

KERALA UNIVERSITY OF HEALTH SCIENCES

THRISSUR – 680 596, KERALA



**REGULATIONS, CURRICULUM, AND SYLLABUS OF
BACHELOR IN AUDIOLOGY & SPEECH
LANGUAGE PATHOLOGY (B.ASLP)**

(With effect from 2018-19 admission onwards)

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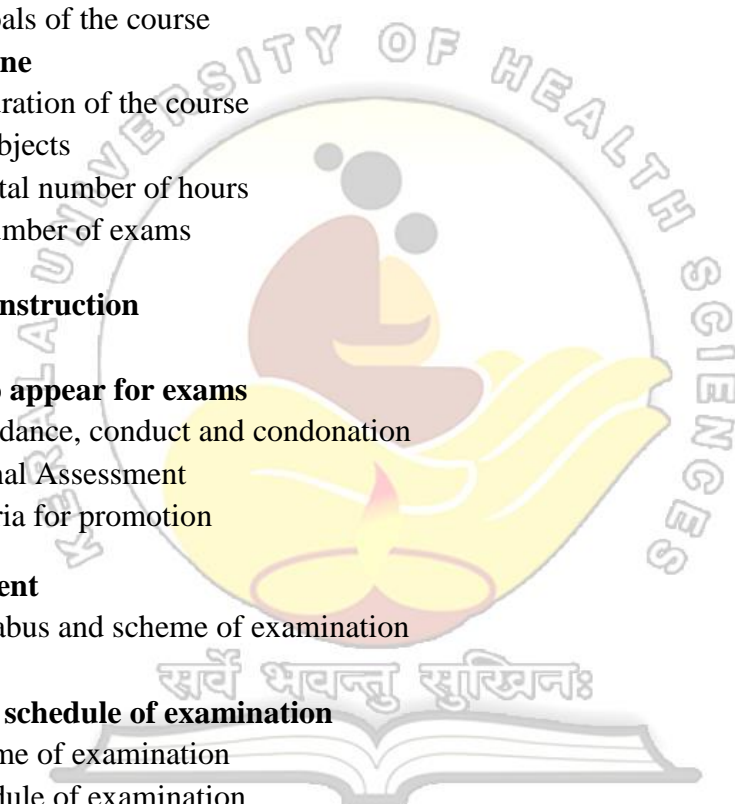
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CURRICULUM

INTRODUCTION

Preamble

The regulation of the Bachelor in Audiology & Speech Language Pathology (B.ASLP) being conducted by the Kerala University of Health Sciences is in accordance with the recommendations of the respective council with an emphasis on the health needs of the Kerala State.

1. TITLE OF THE COURSE

It shall be – BACHELOR IN AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY –
Abbreviated as B.ASLP

1.1 Branches of Study

Audiology and Speech-Language Pathology

1.2. Definition of various Specialities

Audiology- Is defined as the science of hearing and balancing, art of its assessment and the habilitation and rehabilitation of individuals with hearing and balancing disorders.

Speech Language Pathology- Is defined as the branch of science which deals with Speech, language, deglutition and its disorders.

2. AIMS AND OBJECTIVES OF COURSE

2.1 Goals of the course

B.ASLP curriculum is oriented towards training students to undertake the responsibilities of an Audiologist and Speech- Language Pathologist.

2.1.1 This course enables the students to acquire professional knowledge in prevention, identification, assessment, habilitation and rehabilitation of speech, language, hearing, balancing and swallowing aspects. The course enables the students to implement public awareness and education programme.

2.1.2 Adequate emphasis is to be placed on cultivating logical and scientific habits of thoughts, clarity of expression, independence of judgment and ability to collect and analyse information and to correlate them.

2.1.3 The course enables the student to liaise with other Professionals and stakeholders. It also enables the student to undertake advocacy measures on behalf of and for persons with Speech Language and Hearing Disorders.

2.1.4 The educational process should be placed in historical background as an evolving process and not merely as an acquisition of large number of disjointed facts without a proper perspective. The history of the field with reference to its evolution both in this country and rest of the world should form a part of this process.

2.1.5 Lectures alone are generally not adequate as a method of training and are a poor means of transferring / acquiring information and even less effective at skill development and in generating the appropriate attitudes. Every effort should be made to encourage the use of active methods related to demonstrations and on first-hand experience. Students will be encouraged to learn in small groups through peer interactions, so as to gain maximal experience through contacts with patients and the communities in which they live. While the curriculum objectives often refer to areas of knowledge or science, they are best taught in a setting of clinical relevance and hands on experience for students who assimilate and make this knowledge a part of their own working skills.

2.1.6 Clinics should be organized in small groups so that a teacher can give personal attention to each student with a view to improve his/her skill and competence in handling the patient.

2.1.7 Proper records of the work should be maintained which will form the basis of the student's internal assessment for practicals and should be available for the inspectors at the time of inspection of the college.

3. COURSE OUTLINE

3.1 Duration of the course

The course shall be of 4 years including 1 academic year (10 months) of internship. The course should be completed within 6 years from the date of admission.

A year consists of two semesters, and each semester shall extend over a minimum period of 16 weeks excluding examination dates.

3.2 Subjects

First Semester BASLP: Communication Sciences – Speech Language Pathology, Communication Sciences-Audiology, Anatomy physiology and pathology related to speech language and hearing, Clinical Psychology, Electronics and acoustics.

