

# Curriculum Framework

## Bachelor in Audiology and Speech – Language Pathology (B. ASLP)

### Norms and Guidelines Course Content

Effective from Academic Session 2017-18  
Four Years Duration



Rehabilitation Council of India  
B-22, Qutab Institutional Area,  
New Delhi - 110 016

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## 1.0 Nomenclature

As per UGC Notification of 2014, the nomenclature of the program shall be Bachelor in Audiology and Speech-Language Pathology. B. ASLP is the short form.

## 2.0 Objectives of the B.ASLP program

The objectives of the B.ASLP program are to equip the students with knowledge and skills to

function as audiologists and speech-language pathologists in different work settings

understand concepts in speech, language, communication, hearing and disability screen, evaluate, diagnose and assess the severity of different disorders related to speech, language, swallowing and hearing,

manage speech, language, swallowing and hearing disorders across life span

counsel persons with disorders of communication and their family members

rehabilitate persons with speech, language, swallowing and hearing disorders

prevent speech, language, swallowing and hearing disorders liaise with professionals in allied fields and other stake holders

implement public awareness and education program, undertake advocacy measures on behalf of and for persons with speech language and hearing disorders

## 3.0 Duration of the program

The program shall be of 4 academic years including 1 year of internship and should be completed within six years from the date of admission.

An academic year consists of two semesters, and each semester shall extend over a minimum period of sixteen weeks excluding examination days. The semesters shall be spread out as follows:

Odd semester – 1

July – December

Odd semesters – 3, 5, 7 June – October/November Even semesters – 2,

4, 6, 8 December – April

There shall be examinations at the end of each semester. There shall be a vacation of minimum 1 week after the examinations at the end of odd semesters and 3 weeks after the examinations at the end of even semesters.

Number of working days in a semester shall not be more than 100 days.

#### 4.0 Eligibility for admission <sup>1</sup>

- i. Candidates passed 10+2 or an equivalent examination from a recognized Board with minimum of 50% aggregate marks. Relaxation in the qualifying marks shall be as per rules and regulations of respective University / State/UTs or Central Government.
- ii. The applicant/candidate should have studied Physics, Chemistry and any one of the subject Biology / Mathematics / Computer Science / Statistics / Electronics / Psychology.
- iii. No age bar

#### 5.0 Program Structure

Time structure of the program shall be as follows:

16 weeks / Semester	16 weeks	
5 days / week	80 days	
7 hours / day	560 hours per semester	
Semester 1 Theory	6 papers x 60 hours	360 hours
Clinical		200 hours
Semester 2 Theory	4 papers x 60 hours	240 hours
Practicals		320 hours
Semester 3 Theory	4 papers x 60 hours	240 hours
Clinicals		320 hours
Semester 4 Theory	4 papers x 60 hours	240 hours
Clinicals		320 hours
Semester 5 Theory	4 papers x 60 hours	240 hours
Clinicals		320 hours
Semester 6 Theory	4 papers x 60 hours	240 hours
Clinicals		320 hours
Theory	360 + (240 x 5)	1560 hours
Clinicals	200+320 + (320 x 4)	1800 hours
Internship	18 weeks per semester	36 weeks

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<sup>1</sup> Modified as approved in 43<sup>rd</sup> General Council of Rehabilitation Council of India in its meeting held on

	5 days / week	180 days
	7 hours / day	1260 hours
Total: 6 semesters	560 hours x 6 semesters	3360 hours
Internship	630 hours x 2 semesters	1260 hours
Total	Theory	1560 hours
Total	Clinicals	3060 hours
<b>Grand Total</b>		<b>4620 hours</b>

16<sup>th</sup> February 2021 vide notification no. 2-6/ASLP/2003/RCI dated 7 May, 2021



## 6.0 Attendance

Minimum attendance shall be as stipulated by the respective University where the students are studying. However, attendance shall not be less than 80% in theory and 90% in Clinical/ Practicals in each semester to be eligible to appear for examination at the end of each semester.

Candidates who cannot appear for the examination for want of attendance will be declared as failed and will have to repeat the particular semester to be eligible to appear for exams subsequently.

Condonation of shortage of attendance in genuine cases shall be from the ViceChancellor of the respective University where the candidates are studying.

## 7.0 Examination Pattern

7.1 The examination pattern and papers shall be as shown in the table below:

No.	Title of the paper	Practical	IA	Exam	Total
B 1.1	Communication Sciences	--	25	75	100
B 1.2	Anatomy and Physiology of Speech and Hearing	--	25	75	100
B 1.3	Clinical Psychology	--	25	75	100
B 1.4	Linguistics and Phonetics	--	25	75	100
B 1.5	Electronics and Acoustics	--	25	75	100
B 1.6	Research Methods and Statistics	--	25	75	100
B 2.1	Neurology	--	25	75	100
B 2.2	Otolaryngology	--	25	75	100
B 2.3	Speech-Language Pathology	--	25	75	100
B 2.4	Audiology	--	25	75	100

B 2.5	Practicals (Speech-language Pathology)	--	25	75	100
B 2.6	Practicals (Audiology)	--	25	75	100
B 3.1	Voice and its Disorders	25	25	50	100
B 3.2	Speech Sound Disorders	25	25	50	100
B 3.3	Diagnostic Audiology - Behavioral Tests	25	25	50	100

B 3.4	Amplification Devices	25	25	50	100
B 3.5	Clinicals in Speech-Language Pathology	--	25	75	100
B 3.6	Clinicals in Audiology	--	25	75	100
B 4.1	Motor Speech Disorders in Children	25	25	50	100
B 4.2	Child Language Disorders	25	25	50	100
B 4.3	Diagnostic Audiology - Physiological Tests	25	25	50	100
B 4.4	Implantable Hearing Devices	25	25	50	100
B 4.5	Clinicals in Speech-Language Pathology	--	25	75	100
B 4.6	Clinicals in Audiology	--	25	75	100
B 5.1	Structural Anomalies & Speech Disorders	25	25	50	100
B 5.2	Fluency and its Disorders	25	25	50	100
B 5.3	Pediatric Audiology	25	25	50	100
B 5.4	Aural Rehabilitation in Children	25	25	50	100



B 5.5	Clinicals in Speech-Language Pathology	--	25	75	100
B 5.6	Clinicals in Audiology	--	25	75	100
B 6.1	Motor Speech Disorders in Adults	25	25	50	100
B 6.2	Language Disorders in Adults	25	25	50	100
B 6.3	Aural Rehabilitation in Adults	25	25	50	100
B 6.4	Audiology in Practice	25	25	50	100
B 6.5	Clinicals in Speech-Language Pathology	--	25	75	100
B 6.6	Clinicals in Audiology	--	25	75	100
B 7.1	Clinicals in Speech-Language Pathology	--	--	100	100
B 7.2	Clinicals in Audiology	--	--	100	100
		400	900	2500	3800

7.2 Course content shall be as in Annexure 1

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7.3 Practical exams at the end of 2 semester shall be University exam and shall be conducted by an external examiner along with an internal examiner. Record of practicals maintained by the students shall also be evaluated by the examiners.

7.4 Performance in at least two written tests and one group assignment shall be the basis for awarding internal assessment marks in each semester.

7.5 All clinical examinations shall be conducted by one internal and one external examiner. B7.1 and B7.2 in the above table shall be conducted at the end of the internship (8 semester).

8.0 Criteria for passing

The student is required to obtain a minimum of 50% in each of the theory papers, internal assessment, practical and clinical exams for a pass. Students will not be able to appear for University theory exam if they do not pass in their practical, internal assessment or clinical component. Students will have to pass the clinical examination of the given semester to proceed to the next semester.

#### 8.1 Carry-over of papers

Each paper should be successfully completed within 3 attempts including the first one.

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Students can start internship after the 6 semester exams. However, students who th fail in their clinical exam of 6 semester will have to discontinue internship. The candidates are permitted to carry over the theory courses until the end of the program.

#### 9.0 Clinical internship

All candidates shall complete a clinical internship of one academic year (10 months) th after the 6 semester. The rules and regulations of clinical internship shall be as in Annexure 2.

#### 10.0 Infrastructure for starting the course

Only those institutions which have the infrastructure as given in Annexure 3 can start the B.ASLP program after due formalities.

#### 11.0 Award of Degree

The University shall award the degree and issue certificate only after the candidates successfully complete all the University examinations and clinical internship.

#### 12.0 Others

On all other issues not mentioned in these rules and regulations like the pattern of question paper, grading, award of grace marks, and declaration of rank, among others, the rules and regulations of the respective University shall prevail.

Guidelines for implementation of Clinical Internship of B.ASLP program with effect from the academic session 2017-18

Objectives of the clinical internship are to:

facilitate transition from academic training to independent clinical responsibility, provide additional inputs to attain and maintain competence in the clinical management of persons with communication disorders,

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

provide training to understand professional responsibilities and ethical practices including :

Rights and dignity of patients.

Consultation and referral to other professionals.

Conduct and professional obligations to peers/patients/families and the community at large.

#### Guidelines

Internship is mandatory

Duration: One academic year (10 months) split in to two semesters (VII & VIII).

Eligibility: Internship will start immediately after the candidate completes the 6<sup>th</sup> academic and clinical training till the 6<sup>th</sup> semester. Students can start internship after

6<sup>th</sup>

the 6<sup>th</sup> semester exams. However, students who fail in their clinical exam of 6<sup>th</sup> semester will have to discontinue internship.

Structure and duration of posting

The respective parent institutions shall decide on the institutions where their students will be posted for internship. However, students can be posted for internship only at those institutions approved by the Rehabilitation Council of India.

Students will do internship at their parent institute for one semester and at an institute(s) outside the parent institute for one semester. Internship can be done at institutes like hospitals, special educational centers/schools, centers where clinical facilities for management of ASD, cochlear implantation, AVT etc. are available, centers which undertake empowering of mothers, centers for CP, and centers for LD, etc. Attempts must be made to provide clinical training to students in a variety of set ups.

It shall be mandatory to provide additional clinical training to students in such areas as management of neurologically afflicted persons, prevention and early intervention programs, community based rehabilitation, occupational health programs, structural abnormalities related to speech and hearing, etc.

Mode of supervision during internship: Supervision should generally be provided by a Speech-language Pathologist and Audiologist. However, in institute/centers where this is not feasible, supervision can be done by a specialist from an allied area like Otolaryngology, Neurology, Mental Health, Pediatrics, among others.

Maintenance of records by students: Every student shall 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.

Leave: Candidates should have an attendance of at least 90% during the internship period. Internship shall be extended by the number of days the student falls short of 90% attendance. Compensatory work for shortage of attendance must be completed th before the final clinical exams of 8 semester.

Stipend: As per the norms of the parent institute.

Grading and evaluation of student: All internees will be assessed based on their attendance, performance in the postings and presentation of log books. The mode of assessment and frequency of assessment will be prescribed by the institute. The student is required to repeat those postings in which his/her performance is below 40%.

Certification: The parent institute will award a certificate after successful completion of the internship and clinical examination (7.1 and 7.2 in the Scheme of examination). Supervised clinical hours spent during internship shall be included in the clinical competence certificate issued to students.

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

Infrastructure requirements for B.ASLP programs  
(Academic year 2017-18 onwards)

The following are the minimum requirements for starting/continuing a B.ASLP program. This should be read and interpreted along with the guidelines of RCI for inspectors for inspection of new/existing programs for recognition.

Personnel

	B.ASLP (Intake : 20 / year)	B.ASLP (Intake : 40 / year)
Core Faculty		
Professor- Speech Pathology & Audiology	--	1
Associate Professor- Speech Pathology & Audiology	1	2 (1+1)
Assistant Professor - Speech Pathology	2	2
Assistant Professor - Audiology	2	2
Clinical Staff		
Speech Pathologist - Gr. I	1	2
Speech Pathologist - Gr. II	1	1
Audiologist - Gr. I	1	2
Audiologist - Gr. II	1	1
Allied Faculty (Part time)		
Asst. Prof in Cl. Psychology	1	1
Asst. Prof in Electronics	1	1
Asst. Prof in Otolaryngology	1	1
Asst. Prof in Linguistics	1	1
Asst. Prof in Statistics	1	1
Asst. Prof in Neurology	1	1
Supporting staff - Technical		
Earmold technician	1	1
Bio-medical technician	1	1
Computer technician	1	1
Library & Information Officer	1	1
Library Assistant	1	1
Supporting staff - Administrative		
Secretary - Academics	1	1

@	Secretary - Clinic	1	1	*
	Secretary - Admin	1	1	

A minimum-of 2 faculty members in the core areas of  
 Speech-language Pathology  
 and Audiology is a must to get approval to start the B.ASLP program. Two more faculty  
 members in the core areas must be added before the commencement of the

second year. Full contingent of staff must be in place before the commencement of the third year. \$ The B. ASLP program should be conducted by an independent institute/ college/ department in a university / department in a hospital/rehabilitation unit headed and coordinated (administrative/academic and clinical) by a full-time Audiologist and Speech Language Pathologist professional only. His/her qualification and experience should not be less than that of an Associate Professor.

Only on completion of two batches of B.ASLP, an institution becomes eligible to increase the intake subject to availability of recommended infrastructure.

All aided and Government institutions shall implement reservations in admission as per Government rules from time to time. However, there shall be increase in infrastructure commensurate with increase in the number of seats as per reservation policy.

Note: All training institutions must have given infrastructure and faculty and professional requirement before commencement of academic session 2018-19.

#### Faculty and Professional qualification of in the core areas

Designation	Qualifications	Pay Scale
Professor	Essential a) M.Sc(Sp & Hg)/MASLP/equivalent and Ph.D (in core areas) b) 10 years teaching experience at PG/UG level c) PhD (in core areas*) d) Minimum of five Publications with cumulative impact factor of 05. e) Valid RCI registration Desirable: Experience of running under-graduate training programs	As per UGC guidelines
Associate	Essential	As per UGC



Professor	<ul style="list-style-type: none"> <li>a) M.Sc(Sp &amp; Hg)/M.ASLP/equivalent</li> <li>b) 8 years of teaching experience at graduate/post graduate level;</li> <li>c) Minimum of five Publications with cumulative impact factor of 05.</li> <li>d) Valid RCI registration Desirable: Ph.D (in core areas*) Experience of running under-graduate training programs</li> </ul>	guidelines
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Assistant Professor-Audiology	<p>Essential</p> <ul style="list-style-type: none"> <li>a) M.Sc(Sp &amp; Hg)/M.ASLP or its equivalent / M.Sc.(Audiology)</li> <li>b) 2 years teaching/ clinical / research experience</li> <li>c) Valid RCI registration Desirable: <ul style="list-style-type: none"> <li>a) Ph.D (in core area*)</li> <li>b) Publications</li> </ul> </li> </ul>	As per UGC guidelines
Assistant Professor-Speech Language Pathology	<p>Essential</p> <ul style="list-style-type: none"> <li>a) M.Sc(Sp &amp; Hg)/M.ASLP or its equivalent / M.Sc.(Speech Language Pathology)</li> <li>b) 2 years teaching/ clinical / research experience</li> <li>c) Valid RCI registration Desirable: <ul style="list-style-type: none"> <li>a) Ph.D (in core area*)</li> <li>b) Publications</li> </ul> </li> </ul>	As per UGC guidelines
Audiologist Grade I	<p>Essential</p> <ul style="list-style-type: none"> <li>M.Sc(Sp &amp; Hg) / M.ASLP or its equivalent</li> <li>M.Sc.(Audiology)</li> <li>Valid RCI registration</li> <li>Desirable: 1 year experience in the field</li> </ul>	
Speech Pathologist	<p>Essential</p> <ul style="list-style-type: none"> <li>M.Sc(Sp &amp; Hg) / M.ASLP/ or its equivalent</li> </ul>	

Grade I	M.Sc.(Speech Language Pathology) Valid RCI registration Desirable: 1 year experience in the field	
Speech Pathologist/ Audiologist Grade II	Essential B.Sc (Sp & Hg)/B.ASLP or its equivalent Valid RCI registration	

\*Audiology & Speech Language Pathology

#### Clinical

Facility for diagnosis, management and rehabilitation of all types of speech, language, hearing and swallowing disorders in clients of all age groups from infancy to geriatrics.

Size of clinical population shall be 2 per student per semester in a given area (read in consonance with the above clause).

#### Library

Library should accommodate at least 30% of the staff and students of the institute at any given time.

Library should have internet and photocopying facilities.

Books mentioned under 'Recommended reading' under each paper must be available. There shall be addition of a minimum of two books every year for each subject of study.

There should be at least 5 journals (2 each in Speech-language pathology and Audiology, and 1 general) for the B.ASLP program

#### Library Staff

Library and Information Officer - 1

Qualification: B.Lib Sci with one year experience in managing a technical library

Library Assistant - 1

Qualification: Diploma in Library Science

Space

Sl.No.		Size	Number
Academic Space			
a)	Class Rooms	Space @ 10 sq. ft per student + 20 Sq. ft for the teacher: Room with a minimum area of 220 sq. ft.	2 class rooms for every 20 students
b)	Seminar hall	Space to accommodate 50% of total student strength	1
c)	Labs to transact practicals	Space to accommodate 50% of total student strength	2
d)	Computer lab/multipurpose hall	Space to accommodate 50% of total student strength	1
e)	Library	Space to accommodate 50% of total student strength	1
Clinical Space			
f)	Room for reception where patients are registered.	10' x 10'	1 room for every 20 students
g)	Room for case history, diagnostic room and interviews	6' x 8'	2 rooms for every 20 students
h)	Speech Lab (Quiet Room) for	15' x 20'	1 room for every 20 students

	diagnostic purposes.		
i)	Recording room (Sound proof)	8' x 10'	1 room for every 20 students
j)	Speech Therapy Rooms/ Cabins (completely partitioned/sound isolated)	6' x 8'	5 rooms for every 20 students
k)	Two room audiometric suite with control and test room situation. (Sound Proof. ANSI 1977)	10' x 16'	1 for every 20 students
l)	Room for hearing aid fitting	10' x 15'	1 room for every 20 students
m)	Earmold Lab & Hearing aid repair lab	12' x 12'	1 room for every 20 students
n)	Electro physiological test room	10' x 10'	1 room for every 20 students
Administrative Space			
o)	Staff Room	15' x 20'	1
p)	Individual work space (with provision for storage facilities)	10' x 10'	1 room for every 2 faculty/staff members
q)	Academic/admini strative office	10' x 10'	1

r)	Principal's Office room	10' x 10'	1
Other Facilities			
s)	Sanitary facilities	Separate facility for males and females, staff/students and clinical population	
t)	Hostel	Separate hostel for Men and Women with dining facility. Accommodation for at least 50% of the student population.	
u)	Barrier free access		
v)	Space for recreation - both indoor and outdoor		

Equipment - Audiology (Minimum for a batch of 20 students)

Sl. No.	Equipment	For a batch of 20 students (Clinical)
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 for Lab
b)	Portable audiometer with provision of A.C. and B.C. testing : desirable screening audiometer	1
c)	Clinical immittance audiometer (Desk model) with accessories.	1+1 for Lab
d)	Portable/Screening impedance audiometer	1
e)	Clinical BSEAR	1+1 for Lab
f)	Otoacoustic emission	1+1 for Lab
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,	A representative

	canal and spectacle hearing aid (1 each), FM, Digital, Programmable aids, ILS Assistive listening devices.	sample of hearing aids and assistive devices
i)	IGO and HAT for hearing aid trial and making electroacoustic measurements.	1
j)	Stop watch	2
k)	Otoscope	4
l)	Auditory training and Screening material	
m)	Ear Mould Lab-fully equipped	

