP course with effect from academic session 2009-10 onwards**

#### **Objectives of Internship are to:**

1. facilitate the transition of training from supervised to independent responsibility,
2. provide additional inputs to attain and maintain competence in clinical management of persons with communicative impairments,
3. initiate group and individual action focusing on prevention/early identification and intervention in individuals with speech, hearing and language impairments at the level of the individual, family and community, and
4. facilitate the understanding of professional responsibilities and ethical practices including :
  - (i) Rights and dignity of patients.
  - (ii) Consultation and referral to other professionals.
  - (iii) Conduct and professional obligations to peers/patients/families and the community at large.

#### **Guidelines**

1. Internship is mandatory
2. Duration: One academic year (10 months)
3. Eligibility: Internship will start in the immediate academic year after the candidate completes the required courses and appeared for sixth semester/third year examinations.
4. Structure and duration of the postings:
  - i) The place of postings of the students for internship will be decided by the respective institute conducting the course.
  - ii) Students should spend minimum of 50% period of internship at parent institute and 50% period outside the parent institute like hospital set ups, educational set ups, special clinical facilities like ASD, cochlear implants, AVT, mother's training program, centres for CP, centres for LD. Exposure

should be for those areas where limited exposure was provided in the parent institute.

iii) During internship students should get additional training in the areas of neurological related problems, prevention and early intervention programmes, community based rehabilitation, occupational health programmes, structural abnormalities related to speech & hearing.

5. Mode of supervision during internship:

Supervision should generally be provided by a Speech Language Pathologist or Audiologist. Where this is not feasible, supervision can be done by a specialist from the allied areas in Medical Sciences like Otolaryngology, Neurology, Mental Health, Paediatrics, etc. Supervised clinical hours spent during internship can be included in the clinical competence certificates issued to students.

6. Maintenance of records by students:

Every student should maintain records of the number of hours of clinical work in different areas and institutions. This should be certified by the head of the institution or his/her nominee where the student is undergoing internship.

7. Leave permitted : As per norms of the parent Institute.

8. Extension of internship: Internship shall be extended by the number of days the student remains absent unauthorizedly.

9. Stipend: As per the norms of the parent Institute.

10. Grading and evaluation of student:

Grading and evaluation should be done by the institute where the candidate is doing internship. The student is required to repeat those postings in which his/her performance is below 40%.

11. Certification :

The parent institute will award a certificate after successful completion of the internship.

12. The University shall award the degree certificate only after the successful completion of the internship.

13. The candidate failing in final semester/year exam will be exempted from the duration of Internship period which he/she has already completed till the date of declaration of results.

**SCHEME OF CURRICULUM FOR BASLP**

<b>CODES/ PAPER NO.</b>	<b>PAPER TITLE</b>	<b>Teaching hours per week (minimum)</b>	<b>Total hours per year (minimum)</b>	<b>Exam duration</b>	<b>Exam Marks</b>	<b>I.A. Marks</b>	<b>Total Marks</b>
B 1.1	<i>Introduction to Human Communication</i>	3	75	3	80	20	100
B 1.2	<i>Speech - Language Development &amp; Disorders</i>	3	75	3	80	20	100
B 1.3	<i>Introduction to Hearing &amp; Hearing Sciences</i>	3	75	3	80	20	100
B 1.4	<i>Management of the Hearing Impaired</i>	3	75	3	80	20	100
B 1.5	<i>Basic Medical Sciences related to Speech &amp; Hearing</i>	3	75	3	80	20	100
B 1.6	<b>Psychology related to Speech &amp; Hearing</b>	3	75	3	80	20	100
B 1.7	<i>Clinical Practicum Speech-Language Pathology</i>	8		-	50	50	100
B 1.8	<i>Clinical Practicum Audiology</i>	8		-	50	50	100
<b>TOTAL</b>		34	600	18	580	220	800
<b>**B 1.1.1</b>	<b>Computer Fundamentals</b>	3	75	3	80	20	100
** B.1.1.1 is optional as per respective university & accurate to their prescribed paper content/course work							
B 2.1	<i>Speech Language Diagnostics and Therapeutics</i>	3	75	3	80	20	100
B 2.2	<b>Articulation &amp; Phonological Disorders</b>	3	75	3	80	20	100
B 2.3	<b>Voice &amp; Laryngectomy</b>	3	75	3	80	20	100
B 2.4	<b>Motor Speech Disorders</b>	3	75	3	80	20	100
B 2.5	<b>Diagnostic Audiology</b>	3	75	3	80	20	100
	<i>Technology &amp;</i>						

B 2.6	<i>Amplification Devices for persons with Hearing impairment</i>	3	75	3	80	20	100
B 2.7	<i>Paediatric Audiology</i>	3	75	3	80	20	100
B 2.8	<i>Clinical Practicum Speech-Language Pathology</i>	8		-	50	50	100
B 2.9	<i>Clinical Practicum Audiology</i>	8		-	50	50	100
TOTAL		37	675	21	660	240	900
**B 2.1.2	<b>Indian Constitution</b>	3	75	3	80	20	100
** B.2.1.2 is optional as per respective university & accurate to their prescribed paper content/course work							
B 3.1	<b>Fluency &amp; its Disorders</b>	3	75	3	80	20	100
B 3.2	<b>Neurogenic Language Disorders in Adults</b>	3	75	3	80	20	100
B 3.3	<i>Rehabilitative Audiology</i>	3	75	3	80	20	100
B 3.4	<b>Noise Measurements &amp; Hearing Conservation</b>	3	75	3	80	20	100
B 3.5	<b>Community oriented Professional Practices in Speech Language Pathology &amp; Audiology</b>	3	75	3	80	20	100
B 3.6	<b>Basic Statistics &amp; Scientific Enquiry in Audiology &amp; Speech Language Pathology</b>	3	75	3	80	20	100
B 3.7	<i>Clinical Practicum Speech-Language Pathology</i>	8		-	50	50	100
B 3.8	<i>Clinical Practicum</i>	8		-	50	50	100

	<b>Audiology</b>						
<b>TOTAL</b>		34	600	18	580	220	800
<b>**B 3.1.3</b>	<b>Environmental Studies</b>	3	75	3	80	20	100
** B.3.1.3 is optional as per respective university & accurate to their prescribed paper content/course work							

GRAND TOTAL (FOR ALL YEARS)	Teaching hours per week (minimum)	Total hours per year (minimum)	Exam duration	Exam Marks	I.A. Marks	Total
THEORY	105	1875	57	1820	680	2500

GRAND TOTAL (FOR ALL YEARS)	INTERNAL MARKS	EXTERNAL MARKS
CLINICAL PRACTICUM (SPEECH PATHOLOGY & AUDIOLOGY)	300	300

**NOTE:**

1. Papers 1.1.1, 2.1.2, 3.1.3 are applicable only where university has imposed them as per UGC & Supreme Court guidelines. These marks obtained in these papers are not considered for calculation of class or division or for grade point. However, it is compulsory to pass these papers.
2. Wherever there is cerebral palsy, hearing impairment, mental retardation, cleft lip & palate, apraxia, aphasia, dysarthria; it is to be considered as person with cerebral palsy, hearing impairment, mental retardation, cleft lip & palate, apraxia, aphasia, dysarthria.

## YEAR 1

### B 1.1 INTRODUCTION TO HUMAN COMMUNICATION

**(80+20 marks)**

**(Total = 75hrs)**

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

1. Human communication, processes involved in communication
2. Interrelation between Hearing, Speech and Language
3. The neurological, psychological, social and acoustic bases of communication

#### **Unit 1**

**(15 hrs)**

1. History and development of the profession of Speech-Language Pathology (SLP) specifically in India
1. Major work activities of the SLP
2. Various settings of service delivery
3. Other professions concerned with communication disorders
4. Human communication:
  - Definition and component
  - Interdependency & interrelation between communication, hearing, speech, and language.
  - Function of communication, speech and language
  - Modes of communication (Verbal & Non-verbal)
  - Characteristics of good speech
5. Interactive bases of human communication
  - genetic bases
  - psychological & cognitive bases
  - social bases
6. Speech as an overlaid function
7. Pre-requisites and factors affecting language and speech development

#### **Unit 2**

**(15 hrs)**

1. Nervous system:
  - Divisions and functions of the nervous system, nerve cell, receptors and synapse, types of nerve fibers. Peripheral nervous system. Brief description of spinal cord and CSF.
  - Structure of the brain and divisions: general and lobes of cerebrum. Reticular formation, Basal ganglia and cerebellum. Reflex action and common reflexes. Cranial nerves, distribution and supply with the special reference to II , V, VII , IX,

X , XII., Nerve tracts (motor and sensory), Brodmann's area, anatomy of the nervous system related to speech and language.

### **Unit 3**

**(15 hrs)**

#### Mechanism of speech and language production- I

- Anatomy and physiology of respiratory system: Detailed study of trachea, larynx, oropharynx and nasopharynx.
- Respiration for life and speech
- Physiology: External and internal respiration. Mechanism of respiration-internal and external influence, nervous control, Lung volumes (vital capacity-tidal volume, residual air, artificial respiration.(in brief)
- Composition of gases. Exchange of gases in the lungs and tissues. Hypoxia, asphyxia and cyanosis. Regulation of respiration. Respiratory efficiency test and artificial respiration.

### **Unit 4**

**(15 hrs)**

#### 1. Basic Acoustics of speech:

- Vibrating system – simple harmonic motion – simple vibrating system – system with two or more masses – system with many modes of vibrations – vibration spectra. Waves – What is a wave? Progressive waves – sound waves – wave propagation – Doppler effect – reflection, diffraction, interference, absorption. Resonance of a mass spring vibrator- standing waves – partials, harmonics and overtones – Acoustics impedance – Helmholtz resonator – sympathetic vibrations.

#### 2. Mechanism of speech and language production- II

- Anatomy and physiology of laryngeal system
- Development of voice
- Bases of pitch and loudness change mechanism

### **Unit 5**

**(15 hrs)**

#### Mechanism of speech and language production- III

- Anatomy and Physiology of Articulatory system
- Development of Articulation
- Anatomy and Physiology of Resonatory system

### **LIST OF BOOKS**

#### Compulsory Reading:

- 1) Speech Correction: An Introduction to Speech Pathology and Audiology (8th Ed.). Van Riper, C and Emerick, L. (1990). New Jersey: Prentice Hall Inc.



- 2) Singh, I. (1996). Textbook of Anatomy with Color Atlas, Vol. III Jaypee Brothers.
- 3) Zemlin, W.R. (1981). Speech and Hearing Science: Anatomy and Physiology, (2nd Ed.). Englewood Cliffs, New Jersey: Prentice Hall.