Second Semester BASLP: Speech Language Pathology-Assessment and Management, Audiological Evaluation, Linguistics and Phonetics, Otolaryngology, Paediatrics and

Genetics, Clinical practicum-Speech language pathology, Clinical practicum- Audiology.

Third Semester BASLP: Voice and Its Disorders, Speech Sound Disorders, Diagnostic Audiology-Behavioural tests, Educational Audiology, Neurology, Clinical practicum-Speech language pathology, Clinical practicum- Audiology.

Fourth Semester BASLP: Fluency and its disorders, Child language disorders, Diagnostic Audiology-Physiological tests, Rehabilitative Audiology, Research methods and Statistics, Clinical practicum Speech language pathology, Clinical practicum Audiology.

Fifth Semester BASLP: Motor speech disorders in Children, Maxillofacial Anomalies and Laryngectomy, Amplification Devices, Paediatric audiology, Speech Language Pathology and Audiology in Practice, Clinical practicum Speech language pathology, Clinical practicum Audiology.

Sixth Semester BASLP: Motor speech disorders in Adults and dysphagia, Language Disorders in Adults, Environmental audiology, Implantable Hearing Devices and Hearing aid fitting, Clinical practicum Speech language pathology, Clinical practicum Audiology.

3.3 Total number of hours

3.3.1. Minimum teaching hours recommended for each theory paper is 60 hours and minimum hours recommended for clinical practicum is 240 hours in each semester (First semester to sixth Semester).

3.3.2. All candidate shall complete a clinical internship of one academic year (10 months) after the sixth semester.

3.4 Number of exams

3.4.1. Theory: There shall be University examinations at the end of each semester and supplementary examinations will be conducted along with the regular examinations.

3.4.2: Clinical Practical: There shall be University examinations for Clinical Practicum at the end of 2nd, 3rd, 4th, 5th, 6th and 8th. The Clinical Practicum examination for even semesters (2nd, 4th, 6th & 8th) will be conducted by an external examiner along with an internal examiner and Clinical Practicum examination at the end of odd semesters (3rd and 5th) will be conducted by internal examiners. The practical records will be evaluated during Clinical Practicum examination. Supplementary examinations for Clinical Practical will be conducted along with the regular examinations.

4. MEDIUM OF INSTRUCTION

Medium of instruction shall be English

5. ELIGIBILITY TO APPEAR FOR EXAMS

5.1 Attendance and condonation

Each candidate should put in minimum 80% of attendance in theory and 90 % in clinical practicum for appearing university examination. Condonation of 10% in the attendance once in the entire course period can be granted by the Head of the Institution and the same may be communicated in the university. Condonation is not applicable during internship programme.

5.2 Internal assessment

Theory: It shall be based on periodical assessment, evaluation of student assignment, class presentation etc. Regular examination should be conducted throughout the course. Weightage for internal assessment shall be 25% of the total marks in each subject. There shall be minimum 2 examinations and average will be taken as 50% of the internal assessment. The remaining 50% of the internal assessment will be based on day to day assessment.

Clinical Practicum: The internal assessment for clinical practicum shall be made by the faculty of concerned departments based on the clinical skills in assessment, remediation, clinical case presentation and clinical viva. The weightage of internal assessment for clinical practicum shall be 25 % of the total marks.

The candidate must secure a minimum of 50% marks for internal assessment in a particular subject in order to be eligible to appear in the university examination of the subject.

The class average of internal assessment marks in each subject should not exceed 75% (regular examination) and 80%(supplementary examination), both in theory and clinical practicum.

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5.3 Criteria for promotion

Before the commencement of internship the candidate should have passed in all the subjects of first, second and third year. The students will have to pass the clinical practicum examination of the given semester to proceed to the next semester.

6. COURSE CONTENT

6.1 Syllabus and scheme of examination

A) Scheme of curriculum for first Semester BASLP

CODE/ PAPER NO	PAPER TITLE	TEACHING HOURS(MI NIMUM)	EXAM DURATIO N	EXAM MARKS	PRACTIC AL	IA MARK S	TOTAL
1.1.1	Communication Sciences- Speech Language Pathology	60	3 Hrs	75	-	25	100
1.1.2	Communication Sciences- Audiology	60	3 Hrs	75	-	25	100
1.1.3	Anatomy, Physiology and Pathology related to Speech language and Hearing	60	3 Hrs	75	-	25	100
1.1.4	Clinical Psychology	60	3 Hrs	75	-	25	100
1.1.5	Electronics and Acoustics	60	3 Hrs	75	-	25	100
Total							500

B) Scheme of curriculum for second Semester BASLP

CODE S/PAP ER NO	PAPER TITLE	TEACHING HOURS(MI NIMUM)	EXAM DURATIO N	EXAM MARKS	PRACTIC AL	IA MARK S	TOTAL
1.2.1	Speech Language Pathology-Assessment and Management	60	3 Hrs	75	-	25	100
1.2.2	Audiological Evaluation	60	3 Hrs	75	-	25	100
1.2.3	Linguistics and Phonetics	60	3 Hrs	75	-	25	100
1.2.4	Otolaryngology	60	3 Hrs	75	-	25	100
1.2.5	Pediatrics and Genetics	60	3 Hrs	75	-	25	100
1.2.6	Clinical practicum-Speech language pathology	320		75	-	25	100
1.2.7	Clinical practicum- Audiology			75	-	25	100
Total							700