Equipment - Speech-Language Pathology (Minimum for a batch of 20 students)

Sl. No.	Equipment	For a batch of 20 students
a)	Speech and Language Tests (Tests for differential diagnosis) (English and local language)	As per course requirement
b)	Proformae	As per course requirement
c)	Speech Therapy material (Indian, Language and English)	As per course requirement
d)	Toys and Books	
e)	Mirrors - Size 2' x 3'	4
f)	Speech Trainer	1
g)	Portable and Digital tape recorders	2
h)	Hi-Fi Ampli Deck with speakers and good microphone	1
i)	Spirometer	1 (+1 for lab)
j)	Computer PC-AT with VGA Color Monitor & printer for clinic administration	1
k)	Software for diagnostic/therapeutic use and computer with necessary accessories	1 (+1 for lab)

l)	Stroboscope/VL scope/ FEES (by possession or access)	1
m)	Electroglottograph	1
n)	Audio cassettes for training/CDs	
o)	Pitch pipe	
p)	Tongue depressors	3

Audiovisual Instruments, Furniture in class rooms, clinical areas, labs and other administrative areas and internet access: Appropriately

Course Content  
Semester I

## B 1.1 Communication Sciences

Hour - 60

Marks -100

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

basic concepts in speech, hearing, language and communication

basic concepts of hearing sensitivity and acoustics

### Part A Speech-Language Pathology

#### Unit 1: Speech, language and communication

Definitions of speech, language, communication, and their components

Distinctions, similarities and functions of communication, speech and language

Speech as an overlaid function

Speech chain

Normal development of speech & language

Pre-requisites and factors affecting speech-language development

Cultural and linguistic issues in communication; bi/multilingual issues

#### Unit 2: Bases of speech and language

Overview of speech production – speech sub-systems

Speech mechanism as a sound generator, vocal tract, periodic and aperiodic sounds

Acoustic theory of speech production

Social, cognitive, neurological, and genetic bases of speech and language

### Part B Audiology

#### Unit 3: Sound intensity and concept of decibel



acoustic energy and power, absolute and relative units – importance of reference sound intensity and intensity levels –absolute and relative measurements and  
Bel and decibels, sound pressure and decibel sound pressure levels, relationship between intensity and pressure  
characteristics and application of decibels

#### Unit 4: Audibility & hearing

Hearing range –intensity and frequency

Up-down and staircase procedure of estimating minimum audible levels  
Minimum audible pressure and field, Missing six dB and related issues  
Reference equivalent threshold sound pressure levels and hearing levels                      Sensation  
levels, Threshold of pain, Most comfortable levels

#### Unit 5: Introduction to Audiology and Speech-language Pathology

##### Part A: Speech and language

Historical aspects of the field of speech-language pathology

Development of speech and language pathology: Indian and global context

Scope of practice in speech-language pathology

Interdisciplinary nature of speech-language pathology

##### Part B: Audiology

Audiology – historical aspects, development of instrumentation in audiology

Development of audiology: Indian and global context

Branches of audiology

Scope of audiology

#### Recommended Reading

Bordon, G J., Harris, K S., & Raphael, L J. (2006). Speech science primer:  
Physiology, acoustics, & perception of speech. Lippincott-Williams & Wilkins.

SubbaRao, T A. (1992). Manual for developing communication skills. NIMH. ISBN: 81-86594-03-5

Speaks, C. E. (1999). Introduction To Sound: Acoustics for the Hearing and Speech Sciences (3 edition). San Diego: Cengage Learning.

Martin, F. N., & Clark, J. G. (2014). Introduction to Audiology (12 edition). Boston: Pearson.

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

Khara L. Pence, T., Laura M. & Justice (2011). Language Development: From Theory to Practice (2nd Ed.), Allyn & Bacon Communication Sciences and Disorders

Webb, W. G., & Adler, R. K. (2008). Neurology for the speech-language pathologist (5th ed.). St. Louis, Mo: Mosby/Elsevier.

## B1.2 Anatomy and Physiology of Speech and Hearing

Hours - 60

Marks - 100

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

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

Unit 1: Introduction

General anatomical terms

Anatomical positions and planes of reference

Cells, tissues and muscles

Muscle connection and joints Tissue

- vascular and neural

## Unit 2: Embryology

Basic terminologies related to embryology

Development of external ear

Development of middle ear

Development of Inner ear and the auditory system

Five examples of embryonic anomalies affecting speech-language & hearing

Development of respiratory structures

Development of larynx

Development of facial region and palate

Development of tongue and teeth

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

Mechanisms of breathing with emphasis on speech breathing

Supportive frame work of larynx

Anatomy of larynx

Anatomy of oesophagus

Brief mechanisms of swallowing

Mechanisms of phonation

Anatomy of articulators and associated structures

Contribution of articulatory structures to speech production

Anatomy of resonatory mechanisms

Contribution of resonatory mechanisms to speech production

#### Unit 4: Anatomy and physiology of external and middle ear

Ä □ Ä      Ä      Ä      anatomy of the external ear  
Ä □ Ä      Ä      Ä  
    physiology of external ear including localization  
Ä □ Ä      Ä      Ä  
    head shadow effect, inter-aural intensity and time differences  
Ä □ Ä      Ä      Ä  
    brief anatomy of temporal bone  
Ä □ Ä      Ä      Ä  
    anatomy of tympanic membrane and associate structures  
Ä □ Ä      Ä      Ä  
    anatomy of middle ear and ossicles  
Ä □ Ä      Ä      Ä  
    anatomy of Eustachian tube and middle ear muscles  
Ä □ Ä      Ä      Ä  
    physiology of Eustachian tube  
Ä □ Ä      Ä      Ä  
    middle ear transformer action  
Ä □ Ä      Ä      Ä  
    physiology of middle ear muscles

#### Unit 5: Anatomy and physiology of labyrinth

Anatomy of bony and membranous labyrinth  
Macro anatomy of cochlea  
Micro anatomy of cochlea  
Innervations and blood supply to cochlea  
Overview of theories of hearing  
Physiology of cochlea  
Electrical potentials of the cochlea  
Physiology of hearing through bone conduction  
Overview to physiology of balancing mechanisms  
Overview to anatomy of central auditory pathway      Overview to  
central auditory mechanism

#### Recommended Reading

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

Zemlin, W. R. (2010). *Speech and Hearing Science: Anatomy and Physiology: International Edition* (4 edition.). Boston: Pearson.

Chaurasia, B.D (2004). *Human Anatomy, vol 3. Head Neck and Brain 4 th Eds*, CBS Publishers and Distributors, New Delhi. ISBN 81-239-1157-2.

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

## B1.3 Clinical Psychology

Hour - 60

Marks -100

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

scope of clinical psychology and its significance for speech and hearing concept of normality, abnormality and classification of abnormal behavior cognitive, motor, emotional and social development

theories of learning and therapy techniques based on learning principles neuropsychological assessment and rehabilitation

application of neuropsychology in the field of speech and hearing basics of counselling

Unit 1: Introduction to psychology

Introduction to psychology: definition, history and schools of psychology Scope of psychology

Meaning and definition of clinical psychology

Historical development, modern clinical psychology

Significance of clinical psychology in health sciences

Role of clinical psychology in speech and hearing

Concept of normality

Concept of abnormality

Models of mental disorders: biological, psychological social models

Unit 2: Assessment procedures in clinical psychology

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

Assessment of cognitive functions

Adaptive functions,

Personality

Behavioural assessment

Classification of abnormal behavior

History, need & rationale of classification

Current classificatory system: DSM, ICD

Unit 3: Developmental psychology

Child and developmental psychology: meaning, definition and scope

Meaning of growth, development & maturation

Principles of child development

Motor development: general principals of motor development

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Stages in motor development: early motor development, motor development during later childhood and adolescence, decline with age





Cognitive development: growth from early childhood to adolescence  
Piaget's theory of cognitive development  
Emotional development  
Social development

#### Unit 4: Principles of learning and behaviour modification

Learning: meaning, definition and characteristics  
Theories of learning: introduction  
Pavlov's classical conditioning: experiments and principles  
Skinner's operant conditioning: experiments and principles  
Therapeutic techniques based on learning principles  
Skill behavior techniques  
Problem behavior techniques

#### Unit 5: Neuropsychology and its relevance to study of speech

Neuropsychology: introduction and definition  
Neuropsychological assessment  
Neuropsychological rehabilitation  
Application of neuropsychology in the field of speech and hearing  
Counselling: introduction and definition  
Types of counselling: directive and non- directive  
Characteristics of a good counsellor

#### Recommended Reading

- Morgan C.T., King R.A., Robinson N.M. Introduction to Psychology. Tata McGraw Hill Publishing Co.  
Anastasi, A. (1999). Psychological testing, London: Freeman  
Baura, M (2004). Human Development and Psychology, Rehabilitation Council of India, New Delhi. ISBN: 81-7391-868-6  
Coleman J.C. Abnormal Psychology and Modern Life, Taraporevala Sons & Co.

Gregory, R.J. (2000). Neuropsychological and geriatric assessment in Psychological Testing: History, Principles, and Applications (3rd ed.). New York: Allyn & Bacon.

Hurlock, E.B. (1981). Child development. (VI Ed.). Mc Graw Hill International Book Co.

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

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

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

#### B1.4 Linguistics and Phonetics

Hour - 60

Marks -100

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

different branches and aspects of linguistics

characteristics and functions of language different branches of phonetics, applied linguistics, and phonology

morphology, syntax, semantics, pragmatics acquisition of language and factors affecting it bi/multilingualism and related issues

#### Unit 1: Linguistics

Introduction to linguistics and different branches of linguistics: applied linguistics, sociolinguistics, psycholinguistics, metalinguistics, neurolinguistics and clinical linguistics

Language characteristics and functions, difference between animal communication systems and human language

Morphology – concepts of morph, allomorph, morpheme, bound free and compound forms, roots etc.

Processes of word formation, content and function words

Endocentric and exocentric constructions, form classes, grammatical categories

Inflection and derivation, paradigmatic and syntagmatic relationship  
Principles and practices of morphemic analysis  
Langue versus parole  
Competence vs. performance

## Unit 2: Phonetics and Phonology

Introduction to phonetics

Articulatory, acoustic, auditory and experimental phonetics – an introduction

Articulatory classification of sounds – segmental and supra-segmental

Classification description and recognition of vowels and consonants Pathological aspects of speech sound production

Transcription systems with special emphasis on IPA. Transcription of samples of normal and disordered speech

Introduction to phonology, classification of speech sounds on the basis of distinctive features and phonotactics

Application of distinctive feature theory to speech pathology and speech therapy, phonotactics, phonotactic patterns of English and Indian languages

Phonemic analysis – Principles and practices; their practical implications for speech pathologists

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

## Unit 3: Morphology, syntax, semantics and applied linguistics

Morphology – concepts of morph, allomorph, morpheme, roots, compound forms - endocentric and exocentric constructions, free and bound morphemes, inflection and derivation, principles and practices of morphemic analysis

Syntax – different methods of syntactic analysis

IC analysis, phrase structure, grammar, transformational generative grammar

Introduction to the major types of transformations

Sentence types, notions about competence versus performance

Deep structure versus surface structure

Acceptability versus grammaticality language versus parole etc.

A brief introduction to semantics – semantic feature theory, pragmatics

Processes of word formation, content and function words, form classes, grammatical categories

Syntax – concepts of phrases and clauses, sentence and its types

Different methods of syntactic analysis – Immediate constituent analysis, Phrase structure, grammar, transformational generative grammar– deep structure versus surface structure, acceptability versus grammaticality; Introduction to the major types of transformations  
Usefulness of morphemic and syntactic analysis in planning speech and language therapy

A brief introduction to semantics, semantic relations, semantic feature theory A brief introduction to pragmatics and discourse.

#### Unit 4: Language acquisition

Issues in first language acquisition

Pre-linguistic stages, linguistic stages

Acquisition of phonology, morphology, syntax, semantics, and pragmatics

Language and cognition

A brief introduction to theories and models of language acquisition

Biological maturation theory, linguistic theory, behavioral theory, information processing theory, social interaction theory

An integrated approach to theories communicative competence and its development

Applied linguistics with special reference to communication disorders

Usefulness of morphemic and syntactic analysis in planning speech and language therapy

#### Unit 5: Bi/multilingualism

Introduction to the language families of the world and India

Issues related to second language acquisition & factors influencing it

Inter-language theory, language transfer and linguistic interference

Differences between first and second language acquisition/learning  
Bilingualism/Multilingualism

Metaphonology

Writing systems – types of writing

History of writing systems

Indian writing systems

### Recommended Reading

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

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

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

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

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

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



## B1.5 Electronics and Acoustics

Hours - 60

Marks - 100

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

concept and types of power supply for biomedical instruments basic aspects of digital signal processing theoretical basis of acoustics required for audiologists functioning of computers and computing systems

### Unit 1: Electronic components and power supply

Resistors, capacitors, inductors

Transformers and potentiometers,

Semiconductor diodes and transistors

Light emitting devices, seven segment displays, Liquid crystal displays

Principles of operations and working of Field Effect Transistors, Uni-junction transistors and thyristors

Introduction to linear and digital integrated circuits

Block diagram of a DC power supply

Linear regulated power supplies, line regulation and load regulation, specifications of a DC power supply unit, Switched Mode Power Supply

AC power supply, stabilizers, Uninterrupted Power Supply, and inverters Basic electronic concepts such as Polarity, Grounding

### Unit 2: Introduction to acoustics

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ibrations and their characteristics

ÈÄ Ä □Ä Ä Ä

ound - generation and propagation

ÈÄ Ä □Ä Ä Ä

haracteristics of sound

ÈÄ Ä □Ä Ä Ä

mplitude, frequency and phase of pure tones

ÈÄ Ä □Ä Ä Ä

mplitude, frequency and phase of complex tones (FFT and spectrum, relationship between time waveform, FFT and impulse response)

$\bar{E}$      $\bar{A} \square \bar{A}$      $\bar{A}$      $\bar{A}$   
 reflection and absorption, acoustic impedance, reverberation  
 $\bar{E}$      $\bar{A} \square \bar{A}$      $\bar{A}$      $\bar{A}$   
 impedance and admittance  
 $\bar{E}$      $\bar{A} \square \bar{A}$      $\bar{A}$      $\bar{A}$

electro-mechano-acoustic transformers

### Unit 3: Acoustical treatment, transducers and basics of computers

Introduction to audiometric rooms

Absorption coefficient, Sabine's formula

Materials for construction of audiometric rooms

Lighting, grounding and other miscellaneous issues related to audiometric rooms

Evaluation of efficiency of sound proofing in the audiometric rooms

Amplifiers



Microphones, loudspeakers - types and function

Fundamentals of digital electronics, binary number system, Hex code, bit, byte, logic gates, counters, flip-flops etc.

Introduction to computers

Operating systems, hard ware, software, memory devices and other peripherals, care and preventive maintenance of computers

#### Unit 4: Digital signal processing

Digital signal processing –introduction and need

Analog to digital converters, sampling and quantization

Fundamentals of digital filtering

Infinite impulse response and finite impulse response filters

Time domain methods of speech processing

Frequency domain methods of speech processing

Linear predictive analysis of speech signals

Digital coding of speech signals

Automatic speech recognition

Speech synthesis

#### Unit 5: Instrumentation in speech and hearing

Introduction to electronic instrumentation in speech and hearing

Electrodes, filters and preamplifiers

Principle of operations, block diagram, calibration, maintenance and troubleshooting of audiometers, immittance meters, oto-acoustic emissions, hearing aids, evoked potential system, speech and voice analyses systems, artificial larynx, electroglottograph

#### Recommended Reading

Haughton, P., & Haughton, P. M. (2002). *Acoustics for Audiologists* (1st edition). San Diego, Calif: Emerald Group Publishing Limited.

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

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

Rout, N and Rajendran, S. (2014). *Hearing aid trouble shooting and Maintenance*,

Published by National Institute for Empowerment of Persons with Multiple Disabilities, Chennai. Freely downloadable from <http://niepmd.tn.nic.in/publication.php>. ISBN 978-81-928032-1-0.

Speaks, C. E. (1999). Introduction To Sound: Acoustics for the Hearing and Speech Sciences (3 edition.). San Diego: Cengage Learning.

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



## B1.6 Research Methods and Statistics

Hours - 60

Marks - 100

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

basic concept of research in the field of audiology and speech-language pathology design and execution of research ethical guidelines for conducting research

### Part A: Research Methods

#### Unit I: Introduction to research methods

Meaning and purpose of research: meaning

Need for research in audiology and speech-language pathology

Funds/grants for research

Steps in research: identification, selection

Formulation of research questions: aims, objectives, statement of problem, hypothesis

Types of variables; types of sampling procedures (random and non-random); Types/  
methods of data collection and their advantages and disadvantages Reliability and  
validity (internal and external validity)

#### Unit II: Research design in audiology and speech-language pathology

Types of research: survey, ex-post facto research, normative research, standard-group  
comparison

Experimental and quasi experimental research: group design & single subject design

Internal and external validity of research

Between groups vs. repeated measures design

Documentation of research: scientific report writing, different formats or styles (APA, AMA  
and MLA), Ethics of research

### Part B: Statistics

#### Unit III: Introduction to statistics and data collection

Application of statistics in the field of Audiology and speech-language pathology.

Scales of measurement: nominal, ordinal, interval, ratio

Classification of data: class intervals, continuous and discrete measurement

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

Variants from the normal distribution: skewness and kurtosis

Measure of central tendency: mean, median, mode

Measures of variability: range, deviation (average and standard deviation), variance

#### Unit IV: Statistics and research designs

Choosing statistics for different research designs

Correlational techniques: Pearson's Product Moment Correlation Coefficient; Spearman's Rank order correlation coefficient

Statistical inference: concept of standard error and its use; the significance of statistical measures; testing the significance of difference between two means z-test, t-test; analysis of variance, post hoc tests,

Non-parametric tests: Chi-square test, Wilcoxon test, Mann-Whitney U test,

Reliability and validity of test scores: reliability and validity, Item analysis

Analysis of qualitative data

Software for statistical analysis

#### Unit V: Epidemiology

Basic epidemiologic concepts and principles

Epidemiologic data sources and measurements

Epidemiologic methods – questionnaire survey, screening, personal survey, testing

Media - their advantages and disadvantages

Incidence and prevalence of hearing, speech, language disorders as per different census (NSSO, WHO)

#### Recommended Reading

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

#### Publications.

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

Hegde, M. N. (2003). Clinical research in communicative disorders: Principles and strategies. (3rd Edition), Austin: Pro-ed

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

Jekel, F. J., Katz, L.D., & Elmore, G.J (2001). Basic Epidemiologic Concepts and Principles in epidemiology, Biostatistics, and Preventive Medicine (2nd Edition).

Pennsylvian: Saunders

Meline, T. (2010). A research primer for communication sciences and disorders. Singapore: Pearson publication.