Additional / Optional Reading:

- 1) Minifie, F.D., Hixon, T.J., and Williams, F. (1973). Normal aspects of Speech, Hearing and Language. New Jersey: Prentice Hall Inc.
- 2) Skinner, P.H. and Shelton, R.L. (1978). Speech, Language and Hearing- Normal Processes and Disorders. (2<sup>nd</sup> Ed.). New York: John Wiley and Sons.
- 3) Human Communication Disorders: An Introduction (4th Ed.). Shames, G.H. Wiig, E.H. & Secord, W.A. (1994) New York: Merrill Publishing Co.
- 4) Speech and Hearing Science, Anatomy and Physiology (3rd ed.). Zemlin, W.R.(1988) New Jersey: Englewood Cliffs
- 5) Human Communication & Its Disorders (2nd Ed.). Boone, D.R. & Plante, E. (1993). New Jersey: Prentice Hall Inc.
- 6) Palmer, J.M. (1984). Anatomy for Speech and Hearing, (3rd Ed.). New York: Harper and Row.
- 7) Perkins, W.H. and Kent, R.D. (1986). Textbook of Functional Anatomy of Speech, Language and Hearing. London: Taylor and Francis.
- 8) Gray's Anatomy. (37th Ed.). Williams Warwick and Dyson Banniser. (1989). Churchill

## **B 1.2 SPEECH - LANGUAGE DEVELOPMENT AND DISORDERS**

**(80+20 marks)**

**(Total = 75 hrs)**

### **Objectives**

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

- Development of speech & language
- Identify different speech & language disorders
- Basics of assessment and intervention for Child language disorders.

### **Unit 1**

**(15 hrs)**Development of

speech and Language:

Development of language

- Semantics: A brief introduction to different types of meaning homonyms, synonyms and antonyms.
- Morphology: Morpheme – bound and free, process of word formation, content and function words.
- Syntax:, grammatical and syntactic categories, sentence types, Syntactic analysis.
- Pragmatics: Introduction to verbal and non-verbal communication and other indicators, intent of communication.

### **Unit 2**

**(15 hrs)**

Theories and models of language Acquisition – Behavioral, Nativistic, Cognitive, Linguistic, Pragmatic, Biological and Information processing model.

Developmental issues in communicative development – genetic, neurological, medical, behavioural, social and psychological.

Bilingualism / multilingualism in children; Bilingual Language learning contexts at home and school situations, compound / coordinate context and others.

### **Unit 3**

**(15 hrs)**

Definition, Etiology, Characteristics, Classification and Impact of

- Hearing Impairment
- Mental Retardation
- Cerebral Palsy
- Seizure disorders

Introduction to assessment procedures, differential diagnosis and management.

#### **Unit 4**

**(15 hrs)**

Definition, Etiology, Characteristics and classification of

- Autism Spectrum Disorders/Pervasive Developmental Disorders
- Attention Deficit Disorder/ Attention Deficit Hyperactive Disorder

Introduction to assessment procedures, differential diagnosis and management.

#### **Unit 5**

**(15 hrs)**

Definition, Etiology, Characteristics, Classification and Impact of

- Specific Language Impairment
- Learning Disability
- Acquired aphasia in childhood
- Traumatic Brain Injury
- Multiple disabilities

Introduction to assessment procedures, differential diagnosis and management.

### **LIST OF BOOKS**

#### Compulsory Reading:

- 1) Reed, V. (1994). An Introduction to children with language disorders. (2nd Ed.) New York: Macmillan.
- 2) Nelson N. W (1998). Childhood language disorders in context – infancy through adolescence, Allyn and Bacon, Boston.
- 3) Hegde, M. N. (1996). A Coursebook on Language Disorders in Children. San Diego: Singular Publishers.
- 4) Ladefoged P. (1992). A course in Phonetics. (3rd Ed.). New York: Harcourt Brace Jovanovich.
- 5) Lees, J.A. and Urwin, S. (1991): Children with Language Disorders. Whurr Publishers

#### Additional/Optional Reading:

- 6) Woolfolk, E. & Lynch J. (1982). An integrative approach to language disorders in children. New York: Grune and Stratton.
- 7) Thirumalai M. S. Shyamala Chengappa (1988) Simultaneous Acquisition of two languages CIIL, Mysore
- 8) Fromkin, L.F. and Rodman, R. (1993). An Introduction to Language (5<sup>th</sup> Ed.). New York: Harcourt Brace Jovanovich
- 9) Subba Rao (1992). Developing communication skills in MR, NIMH, Secunderabad.
- 10) Shyamala K. Chengappa (1992). Speech and Language of the cerebral palsied, CIIL, Mysore.
- 11) Shyamala K. Chengappa (1986). Introduction to speech disorders in children an introduction IED cell, Port Blair, Anadamans & Nichobars.
- 12) O'Connor. (1993). Phonetics. Hammondsworth: Penguin books
- 13) Yule, G (1996). The Study of Language: An Introduction. (2nd Ed.). Cambrige: Cambridge University Press.
- 14) Lyons, J. (Ed.). (1970). New Horizons in Linguistics. Hammondsworth: Penguin Books.
- 15) Akmajian. A. et al. (1990). Linguistics: An Introduction to Language and Communication

## **B 1.3: INTRODUCTION TO HEARING & HEARING SCIENCES**

**(80+20 marks)**

**(Total = 75 hrs)**

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

- Basic aspects of auditory system
- Physical and psychophysical basis of sound
- Tuning fork tests

### **Unit 1**

**(15 hrs)**

- Origin of Audiology, Its growth & development (since World War II)
- Its growth in India
- Scope of Audiology, Branches of Audiology
- Audiovestibular system: Anatomy of the external, middle and internal ears. Ascending and descending auditory and vestibular pathways.
- Physiology of the external, middle & inner ear, central hearing mechanisms, cochlear microphonics, action potentials, theories of hearing (AC & BC) , Theory of bone conduction
- Vestibular system: Functions of utricle, saccule and vestibular apparatus. Posture and equilibrium. Tests of posture and equilibrium
- Causes of hearing loss
  - Genetic (congenital, late onset, progressive, syndromic / non-syndromic)
  - Non-Genetic (Congenital/acquired)
  - Importance of case history in identifying the cause of hearing loss

### **Unit 2**

**(15 hrs)**

- Role of hearing (threshold concept, binaural hearing, head shadow, pinna shadow effect, MAF, MAP – Curve for threshold of hearing)
- Sound Pressure, Power and Loudness. Physical and psychophysical scales, Equal loudness contours, Frequency weighting curves, combined sources, Pitch and Timbre. Physical and psychophysical scales. Fourier analysis of complex Tones
- dB concept: power and pressure formulae: zero dB reference for pressure and power calculation of actual SPL, reference and dB values with any to given values, calculation of overall dB when two signals are superimposed.
- Phons and Sones: relation between phons and sones; use of phone and sonograph; computation of relative loudness of two given sounds using these graph. Frequency and intensity, their psychological correlates: dL for frequency and intensity

### **Unit 3**

**(15 hrs)**

- Calibration: Biological and instrumental for AC & BC transducers
  - Procedure

- interpretation
- precautions to be taken while testing
- Audiometric room construction
  - Acoustics of Rooms. Sound propagation in outdoors and indoors.
  - Direct, early and reverberant sound. Calculation of reverberation time.
  - Air absorption. Background noise.
  - Loudspeaker placement and directivity.
  - Sound images and multiple sources.
  - Sound field in listening rooms. Quadraphonic sound.
  - Listening with earphones. Pressure field, free field and diffused field.
  - Audiometric test rooms – Basic requirements concept and structure – transmission loss,
  - NRC rating – Standards for sound treated rooms – Basic requirements, concept and structure – standards.
  - Classrooms of hearing impaired children – Basic requirements, concept and structure – standards.

#### Unit 4

(15 hrs)

- Basic concepts of AC & BC testing
- Pure Tone audiometry
  - Need and scope
  - Instrumentation, Different types of transducers
  - Standards
  - Permissible ambient noise levels for audiometric testing
  - Classification of audiograms
  - Sound field & closed field testing
  - Factors affecting AC & BC testing
  - Screening Vs Diagnostic pure tone testing
  - Extended high frequency testing & its interpretation
  - Masking: Definition, types of masking, types of noises, critical band concept,
  - Terminology related to masking: Test ear, non-test ear, masker, maskee, crossover, cross hearing and shadow curve
  - Interaural attenuation; Factors affecting IA; Criteria for masking during AC & BC
  - Factors determining amount of masking noise, AB gap in masked ear, masking dilemma in bilateral symmetrical conduction hearing loss.
  - Fusion Inferred Test (FIT)
- Types and degrees of hearing loss

#### Unit 5

(15 hrs)

- **Tuning fork tests** : Tuning fork tests (Rinne, Weber, Bing, Schwabach), interpretation, merits & demerits.
- **Speech audiometry**

- Orientation to speech audiometry
- Need for speech audiometry
- Speech recognition threshold, speech identification score, UCL, MCL, dynamic range, articulation index
- Tests developed in India and abroad
- Factors affecting speech audiometry
- Limitations of speech audiometry
- Masking for speech audiometry
- PI-PB function

### **LIST OF BOOKS**

#### Compulsory Reading:

1. Hodgson, H.R. (1980) Basic Audiologic Evaluation, London Williams and Wilkins.
2. Martin, F.N. (1991), Introduction to Audiology, IV Edition, New Jersey: Prentice Hall.
3. Newby, H.A. (1985), Audiology, New York: Appleton-Century-Crofts.
4. Testing, interpretation and recording - ISHA Battery (1990). ISHA publication.
5. The Science of sound – Thomas D. Rossing, Addison – Wesley Publishing Company
6. Architectural Acoustics. Egan, M. D. Mc Graw Hill Inc, (1988)
7. Bess and Humes (1990) Audiology - Fundamental. Williams and Wilkins, London.
8. Davis and Silverman, (Latest Edition). Hearing and deafness. Holt, Rinehart & Winston, London.
9. Rose, D.M. (Ed.) 1978), Audiological Assessment, New Jersey: Prentice Hill.