C) Scheme of curriculum for Third Semester BASLP

CODE S/PAPER NO	PAPER TITLE	TEACHING HOURS(MINIMUM)	EXAM DURATION	EXAM MARKS	PRACTICAL	IA MARKS	TOTAL
2.3.1	Voice and Its Disorders	60	2 Hrs	50	25	25	100
2.3.2	Speech Sound Disorders	60	2 Hrs	50	25	25	100
2.3.3	Diagnostic Audiology-Behavioural tests	60	2 Hrs	50	25	25	100
2.3.4	Educational Audiology	60	2 Hrs	50	25	25	100
2.3.5	Neurology	60	3 Hrs	75	-	25	100
2.3.6	Clinical practicum-Speech language pathology	320		75	-	25	100
2.3.7	Clinical practicum-Audiology		-	75	-	25	100
Total							700

D) Scheme of curriculum for fourth Semester BASLP

CODES /PAPER NO	PAPER TITLE	TEACHING HOURS(MINIMUM)	EXAM DURATION	EXAM MARKS	PRACTICAL	IA MARKS	TOTAL
2.4.1	Fluency and its disorders	60	2 Hrs	50	25	25	100
2.4.2	Child language disorders	60	2 Hrs	50	25	25	100
2.4.3	Diagnostic Audiology-Physiological tests	60	2 Hrs	50	25	25	100
2.4.4	Rehabilitative Audiology	60	2 Hrs	50	25	25	100
2.4.5	Research methods and Statistics	60	3 Hrs	75	-	25	100
2.4.6	Clinical practicum Speech language pathology	320	-	75	-	25	100
2.4.7	Clinical practicum Audiology		-	75	-	25	100
Total							700

E) Scheme of curriculum for fifth Semester BASLP

CODES /PAPER NO	PAPER TITLE	TEACHING HOURS(MINIMUM)	EXAM DURATION	EXAM MARKS	PRACTICAL	IA MARKS	TOTAL
3.5.1	Motor speech disorders in Children	60	2 Hrs	50	25	25	100
3.5.2	Maxillofacial Anomalies and Laryngectomy	60	2 Hrs	50	25	25	100
3.5.3	Amplification Devices	60	2 Hrs	50	25	25	100
3.5.4	Paediatric audiology	60	2 Hrs	50	25	25	100
3.5.5	Speech Language Pathology and Audiology in Practice	60	2 Hrs	50	25	25	100
3.5.6	Clinical Speech pathology practicum language	320	-	75	-	25	100
3.5.7	Clinical Audiology practicum		-	75	-	25	100
Total							700

F) Scheme of curriculum for sixth Semester BASLP

CODES /PAPER NO	PAPER TITLE	TEACHING HOURS(MINIMUM)	EXAM DURATION	EXAM MARKS	PRACTICAL	IA MARKS	TOTAL
3.6.1	Motor speech disorders in Adults and dysphagia	60	2 Hrs	50	25	25	100
3.6.2	Language Disorders in Adults	60	2 Hrs	50	25	25	100
3.6.3	Environmental audiology	60	2 Hrs	50	25	25	100
3.6.4	Implantable Hearing Devices and Hearing aid fitting	60	2 Hrs	50	25	25	100
3.6.5	Clinical Speech pathology practicum language	320	-	75	-	25	100
3.6.6	Clinical Audiology practicum		-	75	-	25	100
Total							600

G) Scheme of curriculum for seventh & eighth Semester BASLP

CODES/ PAPER NO	PAPER TITLE	TEACHING HOURS(MINIMUM)	EXAM DURATI ON	EXAM MARKS	IA MARKS	TOTAL
4.1	Clinical practicum Speech language pathology	1400	-	100	-	100
4.2	Clinical practicum Audiology		-	100	-	100
Total						200
Grand Total						4100

7. SCHEME AND SCHEDULE OF EXAMINATION

7.1 Scheme of examination

Theory Examination: There shall be a university examination at the end of each Semester. Duration of theory papers with a maximum mark of 75 is 3 hours and the duration of theory papers with a maximum mark of 50 is 2 hours.

Clinical Practicum Examination: There shall be University examinations for Clinical Practicum at the end of 2nd, 3rd, 4th, 5th, 6th and 8th. The Clinical Practicum examination for even semesters (2nd, 4th, 6th & 8th) will be conducted by an external examiner along with an internal examiner and Clinical Practicum examination at the end of odd semesters (3rd and 5th) will be conducted by internal examiners. The practical records will be evaluated during Clinical Practicum examination.

Clinical Practicum Examinations for 7th and 8th semester shall be conducted at the end of 8th semester.

7.2 Schedule of Examination

Regular university examinations will be conducted at the end of each semester. There shall be no separate supplementary examination and the same will be conducted along with the regular examination.

7.3 Question paper setting / pattern

The pattern of question paper for 2 Hours examination is

- Three essay -10 marks each
- Three short notes -5 marks each
- Five answer briefly -1 marks each

The pattern of question paper for 3 Hours examination is

- Four essay -10 marks each
- Five short notes -5 marks each
- Five answer briefly -2 marks each

The candidate should answer all the questions.