### Semester II

#### B 2.1 Neurology

Hour - 60

Marks -100

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

basic concepts, anatomy and physiology of nervous system related to speech and hearing

neural organization –different structures and functions of various systems

neurosensory and neuromotor controls in speech, language and hearing mechanisms

cerebral plasticity and dominance and its relevance for speech, language and hearing disorders

various neural diseases, lesions, nutritional and metabolic conditions affecting speech, language and hearing

basic principles and assessment procedures used in speech, language and hearing disorders associated with neurological conditions

basic principles and management procedures used in speech, language and hearing disorders associated with neurological conditions

Unit 1: Anatomy and physiology of the nervous system

- General introduction to basic neurological concepts
- Organization of the neural system
- Central, peripheral and autonomic neural system
- Neural structures - applied anatomy and physiology
  - Cranial nerves and those important for speech, language, hearing and balance
  - Cerebral blood supply, nourishment and protection of the brain
  - General principles of neural organization
- Transmission of information in neural system – nerve fibers, synaptic transmission, action potential, chemical transmission, excitatory and inhibitory potential & neuromuscular transmission
  - Cerebral plasticity and development of neural plasticity and cerebral dominance

#### Unit 2: Neural organization of speech and hearing processes

- Neurosensory organization of speech and hearing
- Central auditory nervous system
- Anatomy of oral sensation and oral sensory receptors
- Neuromotor control of speech
- The pyramidal, extra-pyramidal system, basal ganglia and cerebellar system
- Lower and upper motor neuron
- Alpha and gamma motor neurons
- Sensory and motor examination, oral, peripheral and other reflexes
- Swallowing mechanism and neural control
- Screening and bedside neurological examination

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

- Neural infections – meningitis, encephalitis
- Developmental anomalies – spinal cord defects, syringomalacia and bulbia, Arnold chian malformations
  - Hydrocephalus – source and circulation of CSF, types and etiopathogenesis
  - UMN lesions –spastic dysarthria
  - LMN lesions –flaccid dysarthria
  - Mixed lesions

Extra pyramidal lesions – dyskinetic dysarthria  
Cerebellum and cerebellar pathway lesions – ataxic dysarthria    Other diverse lesions and dysarthrias

#### Unit 4: Neural disorders associated with speech and hearing disorders - II

Cerebrovascular diseases – ischemic brain damage – hypoxic ischemic encephalopathy, cerebral infarction – intracranial hemorrhage – intracranial, subarachnoid  
Trauma to the CNS – subdural hematoma, epidural hematoma, parenchymal brain damages  
Demyelinating diseases – multiple sclerosis, perivenous encephalomyelitis, Dementia  
Degenerative, metabolic and nutritional disorders – Alzheimer’s disease, Parkinsonism  
Metabolic, hereditary, acquired, neuronal storage disorders  
Wilson’s disease, Phenylketonuria  
Nutritional – Wernicke’s encephalopathy, pellagra  
Alcoholic cerebellar degeneration  
Clinical-pathological methods and Neuro-imaging  
Tumors of the CNS – gliomas, embryonal tumors of meninges, metastasis, malignant tumors

#### Unit 5: Speech-language and swallowing disorders

Central language mechanism and its disorders

Developmental motor speech disorders – cerebral palsy, muscular dystrophy

Neurologic disorders with primitive reflexes, diagnosis and management

Clinical neurological syndromes associated with speech and language disorders

Childhood language disorders associated with neurologic disorders

Swallowing associated with neurogenic disorders and assessing mastication and deglutition

Agnosia and other conditions associated with speech and hearing disorders

Cognitive disorders associated with neurologic disorders

General management principles and options for childhood neurogenic speech, language and hearing disorders

General management principles and options for adult neurogenic speech, language and hearing disorders



## Recommended Reading

- Adams, R.D. & Sidman, R.L. (1968). Introduction to neuropathology. New Jersey: McGraw-Hill.
- Bhatnagar, S.C. (2012). Neuroscience for the Study of Communicative Disorders. Lippincott, Williams & Wilkins
- Garden, E. (1968). Fundamental of neurology, V Edn., Philadelphia: Sarenders Co.
- Webb, W. G., & Adler, R. K. (2008). Neurology for the speech-language pathologist (5th ed.). St. Louis, Mo: Mosby/Elsevier.
- Duffy, J. R. (2013). Motor Speech Disorders: Substrates, Differential Diagnosis, and Management (3rd Ed.). University of Michigan, Elsevier Mosby.

Hour - 60

Marks -100

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

causes, signs, symptoms, pathophysiology and management of diseases of external, middle and inner ear leading to hearing loss, and

causes, signs, symptoms, pathophysiology and management of diseases of laryngeal and articulatory systems

#### Unit 1: External and middle ear and their disorders

Clinical anatomy of the ear

Congenital anomalies

Diseases of the external ear

Tumors of the external ear

Perforation and ruptures of tympanic membrane

Eustachian tube dysfunction

Otitis media with effusion

Cholesteatoma and chronic suppurative otitis media

Otosclerosis

Trauma to temporal bone

Facial nerve and its disorder

#### Unit 2: Inner ear and its disorders

Congenital anomalies

Meniere's Disorder

Ototoxicity

Presbycusis

Disorders of vestibular system

Vestibular Schwannoma

Tinnitus and medical line of treatment

Pre-surgical medical and radiological evaluations for implantable hearing devices

Overview of surgical technique for restoration and preservation of hearing

Post-surgical care and complication of surgery for cochlear implants

Overview of surgical technique, post-surgical care and complication of surgeries for implantable bone conducted hearing aids and middle ear implant

### Unit 3: Oral cavity and its disorders

Anatomy of the oral cavity

Common disorders of the oral cavity

Tumors of the oral cavity

Cleft lip and palate – medical aspects

Clinical anatomy and physiology of pharynx

Inflammatory conditions of the pharynx, tonsils and adenoids  
Tumors of the pharynx

### Unit 4: Larynx and its disorders

Clinical anatomy of larynx

Difference between adult and infant larynx

Clinical examination of larynx

Stroboscopy - technique, procedure, interpretation and precautions

Congenital laryngeal pathologies

Inflammatory conditions of the larynx

Vocal nodule and other disorders of the vocal folds

Benign and malignant tumours of the larynx

Laryngectomy – overview of surgical procedure

Phono surgery and other voice restoration surgeries

### Unit 5: Esophagus and its disorders

Clinical anatomy and physiology of esophagus

Clinical examination of esophagus

Congenital anomalies of esophagus

Esophageal fistula

Inflammatory conditions of esophagus

Benign conditions of esophagus

## Malignant conditions of the esophagus Airway management procedures

### Recommended Reading

- Chan, Y. and Goddard, J.C. (2015). K J Lee's Essential otolaryngology: head and neck surgery. (11th edition). New Delhi: Atlantic Publisher and Distributers
- Dhingra, P. L. (2013). Diseases of Ear, Nose and Throat (Sixth edition). Elsevier.
- O'Neill, J.P. and Shah, J.P. (2016). Self-assessment in otolaryngology. Amsterdam: Elsevier
- Postic, W.P., Cotton, R.T., Handler, S.D. (1997). Ear trauma. Surgical Pediatric Otolaryngology. New York: Thieme Medical Publisher Inc.
- Wackym, A. and Snow, J.B. (2015). Ballenger's otorhinolaryngology head and neck surgery. (18th edition). United States: McGraw-Hill Medical

### B2.3 Speech-Language Pathology

Hour - 60

Marks -100

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

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

Unit 1: Basic concepts and methods of diagnostics

Introduction to Speech Language Disorders

Definition and descriptions of delay, deviancy and disorders; impairment, disability and handicap

Incidence and prevalence of speech and language disorders

Causes of speech and language disorders

Basic principles in assessment, evaluation and appraisal

Tools for diagnosis- case history, interview, self-reports, questionnaire & observations

Diagnostic models – SLPM, Wepman, Bloom and Lahey

Types of diagnoses – Clinical diagnosis, direct diagnosis, differential diagnosis, diagnosis by treatment, diagnosis by exclusion, team diagnosis, instrumental diagnosis, provocative diagnosis, tentative diagnosis advantage/disadvantages

Characteristics of a diagnostic clinician

Organization and basic requirements for clinical set up and team approach     DSM,  
ICD classification and ICF

Unit 2: Basic concepts and methods of therapeutics

Basic concepts and terminologies in speech therapeutics

General principles of speech and language therapy

Speech therapy set-up

Individual and group therapy

Procedures and types of for speech-language therapy

Approaches to speech and language therapy – formal, informal and eclectic approaches

Planning for speech and language therapy – goals, steps, procedures and activities

Importance of reinforcement principles and strategies in speech and language therapy, types and schedules of rewards and punishment

Individual and group therapy

AAC and other nonverbal methods of therapy

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

Causes of speech disorders

b) Overview of assessment procedures for voice disorders; articulation and phonological disorders; and fluency disorders    Overview of management procedures for voice disorders; articulation and phonological disorders; and fluency disorders

Early identification and prevention of speech disorders

Basic concepts in assessment and management of swallowing disorders

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

Types, characteristics and classification of language disorders

Causes of language disorders

Overview of assessment procedures for child language disorders; adult language disorders; and neurogenic language disorders

Overview of management procedures for child language disorders; adult language disorders; and neurogenic language disorders

Early identification and prevention of language disorders      Issues related to bi- /multilingualism

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

Professional code of conduct – social, cultural and other ethical issues

Scope of practice –different set ups and prerequisites

Documentation of diagnostic, therapeutic and referral reports

Counselling, guidance, facilitation of parent participation and transfer of skills

Evaluation of therapy outcome and follow up

Evidence based practice

Community based rehabilitation

Role of itinerant speech therapist, Anganwadis, resource teachers etc. PWD act, National Trust, Consumer protection Act, noise pollution Act and other public laws, RCI, ISHA and other organizations controlling the field Facilities and concessions available for speech and hearing disabled

#### Recommended Reading

Owens, Jr, Kimberly, A. Metz, F.E. (2014). 5th Ed. Introduction to Communication Disorders: A life span based Perspective. Pearson Communication Science and Disorders Series.

Hegde, M. N., & Davis, D. (2005). Clinical methods and practicum in speechlanguage pathology (4th ed.). Australia; Clifton Park, NY: Thomson Delmar Learning.

ShIPLEY, K. G., & ROSEBERRY-McKIBBIN, C. (2006). Interviewing and counselling in communicative disorders : Principles and procedures (3rd ed.). Austin, Tex: Pro-Ed.

- Brookshire, R. H. (2003). Introduction to neurogenic communication disorders (6th ed.). St. Louis, Mo: Mosby.
- Hulit, L.M., Marle. R., Kathleen, R. H., & Fowey (2010). Born to Talk. Pearson Communication Science and Disorders Series 5th Ed.
- Roth, F. P., & Worthington, C. K. (2005). Treatment resource manual for speech language pathology (3rd ed.). Australia; Clifton Park, NY: Thomson Delmar Learning.
- Shipley, K. G., & McAfee, J. G. (2004). Assessment in speech-language pathology: A resource manual (3rd ed.). Australia; Clifton Park, NY: Delmar Learning.
- Ysseldyke, J. E., & Algozzine, R. (2006). Teaching students with communication disorders : A practical guide for every teacher. Thousand Oaks, Calif.: Corwin Press.

## B2.4 Audiology

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

understand and carryout experiments to measure differential sensitivity loudness and pitch

take case history, administer the tuning fork tests and interpret the results administer pure tone audiometry including masking on clinical population and appreciate the theoretical back ground of it

carryout different tests involved in speech audiometry appreciate the theoretical back ground

carryout subjective calibration and daily listening checks of the audiometer get adequate theoretical information necessary to understand concepts involved in objective calibration

#### Unit 1: Differential sensitivity

Concept of differential sensitivity, just noticeable difference

Weber's fraction

Intensity discrimination

Frequency discrimination

Duration discrimination and temporal resolution

Applications of jnd's

Magnitude estimation and production

Loudness – equal loudness level contours and its application

Loudness scales - sone, phone, Steven's power law Pitch- scales of pitch

#### Unit 2: Case history and tuning fork tests

Need for case history

Basics of history taking

Essential factors to be included in case history for adults

Essential factors to be included in case history for children



Interpretation of case history  
Audiological evaluation – rationale and purpose  
Principles, procedure, interpretation, advantages and disadvantages of Rinne and Schwabach tuning fork test  
Principles, procedure, interpretation, advantages and disadvantages of Weber and Bing tuning fork test  
Audiometric version of Weber and Bing test

### Unit 3: Pure tone audiometry

a) Classification of audiometers, Parts of an audiometer, characteristics and specifications of transducers used (earphones, bone vibrators, loud speakers)  
Audiogram- concept and symbols used  
Clinical method of threshold estimation  
Factors affecting air conduction threshold  
Bone conduction thresholds- measurements, factors effecting Permissible noise levels in the audiometric room

### Unit 4: Speech audiometry

Importance and purpose  
Different types of stimuli used in speech audiometry  
Concept of phonetically and phonemically balanced  
Speech detection thresholds – procedure and application  
Speech reception thresholds – procedures and application  
Word recognition scores –procedure and applications  
PIPB function – procedure and applications  
Factors affecting speech audiometry  
BC speech audiometry – procedure and its application  
Test materials available in various languages

### Unit 5: Clinical masking and instrumental calibration

Definition and different terminologies  
Purpose and rationale of clinical masking

Different types of stimulus employed in clinical masking  
Interaural attenuation and factors affecting interaural attenuation  
When to mask and how much to mask – importance of adequate noise levels  
Different procedures for masking  
Masking for speech audiometry  
Calibration definition and purpose  
Daily listening checks and subjective calibration  
Objective calibration of air conduction transducers  
Objective calibration of bone conduction transducers Frequency calibration

### Recommended Reading

- Durrant, J. D., & Feth, L. L. (2012). *Hearing Sciences: A Foundational Approach* (1 edition.). Boston: Pearson.
- Emanuel, D. C., & Letowski, T. (2008). *Hearing Science* (1 edition.). Philadelphia: Lippincott Williams and Wilkins.
- Gelfand, S. A. (2009). *Hearing: An Introduction to Psychological and Physiological Acoustics* (5 edition.). London: CRC Press.
- Kaplan, H., Gladstone, V. S., & Lloyd, L. L. (1993). *Audiometric Interpretation: A Manual of Basic Audiometry* (2 edition.). Boston: Pearson.
- Katz, J. (2014). *Handbook of Clinical Audiology* (7th International edition edition.). Lippincott Williams and Wilkins.
- Martin, F. N., & Clark, J. G. (2014). *Introduction to Audiology*. Boston: Pearson.
- Silman, S., & Silverman, C. A. (1997). *Auditory Diagnosis: Principles and Applications* (Reissue edition.). San Diego: Singular Publishing Group

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

Marks -100

### Practicals

Demonstrate normal aspects of speech and analyse perceptually variations in voice, articulation and fluency in different recorded speech samples of typical individuals at different age groups (children, adults and older adults) and sex.

Demonstrate normal aspects of language and analyse perceptually variations in language in different recorded samples of typical individuals at different age groups (children, adults and older adults) and sex.

Demonstrate stress, rhythm and intonation and variations in rate of speech and analyse perceptually variations in prosody in different recorded samples of typical individuals at different age groups (children, adults and older adults) and sex.

Use IPA to transcribe spoken words.

Record a standard passage, count number of syllables and words, identify syllable structure, syntactic structures in the passage.

Oral mechanism examination on 5 normal children and 5 normal adults.

Prepare a chart and show the developmental stages of speech and language behavior.

Administer standardized tests for assessment of delayed speech and language development such as REEL, SECS, LAT, 3DLAT, ALD each on any 2 children.

Study the available normative data (Indian/Western) of speech such as respiratory, phonatory, resonatory and articulatory parameters.

Measure the following in 5 normal subjects: (a) Habitual frequency (b) Frequency range (c) Intensity (d) Intensity range (e) Phonation duration (f) rate of speech (g) Alternate Motion Rates and Sequential Motion Rates (h) s/z ratio.

Study the available normative data (Indian/Western) of language such as phonology, semantics, syntax, morphology and pragmatic measures.

Perceptual analysis of speech and language parameters in normal (2 children and 2 adults and persons with speech disorders (3 adults + 3 children).

Prepare a model diagnostic report of a patient with speech and language disorder.

Prepare a diagnostic and therapy kit.

Make a list of speech language stimulation techniques and other therapy techniques for various speech disorders.

Familiarize with the sources for referral and parent counseling procedures.

Prepare a report on the available audiovisual material and printed material/pamphlets relating to speech-language pathology, public education of communication and hearing disorders, etc.

Prepare a report on the available clinical facilities and clinical activities of the institute.

#### Clinical Practicum

Observe the evaluation process and counselling of at least 5 different speech and language disorders in children.

Observe the evaluation process and counselling of at least 5 different speech and language disorders in adults.

Take case history of a minimum of 10 individuals (5 normal & 5 clients with complaints of speech-language problems).

Observation of diagnostic procedures.

Observe various therapeutic methods carried out with children and adults with speech and language disorders.

## B2.6 Practicals (Audiology)

Marks -100

### Practicals

Calculate/derive the answers for following

Calculate the relative intensities with different reference intensities.

Calculate decibels when sound intensities are doubled, increased by 4 times Add decibels when two sounds with different intensities are produced simultaneously

Collect pictures of audiometers that existed between 1920 and 1990.

Perform the following experiments

Calculate reference equivalent sound pressure levels (RETSPL) for head phones and bone vibrator for any two frequencies using 30 participants.

Measure most comfortable level on 10 participants with normal hearing sensitivity.

Measure uncomfortable levels on 10 participants with normal hearing sensitivity.

Calculate the sensation levels of MCL and UCLs in above 10 participants.

Measure difference limen of intensity, frequency and duration on 10 normal hearing adults and plot it in graphical form and interpret the results.

Measure equal loudness level contours at minimum level, 40 dB SPL, 70 dB SPL (1 kHz) in 5 normal hearing adults.

Measure sone and mel in 5 normal hearing adults using scaling techniques.

Take case history on 5 adults and 5 children with hearing problem and correlate the information from case history to results of pure tone audiometry.

Administer different tuning fork tests on 5 simulated conductive and 5 sensori neural hearing loss individuals.

Carry out pure tone and speech audiometry on 10 normal hearing individuals.

Carry out clinical masking on 10 normal hearing individuals with simulated conductive hearing loss and carry out clinical masking on 5 individuals with conductive hearing loss and 5 individuals with sensori-neural hearing loss.

Carryout daily listening checks and subjective calibrations 20 times and observe objective calibration once

Perform otoscopy and draw the tympanic membrane of 10 healthy normal individuals

Measure difference limen of intensity, frequency and duration on 10 normal hearing adults and plot it in graphical form and interpret the results

Measure equal loudness level contours at minimum level, 40 dB SPL, 70 dB SPL (1 kHz) in 5 normal hearing adults

Measure sone and mel in 5 normal hearing adults using scaling techniques

Take case history on 5 adults and 5 children with hearing problem and correlate the information from case history to results of pure tone audiometry

Administer different tuning fork tests on 5 simulated conductive and 5 sensori neural hearing loss individuals

Carry out pure tone and speech audiometry on 10 normal hearing individuals

Carry out clinical masking on 10 normal hearing individuals with simulated conductive hearing loss and carry out clinical masking on 5 individuals with conductive hearing loss and 5 individuals with sensori-neural hearing loss

Carryout daily listening checks and subjective calibration 20 times and observe objective calibration once

## Clinical Practicum

Observe case history being taken on 5 adults and 5 children with hearing problem and correlate the information from case history to results of pure tone audiometry.

Administer different tuning fork tests on 5 conductive and 5 sensori neural hearing loss individuals.

Observe the pure tone audiometry being carried out on 30 clients.

Plot the audiogram, calculate the pure tone average and write the provisional diagnosis of observed clients.