#### Additional Readings:

1. Beagly, H.A. (Ed.) (1981). Audiology and Audiological Medicine. Vol. 1, Oxford University Press.
2. Relevant BIS documents

## **B.1.4 MANAGEMENT OF THE HEARING IMPAIRED**

**(80+20 marks)**

**(Total = 75 hrs)**

### **Objectives:**

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

- importance of early identification
- different methods and approaches to train children with hearing impairment
- educational options for children with hearing impairment
- classification of hearing aids
- setting up of classrooms for children with hearing impairment

### **Unit 1**

**(15 hrs)**

- Definitions and goals of rehabilitation & aural rehabilitation
- Early identification and its important in aural rehabilitation
- Unisensory Vs Multisensory approach
- Manual Vs oral form of communication for children with hearing impairment
- Total communication

### **Unit 2**

**(15 hrs)**

- Methods of teaching language to the hearing impaired
  - Natural method
  - Structured method
  - Computer aided method

### **Unit 3**

**(15 hrs)**

- Educational problems, of children with hearing impairment in India
- Educational placement of hearing impaired children
- Criteria for recommending the various educational placements
- Factors affecting their outcome
- Counseling the parents and teachers regarding the education of the hearing handicapped
- Parent Infant Training Programme (PIP) & Mother's Training Programme, Home training –need, preparation of lessons; correspondence programs (John Tracey Clinic, SKI-HI), follow up

### **Unit 4**

**(15 hrs)**

- Introduction to hearing aid technology: Parts of hearing aids & its functions
- Type of hearing aids:
  - Body level Vs ear level
  - Monaural Vs Binaural Vs Pseudobinaural
  - Directional hearing aids, modular hearing aids



- Classroom amplification devices; Group amplification systems– hard wired, induction loop, FM, infrared rays.
- Setting up class rooms for the hearing handicapped
- Classroom acoustics preferential seating and adequate illumination

## **Unit 5**

**(15 hrs)**

- Ear moulds: Importance, types (hard, soft), procedure of making each type of ear mould, styles of ear moulds, criteria for selection of one style over the other, ear mould modifications, EAC of hearing aid along with ear mould.
- Importance of counseling for users & parents – importance of harness, BTE loops. Tips to facilitate acceptance of hearing aids, battery life, battery charger. Counseling for geriatric population, Trouble shooting of hearing aids

### **LIST OF BOOKS**

#### **Compulsory Reading:**

1. Sanders, D. A. (1993). Management of Hearing Handicap; Infants to Elderly, 3rd Ed., New Jersey, Prentice Hall.
2. Tucker, I., & Nolan, M. (1984). Educational Audiology. London: Croom Helm, Chapter.10.
3. Markides A (1977) Binaural hearing aids, Academic Press Inc., London.
4. Hodgson HR and Skinner (PH) (1977, 1981), Hearing aid Assessment and use in audiologic habilitation, Williams and Wilkins, Baltimore.
5. Pollack M. (1980). Amplification for the hearing impaired. NY: Grune and Stratton.

#### **Additional Reading:**

1. Davis, J.M. and Hardick, E.J. (1981). Rehabilitative Audiology for Children and Adults. New York: John Wiley and Sons.
2. Ross, M. Brackett, D. and Maxon, A.B. (1991). Assessment and management of mainstreamed hearing-impairment children: Principles and practice. Austin: Pro.Ed.
3. Lynas, W. (2000). Communication options. In J. Stokes (Ed.), Hearing impaired infants – Support in the first eighteen months. London: Whurr Publishers Ltd.
4. Sims, L.G., Walter, G.G., and Whitehead, R.L. (1981). Deafness and Communication: Assessment and Training. Baltimore: Williams and Wilkins.
5. Alpiner, J.G. (1982). Handbook of Adult Rehabilitative Audiology. Baltimore: Williams and Wilkins.

6. Chermak, G.D. (1981). Handbook of Audiological Rehabilitation. C.C.Thomas.
7. Ebbin, J.B. (1974). Critical Age in Hearing. In C.Griffiths (Ed), Proceeding of the International Conference on Auditory Techniques. Illinois: Charles C. Thomas.
8. Griffiths, C. (1974). Early Identification - Plus the Auditory Approach. In C. Griffiths (Ed.), Proceeding of the International Conference on Auditory Techniques. Illinois: Charles C. Thomas.
9. Borastein, H. (1977). Systems of Sign. In L.J. Bradford & W.G. Hardy (Eds.), Hearing and Hearing-Impairment. New York: Grune and Stratton Inc.
10. Hull, R.H. (Ed). (1982). Rehabilitative Audiology. New York: Grune and Stratton Inc.
11. Fitzgerald, E. (1929). Straight Language for the Deaf. McClure.
12. Jackson, A. (1981). Ways and Means-3. Hearing-Impairment a Resource Book of Information, Technical Aids, Teaching Material, and Methods used in the Education of Hearing-Impaired Children. Hong Kong: Somerset Education Authority.
13. Tebbs, T. (1978). Ways and Means: A Resource Book of Aids, Methods, Materials, Materials and Systems for use with the Language Retarded Child. Hong Kong: Somerset Education Authority.
14. Correspondence Program for Parents of the Deaf, John Tracy clinic.
15. Nix, G.W. (1976) Mainstream Education for Hearing-Impaired Children and Youth. New York: Grune and Stratton Inc.
16. Ross, M. Brackett, D. and Maxon, A.B. (1991). Assessment and management of mainstreamed hearing-impairment children: Principles and practice. Austin: Pro.Ed.
17. Webster, A. & Ellwood, J. (1985). The Hearing-Impaired Child in the Ordinary School. London: Croom Helm.

## **B 1.5 BASIC MEDICAL SCIENCES RELATED TO SPEECH & HEARING**

**(80+20 marks)**

**(Total = 75 hrs)**

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

- Basic anatomy and physiology related to speech and hearing
- Basic neurological, genetic issues related to speech and hearing
- General diseases/conditions related to speech and hearing disorders

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

- Basic anatomy and physiology related to speech and hearing
- Basic neurological, genetic issues related to speech and hearing
- General diseases/conditions related to speech and hearing disorders

### **PART A ( UNIT 1 ) ANATOMY**

**Unit 1 (20 + 5 marks)**

**(15 hrs)**

- (a) General introduction, definitions, Coronal / saggital / plane) Planes. Definition of anatomy, morphology, physiology, histology, embryology.
- (b) Definition of Cell and organelles, tissue, organ system, specialized tissues like nervous tissue, vascular tissue, muscle and bone tissue.
- (c) Nervous system: Definition of neuron, synapse, reflex action, bio electrical phenomena, action potential, depolarisation, division and functions of the nervous system, brain – general lobes, reticular formations, basal ganglia, cerebellum, circle of willis, cranial nerves, spinal cord, CSF – formation & flow.
- (d) Circulatory system: Definition of capillaries, arteries, veins, cardiac cycle, blood brain barrier, aneurysm, vascular shock – its reference to aphasia / speech disorders.
- (e) Respiratory system: General outline, detailed study of trachea, larynx and nasopharynx,

### **PART B ( UNIT 2 ) PHYSIOLOGY**

**Unit 2 (20 + 5 marks)**

**(15 hrs)**

- (a) Definition of inflammation, infection, tumor – benign & malignant, tissue healing.
- (b) Mechanism of respiration – internal and external influence, nervous control – vital capacity – tidal volume, residual air, artificial respiration (in brief).

- (c) Genetics :introduction – structure of DNA and RNA, karyotyping, family tree (pedigree chart), symbolic representation, inheritance, autosomal dominant, autosomal recessive, sex chromosomal disorders, structural aberrations, mutation (in brief).
- (d) Endocrine system: Definition of hormone, functions of thyroid hormone, growth hormone, androgen, testosterone and its influence in voice disorders.

### **PART C ( UNIT 3, 4, 5 ) ENT**

#### **Unit 3 (40 + 10 marks) (15 hrs)**

- (a) Anatomy & Physiology of external, middle & inner ear, auditory pathways, vestibular pathway. Diseases of the external middle and inner ear leading to hearing loss: Congenital malformations, traumatic lesions, infections, management of middle ear and Eustachian tube disorders.
- (b) Other causes of hearing loss – Facial paralysis, Tumors of the cerebello- pontine angle, Acoustic neuroma. Infection and management of inner ear diseases. Cochleo-vestibular diseases and its management.

#### **Unit 4 (15 hrs)**

- (a) Anatomy & Physiology of pharynx & oro-peripheral structures  
  
Causes of speech disorder, Disorders of the mouth, Tumors of the jaw and oral cavity, nasopharynx and pharynx, pharyngitis, Diseases of tonsils and adenoids.
- (b) Oesophageal conditions: Congenital abnormality – Atresia, Tracheo-oesophageal fistula, Stenosis, Short oesophagus. Neoplasm – Benign, Malignant, Lesions of the oral articulatory structures like cleft lip, cleft palate, submucosal cleft, Velopharyngeal incompetence.

#### **Unit 5 (15 hrs)**

- (a) Anatomy & Physiology of larynx – physiology of phonation / physiology of respiration.
- (b) Congenital diseases of the larynx – difference between an infant and an adult larynx. Stridor – causes of infantile stridor. Disorders of structure – Laryngomalacia, Bifid epiglottis, Laryngeal web, Atresia, fistula, Laryngeal cleft, Tumors and Cysts, Laryngitis, Laryngeal trauma and Stenosis. Neuromuscular dysfunctions of the larynx – Vocal cord palsy, Spastic dysphonia, Hypothyroidism, gastro oesophageal reflux disorders, Laryngectomy, artificial larynx, oesophageal speech, tracheo oesophageal puncture.

## LIST OF BOOKS

### Compulsory Reading:

- 1) Singh, I. (1996). Textbook of Anatomy with Color Atlas, Vol. III Jaypee Brothers.
- 2) Zemlin, W.R. (1981). Speech and Hearing Science: Anatomy and Physiology, (2nd Ed.). Englewood Cliffs, New Jersey: Prentice Hall.
- 3) Alper, C.M., Myers, E.N., Eibling, D.E. (2001). Decision making in Ear, Nose & Throat disorders. W.B. Saunders Company, Philadelphia.
- 4) Dhingra, P.L. (1992). Diseases of Ear, Nose & Throat. Churchill Livingstone, New Delhi.
- 5) Graym R.F., Hawthorne, M. (1992). Synopsis of Otolaryngology. Butterworth Heinemann Ltd, Oxford. 5<sup>th</sup> Edition.
- 6) Ramalingam, K.K., Sreeramamoorthy, B. (1990). A short practice of Otolaryngology. A.I.T.B.S. Publishers Distributors.
- 7) Scott-Brown, W.G., Ballantyne, J., Groves, J. Diseases of the nose & throat. Butterworth & Co., Ltd. 2<sup>nd</sup> edition, Chichester.
- 8) Inderbeer Singh (1996) – Text book of embryology.

### Additional / Optional Reading:

- 9) Palmer, J.M. (1984). Anatomy for Speech and Hearing, (3rd Ed.). New York: Harper and Row.
- 10) Perkins, W.H. and Kent, R.D. (1986). Textbook of Functional Anatomy of Speech, Language and Hearing. London: Taylor and Francis.
- 11) Gray's Anatomy. (37th Ed.). Williams Warwick and Dyson Banniser. (1989). Churchill Livingstone.

## **B.1.6 PSYCHOLOGY RELATED TO SPEECH AND HEARING**

**(80+20 marks)**

**(75 hrs)**

### **Objectives**

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

- Developmental Psychology
- Psychology of learning
- Neuro -Cognitive issues in the field of speech and hearing

### **Unit 1**

**(15 hrs)**

- Introduction to psychology- Definition, History and perspectives, Branches and scope, application of psychology in the field of speech and hearing.
- Introduction to Clinical psychology – Definition, Perspectives and models of mental disorders

### **Unit 2**

**(15 hrs)**

- Psychology of learning – Introduction, Definition of learning, Theories of learning, Classical conditioning, Operant conditioning and Social learning.
- Application of learning theories in the field of speech and hearing (therapeutic, educational and rehabilitative applications).