Question paper setters shall be appointed from inside and/or outside the State.
Scrutiny of Question papers shall be done by the subject experts in respective faculties.

7.4 Scheme of valuation

The valuation will be conducted as per KUHS rules and regulations.

8. CRITERIA FOR PASS AND GRACE MARKS

8.1 Criteria for pass

For each theory subject a candidate must obtain a separate 50% mark for university examination, 50% for internal assessment and 50% for Practical (wherever applicable).

For each clinical practicum, a candidate must obtain a separate 50% mark for university examination and 50% for internal assessment

8.2 Grace marks

A maximum of 5 marks or as per University regulations may be given as grace mark either in a subject alone or distribute it among subjects so as to make the candidate eligible for a pass. No grace mark will be given for clinical practicum examination.

9. CRITERIA FOR PROMOTION

Before the commencement of internship the candidate should have passed in all the subjects of all the six semesters. The students will have to pass the clinical practicum examination of the given semester to proceed to the next semester.

9.1 Rules for Supplementary batch / Additional batch

No supplementary batch / additional batch will be allowed.

10. DECLARATION OF CLASS

Successful candidates are declared as follows

75% and above marks - Distinction
 60% and above marks - First class
 50% and above marks - Second class.

Candidates who fail in first attempt in any subjects and pass subsequently shall not be ranked in distinction or first class.

11. DECLARATION OF RANK

Rank shall be awarded on the basis of total marks obtained for first, second third and fourth year BASLP examinations. However the candidates who fail in first attempt in any subjects shall not be considered for rank.

12. QUALIFICATION OF TEACHER / EXAMINER

Teacher: Post Graduation with 2 years of Research/ clinical experience in the respective speciality.

Examiner for theory papers: 3 years of teaching experience in the respective speciality after completion of Post-Graduation. In case of shortage of examiners for allied papers, an examiner with 3 years of teaching experience after MASLP / equivalent may be considered.

Examiner for Clinical Practicum: 3 years of teaching experience after MASLP / equivalent

13. INTERNSHIP

13.1 Duration: The duration of internship will be for one academic year (10 months) split into two semesters (7th & 8th semester).

13.2 Eligibility: Students will be eligible to do internship only after passing all the theory papers and clinical practicum examinations.

13.3 Internship posting: During the internship, the candidates should do 5 months of internship in an external institute (approved by KUHS) and the remaining 5 months in the parent institute.

13.4 Internship completion certificate: The parent institute will award an internship completion certificate after successful completion of the internship and clinical practicum examination.

- A candidate with 90% attendance during internship shall be eligible for appearing clinical practicum examinations at the end of 8th semester. However internship completion certificate shall be issued only after obtaining prescribed attendance.

13.5 Maintenance of records by students: Every student should maintain records of the number of hours of clinical work in different areas and institutions. This should be

certified by the head of the institution or his/her nominee where the student is undergoing internship. The students should get the appraisal form duly filled by the supervisors in the respective institutions where they are undergoing internship and should be submitted to the parent institution in order to obtain internship completion certificate from the parent institutes. (See annexure)

13.6 Leave: No leaves will be permitted during the internship. The student shall abide the rules and regulations of the Institution where they are doing their internship.

13.7 Extension of internship: Internship shall be extended by the number of days the student remains absent. These extended days of internship should be completed in the respective external/internal institution.

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

13.9 Mode of Supervision during Internship: Supervision should generally be provided by a speech language pathologist and audiologist with valid RCI registration.

14. ELIGIBILITY OF AWARD OF DEGREE

Each student is eligible to apply for award of B.ASLP degree if he/ she successfully complete all the papers (Theory and clinical practicum of the 3 academic years) and successful completion of 10 months of internship program. No candidate will be awarded the degree before completion of Internship.

REGULATIONS

15. TITLE OF THE COURSE

It shall be – BACHELOR IN AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY –
Abbreviated as B.ASLP

16. ACADEMIC ELIGIBILITY FOR ADMISSION

The candidate applying for admission to B.ASLP course

16.1 Should have obtained a minimum of 50% (40% in case of SC/ST candidates) in 10+2 examination or equivalent examination conducted by the Pre University Board of Education of Government of respective State, and further

16.2 Should have studied: Physics, Chemistry, Biology and any one of Mathematics/ Computer Science/ Statistics/ Electronics / Psychology

16.3 At the time of entry / admission to the first year of B.ASLP course the candidate should be of age 17 years or above. The maximum age at admission shall not exceed 25 years.

17. MODE OF SELECTION TO THE COURSE

The selection of students for the B.ASLP course shall be made strictly based on merit as decided by the competent authority approved by the Government of Kerala/Kerala University of Health Sciences and as per guidelines of the respective council.

18. NUMBER OF SEATS

Twenty in one unit

19. REGISTRATION

A candidate on admission to the BASLP course shall apply to the University for Registration by making a formal application in the prescribed format through the institution with the following documents

- Original marklist of qualifying examination.
- Transfer certificate from the previous institution
- Allotment letter from the competent authority who conducted the admission process.
- Equivalency and migration certificate wherever needed.
- Original SSLC/equivalent certificate.
- The fees prescribed for the registration.

The institution should complete the student registration (Basic entry) on or before the cut-off date prescribed by the university.

20. TRANSFER

Transfer to other institutions within the University under normal circumstances will not be allowed during the course of study / Internship.