Perform otoscopy (under supervision) on at least 1 client with following conditions:  
Tympanic membrane perforation, SOM, CSOM

### Semester III

#### B3.1 Voice and its Disorders

Hour - 60

Marks -100

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

describe characteristics of normal voice and identify voice disorders explain etiology related to voice problems, and its pathophysiology assess voice disorders

provide counselling and therapy to individuals with voice disorders

## Unit 1: Basic concepts in voice and its production

Definition and functions of voice – biological and non-biological

Parameters of voice

Structures and function of respiratory system for the purpose of phonation

Laryngeal anatomy – Structural support of larynx, muscles, vocal fold microstructure, blood supply, and innervations

Vocal tract resonance and voice quality

Development of voice: Birth to senescence; structural and voice related changes

Aerodynamic myo-elastic theory of voice production

Voice mechanics – Physiologic, acoustic and aerodynamic correlates of voice

Pitch and loudness changing mechanism, voice registers and voice quality

Description of normal and abnormal voice: Parametric, pathologic/perceptual, social Unit 2:  
Characteristics and pathophysiology of voice disorders

Pathologies of the laryngeal mechanism: classification of voice disorders, incidence, and prevalence

Etiology of voice disorders: voice misuse and abuse, medical related etiologies, primary disorder etiologies and personality related etiologies

Pathologies of vocal fold cover (infective and trauma related secondary conditions) and muscular dysfunction

Non-organic voice disorders: functional disorders, psychosomatic- functional aphonia and physiological- voice abuse, puberphonia)

Congenital voice disorders

Neurological voice disorders

Voice problems in systemic illnesses and endocrine disorders

Voice problems in transgenders

Voice problems in the elderly

Voice problems in professional voice users: teachers and singers

## Unit 3: Assessment of voice

Referral sources, medical examination and team approach

Protocol for voice assessment: components and philosophies (ICF, ICD)



Clinical voice laboratory: principles of instrumental measurements – electrical error, electrical safety, hygiene safety; recording of data; storage; patented soft wares, free wares

Perceptual evaluation of voice: GRBAS, CAPE -V

Visualization procedures- indirect laryngoscopy, video laryngoscopy & stroboscopy

Acoustic analysis of voice: F0 related measures, intensity related measures, quality related measures, phonetogram, DSI

Electroglottography and inverse filtering procedures

Aerodynamic analysis of voice: static & dynamic measures

Self-evaluation of voice : PROM, VHI, V-DOP

Reporting of voice findings, normative comparisons, differential diagnosis

#### Unit 4: Management of voice

Voice therapy orientation: basic principles, goal setting and approaches

Vocal hygiene and preventive counselling

Symptomatic voice therapy – voice facilitation techniques

Psychological approaches to voice therapy – psychoanalysis, rational emotive therapy and cognitive behavior therapy

Physiological approach – breathing and postural techniques

Holistic voice therapy approaches -1: accent therapy, confidential voice therapy,

Holistic voice therapy approaches - 2: vocal function exercises, resonant voice therapy, Lee Silverman voice therapy

Medical and surgical procedures in the treatment of benign vocal fold lesions: pharmaceutical effects on voice, phono surgery : re-innervation techniques, laryngeal framework surgeries, micro laryngeal excision Professional voice care

#### Unit 5: Intervention strategies for voice disorders

Vocal trauma related disorders

Functional voice disorders – inappropriate vocal components

Functional aphonia

Puberphonia/mutational falsetto

Muscle tension dysphonia

Sulcus vocalis

Vocal fold palsy

Spasmodic dysphonia  
GERD/LPR  
Benign vocal fold lesions requiring surgical intervention  
Post-operative care for benign vocal fold lesions disorders  
Documenting voice therapy outcomes

### Practicals

Record phonation and speaking samples (counting numbers) from five children, adult men, adult women, geriatric men and geriatric women. Note recording parameters and differences in material.

Make inferences on age and sex differences across the samples obtained in the previous experiment using perceptual voice profiling. Make a note of differences in pitch, loudness, quality and voice control. Explain how voice reflects ones personality and other social needs.

Perform an acoustic voice analysis on phonation sample and generate a voice report based on acoustic findings. Compare findings between men & women.

Perform MPT and s/z ratio. Infer differences across age and sex.

Perform spirometry or any other appropriate aerodynamic procedure. Infer differences across age and sex.

Perform acoustic analysis on five abnormal voice samples.

Observe and document findings from five laryngeal examinations (pre-recorded or live) such as VLS, stroboscopy or any other relevant.

Administer a PROM on five individuals.

Prepare a vocal hygiene checklist.

Demonstrate therapy techniques such as vocal function exercise, resonant voice therapy, digital manipulation, push pull, relaxation exercises.

### Recommended Reading

Stemple, J. C., Glaze, L. E., & Gerdeman, B, K. (2014). Clinical voice pathology: Theory & Management (5th Ed.). San Diego: Plural publishers.

Aronson, A.E. & Bless, D. M. (2009). Clinical Voice Disorders.(4th Ed.). New York: Thieme, Inc.

Boone, D. R., McFarlane, S. C, Von Berg, S. L. & Zraick, R, I. (2013): The Voice and Voice Therapy. (9th Ed.). Englewood Cliffs, Prentice-Hall, Inc. New Jersey.

- Professional Voice: Assessment and Management. Proceedings of the national workshop on “Professional Voice: Assessment and management”, 9-10 Dec 2010.  
All India Institute of Speech & Hearing, Mysore. 2010.
- Andrews, M. L. (2006). Manual of Voice treatment: Pediatrics to geriatrics (3rd Ed.). Thomson Delmar Learning.
- Colton, R. H, Casper, J. K. & Leonard, R. (2006). Understanding voice problems. Baltimore: Williams & Wilkins.
- Sapienza, C. M., & Ruddy, B H. (2013). Voice Disorders.(2nd Ed.). San Diego: Plural Publisher.
- Voice: Assessment and Management. Proceedings of the national workshop on “Voice: Assessment and management”, 14-15 Feb 2008. All India Institute of Speech & Hearing, Mysore. 2008.

### B3.2 Speech Sound Disorders

Hour - 60

Marks -100

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

describe normal speech sound development and characterization of individuals with speech sound disorders.

perform phonological analysis and assessment of speech sound disorders.

plan intervention for individuals with speech sound disorders.

#### Unit 1: Speech sound acquisition and development

Fundamentals of articulatory phonetics - phonetic description of vowels & consonants.

Phonology & phonological theories – generative phonology, natural phonology.

Phonology & phonological theories – non-linear phonology, optimality theory.

Methods to study speech sound acquisition – diary studies, cross sectional studies and longitudinal studies.

Speech sound acquisition birth to one year (development of infant speech perception, early speech production). one to two years (consonant inventories, influence of phonological knowledge on vocabulary acquisition).

two to five years (growth of phonetic, phonemic, phonotactic inventory – consonants, clusters, phonological patterns). above five years (speech sound mastery and development of literacy – phonological awareness).

Factors influencing speech sound acquisition

Acoustics of speech sounds

Speech intelligibility, factors affecting speech intelligibility, assessment of speech intelligibility

Co articulation: types and effects

Phonological development in bilingual children. Phonological development in Indian languages.

## Unit 2: Assessment of speech sound disorders - I

Current concepts in terminology and classification of speech sound disorders

Organically-based speech sound disorders, childhood apraxia of speech.

Speech sound disorders of unknown origin, classification by symptomatology.

Factors related to speech sound disorders structure and function of speech & hearing and oro-sensory mechanisms. cognitive – linguistic, psychosocial and social factors. metalinguistic factors related to speech sound disorders.

Introduction to assessment procedures: aims of assessment, screening and comprehensive assessment.

Speech sound sampling procedures - issues related to single word and connected speech samples; imitation and spontaneous speech samples, contextual testing, recording of speech samples.

Review of tests in English and other Indian languages - Single word articulation tests, deep articulation of articulation, and computerized tests of phonology.

Influence of language and dialectal variations in assessment.

Transcription of speech sample - transcription methods –IPA and extension of IPA; broad and narrow transcription.

## Unit 3: Assessment of speech sound disorders - II

Introduction to independent and relational analysis.

Independent analyses – phonetic inventory, phonemic inventory and phonotactic inventory (utility of independent analysis for analysis of speech of young children and children with severe speech sound disorders).

Relational analyses – SODA, pattern analysis, (distinctive features, phonological process analysis).

Phonological processes analyses - language specific issues, identification and classification of errors.

Assessment of oral peripheral mechanism.

Speech sound discrimination assessment, phonological contrast testing.

Stimulability testing.

Determining the need for intervention – speech intelligibility and speech severity assessment.

Factors influencing target selection – stimulability, frequency of occurrence, developmental appropriateness, contextual testing, and phonological process analysis.

Case study – Documenting the assessment findings and determining the need for intervention.

#### Unit 4: Management – I

Basic considerations in therapy – target selection, basic framework for therapy, goalattack strategies, organizing therapy sessions, individual vs. group therapy.

Treatment continuum – establishment, generalization and maintenance; measuring clinical change.

Facilitation of generalization.

Maintenance and termination from therapy.

Motor-based treatment approaches – Principles of motor learning.

Discrimination/ear training and sound contrast training.

Establishing production of target sound – imitation, phonetic placement, successive approximation, context utilization.

Traditional approach, contextual/sensory-motor approaches. General guidelines for motor-based treatment approaches.

Use of technology in articulation correction.

#### Unit 5: Management – II

Core vocabulary approach.

Introduction to linguistically-based treatment approaches- Distinctive feature therapy.  
Minimal pair contrasts therapy.

Metaphon therapy, Cycles approach. Broad-based language approaches.

General guidelines for linguistically-based approaches.

Phonological awareness and phonological disorders.

Phonological awareness intervention for preschool children.

Adapting intervention approaches to individuals from culturally and linguistically diverse backgrounds.

Role of family in intervention for speech sound disorders.

### Practicals

List the vowels and consonants in your primary language and provide phonetic and acoustic descriptions for the speech sounds.

Identify the vowels and consonants of your language on the IPA chart and practice the IPA symbols by transcribing 25 words.

Make a list of minimal pairs (pairs of words which differ by only one phoneme) in English.

Make a list of minimal pairs in any language other than English.

Identify the stages of speech sound acquisition by observations from videos of children from birth to 5 years of age.

Record the speech of a two year old typically developing child, transcribe and analyze the speech sample.

Record the speech of one typically developing child from 3-5 years of age (include single word and connected speech samples), transcribe the sample, and perform phonological assessment.

Analyze transcribed speech samples of typically developing children – practice independent and relational analysis.

Practice instructions for phonetic placement of selected sounds.

Develop a home plan with activities for any one section of phonological awareness in English and in one Indian language.

### Recommended Reading

Bernthal, J.E., Bankson, N.W., & Flipsen, P. (2013). Articulation and phonological disorders.(7th Ed.). Boston, MA: Pearson.

Dodd, B. (2013). Differential diagnosis and treatment of children with speech disorder.(2nd Ed). NJ: Wiley.

Rout, N (Ed)., Gayathri, P., Keshree, N and Chowdhury, K (2015). Phonics and Phonological Processing to Develop Literacy and Articulation; A Novel Protocol. A publication by NIEPMED, Chennai. Freely downloadable from <http://niepmd.tn.nic.in/publication.php>. ISBN 978-81-928032-9-5

Vasanta, D. (2014). Clinical applications of phonetics and phonology. ISHA Monograph. Vol 14, No. 1. Indian Speech & Hearing Association.

Velleman, S. L (2003). Resource guide for Childhood Apraxia of Speech. Delmar/Thomson Learning.

Williams, A., McLeod, S., & McCauley, R. (2010). Interventions for speech sound disorders in children. Baltimore: Brookes.

### B3.3 Diagnostic Audiology: Behavioural Tests

Hours - 60

Marks - 100

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

choose individualized test battery for assessing cochlear pathology, retro cochlear pathology, functional hearing loss, CAPD, vestibular dysfunctions, tinnitus and hyperacusis

independently run the tests and interpret the results to identify the above conditions and also use the information for differential diagnosis

make adjustments in the test parameters to improve sensitivity and specificity of tests. make appropriate diagnosis based on the test results and suggest referrals.

#### Unit 1: Introduction to diagnostic audiology

Characteristics of a diagnostic test, difference between screening and diagnostic test, functions of a diagnostic test in Audiology

Need for test battery approach in auditory diagnosis and integration of results of audiological tests, cross-check principle

Concept of sensitivity, specificity, true positive, true negative, false positive, false negative, hit rate

Definition of behavioural and physiological tests and their characteristics in diagnostic audiology

Theories and physiological bases of recruitment

Theories and physiological bases of adaptation

Clinical indications for cochlear pathology, retro-cochlear pathology, central auditory processing disorders, functional hearing loss, vestibular disorders

#### Unit 2: Tests to identify cochlear and retro cochlear pathology

ABLB, MLB and SISI tests

Behavioural tests of adaptation

Bekesy audiometry

Brief tone audiometry



PIP function

Glycerol test

Test to identify dead regions of cochlea

### Unit 3: Tests to diagnose functional hearing loss

Behavioural and clinical indicators of functional hearing loss

Pure tone tests including tone in noise test, Stenger test, BADGE, puretone DAF

Speech tests including Lombard test, Stenger test, lip-reading test, Doerfler-Stewart test, Low level PB word test, Yes-No test, DAF test

Identification of functional hearing loss in children: Swinging story test, Pulse tone methods

### Unit 4: Assessment of central auditory processing

Definition, different behavioral processes

Behavioral and clinical indicators of central auditory processing disorders

Bottle neck and subtlety principles and their implications in

Tests to detect central auditory processing disorders

Monaural low redundancy tests - filtered speech tests, time compressed speech test, speech-in-noise test, SSI with ICM, other monaural low redundancy tests.

Dichotic speech tests – Dichotic digit test, Staggered spondaic word test, Dichotic CV test, SSI with CCM, Competing sentence test, other dichotic speech tests.

Binaural interaction tests – RASP, BFT, MLD, other binaural interaction tests

Tests of Temporal processing – pitch pattern test, duration pattern tests, other temporal ordering tests, gap detection test, TMTF

Variables influencing the assessment of central auditory processing: Procedural and subject variables

Test findings of important tests in subjects with central auditory disorders: brainstem lesion, cortical, CAPD in children.

### Unit 5: Assessment of persons with vestibular disorder, tinnitus, hyperacusis

Introduction to structure and function of vestibular system

Vestibular ocular reflex and vestibulo spinal reflex

Overview on other systems involved in balance

Signs and Symptoms of vestibular disorders

Team in the assessment and management of vestibular disorders

Behavioral tests to assess vestibular functioning: Fukuda stepping test, tandem gait test, finger nose pointing, Romberg test, Sharpened Romberg test, Dix-Hallpike test, Logroll test

Overview of tinnitus and hyperacusis and tests for assessment

Pitch matching, loudness matching, residual inhibition, Feldman masking curves Johnson Hyperacusis Dynamic Range Quotient

### Practicals

Administer ABLB, MLB and prepare ladder gram (ABLB to be administered by blocking one ear with impression material)

Administer classical SISI on 3 individuals and note down the scores

Administer tone decay tests (classical and its modifications) and note down the results (at least 3 individuals)

Administer Bekesy audiometry

Administer Brief tone audiometry

Plot PIPB function using standardized lists in any 5 individuals

Administer the tests of functional hearing loss (both tone based and speech based) by asking subject to malingering and having a yardstick of loudness.

Administer CAPD test battery to assess different processes on 3 individuals and note down the scores

Administer Fukuda stepping test, Tandem gait test, Finger nose pointing, Romberg test, Sharpened Romberg test, Dix-Hallpike test, Log-roll test on 5 of the individuals each and note down the observations.

Estimate the pitch and loudness of tinnitus in 2 persons with tinnitus (under supervision). Assess the residual inhibition in them.

Plot Feldman masking curves for a hypothetical case

Administer Johnson Hyperacusis Dynamic Range Quotient on any 2 of the individuals and note down the scores.

### Recommended Reading

- Gelfand, S. A. (2009). *Essentials of Audiology*. Thieme.
- Hall, J. W., & Mueller, H. G. (1996). *Audiologists' Desk Reference: Diagnostic audiology principles, procedures, and protocols*. Cengage Learning.
- Jerger, J. (1993). *Clinical Audiology: The Jerger Perspective*. Singular Publishing Group.
- Katz, J., Medwetsky, L., Burkard, R. F., & Hood, L. J. (Eds.). (2007). *Handbook of Clinical Audiology* (6th revised North American edition). Philadelphia: Lippincott Williams and Wilkins.
- Martin, F. N., & Clark, J. G. (2014). *Introduction to Audiology* (12 edition). Boston: Pearson.
- Roeser, R. J., Valente, M., & Hosford-Dunn, H. (2007). *Audiology: Diagnosis*. Thieme.
- Stach, B. A. (2010). *Clinical audiology: an introduction* (2nd ed). Clifton Park, NY: Delmar Cengage Learning.

#### B.3.4 Amplification Devices

Hours - 60

Marks - 100

Objectives: After completing this course, students will be able to

- assess the candidacy for hearing aids and counsel accordingly
- evaluate the listening needs and select the appropriate hearing aid
- independently program digital hearing aids as per the listening needs of the client
- independently assess the benefit from the hearing aid using subjective and objective methods
- make all types of ear molds
- counsel the parents/care givers at all stages

## Unit 1: Types of hearing aids

Historical development of hearing aids: development of concept of amplification, development of different types of amplification devices

Review of basic elements of hearing aids: Microphone, Amplifier, Receiver/vibrator, Cords, Batteries.

Classification and Types of hearing aids

Body level, ear level, in the ear, ITC, invisible in the canal, CIC

Binaural, pseudo binaural, monaural

Programmable, trimmer digital and digital hearing aids

Directional hearing aids, modular hearing aids

RIC hearing aids            Implantable  
hearing aids    Master hearing aids

CROS hearing aids

Group amplification – hard wired, induction loop, FM, infrared

Assistive listening devices – types and selection (Telephones, Television, typing technology)

## Unit 2: Technological aspects in hearing aids

Routing of signals, head shadow/baffle/diffraction effects

Output limiting and issues related to them: peak clipping, compression

Concept and use of compression in hearing aids: BILL, TILL, PILL, Wide Dynamic Range Compression, Syllabic Compression, Dual Compression

Signal processing in hearing aids – BILL, TILL, PILL

Signal enhancing technology

Noise reduction algorithms

Extended low frequency amplification, frequency lowering technology (transposition, compression)

Recent advances in hearing aids

## Unit 3: Electro-acoustic measurements for hearing aids

Purpose and Parameters to be considered: OSPL90, SSPL90, HFA SSPL90, Gain, Full on Gain, HFA Full on Gain, Reference test Gain, Basic Frequency Response,

Total Harmonic distortion, Intermodulation Distortion, input Output functions, instrumentation, procedure, variables affecting EAM Electro-acoustic measurements, BIS, IEC and ANSI standards Environmental tests.

Care, maintenance and troubleshooting of hearing aids

Counselling and orienting the hearing aid user (Client and significant others)

#### Unit 4: Selection of hearing aids

Pre-selection factors; Prescriptive and comparative procedures; Functional gain and insertion gain methods; Use of impedance, OAEs and AEPs audiometry; Hearing aids for conductive hearing loss; Hearing aids for children; Hearing aids for elderly;

Selection of non-linear programmable and digital hearing aids

Hearing aid programming

Methods for assessing hearing aid benefit

Real ear insertion measurements for verification of hearing aid benefit: REIG, REUR, REAR, REOR, RESR, REIG, REAG, RECD

Acoustic feedback in hearing aids

#### Unit 5: Mechano-acoustic couplers (Ear molds)

Different types of molds

Procedure for hard molds and soft mold

UV curing methods

Special modifications in the ear molds: Vents (diagonal and parallel), deep canal molds, short canal, horns, Libby horn, reverse horn, acoustic modifier Effects of mechano-acoustic couplers on the hearing aid output

#### Practicals

Listen to the output of different types and classes of hearing aids (monaural, binaural, analog, digital hearing aids), in different settings

Troubleshoot hearing aids: Check the continuity of the receiver cord using multi meter, measure the voltage of different sized batteries using multi meter, Check voltage of batteries different types and sizes

Carry out electroacoustic measurements for the body level and ear level hearing aids

Program the hearing aid for different configuration and degrees of hearing loss (at least 5 different audiograms) using different prescriptive formulae

Program the hearing aid for different listening situations (at least 3 different situations)

Vary the compression settings in a digital hearing aid and note down the differences in the output

Perform real ear insertion measurements using different hearing aids (body level and ear level, hearing aids of different gains)

Compare speech perception through conventional BTE and RIC hearing aids using a rating scale

Observe assistive listening devices such as telephone amplifier, vibro-tactile alarms, note down the candidacy and their utility.