### **Unit 3**

**(15 hrs)**

- Cognitive Psychology – Introduction, Definition and theoretical perspectives (David Rumelhart and David Mc Clelland, Noam Chomsky, George miller, Allan Newell).
- Applications of cognitive psychology in the field of speech and hearing.
- Neuropsychology – Introduction, definition, principles of neuropsychological assessment, diagnosis and rehabilitation.
- Applications of neuropsychology in the field of speech and hearing.

### **Unit 4**

**(15 hrs)**

- Psychodiagnosits – Case history taking, Mental status examination, behavioural analysis, psychological testing.
- Counselling- Meaning and definition, types of counselling, Counselling in rehabilitation practice.

### **Unit 5**

**(15 hrs)**

- Developmental psychology:
- Introduction, Definition, Principles, Motor development, Emotional development
- Cognitive development- Definition, Piaget's theory
- Play as a therapeutic tool
- Personality development- Introduction, Stages, Hazards

## **LIST OF BOOKS**

### **Compulsory Reading:**

- 1) Hurlock, E.B. (1981). Child development VI Ed. Mc Graw Hill International Book Co.
- 2) Morgon C.T., King R.A., Robinson N.M. Introduction to Psychology. Tata McGraw Hill Publishing Co.
- 3) Coleman J.C. Abnormal Psychology and Modern Life, Taraporevala Sons & Co.

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

- 4) Siegal M.G. (Ed). (1987). Psychological Testing from Early Childhood Through Adolescence. International Universities Press.
- 5) Kline, P. (1993). The Handbook of Psychological Testing, Routledge,
- 6) Anastasi, A. (1999). Psychological testing, London: Freeman

**I YEAR**  
**CLINICAL PRACTICUM**  
**Speech Language Pathology**

1. Taking case history of a minimum of 10 individuals (5 normal & 5 clients with complaints of speech-language problems)
2. Label and identify structures of the speech mechanisms with the help of charts, models, specimens and computer software
3. Conduct Oral Peripheral Mechanism examination on at least 5 normal and 5 children/adults with speech language complaints
4. Analyze the following in normal subjects:
  - Pitch – normal / high / low
  - Loudness - normal / loud / soft
  - Quality – normal / hoarse / harsh / breathy / hyper - nasal / hypo –nasal
  - Rate of speech - – normal / fast / slow
  - Articulation – normal / abnormal
  - Fluency – normal / abnormal
  - Intelligibility – using the AYJNIHH intelligibility rating scale
5. Use varying range of pitch and loudness
  - Measure F0, Vital capacity, phonation duration, rate of speech, Alternate Motion Rates and Sequential Motion Rates, s/z ratio in 5 normal individuals
6. Measure in 2 normal samples (with the help of video or live)
  - Mean Length of Utterance (MLU)
  - Syllable structure
  - Syntactic structures
  - Communication intent
7. Use proformae for the following disorders:
  - Articulation
  - Voice
  - Fluency
  - Cleft lip and palate
  - Child language assessment
8. Use scale / test for :
  - Receptive language skills



- Expressive language skills

Receptive Expressive Emergent Language Scale (REELS)

3-Dimensional Language Acquisition Test (3DLAT)

Scales of Early Communication Skills for Hearing impaired children (SECS) and Indian tests

Maintenance of a clinical work record to be submitted at the end of the term

- 1) Observation of therapy of 10 clients with speech language disorders.
- 2) Observation of a minimum of 5 diagnostic clients and 5 therapy clients
- 3) Developing therapy material specific to 10 clients they have observed
- 4)

Writing of observation reports of the above

Maintenance of a clinical diary

### **I YEAR CLINICAL PRACTICUM Audiology**

1. Public information materials (videos, pamphlets, booklets etc.)
2. Taking case histories of 10 adults and 10 children with normal hearing & with hearing impairment under supervision.
3. Analyse 10-15 case histories of adults and children with hearing impairment.
4. Undergo pure-tone audiometry. Become familiar with different types of sound stimuli used for assessment of hearing and sound generator softwares.
5. Identify the different types of audiometers (at least 1 portable & 1 diagnostic) and their accessories referring to their respective manuals. Get familiar with the various parts of audiometers and their functions. Carry out listening checks of audiometers. Troubleshoot audiometers. List the different earphone/ear cushion combination, BC vibrator, study the same and report the status of the same.
6. Prepare 0 dB HL equivalent chart with different earphone/ear cushion combinations.
7. Obtain audiograms of 10 normal subjects.
8. Observe /participate during audiological evaluation on a variety of cases under supervision. Plot audiograms, calculate inter-aural attenuation, occlusion effect.

9. Obtain audiograms under supervision on 20 adult clients (AC & BC).
10. Obtain audiograms with masking (5 cases)
11. Classify audiograms as per:
  - Nature of hearing loss
  - Degree of hearing loss
  - Configuration of hearing loss
  -
12. Observe calibration of audiometers (Demonstration) – AC/BC/Sound field, instruments used, identifying the instruments, combination of equipments for different types of calibration, preparing correction charts.

## **B 1.1.1: COMPUTER FUNDAMENTALS**

**(80+20 marks)**

**(Total = 75 hrs)**

### **Unit 1:**

**(14 hrs)**

General features of a computer. Generation of computers. Personal computer, Desktop and laptop workstation, mainframe computer and super computers. Computer applications – signal processing, data processing, information processing, commercial, office automation, industry and engineering, healthcare, education, graphics and multimedia

### **Unit 2:**

**(16 hrs)**

Computer Organization, Central processing unit, Computer memory, primary memory and secondary memory. Secondary storage devices – magnetic semiconductor and optical media. Input and output units. OMR, OCR, MICR, scanner, mouse, Modem.

### **Unit 3:**

**(15 hrs)**

Computer hardware and software. Machine language and high level language. Application software. Computer program. Operating system. Computer virus, antivirus, and computer security. Elements of MS-DOS and Windows OS. Computer arithmetic. Binary, Octal and hexadecimal number systems. Algorithm and flowcharts. Illustrations. Elements of a database and its applications

### **Unit 4:**

**(16 hrs)**

Word processing and electronic spread sheet. An overview of MS-WORD, MS- EXCEL and MS-POWERPOINT (image, file formats, audio and video file formats, print file formats). Elements of Basic programming. Simple Illustrations.

### **Unit 5:**

**(14hrs)**

Network of computers. Types of networks, LAN, Intranet and Internet, Internet Applications. World wide web, e-mail, browsing and searching. Search engines, Multimedia applications. Case study : Networking of speech and hearing clinic, networking for tele-rehabilitation.

List of practical assignments (12 sessions of 2 hours each)

System use, keyboard, mouse operations. Word pad and paint brush, creating a folder and saving a document – two sessions

Simple MS-DOS commands – One session

Windows operating system - icons, menus and sub menus, my computer - sharing of files and folders – two sessions

Desktop publishing – preparation of a document using MS.WORD - Two sessions

Installation of a software ,virus scanning – illustration. One session.

Spreadsheet calculation using MS EXCEL .One session.

BASIC programming – illustrations – One session.

Internet use. Surfing, browsing ,search engines ,E-mail. Two sessions

### **LIST OF BOOKS**

1. Alexis Leon and Mathews Leon (1999): Fundamentals of information technology. Leon Techworld Pub.
2. Jain, S.K.(1999):Information Technology “O” level made simple. BPB Pub.
3. Jain, V.K.(2000): “O” Level Personal Computer software. BPB Pub.
4. Rajaraman, V.{1999}: Fundamental of Computers. Prentice Hall India.
5. Hamacher, Computer Organization. McGrawhill.
6. Alexis Leon: Computers for everyone. Vikas, UBS.
7. Anil Madaan: Illustrated Computer Encyclopedia. Dreamland Pub.
8. Sinha. Computer Fundamentals. BPB Pub.

**Second Year**  
**B.2.1. SPEECH LANGUAGE DIAGNOSTICS**  
**AND THERAPEUTICS**

**(80+20 marks)**

**(75 hrs)**

**Objectives**

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

1. Importance of client history, diagnostics and therapeutic approaches
2. Taking client history and therapy in general
3. Will get theoretical backup for clinical documentation

**A. Speech language diagnostics**

**Unit 1**

**(15 hrs)**

1. Client history – definition, description, utility & need. Essential factors to be included in the client history form – comparison of adults vs. children’s history – usefulness of the client history
2. Basic terminologies and concepts
  - Introduction to diagnostics
  - Terminologies in the diagnostic process
  - General principles of diagnosis
  - Diagnostic setup and tools

**Unit 2**

**(15 hrs)**

1. Diagnostic approaches and methods
  - Approaches to diagnosis – importance of diagnosis in client history, essential factors to be included according to the conditions/disorders. Methods of taking case history.
  - Interview – principles and techniques
  - Self-reports, questionnaire, observations.
  - Diagnostic models – SLPM, Wepman, Bloom and Lahey
  - Types of diagnoses – Clinical diagnosis, direct diagnosis, differential diagnosis, diagnosis by observation, diagnosis by exclusion, diagnosis by treatment, instrumental diagnosis, provocative diagnosis, provisional diagnosis; advantage/disadvantages
  - Team approach to diagnosis
  - Characteristics of a good clinician as diagnostician

## **B. Speech therapeutics**

### **Unit 3**

**(15 hrs)**

1. Basic concepts of therapeutics
  - Terminologies in speech therapeutics
  - General principles of speech and language therapy
  - Speech therapy set-up
  - Individual and group therapy
  - Integrated and inclusive education

### **Unit 4**

**(15 hrs)**

1. Procedures for speech-language therapy
  - Approaches to speech and language therapy – formal, informal and eclectic approaches
  - Types of speech and language therapy
  - Planning for speech and language therapy – goals, steps, procedures, activities
2. Techniques for:
  - Speech and language therapy for various disorders of speech and language
  - Importance of reinforcement principles and strategies in speech and language therapy, types and schedules of rewards and punishment

### **Unit 5**

**(15 hrs)**

1. Clinical documentation and professional codes
  - Documentation of diagnostic, clinical and referral reports
  - Introduction to parent counselling, facilitation of parent participation and transfer of skills, follow-up
  - Evaluation of therapy outcome
  - Ethics in diagnosis and speech language therapy
  - Self-assessment and characteristics of a clinician.

## **LIST OF BOOKS**

### **Compulsory Reading:**

- 1) Meyer, S.M. (1998). Survival guide for the beginning speech-language clinician. Maryland: Aspen Publishers.
- 2) Owens, R.E. (1999). Language disorders: Functional approach to assessment and intervention. Boston: Allyn & Bacon Inc.