21. BREAK OF COURSE

Break of course is not permitted under normal circumstances.

If a candidate is not appearing in the college for more than 3 months, he / she, on the recommendation of the Head of the Institution should get permission from the University for continuing the course with junior batch. However the four year course should be completed within 6 years. Condonation of break of study will be considered strictly as per the KUHS regulation.

22. PERIOD OF COMPLETION OF THE COURSE

The maximum permitted period of completion of the course will be 6 years (as per RCI regulation).

COURSE SPECIFIC SYLLABUS

SEMESTER I

1.1.1: Communication Sciences: Speech and Language 60 hrs

Objective: After completion of the course students shall have:

- Understanding of the relationship between Communication, Speech and Language
- Knowledge of physical, biological, social, psychological and linguistic bases of speech
- Understanding of normal speech and language development
- Understanding of causes related to speech and language disorders
- Knowledge of characteristics of speech and language disorders

Unit 1 Basic Concepts in Speech, Language and Communication. 15 Hrs

- 1.1 Definitions of communication, speech, language and their components and functions
- 1.2 Distinctions and similarities between communication, speech and language
- 1.3 Basic models, levels and modes and functions of speech communication
- 1.4 Speech chain, biological foundations of speech and language including speech as an overlaid function.
- 1.5 Characteristics of speech- normal, clear and abnormal
- 1.6 Bases of speech – anatomical, physiological, neurological, physical, acoustic, aerodynamic, linguistic, psychological and socio-cultural including genetic bases.

Unit 2 Normal Developmental Aspects. 15 Hrs

- 2.1 Normal development of speech and language
- 2.2 Development of articulation
- 2.3 Development of voice
- 2.4 Development of fluency and prosody
- 2.5 Prerequisites for and factors affecting - speech and language development

Unit 3 Basic Concepts Related to Incidence and Causative Factors 15 Hrs

- 3.1 Definition: Speech –Language Pathology
- 3.2 History and development of profession of SLP including Indian context
- 3.3 Role of Speech-Language Pathologists in various settings
- 3.4 Causes of speech and language disorders
- 3.5 Basic epidemiologic concepts and principles and data sources and measurements
- 3.6 Population at risk for hearing loss and communication delay – at risk children, established risk children, high risk checklist.

- 3.7 Incidence and prevalence of Speech- language and hearing disorders as per different census (NSSO, WHO, different registry for various disorders etc)

Unit 4 Introduction to Speech-Language and Swallowing Disorders: Classification and Characteristics. 15 Hrs

- 4.1 Voice disorders- based on Pitch, Loudness and Quality of voice
 4.2 Phonological disorders - misarticulation, apraxia and dysarthria
 4.3 Fluency disorders - stuttering, cluttering, neurogenic stuttering
 4.4 Language disorders – aphasia in children and adults, cerebral palsy, specific language impairment, and hearing impairment, Autism spectrum disorders, Learning disability, Intellectual disability.
 4.5 Feeding and swallowing disorders

Practicum

1. Demonstration of different types of wave forms – quasi-periodic, quasi-random, burst and silence
2. Listening to recorded samples of:
 - a. How they hear
 - b. Stress, rhythm and intonation
 - c. Cardinal vowels
 - d. IPA transcription
 - e. Different speech disorders
 - f. Speech development
3. Measurement of the following in 5 normal subjects:
 - a. Habitual frequency
 - b. Frequency range
 - c. Optimum frequency
 - d. Intensity सर्वे भवन्तु सुखिनः
 - e. Intensity range
 - f. Rise time
 - g. Fall time
 - h. Vital capacity
 - i. Mean airflow rate
 - j. Phonation duration
4. Recording normal speech samples and analyze the recorded normal sample with respect to: Phonological, morphological and syntactic development
5. Counting syllables in a standard passage
6. Production of various speech sounds and their identification
7. Listening to different pitch and their identification. Submission of practical records
8. Oral mechanism examination 5 normal children and 5 normal adults
9. Oral mechanism examination on 2 children with structural oral deficits and 2 adults with structural or neurogenic disorders

10. Perceptual analysis of speech and language parameters in 2 normal children and 2 normal adults
11. Perceptual analysis of speech and language parameters in one sample from articulation, language, fluency and voice disorders
12. Analysis of speech and language behavior of population from diverse cultural background
13. Observation of diagnostics and therapy procedures
14. Report on the available clinical facilities and clinical activities of the institute
15. Prepare a chart and show the developmental stages for speech and language behavior
16. Report on the available audiovisual material in the clinics

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1.1.2. Communication Sciences: Audiology: 60 hrs

Objective: After studying the paper the students are expected to realize the following:

- Explain the origin of audiology
- Take case history and explain the importance of case history in clinical diagnosis
- Explain the physical properties of sound and its psychophysical correlates
- Explain the pathological conditions that would cause hearing loss
- Explain the usefulness of tuning fork tests in identification of different type of hearing loss.

Unit 1: Historical Aspects and Case History 15 Hrs

1.1 Historical aspects

- History of Audiology
- Medical and non-medical fields associated with audiology
- Development of Audiology in INDIA
- Branches of Audiology
- Scope of Audiology

1.2 Case history

- Need for the case history
- Essential factors to be included in the case history form
- Comparison of adults vs. children case history
- Usefulness of the case history

1.3 Early hearing tests

- Nature and properties of tuning fork
- Tuning fork tests: Rinne, Weber, Bing, Schwabach and ABC
- Interpretation, advantages and disadvantages
- Audiometric version of Weber and Bing test.
- Tuning fork tests findings in different degrees and type of hearing loss.