Administer a questionnaire to assess hearing aid benefit on 2 persons using hearing aids.

Carry out a role play activity of counselling a hearing aid user

#### Ear Molds

Take impression for the ear mold using different techniques, different methods and using different materials

Make hard mold for any 2 ears

Make soft mold for any 2 ears

Make vent in hard molds you made

#### Recommended Reading

Dillon. (2012). *Hearing Aids* (2 edition). Thieme Medical and Scientific Publisher.

Hall, J. W., & Mueller, H. G. (1998). *Audiologists' Desk Reference: Audiologic management, rehabilitation, and terminology*. Singular Publishing Group.

Kates, J. M. (2008). *Digital Hearing Aids* (1 edition). San Diego: Plural Publishing Inc.

Metz, M. J. (2014). *Sandlin's Textbook of Hearing Aid Amplification: Technical and Clinical Considerations*. Plural Publishing.

Mueller, H. G., Hawkins, D. B., & Northern, J. L. (1992). *Probe Microphone Measurements: Hearing Aid Selection and Assessment*. Singular Publishing Group.

Mueller, H. G., Ricketts, T. A., & Bentler, R. A. (2007). *Modern Hearing Aids: Pre-fitting Testing and Selection Considerations: 1* (1 edition). San Diego, CA: Plural Publishing Inc.

Sandlin, R. E. (Ed.). (1989). *Handbook of Hearing Aid Amplification: Clinical Considerations and Fitting Practices v. 2*. Boston: Singular Publishing Group.

Sandlin, R. E. (Ed.). (1993). *Understanding Digitally Programmable Hearing AIDS*. Boston: Allyn & Bacon.

- Tate, M. (2013). Principles of Hearing Aid Audiology. Springer.
- Taylor, B., & Mueller, H. G. (2011). Fitting and Dispensing Hearing Aids (1 edition). San Diego: Plural Publishing Inc.
- Valente, M. (2002). Hearing Aids: Standards, Options, and Limitations. Thieme.

### B3.5 Clinicals in Speech Language Pathology

Marks - 100

General considerations:

Exposure is primarily aimed to be linked to the theory courses covered in the semester. After completion of clinical postings in Speech –language diagnostics, the student will know (concepts), know how (ability to apply), show (demonstrate in a clinical diary/log book based on clinical reports/recordings, etc), and do (perform on patients/ client contacts) the following:

Know:

Procedures to obtain a speech language sample for speech & language assessment from children of different age groups such as, pre schoolers, kindergarten, primary school and older age groups.

Methods to examine the structures of the oral cavity/organs of speech.

The tools to assess language abilities in children (with hearing impairment, specific language impairment & mixed receptive language disorder).

Development of speech sounds in vernacular and linguistic nuances of the language.

Know-how:

To evaluate speech and language components using informal assessment methods.

To administer at least two standard tests for childhood language disorders.

To administer at least two standard tests of articulation/ speech sounds. To assess speech intelligibility.

Show:

- Analysis of language components – Form, content & use – minimum of 2 samples.
- Analysis of speech sounds at different linguistic levels including phonological processes – minimum of 2 samples.
- Transcription of speech language samples – minimum of 2 samples. Analyse differences in dialects of the local language.

Do:

- Case history - minimum of 5 individuals with speech & language disorders.
- Oral peripheral examination - minimum of 5 individuals.
- Language evaluation report – minimum of 5.
- Speech sound evaluation report – minimum of 5.

Evaluation:

Internal evaluation shall be based on attendance, clinical diary, log book and learning conference.

External evaluation: Spot test, OSCE, Record, Viva-voce, case work

### B3.6 Clinicals in Audiology

Marks - 100

General considerations:

Exposure is primarily aimed to be linked to the theory courses covered in the semester, however, not just limited to these areas.

After completion of clinical postings in auditory diagnostics and auditory rehabilitation, the student will Know (concept), know how (ability to apply), show (demonstrate in a clinical diary/log book), and do (perform on patients/ client contacts) the following:

Know:

- Methods to calibrate audiometer.
- Materials commonly employed in speech audiometry.
- Calculation pure tone average, % of hearing loss, minimum and maximum masking levels.
- Different types of hearing loss and its common causes



Know-how:

To obtain detailed case history from clients or parents/guardians.

To carryout commonly used tuning fork tests.

To administer pure tone audiometry including appropriate masking techniques on adults using at least techniques

To administer tests to find out speech reception threshold, speech identification scores, most comfortable and uncomfortable levels on adults.

Show:

Plotting of audiograms with different degree and type with appropriate symbols – 2 audiograms per degree and type

Detailed case history taken and its analysis

Calculation degree, type and percentage of hearing loss on 5 sample conditions

Do:

Case history on at least 5 adults and 3 children with hearing disorders

Tuning fork test on at least 2 individuals with conductive and 2 individuals with sensorineural hearing loss

Pure tone audiometry with appropriate masking on 5 individuals with conductive, 5 individuals SN hearing loss and 3 individuals with unilateral/asymmetric hearing loss – 5

Evaluation:

Internal evaluation shall be based on attendance, clinical diary, log book and learning conference.

External evaluation: Spot test, OSCE, Record, Viva-voce, case work

Semester IV

B.4.1 Motor Speech Disorders in Children

Hours - 60

Marks - 100

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

describe the characteristics of motor speech disorders in children such as cerebral palsy, childhood apraxia of speech and other childhood dysarthrias

assess the speech and non-speech aspects associated with the above conditions

plan and execute therapy strategies for children with motor speech disorders

#### Unit 1: Neuro-developmental processes in speech production and motor speech disorders

Review of neuro-anatomy (cerebral cortex, sub-cortical structures, brainstem, cerebellum, spinal cord & cranial nerves, pyramidal and extra-pyramidal systems)

Sensory-motor integration (spatial temporal planning, motor planning and feedback)

Anatomic development of speech production systems

Development of neural pathways of speech motor control (brain maturation, reflexes, sensory and motor)

Dysarthria in children – cerebral palsy – disorders of tone (spastic, flaccid): definition, etiology, characteristics and associated problems

Dysarthria in children – cerebral palsy – disorders of movement (hyperkinetic, hypokinetic) and disorder of balance (ataxia): definition, etiology, characteristics and associated problems

Dysarthria in children – lower motor neuron and other syndromes with motor speech disorders

Childhood apraxia of speech and nonverbal oral apraxia: definition, characteristics and classification

#### Unit 2: Assessment of motor speech disorders in children

Case history and developmental neurological evaluation – primitive postural and oropharyngeal reflexes, cranial nerve examination

Assessment of oral sensory and motor capacity – Oral peripheral mechanism examination, neuro- muscular status

Assessment of speech sub-systems – quantitative and qualitative

Assessment of speech intelligibility and comprehensibility

Assessment of associated problem

Speech assessment with specific reference to childhood apraxia of speech – Phonetic and phonemic inventory, phonotactics and syllable sequencing, variability of errors, speech intelligibility, fluency and prosody

Test materials – checklist for childhood apraxia of speech, screening test for developmental apraxia of speech

Protocols for non-verbal and verbal praxis specific to Indian languages

Differential diagnosis- dysarthria and other developmental disorders

Differential diagnosis - childhood apraxia of speech and other developmental disorders

### Unit 3: Management of childhood dysarthria

Team approach in rehabilitation of motor speech disorders in children

Neuro-developmental therapy

Non speech oral-motor exercises: its application for children with dysarthria

Management of drooling

Behavioral management of respiratory, phonatory, resonatory and articulatory subsystems

Prosthetic appliances in treatment of childhood dysarthria

AAC in management of motor speech disorders- role of devices, AAC team, candidacy and pre-requisites, symbol selection, techniques, assessment for AAC, effective use of AAC Case studies: Planning intervention for children with dysarthria

### Unit 4: Management of childhood apraxia of speech

Principles of motor learning

Integral stimulation – dynamic temporal cueing

Multisensory and tactile cueing techniques (motor kinesthetic speech training, sensory motor approach, PROMPTS, Touch cue method & speech facilitation)

Gestural cueing techniques (signed target phoneme therapy, adapted cueing techniques, cued speech, visual phonics, & Jordon's gestures)

Miscellaneous techniques (melodic intonation therapy, multiple phonemic approach, & instrumental feedback)

Cognitive/conceptual/ linguistic /phonological remedial approaches - phonotactics

Other approaches: Vowel and diphthong remediation techniques (Northampton (Yale) vowel chart and Alcorn symbols), Nancy Kauffman's speech praxis treatment kit

Use of AAC in childhood apraxia of speech

Evidence-based practice in intervention for childhood apraxia of speech Case studies: Planning intervention for childhood apraxia of speech

### Unit 5: Feeding and swallowing disorders in children

Embryology- periods and structures of development

Anatomical structures of swallowing- upper aero digestive system, anatomic difference between adults and children

Physiology of swallowing- swallow phases, neural control of swallowing, reflexes related to swallowing, suckling and sucking, airway and swallowing

Terms involved in dysphagia and development of feeding skills Causes of dysphagia in children

Signs and symptoms of dysphagia in children

Assessment – inferences from neural developmental assessment, cranial nerve examination, assessment scales, nutritive and non-nutritive assessment, instrumental assessment (VFS, cervical auscultation), gastrointestinal evaluation

Management: positioning, oral- motor treatment, team approach, non oral feeding, transitional feeding, modifications in feeding

Role of speech-language pathologist in neonatal intensive care with reference to feeding and swallowing

## Practicals

With the help of models, charts and software, identify the motor control centers in the brain.

Perform oro-motor examination in five children and adults and compare

Identify oro-motor reflexes (rooting, suckling, & phase bite) in 5 infants.

Demonstrate normal posture and breathing patterns required for varied speech tasks.

Alter the postures and breathing patterns and notice changes in speech patterns.

Assess DDK rate in five typically developing children.

Rate intelligibility of speech in five typically developing children. Discuss factors that influenced speech intelligibility and their ratings.

Observe and record (a) physical status, (b) oral sensory motor abilities and vegetative skills, (c) respiration, (d) phonation, (e) resonance, (f) articulation and (g) language abilities in five typically developing children. Compare these with observations made from children with motor speech disorders.

Perform oro-motor exercises – isotonic and isometric. Discuss strategies to modify exercises for children.

Identify from video the AAC system such as low technology vs high technology systems and different symbol system, that is, Bliss symbols, IICP symbols and different signing systems – Makaton.

Observe feeding and swallowing skills in different age groups of children: 2 newborns; 2 infants, 2 toddlers, and 2 older children. Identify the differences in feeding methods, food consistencies, texture, quantity, feeding habits, feeding appliances used by these children.

#### Recommended Reading

Arvedson, J.C., and Brodsky, L. (2002) (2nd Ed.). Pediatric swallowing and feeding. San Diego, Singular publishing.

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

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

Love, R.J. (2000) (2nd Ed). Childhood Motor Speech Disorders. Allyn & Bacon.

Love, R.J. and Webb, W.G. (1993). (2nd ed.) Neurology for the Speech-Language Pathologist. Reed Publishing (USA)

Rosenthal. S., Shipp and Lotze (1995). Dysphagia and the child with developmental disabilities. Singular Publishing Group.

Velleman, S. L (2003). Resource guide for Childhood Apraxia of Speech. Delmar/Thomson Learning.

## B.4.2 Language Disorders in Children

Hours - 60

Marks - 100

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

explain the process of acquisition of language and factors that influence its development in children.

identify and assess language delay and deviance in children. select appropriate strategies for intervention.

counsel and provide guidance to parents/caregivers of children with language disorders.

Unit 1: Bases of language acquisition, development and disorders

Theories of language acquisition 1: Biological, Psycholinguistic/syntactic theory Theories of language acquisition 2: Cognitive, social interaction/pragmatic, information processing, behavioral

Pre-cursors for normal development of language

Development of components of language from birth to two years (pre-linguistic/presymbolic to symbolic)

Development of components of language during preschool period

Development of components of language during early school age and beyond

Basic concepts and terminologies of language development in bilingual children – simultaneous versus sequential language acquisition, additive and subtractive bilingualism, process of second language acquisition, variables influencing second language acquisition

Development of language in culturally diverse environments and exceptional circumstances  
– neglect and abuse, twins, low-socio economic background

Over view of language disorders – definition and classification based on ICD, DSM  
Application of ICF in language disorders

Unit 2: Language disorders – definition, classification, causes, and characteristics

Intellectual disability: definition, classification, causes and characteristics

Autism spectrum disorders: definition, classification, causes and characteristics

Attention deficit hyperactive disorder: definition, classification, causes and characteristics

Language impairment - mixed receptive and expressive language disorder, specific language impairment: definition, classification, causes and characteristics

Learning disability: definition, classification, causes and characteristics

Acquired childhood aphasia: definition, classification, causes and characteristics

Sensory impairments and language disorders: types, causes and characteristics

Syndromic conditions leading to language difficulties: William syndrome, fragile x syndrome, Down syndrome

Other developmental disabilities: deaf-blind, cerebral palsy and multiple disabilities.

Unit 3: Assessment of language in children

Preliminary components of assessment: Case history, screening, evaluation of environmental, linguistic & cultural variables.

Methods to assess children with language disorder: Formal versus informal assessment; types of assessment materials: assessment scales, observational checklists, developmental scales; standardization, reliability, validity, sensitivity and specificity of test materials

Informal assessment - pre-linguistic behavior, play, mother-child interaction

Language sampling: planning and collecting representative sample; strategies to collecting language sample, audio-video recording, transcription

Analysis of language sample: Specific to various components of language such as phonology, morphology, syntax, semantics and pragmatics.

Test materials for assessing language skills: Assessment of Language Development (ALD),

3D-Language Assessment Test, Linguistic Profile Test, Com-DEALL checklist, other Indian and global tests

Test materials used for children with developmental delay, intellectual disability: Madras Developmental Program Scale, Bayley's Scale for infant and toddler development

Test materials used for children with autism spectrum disorder: Modified-Checklist for Assessment of Autism in Toddlers, Childhood Autism Rating Scale, Indian Scale for Assessment of Autism

Other test materials used for children with ADHD, ACA, LD (NIMH battery for assessment of Learning Disability)

Documenting assessment results: diagnostic report, summary report and referral report specific to disorder

Differential diagnosis of language disorders in children

#### Unit 4: Management of language disorders in children - I

General principles and strategies of intervention in children with language impairment – purpose of intervention, basic approaches to language intervention

(developmental or normative approach, functional approach)

Types of service delivery models - Individuals versus group; direct versus telerehabilitation; structure of therapy session, setting the environment, furniture, seating arrangements

Reinforcement in language therapy, types and schedules of reinforcement

Choice of language for intervention, incorporating principles of multiculturalism into treatment activities

Choosing and framing goals and Objectives: SMART Objectives

Specific treatment techniques

Incidental teaching, self-talk, parallel talk, expansion, extension, recasting, joint routines, joint book reading,

whole language, modifying linguistic input, communicative temptations drill, modelling

Focused stimulation, vertical structuring, milieu teaching, and model

Caregivers and family in intervention: Structured and informal approaches

#### Unit 5: Management of language disorders in children - II

Team approach to intervention

Augmentative and alternative communication – types (aided and unaided) and



application in child language disorders

Specific approaches to management of children with Autism: PECS, Lovaas, TEACCH, Com-DEALL, ABA, Facilitated Communication

Approaches to management of children with LD

Strategies to facilitate language skills in children with disorders such as intellectual disability: Redundancy, chunking, chaining

Use of technology in language intervention

Home plan and counselling for children with language disorders

Documentation specific to the disorder: pre-therapy; lesson plan; SOAP notes

Documentation specific to the disorder: summary report, referral report

Decision making in therapy: transition to next objective, termination of therapy

## Practicals

Record mother-child interaction of one typically developing child in the age range of 0-1, 12, 2-4, 4-6 and 6-8 years of age. Compare linguistically the out puts from the mother and the child across the age groups. Make inferences on socio cultural influences in these interactions.

Make a list of loan words in two familiar languages based on interaction with 10 typically developing children in the age range of 2-4, 4-6, 6-8 and 8-10 years. Discuss the influence of bi- or multilingualism on vocabulary.

Record a conversation and narration sample from 3 children who are in preschool kindergarten, and primary school. Perform a language transcription and analyze for form, content and use.

Administer 3D LAT, ALD, LPT, ComDEALL checklist on 2 typically developing children.

Draft a diagnostic report and referral letter for a child with language disorder.

Demonstrate general language stimulation techniques and discuss the clinical application.

Demonstrate specific language stimulation techniques with appropriate materials and discuss its clinical applications.

Draft Subjective Objective Assessment Plan (SOAP) for a pre-recorded sample of a 45 minute session of intervention for a child with language disorder.

Draft a lesson plan for a child with language disorder.

Draft a discharge summary report for a child with language disorder

## Recommended Reading

Roseberry-McKibbin, C. (2007). *Language Disorders in Children: A multicultural and case perspective*. Boston: Pearson Education, Inc.

Paul, R. (2013). *Language disorders from infancy through adolescence* (4th ed.).

St.Louis, MO: Mosby. Dwight, D.M. (2006). *Here's how to do therapy: Hand-on core skills in speech language pathology*. San Diego, CA: Plural Publishing

Hegde, M.N. (2005). *Treatment protocols for language disorders in children – Vol. 1*  
2. San Diego: Plural Publishing

Owens, R.E. (2008). *Language development: An introduction* (7th ed.). Boston:

Pearsons

Reed, V.A. (2004). *An Introduction to children with language disorders* (3rd Ed.) New York: Allyn & Bacon

Rout, N and Kamraj, P (2014). *Developing Communication - An Activity Book*, A publication by NIEPMED, Chennai. Freely downloadable from <http://niepmd.tn.nic.in/publication.php>. ISBN 978-81-928032-41.

### B.4.3 Diagnostic Audiology: Physiological Tests

Hours - 60

Marks - 100

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

justify the need for using the different physiological tests in the audiological assessment independently run the tests and interpret the results to detect the middle ear, cochlear and retro cochlear pathologies and also differentially diagnose

design tailor-made test protocols in immittance, AEPs and OAEs as per the clinical need

make appropriate diagnosis based on the test results and suggest referrals.

#### Unit 1: Immittance evaluation

Clinical significance of physiological tests in audiology

Immittance evaluation: Principle of immittance evaluation: Concept of impedance and admittance, their components,

Tympanometry: definition, measurement procedure, response parameters, their measurement and normative, classification of tympanogram, clinical significance of tympanometry

Eustachian tube functioning tests of tympanometry: basics of pressure equalization function of ET, Valsalva, Toynbee, William's pressure swallow, inflation-deflation test.