- 3) Tomblin, E. et.al. (1994). *Diagnosis in Speech language pathology*. San Diego: Singular Publishing Inc.
- 4) Shipley, K.G., & McAfer, J.G. (1998). *Assessment in speech language pathology: A resource manual*. San Diego: Singular Pub Inc.
- 5) Klein, H.B., & Nelson, M. (1994). *Intervention planning for children with communication disorders: A guide for clinical practicum and professional practice*. New Jersey. Prentice Hall.

Additional / Optional Reading:

- 6) Frattali, C.M. (1998). *Measuring outcomes in Speech Language Pathology*. New York: Thieme.
- 7) Shames, G.H. (2000). *Counselling the communicatively disabled and their families*. Boston: Allyn & Bacon.
- 8) Hegde, M.N. (1985). *Treatment procedures in communicative disorders*. Texas. Pro Ed.
- 9) Darley, F.L., & Spriesterbach (1978). *Diagnostic methods in Speech Pathology*. San Diego: Singular Pub Inc.
- 10) Leith, W.R. (1993). *Clinical methods in communicative disorders*. Texas. Pro. Ed.

## **B 2.2 ARTICULATION AND PHONOLOGICAL DISORDERS**

**(80+20 marks)**

**(Total = 75 hrs)**

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

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

### **Unit 1**

**(15 hrs)**

- Review of phonological development and articulatory mechanism
- Fundamentals of Articulatory phonetics
- Definition and types of coarticulation
- Transcription methods in perceptual analysis
- Phonological processes – types, language specific issues, identification and classification of errors.

### **Unit 2**

**(15 hrs)**

- Distinctive features – types, language specific issues, identification of errors and analysis.
- Acoustic aspects of production and perception of speech sounds; use of spectrograms
- Factors related to articulation and phonological disorders:
  - Structural
  - Cognitive – Linguistic
  - Neurological
  - Psychosocial
  - Social
  - Metalinguistic

### **Unit 3**

**(15 hrs)**

- Assessment procedures: Types of assessment, sampling procedures, scoring procedures, criteria for selection of instruments for assessment.
- Assessment of Oral peripheral mechanism
- Speech sound discrimination, stimulability and oral stereognosis.
- Analysis and interpretation of data:
- Intelligibility and severity judgments
- Normative data
- Error patterns.
- Characteristics of disordered phonology and differential diagnosis



#### **Unit 4**

**(15 hrs)**

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

#### **Unit 5**

**(15 hrs)**

##### **Cleft Lip and Palate**

- Etiological factors
- Embryology of the Face and Palate
- Types of Cleft lip and Palate, Classification systems
- Syndromes
- Velopharyngeal mechanism- muscles and function; inadequacy, incompetency and insufficiency
- Speech and Language problems of individuals with Cleft
- Associated problems of individuals with Cleft
- Diagnostic procedures and Instruments used in Assessment of speech in Cleft palate
- Team Management: Composition, responsibilities and co-ordinator
- Treatment concepts
- Treatment procedures for speech
- Prosthetic speech appliances for patients with Cleft palate

##### **Glossectomy and Mandibulectomy**

- Effect of partial and Total Glossectomy on speech
- Characteristics of Glossectomy speech
- Rehabilitation of speech
- Prosthetic fitting, design, assessment
- Dysphagia specific to glossectomy and mandibulectomy: assessment and rehabilitation

#### **LIST OF BOOKS**

##### **Compulsory Reading:**

- 1) Bernthal, J.E. and Bankson, N.W. (1988). Articulation and Phonological Disorders. (3rd Ed.). New Jersey: Prentice Hall Inc.
- 2) Weiss, C.E., Lillywhite, H.S. and Gordon, M.E. (1980). Clinical Management of Articulation Disorders. St. Louis: C.V. Mosby

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

Additional/Optional Reading:

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

## **B.2.3 VOICE AND LARYNGECTOMY**

**(80+20 marks)**

**(Total = 75 hrs)**

### **Objectives:**

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

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

### **Unit 1**

**(15 hrs)**

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

### **Unit 2**

**(15 hrs)**

Etiology, incidence, prevalence, signs and symptoms of:

- Organic voice disorders: Laryngeal cancer also to be included here
- Non-organic voice disorders: eg: Functional disorders (Psychosomatic- Functional aphonia and physiological- voice abuse)
- Congenital voice disorders
- Neurological voice disorders

### **Unit 3**

**(15 hrs)**

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

## Unit 4

(15 hrs)

Laryngectomy:

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

## Unit 5

(15 hrs)

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

### **LIST OF BOOKS**

Compulsory Reading:

- 1) Boone, D.R. & McFarlane, S. C (1994): The Voice and Voice Therapy. (Fifth Ed.). Englewood Cliffs, Prentice-Hall, Inc. New Jersey.
- 2) Prater, R.J. and Swift, R.W. (1984): Manual of Voice Therapy. Little, Brown and Co, Boston.
- 3) Andrews . M.L. (1995): Manual of Voice treatment, Singular publishing group, San Diego.
- 4) Doyle, P C (1994) Foundation of voice and speech rehabilitation following laryngeal cancer. Singular publishing group. San Diego.

Additional/Optional Reading:

- 5) Brown. W.M.s. and others (1996) (ed): Organic voice disorders. Singular publishing group, Sandiego.
- 6) Joseph, C Stemple Leble, E Glaze, Bernick K Gerdeman. Clincial voice pathology. Theory & Management (II Edition)
- 7) Aronson, A.E. (1990): Clinical Voice Disorders, New York: Thieme, Inc.

- 8) Greene, M.C.L. and Mathieson, L. (1989): The Voice and Its Disorders. Whurr publications, London.
- 9) Case, J.L. (1991): Clinical Management of Voice Disorders, Pro-Ed, Austin.
- 10) Fawcus, M. (Ed.) (1991): Voice Disorders and Their Management. Singular Publishing. Group. San Diego
- 11) Salmon, S.J. and Mount, K.H. (Eds.) (1991): Alaryngeal Speech Rehabilitation. Prof-Ed. Austin.
- 12) Keith, R L & Darley (III Edition) Laryngectomee rehabilitation. Pro. Ed.Austin

## **B 2.4: MOTOR SPEECH DISORDERS**

**(80+20 marks)**

**(Total = 75hrs)**

### **Objectives:**

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

- Characteristics of motor speech disorders in children and adults
- Types of dysarthria, Apraxia (Developmental apraxia of Speech) and other conditions in children and adults
- Assessment and Management

### **Part A: Childhood Motor Speech Disorders**

**(38Hrs)**

#### **Unit 1**

**(12 Hrs)**

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

#### **Unit 2**

**(8 Hrs)**

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

#### **Unit 3**

**(9 Hrs)**

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

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

#### **Unit 4**

**(5 Hrs)**

Apraxia of speech in children or developmental apraxia of speech

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

#### **Unit 5**

**(4 Hrs)**

Definition - alternative and augmentative communication (AAC). Application of alternative and augmentative communication methods in developmental dysarthrias and developmental apraxia of speech- Symbol selection, techniques for communication, assessment for AAC candidacy, choosing an appropriate system and technique, training communication patterns, effective use of AAC

### **Part B: Adult Motor Speech Disorders DYSARTHRIA AND APRAXIA**

**(37Hrs)**

#### **Unit 1**

**(10 Hrs)**

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

#### **Unit 2**

**(8 Hrs)**

- d) Assessment of dysarthria

### Instrumental analysis

- Physiological and Electrophysiological methods
- Acoustics
- Advantages and disadvantages of instrumental analysis of speech in dysarthria.

Perceptual analysis – measures, standard tests and methods, speech intelligibility assessment scales, advantages and disadvantages of perceptual analysis of speech in dysarthria.

- e) Differential diagnosis of dysarthria from functional articulation disorders, apraxia of speech, aphasia and allied disorders.

### Unit 3

(6 Hrs)

- f) Management of dysarthria - Medical, surgical and prosthetic approaches - Speech therapy

- Vegetative exercises
- Oral sensori motor facilitation techniques
- Compensatory approaches – correction of respiratory, phonatory, articulatory and prosodic errors.
- Strategies to improve intelligibility of speech.

### Unit 4

(7 Hrs)

- g) Apraxia of speech in adults

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

### Unit 5

(6 Hrs)

Dysphagia:

- Definition
- Phases of normal swallow
- Etiology of swallowing disorders
- Assessment and Intervention



## **LIST OF BOOKS**

### **Compulsory Reading:**

- 1) Clinical Management of Motor Speech Disorders in Children. (1999). Caruso, F. J. and Strand, E. A. New York: Thieme.
- 2) Motor Speech disorders - A Treatment guide. (1991). Dworkin, P.J. St. Louis: Mosby Year Book. Inc.
- 3) Motor Speech Disorders: Substrates, Differential diagnosis and Management. (1995). Duffy, J. R. St. Louis: Mosby.
- 4) Pre feeding skills. Morris. S. and Klein. M. U.K.: Winslow

### **Additional/Optional Reading**

- 1) Working with Swallowing Disorders. Langley. J. U.K.: Winslow
- 2) Acquired Speech and Language disorders - A Neuroanatomical and Functional Neurological Approach. (1994). Murdoch, B.E. London: Chapman and Hall.
- 3) Neurology for Speech-Language Pathology. (1986). (2nd ed.) Love, R.J. and Webb, W.G. Butterworth.

## **B 2.5: DIAGNOSTIC AUDIOLOGY**

**(80+20 marks)**

**(Total = 75hrs)**

### **Objectives:**

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

- need for test battery approach
- indications for administering different audiological tests
- procedures for identifying an individual with pseudohypacusis
- administration and interpretation of tests for APD

### **Unit 1**

**(13 Hours)**

#### 1. Introduction to Diagnostic Audiology:

- Need for test battery approach in auditory diagnosis & integration of results of audiological tests.
- Indications for administering audiological tests to identify Cochlear pathology, Retro-cochlear pathology, functional hearing loss, Central processing disorders.

#### 2. Tests to differentiate between cochlear & retro-cochlear pathology

- ABLB, MLB
- SISI
- Test for adaptation
- Bekesy Audiometry
- Brief tone audiometry
- PIPB function

### **Unit 2**

**(10 Hours)**

#### 3. Immittance Audiometry

- Introduction
- Principle of Immittance audiometry
- Instrumentation
- Tympanometry – Tympanometric peak pressure, static immittance, gradient/tympanometric width.
- Reflexometry – Ipsilateral & contralateral acoustic reflexes, special tests
- Clinical application of Immittance evaluation
- Immittance evaluation in the pediatric population

### **Unit 3**

**(12 Hours)**

#### 4. Auditory Brainstem Response

- Introduction & classification of AEPs, Instrumentation, Test procedure, factors affecting Auditory Brainstem Responses, Interpretation of results & clinical application, Auditory Brainstem Response in pediatric response.
- ECOG, early response
- Middle & Long latency auditory evoked potentials – test procedure, factors affecting MLR & LLR, Interpretation of results & clinical application, Findings in the pediatric population.