Unit 2 Concept of dB and Threshold Measurements**15 Hrs**

2.1 dB concept

- Different aspects of the dB
- Power and pressure formulae, zero dB reference for pressure and power
- Calculation of dB values from absolute values and vice-versa
- Calculation of overall dB when two signals are superimposed, hearing level, sensation level
- Application of dB

2.2 Threshold concept

- Threshold of audibility
- MAP and MAF
- Threshold of pain
- Application of MAP and MAF

Unit 3: Properties of Sound-**15 Hrs**

- 3.1 Frequency: Concept – frequency, octave frequency, Psychophysical correlates, Factors affecting pitch
- 3.2 Intensity: Concept, Psychophysical correlates: Phons and sones – relation between phons and sones, use of phon and sone graph, computation of relative loudness of two given sounds using these graphs.
- 3.3 Duration: Basic concept
- 3.4 Differential sensitivity for intensity, frequency and duration.

Unit 4: Causes of Hearing Loss-**15Hrs**

- 4.1 Different types of hearing loss, general characteristics of conductive, mixed and sensorineural hearing loss
- 4.2 Classification of causes of hearing loss. Causes of hearing impairment: hereditary hearing loss, congenital hearing loss, acquired hearing loss in children and adults, causes of central auditory disorders.

Practicum

1. Otoscopy of individuals with normal hearing across age groups (Pediatric, adult and older adults) at least 5 in each group.
2. To familiarize with different types of audiometers.
3. To familiarize with different signals/stimuli used for audiometry
4. Generation of simple sine wave
 - a. With different frequencies
 - b. With different amplitudes
 - c. With different phase

5. Administration and interpretation of tuning fork tests on individuals with normal hearing (5 Nos.)
6. Taking case history of 5 normal hearing individuals
7. Measurement of threshold of audibility in individuals with normal hearing using MAP and MAF (5 Nos.)
8. Measurement of DLI, DLF in individuals with normal hearing (5 Nos.) and generation of stimuli for DLI & DLF

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- Yost —Directional Hearing| – Wiley 2000

1.1.3: Anatomy, Physiology & Pathology of Communication Sciences & Disorders **60 hrs**

Objective: After completion of the course students shall have the understanding of:

- Anatomy of speech, language and hearing mechanism
- Physiological system different systems in speech, language and hearing
- General pathological conditions causing speech, language and hearing disorders

Unit 1: Anatomy and Physiology of Speech Systems- **15 Hrs**

- 1.1 Preliminaries – The anatomical position, body planes, general anatomical terms, directions and locations, common anatomical terms
- 1.2 Overview of embryology of the speech mechanism
- 1.3 Respiratory system – anatomy of lower airway (trachea, lungs), physiology of breathing, volumes and capacities
- 1.4 Phonatory system – anatomy of larynx, vocal folds, physiology of larynx, voice production.

- 1.5 Resonatory and articulatory systems – anatomy of pharynx, oral cavity and nasal cavity, physiology of resonatory and articulatory system – resonance and articulation.

Unit 2: Anatomy and Physiology of Auditory System-

15 Hrs

- 2.1 Overview of embryology of the auditory mechanism
- 2.2 External ear – anatomy and physiology of the pinna, external auditory canal
- 2.3 Middle ear – anatomy of the tympanic membrane, ossicular chain, Eustachian tube, walls of the tympanic cavity, muscles, ligaments and tendons. Physiology – transformer action of the middle ear. Function of the middle ear muscles and Eustachian tube.
- 2.4 Inner ear – Anatomy – parts of the inner ear – bony labyrinth and membranous labyrinth, cochlea, semicircular canals, utricles, saccule. Physiology of the cochlea, cochlear microphonics, summating potential theories of hearing in brief, modes of bone conduction, physiology of the SCC, utricles and saccule.
- 2.5 Auditory pathway and central hearing mechanism: Anatomy of the afferent and efferent auditory pathway, action potential.
- 2.6 Overview of blood supply for auditory system

Unit 3: Anatomy and Physiology of Central Nervous System-

15 Hrs

- 3.1 Anatomy: parts of the brain (CNS, PNS), hemispheres, lobes
- 3.2 Physiology: CNS and PNS, functions of different parts of the brain
- 3.3 Cranial Nerves, cranial nerves important for speech & hearing functions
- 3.4 Overview of blood supply for brain and spinal cord.

Unit 4: General Pathology-

15 Hrs

- 4.1 Introduction to pathology, cell injury and cellular adaptations. The normal cell, etiology of cell injury, pathogenesis of cell injury, pigments, atrophy, hypertrophy, cellular aging.
- 4.2 Immune pathology, inflammation and healing, components of immune system, diseases of immunity; inflammation, chemical mediators of inflammation, morphology of inflammation, regeneration, factors influencing healing.
- 4.3 Infectious diseases with reference to speech and hearing systems
- 4.4 Environmental and nutritional diseases
- 4.5 Pathologies of the laryngeal, articulatory and phonatory systems, inflammatory conditions, tumours, developmental anomalies, carcinoma.
- 4.6 Pathologies of the auditory systems -inflammatory lesions of the ear, tumors.