Overview on multicomponent and multi-frequency tympanometry      Overview on wide band reflectance and wide band tympanometry

Reflexometry: definition, acoustic reflex pathway, measurement procedure, clinical applications of acoustic reflexes, special tests

#### Unit 2: Auditory evoked potentials (AEPs): Auditory brainstem response (ABR)

Introduction and classification of AEPs

Instrumentation

Principles of AEP recording techniques:

Auditory brainstem response generators

Protocol and procedure of recording auditory brainstem response

Factors affecting auditory brainstem responses  
Clinical applications of ABR  
ABR in the paediatric population  
Role of ABR in infant hearing screening

### Unit 3: Overview of other AEPs

ECochG

Auditory Middle Latency Responses (AMLR) and their clinical applications

Auditory Long Latency Responses (Obligatory responses) and their clinical applications  
Other long latency potentials such as P300, MMN, P600, N400, T-complex, CNV) and their clinical applications

ASSR: Instrumentation, recording and clinical applications Brainstem responses to speech and other complex signals

### Unit 4: Otoacoustic emissions

Introduction to otoacoustic emissions

Origin and classification of OAEs

Instrumentation

Procedure of OAE measurement: SOAE, TEOAEs, and DPOAEs

Interpretation of results: SOAE, TEOAEs, and DPOAEs

Clinical applications of OAEs: SOAE, TEOAEs, and DPOAEs

Contralateral suppression of OAEs and its clinical implications

### Unit 5: Physiological tests for assessment of vestibular system

Electronystagmography: procedure, interpretation, clinical applications

Videonystagmography, videoocculograph

Vestibular Evoked Myogenic Potentials

Overview of Rotatory chair test, video Head Impulse Test,

Overview of Dynamic Posturography

### Practicals

- Measure admittance in the calibration cavities of various volumes and note down the observations
- Calculate Equivalent ear canal volume by measuring static admittance in an uncompensated tympanogram (10 ears)
- Do tympanogram in the manual mode and measure peak pressure, peak admittance and ear canal volume manually using cursor (10 ears).
- Measure gradient of the tympanogram (10 ears)
- Administer Valsalva and Toynbee and William's pressure swallow test(5 ears)
- Record acoustic reflex thresholds in the ipsi and contra modes, (10 ears)
- Plot Jerger box pattern for various hypothetical conditions that affect acoustic reflexes and interpret the pattern and the corresponding condition.
- Carry out Acoustic reflex decay test and quantify the decay manually using cursor (5 individuals).
- Trace threshold of ABR (in 5 dB nHL steps near the threshold) for clicks and tone bursts of different frequencies (2 persons) and draw latency intensity function. Record ABR using single versus dual channels and, note down the differences
- Record ABR at different repetition rates in 10/sec step beginning with 10.1/11.1 per second. Latency-repetition rate function needs to be drawn.
- Record with each of three transducers (HP, insert phones and bone vibrator) and polarities and draw a comparative table of the same. Students should also record with different transducers without changing in the protocol in the instrument and calculate the correction factor required.
- Record ASSR for stimuli of different frequencies and estimate the thresholds
- Record TEOAEs and note down the amplitude, SNR, noise floor and reproducibility at octave and mid-octave frequencies. Note down the stimulus stability and the overall SNR (10 ears).
- Record DPOAEs and note down the amplitude, SNR, noise floor and reproducibility at octave and mid-octave frequencies (10 ears)

### Recommended Reading

- Hall, J. W., & Mueller, H. G. (1996). *Audiologists' Desk Reference: Diagnostic audiology principles, procedures, and protocols*. Cengage Learning.
- Hood, L. J. (1998). *Clinical Applications of the Auditory Brainstem Response*. Singular Publishing Group.
- Hunter, L., & Shahnaz, N. (2013). *Acoustic Immittance Measures: Basic and Advanced Practice* (1 edition). San Diego, CA: Plural Publishing.

Jacobson, G. P., & Shepard, N. T. (2007). Balance Function Assessment and Management (1 edition). San Diego, CA: Plural Publishing Inc.

Jacobson, J. T. (1985). The Auditory brainstem response. College-Hill Press.

Katz, J., Medwetsky, L., Burkard, R. F., & Hood, L. J. (Eds.). (2007). Handbook of Clinical Audiology (6th revised North American ed edition). Philadelphia: Lippincott Williams and Wilkins.

- McCaslin, D. L. (2012). Electronystamography/Videonystagmography (1 edition). San Diego: Plural Publishing.

Musiek, F. E., Baran, J. A., & Pinheiro, M. L. (1993). Neuroaudiology: Case Studies (1 edition). San Diego, Calif: Singular.

Robinette, M. S., & Glatke, T. J. (Eds.). (2007). Otoacoustic Emissions: Clinical Applications (3rd edition). New York: Thieme.

#### B.4.4 Implantable Hearing Devices

Hours - 60

Marks - 100

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

assess candidacy for bone anchored hearing devices, middle ear implants, cochlear implants, and ABI

select the appropriate device depending on the audiological and non-audiological findings

handle post-implantation audiological management assess the benefit derived from implantation, and

counsel the parents/care givers during different stages of implantation

## Unit 1: Implantable hearing devices – basics

Need for implantable hearing devices

History of implantable hearing devices (bone anchored hearing devices, middle ear implants, cochlear implants, auditory brainstem implants and midbrain implants)

Candidacy for implantable hearing devices

Team involved in implantable hearing devices

Pre-implant counseling, Informed consent

## Unit 2: Bone anchored hearing devices and middle ear implants

Types, components

Surgical approaches, risks, complications

Audiological evaluations for candidacy, contraindications Assessment of benefits

## Unit 3: Cochlear implant and brain stem implants – basics

Terminology, types, components and features

Bilateral, bimodal and hybrid cochlear implants

Factors related to selection of the device, funding sources

Surgical approaches, risks, complications

Audiological and non-audiological candidacy criteria, contraindications

## Unit 4: Cochlear implants and brainstem implants

Signal coding strategies, classification, types

Intraoperative monitoring by audiologists

Objective measures: ESRT, ECAP, prom stim, EABR, aided cortical potentials

Post implant Mapping: schedule, pre-requisites, switch-on, mapping parameters, impedance, compliance, role of objective and subjective measures in mapping, post mapping audiological evaluation

Assessment of benefits

Optimization of hearing aid on contralateral ear

#### Unit 5: Implantable hearing devices - Counselling and troubleshooting; Rehabilitation

Post implant Counselling on care and maintenance and trouble shooting of the device

Overview of post implant rehabilitation including AVT

Factors affecting outcome of implantable devices in adults and children

#### Practicals

Watch videos of BAHA, middle ear implant, cochlear implant

Create hypothetical cases (at least 5 different cases) who are candidates for cochlear implantation. Make protocol for recording an EABR

List down the technological differences across different models of cochlear implants from different companies, their cost

Observation of mapping

Watching of videos on AVT

Watch video on cochlear implant surgery

#### Recommended Reading

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

Cooper, H., & Craddock, L. (2006). Cochlear Implants: A Practical Guide. Wiley.

Dutt, S. N. (2002). The Birmingham Bone Anchored Hearing Aid Programme: Some Audiological and Quality of Life Outcomes. Den Haag: Print Partners Ipskamp.



Eisenberg, L. S. (2009). *Clinical Management of Children with Cochlear Implants*. Plural Publishing.

Gifford, R. H. (2013). *Cochlear Implant Patient Assessment: Evaluation of Candidacy, Performance, and Outcomes*. Plural Publishing.

Hagr, A. (2007). BAHA: Bone-Anchored Hearing Aid. *International Journal of Health Sciences*, 1(2), 265–276.

Kim C. S., Chang S. O., & Lim D. (Eds.). (1999). *Updates in Cochlear Implantation :The 2nd Congress of Asia Pacific Symposium on Cochlear Implant and Related Sciences*, Seoul, April 1999 (Vol. 57). Seoul: KARGER.

Kompis, M., & Caversaccio, M.-D. (2011). *Implantable Bone Conduction Hearing Aids*. Karger Medical and Scientific Publishers.

Mankekar, G. (2014). *Implantable Hearing Devices other than Cochlear Implants*. Springer India.

Møller A.R. (2006). *Cochlear and Brainstem Implants* (Vol. 64).

Niparko, J. K. (2009). *Cochlear Implants: Principles & Practices*. Lippincott Williams & Wilkins.

Ruckenstein, M.J. (Ed.).(2012). Cochlear Implants and Other Implantable Hearing Devices. Plural.

Suzuki J.L. (1988). Middle Ear Implant: Implantable Hearing Aids (Vol. 4).

KARGER.

Thoutenhoofd, E. (2005). Paediatric cochlear implantation: evaluating outcomes.

Whurr.

Valente, M. (2002). Strategies for selecting and verifying hearing aid fittings. 2nd Edn. Thieme.



## B4.5 Clinicals in Speech-language Pathology

Marks – 100

General considerations:

Exposure is primarily aimed to be linked to the theory courses covered in the semester.

After completion of clinical postings in Speech –language diagnostics, the student will know (concepts), know how (ability to apply), show (demonstrate in a clinical diary/log book based on clinical reports/recordings, etc), and do (perform on patients/ client contacts) the following:

Know:

Speech & language stimulation techniques.

Different samples /procedures required to analyse voice production mechanism.  
(acoustic/ aerodynamic methods / visual examination of larynx/ self evaluation)

Different samples /procedures required to analyse speech production mechanism in children with motor speech disorders.

Know-how:

To administer at least two more (in addition to earlier semester) standard tests for childhood language disorders.

To administer at least two more (in addition to earlier semester) standard tests of articulation/ speech sounds.

To set goals for therapy (including AAC) based on assessment/test results for children with language and speech sound disorders.

To record a voice sample for acoustic and perceptual analysis.

To assess parameters of voice and breathing for speech.

Assessment protocol for children with motor speech disorders including reflex profile and swallow skills.

Counselling for children with speech-language disorders.

Show:

Acoustic analysis of voice – minimum of 2 individuals with voice disorders.  
Simple aerodynamic analysis - minimum of 2 individuals with voice disorders.  
Self evaluation of voice – minimum of 2 individuals with voice disorders.  
Informal assessment of swallowing – minimum of 2 children.  
Assessment of reflexes and pre linguistic skills - minimum of 2 children.  
Pre –therapy assessment and lesson plan for children with language and speech sound disorders - minimum of 2 children each.

Do:

Case history - minimum of 2 individuals with voice disorders.  
Case history - minimum of 2 children with motor speech disorders  
Oral peripheral examination- minimum of 5 children  
Apply speech language stimulation/therapy techniques on 5 children with language disorders (with hearing impairment, specific language impairment & mixed receptive language disorder)/speech sound disorders – minimum of 5 sessions of therapy for each child.  
Exit interview and counselling - minimum of 2 individuals with speech language disorders.

Evaluation:

Internal evaluation shall be based on attendance, clinical diary, log book and learning conference.

External evaluation: Spot test, OSCE, Record, Viva-voce, case work

## B4.6 Clinicals in Audiology

Marks – 100

### General considerations:

Exposure is primarily aimed to be linked to the theory courses covered in the semester, however, not just limited to these areas.

After completion of clinical postings in auditory diagnostics and auditory rehabilitation, the student will Know (concept), know how (ability to apply), show (demonstrate in a clinical diary/log book), and do (perform on patients/ client contacts) the following:

### Know:

Indications to administer special tests

Procedures to assess the listening needs

National and international standards regarding electroacoustic characteristics of hearing aids

### Know-how:

To administer at least 1 test for adaptation, recruitment and functional hearing loss.

Counsel hearing aid user regarding the use and maintenance hearing aids

To troubleshoot common problems with the hearing aids

To select test battery for detection of central auditory processing disorders.

Select different types of ear moulds depending on type of hearing aid, client, degree, type and configuration of hearing loss

Show:

Electroacoustic measurement as per BIS standard on at least 2 hearing aids

How to process 2 hard and 2 soft moulds

How to preselect hearing aid depending on listening needs and audiological findings on at least 5 clinical situations (case files)

How select test battery depending on case history and basic audiological information – 3 situations

Do:

Tone decay test – 2 individuals with sensori-neural hearing loss

Strenger test – 2 individuals with unilateral/asymmetrical hearing loss

Dichotic CV/digit, Gap detection test – 2 individuals with learning difficulty or problem in hearing in noise

Hearing aid fitment for at least 5 individuals with mild to moderate and 3 individuals with mod-severe to profound

Hearing aid selection with real ear measurement system on 3 individuals with hearing impairment

Evaluation:

Internal evaluation shall be based on attendance, clinical diary, log book and learning conference.

External evaluation: Spot test, OSCE, Record, Viva-voce, case work

Semester V

B5.1 Structural Anomalies and Speech Disorders

Hours - 60

Marks - 100

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

understand the characteristics of disorders with structural anomalies including speech  
evaluate and diagnose the speech characteristics seen in these disorders learn about  
the techniques for the management of speech disorders in these conditions

Unit 1: Speech characteristics of persons with cleft lip and palate

Types, characteristics and classification of cleft lip and palate



Causes of cleft lip and palate: genetic, syndrome and others

Velopharyngeal inadequacy: types, causes and classification

Associated problems in persons with cleft lip and palate: speech, language, feeding, dental and occlusion, hearing, psychological

## Unit 2: Assessment and management of cleft lip and palate speech

Team of professionals in the management of persons with cleft lip and palate: their roles in diagnosis and management. Assessment of persons with cleft lip and palate for speech language functions:

Subjective assessment of speech characteristics and speech intelligibility: proforma, tests, scales and others.

Objective assessment of phonatory, resonatory and articulatory features

Diagnosis and differential diagnosis of speech related functions

Subjective assessment of language and communication functions

Reporting test results using Universal Parameters

Management of persons with cleft lip and palate

Surgical and prosthetic management

Techniques and strategies to correct speech sound disorders

Techniques and strategies to improve feeding

Counselling and guidance

## Unit 3: Structural anomalies of tongue and mandible - Characteristics, assessment and management

Types, classification and characteristics of structural anomalies of tongue and mandible

Causes for structural anomalies of tongue and mandible

Team of professionals in the management of persons with structural anomalies of tongue and mandible and their roles.

Associated problems in persons with structural anomalies of tongue and mandible:

Speech

Feeding

Dental and occlusion

Psychological and others

Management of persons with structural anomalies of tongue and mandible

Surgical and prosthetic management

Techniques and strategies to improve speech intelligibility

Techniques and strategies to improve feeding

Counselling and guidance for persons with glossectomy and mandibulectomy

#### Unit 4: Characteristics & assessment of laryngectomy

Causes, symptoms and classifications of laryngeal cancers

Team of professionals in the management of persons with laryngeal cancer

Surgery for laryngeal cancers: types and outcome

Associated problems in laryngectomy individuals

Assessment of speech and communication skills of laryngectomy individuals: Pre and post-operative considerations

#### Unit 5: Management of speech and communication in laryngectomies

Esophageal speech: candidacy, types of air intake procedures, speech characteristics and its modification through techniques and strategies, complications and contraindications.

Tracheo-esophageal speech: candidacy, types of TEP, fitting of prosthesis, speech characteristics and its modification through techniques and strategies, complications and contraindications.

Artificial larynx: types, factors for selection, output characteristics, techniques for efficient use of artificial larynx, complications and contraindications.

Other remedial procedures: Pharyngeal speech, buccal speech, ASAI speech, gastric speech.

#### Practicals

Identify the different types of cleft lip and palate by looking at illustrations and images  
Listen to 10 speech samples of children with cleft lip and palate and rate their nasality/ speech (articulation and cleft type errors) based on universal reporting parameters.

Identify the type of closure of velopharyngeal port for 5 normal individuals and 5 individuals with cleft lip and palate using videos of nasoendoscopy/ videofluoroscopy.

Perform oral peripheral mechanism examination on 10 individuals and document the structure and functions of the articulators.

Analyse the different types of occlusion in 10 individuals.

Identify the type of glossectomy by looking at pictures/illustrations.

Identify the different types of prosthesis in the management of head and neck cancer.

Analyse the speech profile of 5 individuals with laryngectomy.  
Identify parts of an artificial larynx and explore its use.  
Prepare a checklist / pamphlet illustrating care of the stoma and T- tubes in vernacular.

#### Recommended Reading

Berkowitz. S. (2001). Cleft Lip and Palate: Perspectives in Management. Vol II. San Diego, London, Singular Publishing Group Inc.

Falzone. P., Jones. M. A., & Karnell. M. P. (2010). Cleft Palate Speech. IV Ed., Mosby Inc.

Ginette, P. (2014). Speech Therapy in Cleft Palate and Velopharyngeal Dysfunction. Guildford, J & R Press Ltd.

Karlind, M. & Leslie, G. (2009). Cleft Lip and Palate: Interdisciplinary Issues and Treatment. Texas, Pro Ed.

Kummer, A.W. (2014). Cleft Palate and Craniofacial Anomalies: The Effects on Speech and Resonance. Delmar, Cengage Learning.

Peterson-Falzone, S. J., Cardomone, J. T., & Karnell, M. P. (2006). The Clinician Guide to Treating Cleft Palate Speech. Mosby, Elsevier.

Salmon . J & Shriley (1999). Alaryngeal speech rehabilitation for clinicians and by clinicians. ProEd

Yvonne, E (Ed) (1983). Laryngectomy: Diagnosis to rehabilitation. London: Croom Helm Ltd

## B5.2 Fluency and its Disorders

Hours - 60

Marks - 100

Objectives: After completion of the course, the student will be able to

understand the characteristics of fluency and its disorders evaluate and diagnose fluency disorders

learn about the techniques for the management of fluency disorders

### Unit 1: Fluency

Scope and definition of fluency

Factors influencing fluency

Definition and characteristics of features of suprasegmentals in speech: rate of speech, intonation, rhythm, stress and pause

Suprasegmental features in typical speech

Suprasegmental features in the speech of persons with fluency disorders

Developmental aspects of suprasegmentals of speech Normal non-fluency

### Unit 2: Stuttering and other fluency disorders

Stuttering: Definition and causes for stuttering

Characteristics of stuttering: core and peripheral characteristics, primary and secondary stuttering, effect of adaptation and situation

Development of stuttering

Normal non fluency: characteristics and differential diagnosis

Theories of stuttering: organic, functional, neurogenic, diagnosogenic and learning

Cluttering: Definition, causes and characteristics

Neurogenic stuttering: Definition, causes and characteristics

### Unit 3: Assessment and differential diagnosis

Assessment of fluency disorders: stuttering, cluttering, neurogenic stuttering and normal non fluency:

Subjective methods: protocols and tests

Objective methods

Qualitative and quantitative assessment

Differential diagnosis of fluency disorders

Unit 4: Management of stuttering

Approaches to management

Changing scenario in management of stuttering

Different techniques and strategies used in management with their rationale

Relapse and recovery from stuttering

Issues of speech naturalness in stuttering

Unit 5: Management of fluency-related entities

Management of cluttering: rationale, techniques and strategies

Management of neurogenic stuttering: rationale, techniques and strategies

Management of normal non-fluency: rationale, techniques and strategies

Relapse and recovery in cluttering and neurogenic stuttering. Changes in normal nonfluency

Prevention and early identification of stuttering, and cluttering

Practicals

Assess the rate of speech in 5 normal adults.

Record and analyse the supra segmental features in typically developing children between 2 and 5 years.

Record audio visual sample of 5 typically developing children and 5 adults for fluency analysis.

Listen/see samples of normal non fluency and stuttering in children and document the differences.

Identify the types of dysfluencies in the recorded samples of adults with stuttering.

Instruct and demonstrate the following techniques: Airflow, prolongation, easy onset shadowing techniques.

Record 5 speech samples with various delays in auditory feedback and analyse the differences.