## Unit 4

(15 Hours)

### 5. Otoacoustic Emissions

Introduction, classification of OAEs, Instrumentation, measurement of OAE procedure, interpretation of results & clinical applications, findings in the pediatric population.

### 6. Tests to detect Pseudohypoacusis

- Pure tone tests including tone in noise test, Stenger test
- Speech tests including Lombard test, Stenger test, Lip-reading test, Doefler-Stewart test.
- Identification of functional hearing loss

## Unit 5

(25 Hours)

### 7. Central Auditory Disorders

(a) Definition, terminologies used, incidence & causes, indications for administration of CAD test, rationale for CAD tests.

#### (b) Tests to detect Central Auditory Disorders

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

#### (c) Dichotic speech tests

- Dichotic digit test
- Staggered spondaic word test
- Dichotic CV test
- SSI with CCM
- Competing sentence test
- Other dichotic speech tests

#### (d) Binaural interaction tests

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

#### (e) Temporal ordering tasks

- Pitch pattern test
- Duration pattern tests
- Other temporal ordering tests

#### (f) Variables influencing Central Auditory Assessment

- Procedural variables
- Subject variables

- (g) Test findings in subjects with central auditory disorders
  - Brainstem lesion
  - Cortical & hemispheric lesion
  - Interhemispheric dysfunction
  - CAPD in children
  - CAPD in elderly
  
- (h) Other special test – Minimal auditory capability test, SPIN, HINT, CST.

### **LIST OF BOOKS**

#### Compulsory Reading:

1. Hodgson, H.R. (1980) Basic Audiologic Evaluation, London Williams and Wilkins.
2. Martin, F.N. (1991), Introduction to Audiology, IV Edition, New Jersey: Prentice Hall.
3. Martin, H (1987), Speech Audiometry. Whurr Publisher, London
4. Newby, H.A. (1985), Audiology, New York: Appleton-Century-Crofts.
5. ISHA Battery

#### Additional Reading:

1. Beagly, H.A. (Ed.) (1981). Audiology and Audiological Medicine. Vol. 1, Oxford University Press.
2. Bess and Humes (1990) Audiology - Fundamental. Williams and Wilkins, London.
3. Davis and Silverman, (Latest Edition). Hearing and deafness. Holt, Rinehart & Winston, London.
4. Rose, D.M. (Ed.) 1978), Audiological Assessment, New Jersey: Prentice Hill.
5. Relevant IS documents

## **B 2.6 TECHNOLOGY & AMPLIFICATION DEVICES FOR PERSONS WITH HEARING IMPAIRMENT**

**(80+20 marks)**

**(Total = 75 hrs)**

### **Objectives:**

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

- basics of electricity, electronics and digital processing
- transducers
- components and features of hearing aids
- electroacoustic characteristics
- selection of hearing aids

### **PART A:**

#### **Unit 1**

**(15 hrs)**

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

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

#### **Unit 2**

**(15 hrs)**

1. Microphones as transducers. Velocity microphones. uni-directional microphones. Microphone impedance and sensitivity. Loudspeakers as transducers. Structure of a dynamic loudspeaker. Air suspension. Baffles and enclosures. Horn speakers. Multi-speaker systems. Loudspeaker Efficiency, Loudspeaker power and distortion. Recording and Reproduction of sound. Recording characteristics. Dynamic Range, Stereophonic recording. Magnetic tape recording and playback. Tape speed and frequency response, Bias and equalization, Tape noise, Digital Tape recording, CD ROM recording
2. Measuring Instruments - Multi-meter. Cathode ray oscilloscope. Sine wave generator. Function Generator, Frequency counter, Measuring microphones, Sound Level Meter, Integrated Sound Level Meter, Artificial ear, Artificial Mastoid, Couplers, Hearing aid test box, Measurement of different types of sound

### **PART B:**

#### **Unit 3**

**(15 hrs)**

- a) Historical development of hearing aids
  - Non-electrical hearing aids
  - Electric hearing aids
- b) Basic elements of hearing aids: Microphone, Amplifier, Receiver, Cords, Batteries

- c) Directional hearing aids, modular hearing aids  
 Routing of signals, head shadow / baffle / diffraction effects  
 Output limiting: Peak clipping, compression  
 Extended low frequency amplification, frequency transposition (Bone anchored hearing aid, Master Hearing aids)
- d) Signal processing in hearing aids
  - BILL, TILL, PILL
  - Programmable and digital hearing aids
  - Signal enhancing technology

#### **Unit 4**

**(15 hrs)**

Electroacoustic Characteristics & measurements for hearing aids

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

#### **Unit 5**

**(15 hrs)**

Hearing Aid selection

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

### **LIST OF BOOKS**

#### **Compulsory Reading:**

1. Skinner HW (1988), Hearing aid evaluation, Prentice Hall, Englewood Cliffs, HJ.
2. Pollack M (1980) Amplification for the hearing impaired. Grune and Stratton, NY.
3. Basic Electronics: A text-lab manual; Paul B Zbar, Albert, P. Malvino. (5<sup>th</sup> Edn), Mc Graw Hill Inc, (1983)

### Additional Reading:

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

**B 2.7 PAEDIATRIC AUDIOLOGY**  
**(80+20 marks)** **(Total = 75 hrs)**

**Objectives:**

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

- development of auditory system and behaviour
- early identification procedures using subjective and objective measures
- diagnostic tests for the paediatric population

**Unit 1** **(15 hrs)**

- a) Development of human auditory system
  - Basic embryology
  - Embryology of the auditory system
  - Relevance of the information with special reference to syndromes
- b) Development of auditory behaviour
  - Prenatal hearing
  - New born hearing
  - Auditory development from 0-2 years

**Unit 2** **(15 hrs)**

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

**Unit 3** **(15 hrs)**

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

**Unit 4** **(15 hrs)**

- a) Hearing testing in neonates and infants:
  - Behavioural Observation Audiometry (BOA)
  - Conditioning techniques including CORA, VRA and its modifications, TROCA, Play audiometry.
- b) Speech Audiometry in children
  - Tests & material used to obtain:



- Speech Detection Threshold (SDT)
- Speech Recognition Threshold (SRT)
- Speech recognition tests including VASC, WIPI, NuChip, Glendonald Auditory Screening Procedure (GASP), Early Speech Perception Test (EST), Speech tests developed in India.

Factors affecting speech audiometry results in children  
BC speech audiometry

## Unit 5

(15 hrs)

- Unilateral hearing loss in children
- Hearing in children with multiple handicap and special population
- Auditory neuropathy in children
- Central Auditory Processing Disorders in children  
Signs/symptoms  
Screening tests
- Functional hearing loss in children  
Signs/symptoms  
Tests

### **LIST OF BOOKS**

#### Compulsory Reading:

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

#### Additional Readings:

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

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

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

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

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

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

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

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

## YEAR 2

### CLINICAL PRACTICUM IN SPEECH LANGUAGE PATHOLOGY

1. Carry out informal and formal assessment procedures for the following aspects of speech and language (from a normal child sample)
  - i)
    - Pre-linguistic skills
    - Non-verbal communication
    - Child directed speech
  - ii)
    - Semantics
    - Syntax and morphology
    - Pragmatics
  - iii)
    - Phonological process and its analysis
    - Speech intelligibility

Transcription of the sample in IPA should be done.
2. Familiarization of the tools used for evaluation and treatment of Childhood communication disorders, Articulation and Phonological Disorders, Maxillofacial anomalies:
  - Receptive Expressive Emergent Language Scale
  - Scale for Early communication Skills in Hearing Impaired children
  - 3-Dimensional Language Acquisition Test
  - Northwest Syntax Screening Test
  - Bankson's Language Screening Test
  - Test for Examining Expressive Morphology
  - Autism Behaviour Composite Checklist and Profile
  - Linguistic Profile Test
  - Tests for learning Disability
  - Screening Test for Developmental Apraxia of Speech
  - Articulation assessment tests in different Indian languages
  - Other Indian tests and materials available
3. Presentation of 5 cases of detailed assessment and therapy plans (1 each at least under each category), using information from relevant proformae, tests administered and treatment options
4.
  - i) Perceptual analysis of 5 normal and 5 abnormal voice disorder samples
  - ii) Measurement of the following parameters in 5 normal samples and 5 samples with voice disorders:
    - Measurement of F<sub>0</sub>, Amplitude, Diadochokinetic Rate, Maximum Phonation Duration, s/z ratio, Vital capacity and Mean Air Flow Rate
    - Exposure to Electrolottogram and Perturbation measurements using software
    - Measures of suprasegmental aspects

- Identification of place, manner and voicing on spectrograms
  - Nasalance measurements in normal and cleft palate speech
5.
    - Transcription and analysis of phonological processes in motor speech disorders in children using IPA
    - Familiarization with cerebral palsy assessment, reflex testing
  6. Planning and executing a minimum of 5 cases (including child and adult) for approximately 5 sessions each and preparation of the following:
    - Carry out baseline evaluation
    - Preparation of pre therapy reports
    - Develop proficiency in using various therapy techniques for childhood communication disorders, voice disorders, articulation and phonological disorders
    - Provide guidelines for home-based intervention in the form of home training programs/modules for the above mentioned disorders
    - Making appropriate referrals and preparing sample referral letters to various professionals connected with the above mentioned disorders
    - Being aware of various centers available for rehabilitation (local,national, international)
  7. Counselling parents of children with childhood communication disorders, voice disorders, articulation and phonological disorders; Compiling relevant counselling points pertaining to each of the above mentioned disorders
  8. Maintaining audio samples used for the practical analysis
  9. Practice in writing sample diagnostic and therapy reports (for real/hypothetical cases)
  10. Compiling the clinical work done into a clinical work record for submission

**YEAR 2**  
**CLINICAL PRACTICUM IN AUDIOLOGY**

**Section A: Diagnostic Audiology**

1. Familiarization of instrumentation for speech audiometry, immittance audiometry, sound field-testing.
2. Complete pure tone audiometry (with AC/BC, unmasked/masked), interpretation of audiograms, identifying indicators for special/further diagnostic testing, writing case review (25 cases)
3. Speech Audiometry: familiarizing with speech test material in at least 2 Indian languages, mastering live voice presentation/recorded presentation, administering SAT, SRT, WRS, MCL, UCL, PI/PB function test.
4. Collection of Speech Audiometry test materials in Indian languages.
5. Speech Audiometry on 10 normal subjects, and 20 cases with conductive hearing loss, sensorineural hearing loss and functional hearing loss. Interpretation of speech audiometry results.
6. Holistic audiological assessment for differential diagnosis (Cochlear & Retro cochlear):
  - Routine pure tone & speech audiometry
  - Administering special tests using pure tone: Tone Decay Test, STAT, SISI, ABLB, MLB, SPAR, Test for functional hearing loss.
7. Immittance Audiometry (minimum of 5 cases) – PVT, Tympanometry, Acoustic Reflex testing (ipsi & contra). Interpretation of the findings taking into consideration the ENT reports.
8. Auditory Brainstem Response (ABR) & Oto-Acoustic Emissions (OAE) –
  - Preparation of the patient
  - Informing the patient/caregiver with respect to the procedure
  - Electrode montage
  - Conduct the procedure with respect to test protocol (5 cases each)
  - BC-ABR, Tone burst ABR

**Section B: Rehabilitative Audiology**

1. Speech and language characteristics of the deaf
2. Management of post-lingual hearing impaired.
3. Role-play activities for teaching language to the hearing impaired.
4. Prepare schedules for educational placement of 5 hearing impaired children having different hearing capacities.