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1.1.4 Clinical Psychology

60 Hrs

Objective: 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 behaviour
- 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: Basic concepts in Psychology -

15 Hrs

- 1.1 Introduction to psychology: Definition, history & schools of psychology
- 1.2 Scope of psychology
- 1.3 Meaning & definition of clinical psychology
- 1.4 Historical development, modern history of clinical psychology
- 1.5 Current status of clinical psychology
- 1.6 Scope as a specialty (clinical psychology) in health sciences
- 1.7 Role of clinical psychology in speech and hearing
- 1.8 Concept of normality
- 1.9 Concept of abnormality
- 1.10 Models of mental disorders: Biological, psychological and social models

Unit 2: Clinical Methods-

15 Hrs

- 2.1 Methods in clinical psychology
 - Case history
 - Clinical interview
 - Definition & types of psychological testing

- Assessment of cognitive functions
 - Adaptive functions
 - Personality
 - Behavioural assessment
- 2.2 Classification of abnormal behaviour
- History, need & rationale of classification
- 2.3 Current classification systems:
- DSM
 - ICD

Unit 3:Developmental Psychology-

15 Hrs

- 3.1 Child & developmental psychology:
- Definition & Scope
 - Growth, development & maturation
 - Principles of child development
- 3.2 Motor development: general principals of motor development
Stages in motor development: early motor development, motor development during later childhood and adolescence, decline with age
- 3.3 Cognitive development: growth from early childhood to adolescence
- Piaget's theory of cognitive development
- 3.4 Emotional Development
- 3.5 Social Development
- 3.6 Development of play behaviour

Unit 4:Learning, Behaviour Modification and Counselling-

15 Hrs

- 4.1 Learning: Meaning, definition & characteristics
- 4.2 Theories of learning:
- Introduction
 - Pavlov's classical conditioning: experiments & principles
 - Skinner's operant conditioning: experiments & principles
- 4.3 Therapeutic techniques based on learning principles:
- Skill behaviour techniques
 - Problem behaviour techniques
- 4.4 Counselling: Introduction & definition
- 4.5 Types of counselling: Directive & non- directive
- 4.6 Characteristics of a good counsellor
- 4.7 Documentation in counselling and follow up method

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1.1.5: Electronics and Acoustics

60 Hrs

Objective: 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 Introduction to Electronics & Signal Processing-

15 Hrs

1.1 Basic principle of operation and working of

- Resistors, variable resistor, capacitor, inductor, semiconductor and diodes
- LEDs, seven segment displays, LCDs
- Introduction to signal processing
- Amplification
- Concept of gain and band width
- Frequency response

1.2 Power supply

- Block diagram of DC power supply, description and working of each block
- AC power supply & voltage stabilization and servo controlled method of stabilization
- UPS and Inverters
- Isolation transformer, AC power supply grounding

1.3 Fundamental of digital signal processing

- Binary number system, logic gates, flip flops and counters
- Analog signal & digital signal –Representation and comparison
- Converting analog signal to digital signal
- Basic structure of a digital processing system
- Converting digital signal to analog signal

1.4 Application of DSP

- Analog signal processing Vs digital signal processing – Comparison, merits and demerits
- Applications of DSP in communication sciences and disorder.

Unit 2 Fundamental of Acoustics-

15 Hrs

2.1 Physics of Sound

- Nature and Propagation of sound
- Sound characteristics such as frequency, wave length , amplitude
- Pitch and Loudness-Sone, Phon, equal loudness contour
- Sound pressure level and Sound power level

2.2 Quality and properties of sound

- Time domain and frequency domain representation
- Acoustic Impedance

2.3 Acoustic Environment in closed rooms

- Reflection and absorption, reverberation
- Background noise, speech to noise ratio
- Techniques to reduce reverberation
- Acoustically treated rooms – Basic requirements, concept and structure.

2.4 Transducers, Sound Measurement, reproduction and recording

- Microphones-Piezoelectric, moving coil, condenser, electret etc
- Loudspeaker and their enclosures
- Digital recording & audiometric transducers reproduction
- Sound level meters & acoustic measurements

Unit 3: Introduction to Information Technology-

15 Hrs

3.1 Introduction to computers

- SMPS, Hardware, Memory devices and types of storage media
- Specification of personal computers

3.2 Software

- Operating systems-Types, comparison and functioning
- Application software used in Communication Sciences and disorder
Mobile Apps-concept & functioning

3.3 Structure and functioning of internet and intranet

- Concept of internet and world wide web
- Local Area Network – structure and components

3.4 Basic concept of Tele diagnosis & Tele rehabilitation

Unit 4 Instrumentation in Speech, Language and Hearing-

15 Hrs

4.1 Introduction to electronic instrumentation

- Pre-amplifiers and Power amplifiers
- Filters-different types and their frequency response

4.2 Principle of operation, block diagram of

- Basic technology of analog and digital hearing aids
- Audiometers
- Immittance meters
- Group amplification and Assistive Listening Devices
Speech spectrograph

4.3 Calibration of audiometers – Equipment, setup and procedure.

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Clinical Practicum: (Speech-Language Pathology)

1. 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.
2. 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.
3. 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.
4. Record a standard passage, count number of syllables and words, identify syllable structure, syntactic structures in the passage.
5. Oral mechanism examination on 5 normal children and 5 normal adults.
6. Prepare a chart and show the developmental stages of speech and language behavior.
7. Administer standardized tests for assessment of delayed speech and language development such as REEL, SECS, LAT, 3DLAT, ALD each on any 2 children.
8. Study the available normative data (Indian/Western) of speech such as respiratory, phonatory, resonatory and articulatory parameters.
9. 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.
10. Prepare a report on the available clinical facilities and clinical activities of the institute.