Administer SPI on 5 typically developing children.

Administer SSI on 5 adults with normal fluency.

Administer self-rating scale on 10 adults with normal fluency.

### Recommended Reading

Assessment and management of fluency disorders. Proceedings of the national workshop on “Assessment and management of fluency disorders”, 25-26 Oct 2007.

All India Institute of Speech & Hearing, Mysore. 2007.

Bloodstein, O., & Ratner, N. B. (2008). *A Handbook on Stuttering* (6th Ed.). Clifton Park, NY, Thomson Demer Learning.

Guitar, B. (2014). *Stuttering-An Integrated Approach to its Nature and Treatment*. 4th Ed. Baltimore, Lippincott Williams & Wilkins.

Hegde, M. N. (2007). *Treatment Protocols for Stuttering*. CA Plural Publishing.

Howell, P. (2011). *Recovery from Stuttering*. New York, Psychology Press.

Packman, A., & Attanasio, J.S. (2004). *Theoretical Issues in Stuttering*. NY, Psychology Press.

Rentschler, G. J. (2012). *Here's How to Do: Stuttering Therapy*. San Diego, Plural Publishing.

Wall, M. J., & Myers F. L. (1995). *Clinical Management of Childhood Stuttering*. Texas, PRO-ED, Inc.

Ward, D. (2006). *Stuttering and Cluttering: Frameworks for Understanding & Treatment*. NY, Psychology Press.

Yairi, E., & Seery, C. H. (2015). *Stuttering - Foundations and Clinical Applications*. 2nd Ed. USA, Pearson Education, Inc.

### B5.3 Paediatric Audiology

Hours - 60

Marks - 100

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

describe auditory development

list etiologies and relate them to different types of auditory disorders that may arise

explain different hearing screening/identification procedures and their application

elaborate on different aspects of paediatric behavioral and physiological /

electrophysiological evaluation

Unit 1: Auditory development

Review of Embryology of the ear

Development of auditory system from periphery to cortex  
Neuroplasticity  
Prenatal hearing  
Normal auditory development from 0-2 years  
Infant speech perception  
Incidence and prevalence of auditory disorders in children

#### Unit 2: Auditory disorders

Congenital and acquired hearing loss in children    Permanent minimal  
and mild bilateral hearing loss

    Impact on auditory skills, speech-language, educational and socio-emotional abilities  
Moderate to profound sensorineural hearing loss  
Unilateral hearing loss  
Auditory Neuropathy Spectrum Disorders  
Central auditory processing disorders  
Pseudohypacusis  
Auditory disorders in special population and multiple handicap

#### Unit 3: Early identification of hearing loss

Principles of early hearing detection and intervention programs  
Principles and history of hearing screening  
Joint Committee on Infant Hearing position statement ( 2000, 2007,2013)  
High risk register/ checklists for screening  
Sensitivity and specificity of screening tests  
Hearing screening in infants and toddlers: Indian and Global context  
Hearing screening in preschool children: Indian and Global context  
    Hearing screening in school-age children ( including screening for CAPD): Indian  
and Global context

#### Unit 4: Paediatric assessment I

Behavioral observation audiometry  
Conditioned orientation reflex audiometry  
Visual reinforcement audiometry, TROCA, play audiometry



Pure tone audiometry in children: Test stimuli, response requirement and reinforcement  
Speech audiometry (SRT, SDT); Speech recognition and speech perception tests developed in India)

Bone conduction speech audiometry

Immittance evaluation in paediatric population

Central auditory processing disorders assessment

#### Unit 5: Paediatric assessment II

Recording and interpretation of OAE in paediatric population

Factors affecting OAE in paediatric population

Recording and interpretation of click evoked and tone burst evoked ABR in paediatric population

Factors affecting ABR in paediatric population

Recording ASSR in paediatric population

Recording AMLR, ALLR in paediatric population

Assessment of hearing loss in special population

Diagnostic test battery for different age groups

Diagnosis and differential diagnosis

#### Practicals

Observe a child with normal hearing (0-2 years) in natural settings. Write a report on his/her responses to sound.

Observe a child with hearing impairment (0-2 years) in natural settings. Write a report on his/her responses to sound with and without his amplification device

Administer HRR on at least 3 newborns and interpret responses

Based on the case history, reflect on the possible etiology, type and degree of hearing loss the child may have.

Compare ABR wave forms in children of varying ages from birth to 24 months.

Observe live or video of BOA/VRA of a child with normal hearing and hearing loss and write a report on the instrumentation, instructions, stimuli used, procedure and interpretation.

Observe OAE in a child with normal hearing and a child with hearing loss. Write a report on the instrumentation, protocol used and interpretation

Observe ABR in a child with normal hearing and a child with hearing loss. Write down a report on the instrumentation, protocol used and interpretation

Observe immittance evaluation in a child with normal hearing and a child with hearing loss. Write a report on the instrumentation, protocol used and interpretation

Using role play demonstrate how the results of audiological assessment are explained to caregiver in children with the following conditions

- Child referred in screening and has high risk factors in his history
- Child with chronic middle ear disease
- Child with CAPD
- Child with severe bilateral hearing impairment

### Recommended Reading

- Finitzo, T., Sininger, Y., Brookhouser, P., & Village, E. G. (2007). Year 2007 position statement: Principles and guidelines for early hearing detection and intervention programs. *Paediatrics*, 120(4), 898–921.  
<http://doi.org/10.1542/peds.2007-2333>
- Madell, J.R., & Flexer, C. (2008). *Paediatric Audiology: Diagnosis, Technology, and Management*. Ney York NY: Thieme Medical Publishers.
- Northern, J.L. and Downs, M.P. (2014). *Hearing in Children*. 6th Ed. San Diego: Plural Publishing.
- Seewald, R., and Thorpe, A.M. (2011). *Comprehensive Handbook of Paediatric Audiology*, San Diego: Plural Publishing. ( core text book ) [www.jcih.org](http://www.jcih.org)

## B5.4 Aural Rehabilitation in Children

Hours - 60

Marks - 100

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

describe the different communication options available for young children with hearing impairment

explain the impact of hearing impairment on auditory development and spoken language communication

describe factors that effect of acoustic accessibility and strategies to manage them at home and in classroom

design activities for auditory learning at different levels enumerate how the needs of individuals with hearing impairment using sign language and spoken language as form of communication in India are being met

Unit 1: Auditory development, spoken communication and acoustic accessibility

Sensitivity period for auditory development

Impact of hearing impairment on auditory development, spoken language acquisition, parent child communication

Factors affecting auditory development

Hearing loss implications for speech perception: acoustics of speech

Optimizing hearing potential through hearing aids

Optimizing hearing potential through cochlear implants

Barriers to acoustic accessibility: distance, signal to noise ratio, reverberation Managing the listening environment for infants, toddlers schools

Signal to noise ratio enhancing technologies personal FM, loop systems, desktop group systems, blue tooth connectivity

Unit 2: Communication options

Detecting and confirming hearing loss

Parent support counselling, individual family service plan  
Choosing communication options  
Auditory oral approach  
Auditory verbal therapy  
Manual/sign language: Indian and Global context  
Cued speech and total communication  
Listening devices hearing aid/cochlear implant  
Early intervention programs

### Unit 3: Optimal listening and learning environments infancy and early childhood

Involvement of family  
Factors impacting family involvement, supporting families through information and education  
Creating optimum listening and learning environment  
Intervention: Assessment, auditory learning, listening and language facilitation techniques in infancy and early childhood  
Issues with children with mild hearing loss, unilateral hearing loss,  
Children with hearing loss, ANSD or APD: Children are intervened late  
Children with hearing loss and other special needs  
Listening and spoken language in school age: benefits of inclusion  
Intervention at school age: Functional hearing assessment, communication assessment and intervention to integrate with academic targets

### Unit 4: Auditory - speech reading training and literacy

Candidacy for auditory training and speech reading  
Auditory training/learning four design principles skill, stimuli, activity, and difficulty level  
Early training Objectives  
Analytic and Synthetic training Objectives  
Formal and informal training  
Auditory training for infants and very young children Outcomes of training  
Speech and language and literacy characteristics  
Speech language and literacy evaluation assessment

## Speech language therapy

### Unit 5: Indian perspectives

Prevalence of hearing impairment in children

Education of the deaf in India historical perspectives

Available resources for education of the hearing impaired

Early intervention programs and centers

Schools for the hearing impaired; day schools, residential schools

Beyond school: college and vocational training

Training manpower resources for service delivery

Indian sign language

Training sign language interpreters

Cued speech in India

Assessment and therapy tools developed for individuals with hearing impairment in India.

### Practicals

Watch documentaries such as “Sound and Fury” (2001). Write a reflection of why parents made communication choices for their children

Follow on links to the above film that shows the status of the children with hearing impairment after a few years.

Learn at least 50 signs across different categories of Indian sign language. Make a video of you signing 10 sentences. Have a class mate interpret them.

Interview a parent of a child with hearing impairment on how they adapted their child to wear the hearing aids and /or implant. What were the first responses to sound they observed and how language and speech develop?

Complete a functional auditory evaluation on one child with hearing loss. Do a speech and language evaluation and also write a report on the child strengths and weakness.

Design and demonstrate auditory learning activities at the four levels awareness, discrimination, identification and comprehension. Ensure that the activities encompass different skill level and difficulty levels.

Develop a short audio/film/pamphlet for parents in your local language on one of the following: teaching parent to trouble shooting the hearing aid/cochlear implant, establishing consistent use of listening device, activities to facilitate language across different age groups

Visit a school for the deaf. Document your observation about the acoustic environment in the class, strategies used by the teacher to promote listening and spoken language

#### Recommended Reading

- Fitzpatrick, E.M., and Doucet S.P. (2013) (Eds). Paediatric Audiologic Rehabilitation. Thieme, New York
- Hosford-Dumm, H., Roser, R., & Valente, M. (2007). Audiology Practice Management (2nd edition edition). New York: Thieme.
- Mardell, J., & Flexer, C. (2013). Paediatric Audiology: Diagnosis, Technology, and Management (2nd ed.). New York, NY: Thieme.
- Rout, N and Rajendran, S. (2015). Hearing aid Counselling and Auditory training Manual, A publication of NIPMED, Chennai. Freely downloadable from <http://niepmd.tn.nic.in/publication.php>. ISBN 978-81-928032-5-8.
- Schwartz, S., (2007) Choices in Deafness : a Parent's guide to Communication Options , 3rd edition Woodbine house Bethesda
- Status of Disability in India Hearing Impairment (2012) Rehabilitation Council of India, New Delhi
- Tye-Murray, N., ( 2014) Foundations of Aural Rehabilitation: Children , adults and their family members 4th edition Plural Publishing San Diego
- B5.5 Clinicals in Speech Language Pathology

Marks - 100

#### General considerations:

Exposure is primarily aimed to be linked to the theory courses covered in the semester.

After completion of clinical postings in Speech –language diagnostics, the student will know (concepts), know how (ability to apply), show (demonstrate in a clinical diary/log book based on clinical reports/recordings, etc.), and do (perform on patients/ client contacts) the following:

Know:

Procedures to assess speech fluency and its parameters using standardized tests for children and adults.

Differential diagnosis of motor speech disorders in children.

Procedures to assess individuals with cleft lip and palate, and other oro-facial structural abnormalities.

Procedures to assess laryngectomy and provide management options.

Know-how:

To administer at least two more (in addition to earlier semesters) standard tests for childhood language disorders.

To record a speech sample for analysis of fluency skills (including blocks & its frequency, rate of speech, prosody, etc.).

To assess posture and breathing for speech in children with motor speech disorders.

To consult with inter-disciplinary medical/rehabilitation team and counsel the individual/family regarding management options and prognosis.

Show:

Rating of cleft, speech intelligibility and nasality – minimum of 2 individuals with cleft lip and palate.

Language assessment - minimum of 2 individuals with cleft lip and palate.

Transcription of speech sample and assessment of percentage dis/dysfluency– minimum of 2 individuals with stuttering.

Assessment of rate of speech on various speech tasks – at least on 2 children & adults.

Do:

Voice assessment report - minimum of 2 individuals with voice disorders.

Fluency assessment report - minimum of 2 individuals with fluency disorders.

Oral peripheral examination on minimum of 2 individuals with cleft lip and palate.

Apply speech language stimulation/therapy techniques on 5 children with language disorders/speech sound disorders/ motor speech disorders – minimum 5 sessions of therapy for each child.

Evaluation:

Internal evaluation shall be based on attendance, clinical diary, log book and learning conference.

External evaluation: Spot test, OSCE, Record, Viva-voce, case work

### B5.6 Clinicals in Audiology

Marks - 100

#### General considerations:

Exposure is primarily aimed to be linked to the theory courses covered in the semester, however, not just limited to these areas.

After completion of clinical postings in auditory diagnostics and auditory rehabilitation, the student will Know (concept), know how (ability to apply), show (demonstrate in a clinical diary/log book), and do (perform on patients/ client contacts) the following:



Know:

- Different protocols in tympanometry and reflexometry.
- Different protocols used in auditory brainstem responses
  - Protocols for screening and diagnostic otoacoustic emissions
  - Tests to assess vestibular system
  - Different indications for selecting implantable hearing devices
  - Various speech stimulation and auditory training techniques

Know-how:

To administer auditory brainstem responses for the purpose of threshold estimation and site of lesion testing

To administer high frequency tympanometry and calculate resonance frequency  
To administer high risk register

To modify the given environment to suit the needs of hearing impairment

Show:

- Analysis of ABR waveforms – threshold estimation 5 and site of lesion 5
- Analysis of immittance audiometry and relating to other tests – 5 individuals with conductive and 5 individuals with sensori-neural hearing loss
- How to formulate select appropriate auditory training technique based on audiological evaluation

Do:

- Threshold estimation on 5 infants (< 2 years)
- TEOAE and DPOAE on 5 infants (<2 years)
- BOA on 5 infants (<2 years)
- VRA on 2 infants (6 month – 3 year)
- Conditioned play audiometry – 3 children (3-6 years)

Hearing aid fitment on 1 infant (< 3 years) 2 children (3-6 years) Listening  
age of 3 children with hearing impairment Appropriate auditory  
training on 5 children with hearing loss

Evaluation:

Internal evaluation shall be based on attendance, clinical diary, log book and learning  
conference.

External evaluation: Spot test, OSCE, Record, Viva-voce, case work

## Semester VI

### B6.1 Motor Speech Disorders in Adults

Hours - 60

Marks - 100

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

**understand the characteristics of acquired motor speech disorders in adults evaluate and diagnose speech characteristics in acquired motor speech disorders learn about the techniques for the management of speech and related errors in acquired motor speech disorders**

#### Unit 1: Causes & Characteristics of dysarthria

Definition, etiology and classification of acquired dysarthria

General, speech and feeding related characteristics of acquired dysarthria with and without genetic underpinnings:

Vascular lesions: dysarthria following stroke/CVA, cranial and peripheral nerve palsies  
Infectious condition of the nervous system: dysarthria following meningitis, encephalitis, polyneuritis, poliomyelitis, neurosyphilis.

Traumatic lesions: Dysarthria following TBI.

Toxic conditions of the nervous system: Dysarthria following exogenic and endogenic toxic conditions of the nervous system.

Anoxia of the nervous system: Dysarthria following anoxic conditions

Metabolic disorders affecting nervous system: Dysarthria following metabolic conditions that affect the nervous system, Wilson's disease etc.

Idiopathic causes: Dysarthria following idiopathic causes

Neoplastic lesions of nervous system: Dysarthria following neoplastic lesions in the nervous system

Demyelinating and degenerative conditions: Huntington's Chorea, Parkinson's, Multiple Sclerosis, Motor Neuron Diseases

#### Unit 2: Assessment and diagnosis of dysarthria

Subjective assessment of dysarthria:

Assessment of respiratory, phonatory, resonatory, articulatory errors

Assessment of prosodic features  
Assessment of speech intelligibility  
Scales, protocols and tests used for subjective assessment of dysarthria  
Instrumental analysis of speech in dysarthria: Acoustic, kinematic and physiological  
Advantages and disadvantages of subjective and instrumental procedures in the assessment of dysarthria in adults  
Differential diagnosis of acquired motor speech disorders in adults:  
Dysarthria and verbal apraxia  
Dysarthria and functional articulation disorders  
Dysarthria and aphasia  
Apraxia of speech and aphasia  
Dysarthria from other allied disorders such as agnosia, alexia, agraphia etc.  
Apraxia from other allied disorders such as agnosia, alexia, agraphia etc.  
Assessment of feeding, swallowing and related issues in persons with dysarthria

### Unit 3: Management of dysarthria

Management of acquired dysarthria  
General principles in the management of dysarthria  
Influence of medical, prosthetic and surgical procedures on the speech in persons with acquired dysarthria.  
Facilitative approach: vegetative, sensorimotor and reflex based.  
Systems approach: correction of respiratory, phonatory, resonatory, articulatory and prosodic errors.  
Strategies to improve speech intelligibility and speech enhancement techniques  
Strategies to improve feeding, swallowing behavior in persons with acquired dysarthria

### Unit 4: Assessment and management of apraxia in adults

Definition, etiology and classification of acquired apraxia  
Characteristics of nonverbal apraxia's in adults  
Characteristics of verbal apraxia's in adults  
Subjective assessment strategies: standard tests and scales, protocols and behavioral profiles  
Instrumental analysis of the speech of apraxia in adults: Acoustic, Kinematic and Physiological

## Management Approaches for verbal & nonverbal apraxia: principles and strategies

### Unit 5: Management related issues in motor speech disorders

Team involved in the management of persons with acquired dysarthria and apraxia

Issues related to maintenance and generalization of speech in dysarthria and apraxia

Counselling and guidance for persons with acquired dysarthria and apraxia

Augmentative and alternative strategies for persons with acquired dysarthria and apraxia

### Practicals

Identify the cranial nerves and mention its origin and insertion from a picture/ model.

Demonstrate methods to assess the cranial nerves.

Assess the respiratory system using speech and non-speech tasks in 10 healthy adults.

Assess the phonatory system using subjective and acoustic analysis in 10 healthy adults.

Looking at a video identify the clinical signs and symptoms of different neurological conditions resulting in Dysarthria.

Record the speech sample of 5 normal adults and compare with the audio sample of individuals with Dysarthria.

Administer Duffy's intelligibility rating scale on 5 healthy adults.

Administer Frenchay's Dysarthria Assessment on 5 healthy adults.

Demonstrate activities to improve the functions of speech subsystem.

Identify the signs of UMN and LMN based on a video.

Prepare a low tech AAC for functional communication for an individual with apraxia.

### Recommended Reading

Brookshire, R. H. (2007). Introduction to Neurogenic Communication Disorders.

University of Virginia, Mosby.

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

Dworkin, P. J. (1991). Motor Speech Disorders: A Treatment Guide. St. Louis: Mosby.

Ferrand, C. T., & Bloom, R. L. (1997). Introduction to Organic and Neurogenic Disorders of Communication: Current Scope of Practice. US, Allyn & Bacon. Goldenberg, G. (2013). Apraxia: The Cognitive Side of Motor Control. Oxford University Press, UK.

Lebrun, Y. (1997). From the Brain to the Mouth: Acquired Dysarthria and Dysfluency in Adults. Netherlands, Kluwer Academic Publishers.

Murdoch, B. E. (2010). Acquired Speech and Language Disorders: A Neuroanatomical and Functional Neurological Approach (2nd Ed.). New Delhi, India: John Wiley & Sons.

Papathanasiou, I. (2000) (Eds.). Acquired Neurogenic Communication Disorders – A Clinical Perspective, Chapters 5, 6 & 7. London, Whurr Publishers.