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

### **Section C: Paediatric Audiology**

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

## **B 2.1.2 INDIAN CONSTITUTION**

**(80+20 marks)**

**(Total = 75 hrs)**

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

### **Unit 1: Indian Constitution: Its Philosophy and Framing (14 Hrs)**

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

### **Unit 2: The Union & State Legislature (16 Hrs)**

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

### **Unit 3: The Union & State Executive (15Hrs)**

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

### **Unit 4: The Judiciary (16 Hrs)**

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

### **Unit 5: Issues (14 Hrs)**

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

### **LIST OF BOOKS**

1. D.D. Basu : Introduction to the Constitution of India
2. Granville Austin : India's Constitution – Cornerstone of a Nation
3. Granville Austin : Working of a Democratic Constitution - The Indian Experience
4. J. C. Johari : Indian Government and Politics Vol. 1 & 2

5. J.R. Siwach : Dynamics of Indian Government & Politics
6. D.C. Gupta : Indian Government & Politics
7. M.V. Pylee : India's Constitution
8. H.M. Rajasekhar : Bharatha Sarkara mattu Rajkiya
9. M.P. Bhuvaneshwara Prasad : Bharathiya Samvidhana Parichaya
10. S.K. Kabburi : Bharata Samvidhana
11. K.J. Suresh : Bharata Samvidhana
12. D.T. Deve Gowda : Bharata Sarkara mattu Rajkiya
13. Lohitashwa : Bharata Samvidhana

**Third Year**

**B 3.1: FLUENCY AND ITS DISORDERS**

**(80+20 marks)**

**(Total = 75hrs)**

**Objectives:**

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

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

**Unit 1**

**(15Hrs)**

- Fluency: Definition, development of fluency, factors influencing the development
- Definitions of intonation, stress and rhythm- Development of intonation, rhythm, stress – their implications to therapy
- Measures of fluency and other prosodic aspects

**Unit 2**

**(15Hrs)**

Stuttering: definition, nature, incidence and prevalence

- Normal non fluency; primary stuttering; secondary stuttering
- Development of stuttering
- Cluttering and neurogenic stuttering

**Unit 3**

**(15Hrs)**

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

**Unit 4**

**(15Hrs)**

- Assessment of stuttering;
- Associated problems
- Differential diagnosis of developmental stuttering, neurogenic stuttering, cluttering, normal non fluency, spasmodic dysphonia

**Unit 5**

**(15Hrs)**

- Prevention
- Therapy; rationale; prolongation; shadowing; habit rehearsal technique, DAF, masking, shock therapy, desensitization, timeout, airflow and modified airflow technique; sequence of therapy procedures
- MIDVAS
- Transfer and maintenance
- Measurement of progress; naturalness rating
- Relapse and recovery



## **LIST OF BOOKS**

### Compulsory Reading:

- 1) Curlee and Perkins (Ed.). (1985): Nature and treatment of stuttering. Taylor and Francis, London.
- 2) Silverman, F.H. (1992). Stuttering and other fluency disorders. Prentice Hall, Inglewood Cliffs.
- 3) Peter and Guitar (1991). Stuttering- An integrated approach to its nature and treatment

### Additional/Optional Reading:

- 1) Bloodstein, O. (1993): Stuttering. Allyn and Bacon, Boston.
- 2) Fawcus, M. (1995): Stuttering. Whurr Publishers, London.
- 3) Mark Onslow (1996) Behavioural management of stuttering. Singular Publishing Group Inc.

## **B 3.2: NEUROGENIC LANGUAGE DISORDERS IN ADULTS**

**(80+20 marks)**

**(Total = 75hrs)**

### **Objectives:**

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

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

### **Unit 1**

**(15Hrs)**

Neural bases of language: Neuroanatomical, neurophysiological and neurochemical correlates for language function

- Pathophysiology of neurological lesions affecting speech, language and hearing; concepts of recovery, reorganization and relearning
- Theoretical considerations in neurogenic language disorders: Competence Vs Performance; loss Vs Interference, Regression hypothesis, multilingualism, Uni-dimensional Vs multidimensional breakdown

### **Unit 2**

**(15Hrs)**

- Definitions of Aphasia
- Etiology
- Classification of aphasia based on anatomical, linguistic and psycholinguistic aspects
- Clinical features: Linguistic, psycho-social, neuro-behavioural
- Associated problems in aphasia: their definition, classification and clinical features

### **Unit 3**

**(15Hrs)**

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

**Unit 4****(15Hrs)**

- Other language disorders in adults: Introduction, Etiology, clinical profile, assessment and management
  - Traumatic Brain Injury
  - Right Hemisphere Damage Disorder
  - Primary Progressive Aphasia
  - Language disorders in Dementia
- Differential diagnosis of Adult Neurogenic disorders

**Unit 5****(15Hrs)**

- Intervention: Prognostic indicators, Spontaneous recovery; General principles of therapy; specific techniques (Melodic Intonation therapy, Visual Action therapy, Schuell's Auditory stimulation, Thematic language stimulation and the others
- Team approach; Group therapy; Family support-preparing family, friends and colleagues on what to expect and how to deal with aphasic as a person; Counseling regarding role of family; Individual counselling and spouse and family counselling
- AAC

**LIST OF BOOKS****Compulsory Reading:**

- 1) Understanding Aphasia. (1993). Goodglass, H. Academic Press Inc.
- 2) Davis, G. A. (1993). A Survey of Adult Aphasia and Related Language Disorders Prentice Hall Inc.
- 3) Chapey, R. (1994). (Ed). Language Intervention Strategies in Ault Aphasia. Williams and Wilkins Publication

**Additional/Optional Reading:**

- 1) Speech and Language Evaluation in Neurology: Adult Disorders. (1985). Ed. Darby, J. K. Grune and Stratton Inc.
- 2) Acquired Speech and Language Disorders. (1994). Murdoch, B. E. London: Chapman and Hall.
- 3) Aphasia and Related Language Disorders. (1990). LaPointe, L. L. Theime Medical Publishers.

## **B 3.3 REHABILITATIVE AUDIOLOGY**

**(80+20 marks)**

**(Total = 75 hrs)**

### **Objectives:**

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

- speech reading
- auditory learning
- management of individuals with additional problems
- assistive listening devices
- implantable devices

### **Unit 1**

**(15 hrs)**

1. Speech reading
  - (a) Definitions
  - (b) Need
  - (c) Visibility of speech sounds – audio visual perception vs. visual perception
  - (d) Visual perception of speech by the hard of hearing
  - (e) Tests for speech reading ability, including Indian Tests
  - (f) Speech reading activities
2. Factors influencing speech reading
  - (a) Methods of training: analytical vs. synthetic; (including speech tracking)
  - (b) Individual and group training

### **Unit 2**

**(15 hrs)**

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

### **Unit 3**

**(15 hrs)**

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

### **Unit 4**

**(15 hrs)**

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

## Unit 5

(15 hrs)

### 1. Implantable Devices

- Middle Ear Implants and BAHA (Bone Anchored Hearing Aid)
- Cochlear Implants
- Brainstem Implants

Components, Candidacy, Advantages and Complications for the same.

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

## LIST OF BOOKS

### Compulsory Reading:

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

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

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

### Additional Reading:

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

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

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

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

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

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

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

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

BIS, ANSI & IEC Specifications

## **B 3.4 NOISE MEASUREMENT AND HEARING CONSERVATION**

**(80+20 marks)**

**(Total = 75 hrs)**

### **Objectives:**

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

- effects of noise
- measurement of noise and vibration
- audiological findings in noise induced hearing loss
- legislations related to noise

### **Unit 1:**

**(15 hrs)**

a) Noise in the environment and effects of noise:

- Definition of noise
- Sources – community, industrial, music, traffic and others
- Types – steady & non-steady.

b) Auditory effects of noise exposure

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

c) Non-auditory effects of noise exposure

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

### **Unit 2:**

**(15 hrs)**

Audiometry in NIHL

Puretone audiometry:

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

Speech audiometry:

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

Other audiological evaluations:

- Impedance audiometry
- ERA
- OAE
- Tests for susceptibility

**Unit 3:** (15 hrs)

Noise & vibration measurement

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

**Unit 4:** (15 hrs)

Hearing conservation:

Need for hearing conservation program, steps in hearing conservation program

Ear protective devices: (EPDs)

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

**Unit 5:** (15 hrs)

Legislations related to noise:

- Damage Risk Criteria (DRC) – definition, historical aspects, use of TTS and PTS, information in establishing DRC, - Committee on Hearing Bioacoustics & Biomechanics (CHABA), Air Force Regulation (AFR 160-3), American Academy of Ophthalmology & Otolaryngology (AAOO), ASA-Z 24.5, Damage risk contours, Walsh – Healey Act, Occupational Safety & Health Act (OSHA), Environmental Protection Agency (EPA), Indian noise standards.
- Claims for hearing loss: Fletcher point eight formula, AMA method, AAOO formula, California variation in laws, factors in claim evaluation, variations in laws and regulations, date of injury, evaluation of hearing loss, number of tests.
- Indian studies/acts/regulations, American acts.

**LIST OF BOOKS**

1. Bruel, and Kjaer, (1982), Noise Control - Principles and practices.
2. Harris, C.M. (Ed.2), Handbook of Noise Control New York: McGraw-Hill.
3. Kryter, K.D. (1970). The effects of noise on Man. New York: Academic Press.
4. Tempest, N (1985). The Noise Handbook. London: Assessment Press.
5. Sataloff, R.T. (1987). Occupational hearing loss. Marcel Dekker, Inc.
6. Trivedi, P.R. and Gurudeep Raj (1992). Noise Pollution, 1st Ed. New Delhi: Akashdeep Publishing House.

7. BIS Specifications - List attached

- IS Specifications - Noise Measurements.
- IS:7194-1973 Specification for assessment of noise exposure during work for hearing conservation purposes.
- IS:9167-1979 Specification for ear protectors.
- IS:6229-1980 Method for measurement of real-ear protection of hearing protectors any physical attenuation of earmuffs.
- IS:9876-1981 Guide to the measurement of airborne acoustical noise and evaluation of its effects on man.
- IS:7970-1981 Specification for sound level meters.
- IS:9989-1981 Assessment of noise with respect to community response.
- IS:10399-1982 Methods for measurement of noise emitted by Stationary road vehicles.