Yorkston, K. M., Beukelman, D. R., Strand, E. A., & Hakel, M. (2010). Management of Motor Speech Disorders in Children and Adults (3rd Ed.). Austin, Texas; Pro-Ed Inc.

## B.6.2 Language Disorders in Adults

Hours - 60

Marks - 100

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

understand the characteristics of language disorders in adults evaluate and diagnose speech characteristics in adults with language disorders learn about the techniques for the management of speech and related errors in language disorders seen in adults

Unit 1: Neural bases of language

Correlates of language functions:

Neuroanatomical

Neurophysiological

Neurobiological

Cognitive

Neurolinguistic models of language processing Connectionist models

Hierarchical models Global

models Process

models Computational  
models  
Language process in bi/multilingualism  
Language processing in right hemisphere

#### Unit 2: Language disorders in adults

Definition, causes and characteristics of speech, language and cognition in  
Aphasia: cortical and subcortical  
Primary progressive aphasia  
Traumatic brain injury  
Right hemisphere damage  
Schizophasia  
Dementia  
Differential diagnosis of various language disorders seen in adults.

#### Unit 3: Assessment and diagnosis of language disorders

Assessment of the following in aphasia, primary progressive aphasia, traumatic brain injury,  
right hemisphere damage, schizophasia and dementia  
Linguistic behaviour including speech: scales, tests, protocols.  
Assessment of cognitive, social, behavioural characteristics  
Medical Investigation: Neuroimaging

#### Unit 4: Management of language disorders

Medical, linguistic and programmed intervention for persons with  
Aphasia: cortical and subcortical  
Primary progressive aphasia  
Traumatic brain injury  
Right hemisphere damage  
Schizophasia  
Dementia

#### Unit 5: Rehabilitation issues relating to adult language disorders

Team involved in the rehabilitation of persons with adult language disorders

Factors influencing the assessment and intervention for language in the context of bilingual and multilingual influences.

Factors influencing the assessment and management of language in persons who are preliterate, illiterate and literate.

Assessment of quality of life

Recovery patterns and prognosis in adults with language disorders

Age related influence in adults with language disorders

Counselling and guidance for adults with language disorders

Generalization and maintenance issues in adults with language disorders

Augmentative and alternative strategies for adults with language disorders

### Practicals

Identify different lobes of in the brain by looking at a model/ image and label the language areas.

Administer a standardized test battery on 3 normal individuals to assess language and cognition.

Administer bilingual aphasia test on 3 healthy normal adults.

List the language characteristics in different types of aphasia from a video.

Analyse the speech, linguistic and non-linguistic features seen in Right hemisphere damaged individual from a video.

In a given brain model mark the subcortical structures involved in language processing/ production.

g) Demonstrate various facilitatory and compensatory therapy techniques in the management of aphasia.

Formulate activities to assess linguistic abilities in dementia and aphasia.

Counsel by a role play for a given profile of an individual with adult language disorder.

Prepare a counselling checklist /guideline that can be used with the family members of an individual with aphasia and traumatic brain injury.

### Recommended Reading

Chapey, R. (2008). Language Intervention strategies in aphasia and related neurogenic communication disorders. Philadelphia: Lippincott Williams and Wilkins  
Davis, G. A. (2014). Aphasia and related Communication Disorders. Pearson Education Inc.

Edwards, S. (2005). Fluent Aphasia. Cambridge University Press.



Laine, M. & Martin, N. (2006). *Anomia: Theoretical and Clinical Aspects*. Psychology Press.

Lapointe, L. L. (2005). *Aphasia and related neurogenic language disorders*. (3rdEdn.). Thieme.

Lapointe, L. L., Murdoch, B. E., & Stierwalt, J. A. G. (2010). *Brain based Communication Disorders*. Plural Publishing Inc.

Stemmer, B., & Whitaker, H. A. (Eds.). (2008). *Handbook of Neuroscience of Language*. Elsevier.

Whitworth, A., Webster, J., & Howard, D. (2005). *A cognitive neuropsychological approach to assessment and intervention in aphasia: A clinician's guide*. Psychology Press.

### B6.3 Aural Rehabilitation in Adults

Hours - 60

Marks - 100

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

describe the impact on the quality of life of adults with hearing impairment explain the principles benefits and limitations of auditory training and speech reading recognize factors that impair

communication and suggest facilitative and repair strategies identify components of aural rehabilitation program for adults (planning to outcome assessment)

identify strategies used with the older adult to implement a successful aural rehabilitation program

administer different tools for assessment of hearing handicap, attitudes and beliefs that can impact aural rehabilitation

## Unit 1: Aural rehabilitation

### Definition

Scope of aural rehabilitation in adults

Prevalence of hearing loss in children (global and Indian data )

Prevalence of hearing loss in adults (global and Indian data)

Relationship between audiometric data, hearing difficulties and amplification considerations

Limitations of audiometric data

Quality of life and impact on income, education, employment;

Assessing communication handicap : interviews, questionnaires Vocational rehabilitation

## Unit 2: Listening training and speech reading for adults

Listening to speech with a hearing loss

Candidacy for auditory training

Listening training to improve speech perception

Listening training to improve music perception

Benefits of auditory training

Speech reading for communication

Characteristics of good lip readers versus good speech readers

Factors affecting speech reading

Assessing vision only auditory only processing Traditional methods of speech reading training.

## Unit 3: Communication strategies

Factors that influence the reception of spoken message

Facilitative communication strategies

Repair strategies

Repairing a communication breakdown

Conversational styles

Communication strategies training formal instruction, guided learning, real world practice

#### Unit 4: Aural rehabilitation for adults

Principles of aural rehabilitation in adults

Psychological impact of hearing loss

Support through counselling

Orienting towards hearing aid use

Needs assessment for non-hearing and assistive technology for adults

Categories of assistive technology

Aural rehabilitation programs: Individual vs group

Components of aural rehabilitation program Process of aural rehabilitation :

Communication under adverse listening conditions

#### Unit 5: Aural rehabilitation for older adults

Influence of aging on the older adults: quality of life and psychological perspectives

Influence of aging on the older adults: quality of life and social perspectives Auditory barriers to communication

Non auditory barriers to communication

Barriers to aural rehabilitation

Factors influencing hearing aid use by the older adult

Aural rehabilitation for different populations of older adult: independent and semiindependent older adult

Aural rehabilitation for different populations of older adult: dependent older adult

Aural rehabilitation in an old age home

Hearing aid orientation

#### Practicals

\*All scales and tools available in Hull R. H; Introduction to aural rehabilitation

Listen to the speech recorded using hearing loss simulators (available on internet) and experience the sounds as heard by persons with different degrees of hearing loss.

Write your observations on the same

Simulate hearing loss by plugging ears and administer sentence tests of word recognition.

Write a report on the performance

Administer any three self-report questionnaires to three adults who have hearing loss and write a report of the relationship of their hearing loss to performance on the scale

Administer any three self-report questionnaires to three older adults who have hearing loss and write a report of the relationship of their hearing loss to performance

on the scale

Administer any three self-report questionnaires to three adults who wear hearing aids and write a report of the relationship of their hearing loss to performance on the scale

Administer the hearing belief questionnaire (Saunders, 2013) on an adult. Identify the positive and negative attitude and behavior that may impact the success of aural rehabilitation

Design a session of aural rehab program (Objectives, activities, outcomes assessment) for adults recently fitted with cochlear implant, group of 4 older adults.

Design an individualised program for an executive using a hearing aid for the first time, and an adult moving from an analog to a digital hearing aid

Develop a pamphlet in your local language that would address any topic in aural rehabilitation

### Recommended Reading

Hull, R. H., (2014) ed. Introduction to Aural Rehabilitation 2nd edition Plural Publishing, San Diego Chapters 1, 2, 11 to 20

Schow, R.L. & Nerbonne, M.A., (2012). Introduction to Audiologic Rehabilitation (6th edition), Allyn & Bacon, Boston.

Tye-Murray, N., (2014). Foundations of Aural Rehabilitation: Children , adults and their family members 4th edition Plural Publishing San Diego Chapters 5-10

## B.6.4 Audiology in Practice

Hours - 60

Marks - 100

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

list and describe the highlights of legislations relating to hearing impairment and other disabilities

incorporate ethical practices in professional service delivery. provide information on welfare measures, policies of government when needed describe different strategies to create awareness of hearing impairment and programs to address them

explain the different clinical practice settings in audiology with reference to their requirement, protocols and role and responsibility of audiologist

describe methods to measure the impact of noise on humans and strategies to address excessive noise exposure in industries and the community.

describe terminology, technology and methods used in tele practice, and their application in audiological service delivery

Unit 1: Scope, legislation and ethics in audiology

Scope of practice in audiology (National – ISHA & International body - AAA)

Professional ethics (ISHA)

Legislations and conventions relating to disability: need and historical aspects

Classification of hearing impairment and disability certification,

Rehabilitation Council of India Act (1992) and its amendments

Person with

Disability Act (1995)

National Trust Act (1999)

Right to Education (2012)

Biwako Millennium framework (2003) and Salamanca Statement 1994

## UNCRPD

Concept of barrier free access and universal design relating to individuals with hearing impairment

### Unit 2: Hearing health and strategies for prevention of hearing impairment

Epidemiology of hearing disorders

ICD and ICF

Levels of prevention: Primary, secondary and tertiary

National programs and efforts national institutes

Welfare measures by Government,

Camps (planning, purpose, organizing and providing remedial measures)

Public education and information (media, radio broadcasts, street plays) Hearing health and prevention programs (hearing help line, dangerous decibels, online hearing tests etc.)

### Unit 3: Audiological practice in different settings

Audiological Private practice

ENT clinics

Paediatric / neonatology clinic/departments

Neurology departments

Factories and Industry

Hearing aid dispensing centre/hearing aid industry

Rehabilitation centres such as DRC/CRCs

Schools for the hearing impaired

Cochlear implant clinics

Multiple handicap habilitation centre and others

### Unit 4: Noise and hearing conservation in industry and community

Introduction to noise, types

Sources of noise in the industry and community

Effects of noise in the auditory system (outer, middle and inner ear)

Temporary threshold shift, permanent threshold shift, factors increasing the risk of NIHL

Non auditory effects of noise (physiological, psychological, stress, sleep, job productivity and accidents)

Legislations related to noise, permissible noise exposure levels, workers compensation, OSHA standards, Indian legislations related to noise

Instrumentation, measurement and procedure for measuring noise in industry

Instrumentation, measurement and procedure for measuring noise in community

Hearing conservation program (HCP), steps, record keeping, Ear protective devices

#### Unit 5: Scope and practice of tele audiology

Introduction to tele-health: definition, history of tele-health

Terminologies-tele-health, tele medicine, tele practice

Connectivity: internet, satellite, mobile data

Methods of tele-practice-store and forward and real time

Ethics and Regulations for tele-audiology

Requirements/Technology for tele- audiology: Web based platforms, Video conferencing, infrastructure

Manpower at remote end and audiologist end, training assistants for tele-audiology

Audiological screening using tele-technology : new born hearing screening, school screening, community screening, counselling

- i) Diagnostic audiological services using tele-technology : video otoscopy, pure tone audiometry, speech audiometry, oto acoustic emission, tympanometry, auditory brainstem response

Intervention / aural rehabilitation using tele-technology :hearing aid counselling and troubleshooting, tinnitus, counselling, aural rehabilitation services, AVT, and counselling

#### Practicals

Undertake the activities such as ‘Dangerous decibel’ program  
([www.dangerousdecibels.org](http://www.dangerousdecibels.org))

Noise measurement and attenuation measurement of ear protection devices.

Sound level meter measurement in different areas (generator room, audio rooms)

Speech in noise assessment for 10 subjects

Visit an audiologist in different practice settings and provide a report

Administer ICF protocols for patients with different disorders

Explore websites of national institutes, hearing aid companies, NGOs in disability field and describe the accessibility features and information provided

Remote control a PC based audiology equipment connected to internet using any authorized desktop sharing software

Develop one pamphlet/poster/ in local language that would address some aspect of audiology practice

Perform Accessibility ability of your institute/center and prepare a report

Recommended Reading

Audiology Telepractice; Editor in Chief, Catherine V. Palmer, Ph.D.; Guest Editor, Greg D. Givens, Ph.D. Seminars in Hearing, volume 26, number 1, 2005.

Bergland, B., Lindwall, T., Schwela, D.H., eds (1999). Guidelines on Community noise <http://www.who.int/docstore/peh/noise/guidelines2.html> WHO 1999

BIS specifications relating to Noise Measurements.- IS:7194-1973 Specification for assessment of noise exposure during work for hearing conservation purposes. Census of India information on disability

Dobie, R. A (2001). Medical legal evaluation of hearing loss, 2nd Ed.

Hearing health and strategies for prevention of hearing impairment WHO (2001).

International classification of Functioning, Disability and Health. Geneva: WHO [http://www.asha.org/Practice-Portal/Professional-](http://www.asha.org/Practice-Portal/Professional-Issues/Audiology-Assistants/Teleaudiology-Clinical-Assistants/)

[Issues/Audiology-Assistants/Teleaudiology-Clinical-Assistants/](http://www.asha.org/uploadedFiles/ModRegTelepractice.pdf)

<http://www.asha.org/uploadedFiles/ModRegTelepractice.pdf>

IS:10399-1982 Methods for measurement of noise emitted by Stationary vehicles

IS:6229-1980 Method for measurement of real-ear

IS:9167-1979 Specification for ear protectors. 95

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.

John Ribera. Tele-Audiology in the United States. In Clinical Technologies: Concepts, Methodologies, Tools and Applications (pp. 693-702), 2011. Hershey, PA: Medical Information Science Reference. doi:10.4018/978-1-60960-561-2.ch305 Lipscomb, D. M. (1994). Hearing conservation – In industry, schools and the military.

Mandke, K and Oza R.K ( 2014). Private practice in speech pathology and audiology, 2014 ISHA

Philippe Valentin Giffard. Tele-Audiology. Tort, 2012. ISBN 6139256615,



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Rawool, V. W. (2012). Hearing conservation in occupational, recreational, educational and home setting. Thieme: New York

RCI, PWD and National Trust, and Right to education act

Richard Wootton, John Craig, Victor Patterson, editors. Introduction to telemedicine.

Second edition. London: The Royal Society of Medicine Press Ltd. 2006. p. 206

ISBN: 1 85315 677 9.

Salamanca statement and framework for action

Scope of practice by RCI

Swanepoel de W, Hall JW 3rd .A systematic review of tele health applications in audiology.

Telemed J E Health. 2010 Mar;16(2):181-200. doi:

10.1089/tmj.2009.0111.

UNCRPD

## B6.5 Clinicals in Speech-language Pathology

Marks - 100

General considerations:

Exposure is primarily aimed to be linked to the theory courses covered in the semester.

After completion of clinical postings in Speech–language diagnostics, the student will know (concepts), know how (ability to apply), show (demonstrate in a clinical diary/log book based on clinical reports/recordings, etc.), and do (perform on patients/ client contacts) the following:

Know:

Procedures to assess motor speech disorders in adults.

Differential diagnosis of motor speech disorders in adults.

Procedures to assess individuals with adult language disorders, and other related abnormalities.

Know-how:

To administer at least two standard tests for adult language disorders. To administer at least two standard tests/protocols for motor speech disorders in adults.

To record a sample for analysis of language and speech skills in adults with neurocommunication disorders.

To assess posture, breathing, speech and swallowing in adults with motor speech disorders.

To consult with inter-disciplinary medical/rehabilitation team and counsel the individual/family regarding management options and prognosis.

Show:

Language assessment - minimum of 2 individuals after stroke.

Associated problems in individuals after stroke and its evaluation.

Dysphagia assessment – minimum of 2 children & adults.

Goals and activities for therapy (including AAC) based on assessment/test results for adults with neuro-communication disorders.

Do:

Voice therapy - Minimum of 2 individuals with voice disorders.

Fluency therapy - Minimum of 2 individuals with fluency disorders.

Bed side evaluation of individuals with neuro-communication disorders – Minimum of 2 individuals.

Apply speech language stimulation/therapy techniques on 5 children with language disorders/speech sound disorders/ motor speech disorders – minimum 5 sessions of therapy for each child.

Evaluation:

Internal evaluation shall be based on attendance, clinical diary, log book and learning conference.

External evaluation: Spot test, OSCE, Record, Viva-voce, case work

## B6.6 Clinicals in Audiology

Marks – 100

### General considerations:

Exposure is primarily aimed to be linked to the theory courses covered in the semester, however, not just limited to these areas.

After completion of clinical postings in auditory diagnostics and auditory rehabilitation, the student will Know (concept), know how (ability to apply), show (demonstrate in a clinical diary/log book), and do (perform on patients/ client contacts) the following:

### Know:

National and international standards related to noise exposure.

Recommend appropriate treatment options such as speech reading, AVT, combined approaches etc.

### Know-how:

To carryout noise survey in Industry and community

To carryout mapping of cochlear implant in infants and children using both objective and subjective procedures To trouble shoot cochlear implant

### Show:

Analysis of objective responses like compound action potential, stapedial reflexes on at least 3 samples

Comprehensive hearing conservation program for at least 1 situation

### Do:

AVT on at least 1 child with hearing impairment

Trouble shooting and fine tuning of hearing aids on at least 5 geriatric clients

At least one activity for different stages involved in auditory training

Evaluation:

Internal evaluation shall be based on attendance, clinical diary, log book and learning conference.

External evaluation: Spot test, OSCE, Record, Viva-voce, case work

Semester 7 and 8

### B7.1 Clinicals in Speech-language Pathology

Marks – 100

General: Clinical internship aims to provide clinical exposure and experience in different set ups. The students would not only carry out greater quantum of work, but also work varied clinical populations and in different contexts. Internship will provide greater opportunity for the students to liaise with professionals from allied fields. The intern is expected to demonstrate competence and independence in carrying out the following, among others:

Diagnosis and management of speech, language, and swallowing disorders across life span.

Report evaluation findings, counsel and make appropriate referrals.

Plan and execute intervention and rehabilitation programs for persons with speech language, communication, and swallowing disorders

Develop and maintain records related to persons with speech-language, communication, and swallowing disorders

Engage in community related services such as camps, awareness programs specifically, and community based rehabilitation activities, in general.

Make appropriate referrals and liaise with professionals from related fields.

Gain experience in different set ups and be able to establish speech centres in different set-ups

Demonstrate that the objectives of the B.ASLP program have been achieved.

Advise on the welfare measures available for their clinical clientele and their families.

Advise and fit appropriate aids and devices for their clinical population.

## B7.2 Clinicals in Audiology

Marks – 100

General: Clinical internship aims to provide clinical exposure and experience in different set ups. The students would not only carry out greater quantum of work, but also work varied clinical populations and in different contexts. Internship will provide greater opportunity for the students to liaise with professionals from allied fields. The intern is expected to demonstrate competence and independence in carrying out the following, among others:

Diagnosis and management of hearing disorders across life span.

Report evaluation findings, counsel and make appropriate referrals.

Plan and execute intervention and rehabilitation programs for persons with hearing disorders

Develop and maintain records related to persons with hearing disorders

Engage in community related services such as camps, awareness programs specifically, and community based rehabilitation activities, in general.

Make appropriate referrals and liaise with professionals from related fields.

Gain experience in different set ups and be able to establish hearing centres in different set-ups

Demonstrate that the objectives of the B.ASLP program have been achieved.

Advise on the welfare measures available for their clinical clientele and their families.

Advise and fit appropriate aids and devices for their clinical population.