## **B 3.5 COMMUNITY ORIENTED PROFESSIONAL PRACTICES IN SPEECH, LANGUAGE AND HEARING**

**(80+20 marks)**

**(Total = 75 hrs)**

### **Objectives:**

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

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

### **Unit 1**

**(15 hrs)**

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

### **Unit 2**

**(15 hrs)**

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

### **Unit 3**

**(15 hrs)**

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

### **Unit 4**

**(15 hrs)**

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

## **Unit 5**

**(15 hrs)**

1. Legislative support for rehabilitation- Rehabilitation Council of India Act (1992), Persons With Disability Act (1995), National Trust Act for the Welfare of Autism, CP, MR and Multiple Disabilities (1999), Environmental Act, Consumer Protection Act, Right To Information Act, UNCRPD Act.
2. The professional as a witness; documentation; handling legal issues

### **LIST OF BOOKS**

#### Compulsory Reading:

- Baquer, A. & Sharma, A. (1997). Disability: Challenges Vs Responses. CAN publications.
- Kundu, C.L., Status of Disability in India, (2000 & 2003) Ed. Kundu, C.L., RCI
- Narsimhan, M.C. & Mukherjee, A.K. (1986). Disability a Continued Challenge: Delhi willey eastern.
- WHO (2001). International classification of Functioning, Disability and Health. Geneva: WHO
- Professional Issues in Speech-Language Pathology and Audiology - A Text book. (1994). Lubinski R. and Frattali C. California: Singular Publishing Group

#### Additional/Optional Reading:

- Administration and Management of Programs for Young Children. (1995) Shoemaker, C. J. New Jersey : Prentice Hall Inc.
- Management of Child Development Centres. (1993) Hildebrand, V. (3rd Ed.). MacMillan Publishing Company.

## **B 3.6: BASIC STATISTICS & SCIENTIFIC ENQUIRY IN AUDIOLOGY & SPEECH LANGUAGE PATHOLOGY**

**(80+20 marks)**

**(Total = 75hrs)**

### **Objectives:**

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

- 1) The basics of statistics and its relevance to the field of speech and hearing
- 2) Carryout calculations of data related to basic statistical operations
- 3) Interpret statistical results at basic level and make inferences
- 4) Need for scientific enquiry
- 5) Documentation of research

### **Part A: Basic Statistics**

**(38Hrs)**

#### **Unit 1**

**(6 Hrs)**

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

#### **Unit 2**

**(9 Hrs)**

- Measures: scales of measurement; nominal, ordinal, interval and ratio scales
- Data collection: classification of data- class intervals, continuous and discrete measurement, drawing frequency curve, drawing inference from a graph

#### **Unit 3**

**(5 Hrs)**

- Measurement of central tendency: Need, types- mean, median, mode; working out these measures with illustrations
- Measures of variability: Need, types of range, deviation- average deviation, standard deviation, variance; interpretation

#### **Unit 4**

**(8 Hrs)**

- Normal distribution: general properties of normal distribution; theory of probability; illustration of normal distribution; area under normal probability curve
- Variants from the normal distribution: skewness, kurtosis; their quantitative measurement; Introduction to non-parametric statistics

#### **Unit 5**

**(10 Hrs)**

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

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

## **Part B: Research Methods in Audiology and Speech Language Pathology (37Hrs)**

### **Unit 1 (10 Hrs)**

- Scientific status of speech language pathology and audiology; speech language pathology and audiology as a behavioural science; need for scientific enquiry in speech language pathology and audiology; choosing a research problem, formulation of research question, statement of research question, formulation of hypothesis, types of hypotheses

### **Unit 2 (9 Hrs)**

- Parameters for scientific research in speech language pathology and audiology: Identification of variables and the types; types of data and its nature; measurement procedures in speech language pathology and audiology; instrumental and behavioural measures and recording procedures

### **Unit 3 (6 Hrs)**

- Sampling methods: types, methods of data collection
- Application of the above with hypothetical illustrations

### **Unit 4 (6 Hrs)**

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

### **Unit 5 (6 Hrs)**

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

## **LIST OF BOOKS**

### Compulsory Reading:

- 1) Hegde, M.N. Clinical Research in Communicative Disorders- Principles and Strategies. (1994) (2nd Edition). Pro-ed.
- 2) Pannbacker, M.H. and Middleton, G.F. (1994). Introduction to Clinical Research in Communication Disorders. San Diego: Singular Publishing.

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

Additional/Optional Reading:

- 1) Stein, F. and Cutler, S.K. (1996). Clinical Research in Allied Health and Special Education. San Diego: Singular Publishing Group Inc.
- 2) Portney, L.G. and Walkins, M.P. (1993). Foundations of Clinical Research. Connecticut: Appleton and Lange.
- 3) Woods, A., Fletcher, P. and Hughes, A. (1986). Statistics in Language Studies. Cambridge: University Press.

**YEAR 3**  
**CLINICAL PRACTICUM IN SPEECH LANGUAGE PATHOLOGY**

1. Understand aspects of informal and formal assessment for
  - i) Fluency disorders
  - ii) Neurogenic language disorders
  - iii) Motor speech disorders
2. Identify the Differential Diagnostic categories of these disorders
3. Familiarization on the use of various tests and materials available for assessment
  - i) Western Aphasia Battery
  - ii) Illinois Test of Psycholinguistic abilities
  - iii) Boston Diagnostic Aphasia Examination
  - iv) Revised Token Test
  - v) Right Hemisphere Language Battery
  - vi) Apraxia Battery for Adults
  - vii) Frenchay Dysarthria Assessment
  - viii) Stuttering Severity Instrument
  - ix) Stuttering Prediction Instrument
  - x) Indian tests and material available
4. Carry out assessment on atleast 1 case each from the above mentioned disorders with an assessment report and appropriate referral letters
5. Carry out therapeutic plan on a client with the above mentioned disorders and submit a report of the same.
6.
  - Conduct a fluency analysis in 4 normal samples (2 child sample and 2 adult sample) for the percentage of total disfluency and the individual disfluency on a conversation, narration and a reading task
  - Measurement of rate of speech (words per minute, syllables per second) in normals
  - Familiarization to different intonation, stress and rhythm patterns in speech samples (of different languages)
  - IPA transcription of dysfluent speech; calculating the severity using any of the formal tests
  - Comparing suprasegmental aspects of fluent and dysfluent speech samples
  - Comparing normal non-fluency speech sample and child stuttering sample along with SPI scores
7. Counselling parameters for the following groups of disorders:
  - Neurogenic language disorder (adult/geriatric; type)
  - Motor speech disorder (based on age and site of lesion)
  - Fluency disorders (age, motivation)
  - Being cognizant about the legislative support available and direct the same to the parents/caretakers
8. Preparing public education pamphlets, hand-outs on different disabilities

**YEAR 3**  
**CLINICAL PRACTICUM IN AUDIOLOGY**

**Section A: Hearing Aid Trial Postings**

1. Hearing aid trial: pre-selection of hearing aids, styles, EAC, other issues, inspection of ear moulds. Functional gain method (10 children & 10 adults). Concept of speech banana, aided audiogram.
2. Observing Real Ear Insertion Gain measurement (10 cases)
3. Pre-selection based on audiological evaluations (10 cases)
4. Hearing Aid trials:
  - Functional gain, REIG, other methods with monaural fitting, binaural fitting, Programmable hearing aid – Analog Digital
  - Explaining the benefits of hearing aid to the patient/caregiver
5. Counselling patients/caregivers regarding hearing aids – Care, maintenance, adjustments, tips to caregivers regarding acceptance of hearing aids (5 children & 5 adults), preparation of harness, cleaning of ear moulds. Binaural amplification and its uses.
6. Electro-acoustic evaluation of hearing aids (body level & ear level), with and without ear moulds. Equipment for analysis. Calibration of hearing aid analyzer.
7. Models and makes available in the market, their EAC, cost of hearing aids, its suitability to various audiogram configurations, age etc.
8. Specification sheets – BIS, ANSI, IEC with respect to hearing aids.
9. Administration of Self (Help) assessment scales.
10. Fitting of hearing aids for sloping hearing loss.

**Section B: Noise & Rehabilitative Technology**

1. Compile information on cochlear implants regarding candidacy, cost, places where it is done and rehabilitation of cases.
2. Calibration of pure tone audiometry (AC, BC, Speech)
3. Noise measurement and attenuation measurement of ear protection devices.
4. Holistic audiological assessment for differential diagnosis:
  - a. Speech: PI/PB Function, Stenger, BC Speech
  - b. Noise: SAL, SPIN, (10 cases)
  - c. Immittance audiometry: Basic tests, Acoustic Reflex Decay, Eustachian Tube function, SPARCompiling reports for the above.

### **Section C: Rehabilitation Audiology**

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



**B 3.1.1 ENVIRONMENTAL STUDIES**  
(80+20 marks) (Total = 75 hrs)

**Unit 1:** 6 hrs

The multidisciplinary nature of environmental studies  
Definition, scope and importance

**Unit 2:** 10 hrs

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

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

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

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

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

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

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

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

**Unit 3:** 9 hrs

Eco Systems  
Concept of an ecosystem  
Structure and function of an ecosystem  
Producers, consumers and decomposers  
Energy flow in the ecosystem  
Ecological succession  
Food chains, food webs and ecological pyramids  
Introduction, types, characteristic features, structure and function of the following Ecosystem:  
Forest ecosystem  
Grassland ecosystem  
Desert ecosystem  
Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

**Unit 4:**

10 hrs

Biodiversity and its conservation

Introduction – Definition, genetic, species and ecosystem diversity

Biogeographical classification of India

Value of biodiversity: consumptive use, productive use, social, ethical, esthetic and option values

Biodiversity at global, national and local levels

India as a mega diversity nation

Hot-spots of biodiversity

Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts

Endangered and endemic species of India

Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity

**Unit 5:**

8 hrs

Environmental Pollution

Definition

Causes, effects and control measures of:-

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

Solid waste management: causes, effects and control measures of urban and industrial wastes

Role of an individual in prevention of pollution

Pollution case studies

Disaster management: floods, earthquakes, cyclone and landslides

**Unit 6:**

9 hrs

Social issues and the environment

From unsustainable to sustainable development

Urban problems related to energy

Water conservation, rain water harvesting, watershed management

Resettlement and rehabilitation of people, its problems and concerns, case studies

Environment ethics, issues and possible solutions

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies

Wasteland reclamation

Environment Protection Act

Air (Prevention and Control of Pollution) Act.

Water (Prevention and control of pollution) Act

Wild life protection Act

Forest conservation Act

Issues involved in enforcement of environment legislation

Public awareness

**Unit 7:**

7hrs

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

**Unit 8:**

16 hrs

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

**LIST OF BOOKS**

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

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

Brunner R.C 1989, Hazardous Waste

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

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

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