Clinical Practicum: Audiology

Perform the following experiments

1. Measure most comfortable level on 10 participants with normal hearing sensitivity.
2. Measure uncomfortable levels on 10 participants with normal hearing sensitivity.
3. Calculate the sensation levels of MCL and UCLs in above 10 participants.

4. Measure difference limen of intensity, frequency and duration on 10 normal hearing adults and plot it in graphical form and interpret the results.
5. Measure equal loudness level contours at minimum level, 40 dB SPL, 70 dB SPL (1 kHz) in 5 normal hearing adults.
6. 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.
7. Administer different tuning fork tests on 5 simulated conductive and 5 sensori neural hearing loss individuals.

SEMESTER II

1.2.1: Speech-Language Pathology - Assessment & Management

60 hrs

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
- Basic principles of providing counselling and guidance to clients and caregivers

Unit 1: Overview of Procedures Involved in Speech-Language Diagnostics-15 Hrs

- 1.1. Case history-need for the case history-essential- factors to be included in case history-usefulness of the case history-case history format for various communication disorders.
- 1.2. Basic terminologies and concepts.
- 1.3. Introduction to diagnostics, Classification of disorders: DSM, ICD,terminologies in the diagnostic process,general principles of diagnosis.
- 1.4. Characteristics of a diagnostic clinician
- 1.5.Diagnostic setup and tools

Unit 2:Diagnostic Models and Approaches

15 Hrs

- 2.1.Diagnostic models and its application to communication disorders – SLPM,Wepman, Bloom and Lahey.
 - 2.2.Types of diagnoses: Concept, application and its relevance tocommunication disorder – Clinical diagnosis, direct diagnosis, differentialdiagnosis, diagnosis by treatment, diagnosis by exclusion, team diagnosis,instrumental diagnosis, provocative diagnosis, tentative diagnosis
- Advantage/disadvantages

Unit 3: Basic Concepts of Intervention and Procedures Involved in Speech- Language Therapy 15 Hrs

- 3.1. General principles of speech and language therapy.
- 3.2. Models in Therapeutics and its application to Speech-Language Therapy: Medical model, Behavioural model and Learning Models.
- 3.3. Approaches to speech and language therapy – Formal, informal and eclectic approaches; Behaviourist, Linguistic-Cognitive and Social interactionist approach.
- 3.4. Strategies for speech and language therapy- Individual Specific and Developmental strategies.
- 3.5. Speech therapy set-up
- 3.6. Individual and group therapy
- 3.7. Integrated and Inclusive Education
- 3.8. Telepractice and Apps

Unit 4: Execution of Speech-Language Therapy, Documentation and Professional Codes 15 Hrs

- 4.1. Planning for speech and language therapy – goals, steps, procedures, activities.
- 4.2. General techniques for Speech and language therapy in Children.
- 4.3. Importance of behavioural principles in speech and language therapy.
- 4.4. Counselling and Guidance - Facilitation of parent participation and transfer of skills.
- 4.5. Documentation of clinical records.
- 4.6. Evaluation of therapy outcome.
- 4.7. Ethics in diagnosis and speech language therapy.
- 4.8. Self-appraisal of clinicians.
- 4.9. Professional code of conduct for clinicians.

Practicum

1. Observe the evaluation process of at least 5 different speech and language disorders in children
2. Observe the evaluation process of at least 5 different speech and language disorders in adults
3. Administer anyone standardized test on a child and adult with any speech and language disorder

4. Administration of standardized tests for assessment of delayed speech and language development such as REEL, SECS, 3DLAT.
5. Observation of various therapeutic methods carried out with children and adults with speech and language disorders
6. Familiarize with the sources for referral and parent counseling procedures
7. Preparation of a model diagnostic report of a patient with speech and language disorders
8. Preparation of a therapy kit.
9. Submission of record.

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Beech.R.J., & Harding, L., & Jones,H.D. (1993) Assessment in Speech Language Therapy, Unit 1 and 2, 1-35, Routledge

1.2.2: Audiological Evaluation

60 hrs

Objective: 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 background of it
- Carryout different tests involved in speech audiometry and appreciate the theoretical background
- Carryout subjective calibration and daily listening checks of the audiometer
- Get adequate theoretical information necessary to understand concepts involved in objective calibration

Unit 1 Pure tone Audiometry-

15 Hrs

- 1.1 Historical developments, Rationale, Classification of audiometers, Instrumentation, Components and parts of an audiometer, Different types of transducers, their performance and technical specifications – Head phones (such as TDH-39, TDH-49, TDH-50, HDA-200, HDA-500), Bone vibrators (such as B71, B -72, KH 70 & A 20), Loud speakers, Insert ear phones (ER-3A, ER-5A), Microphones (Talk forward & Talk back), VU meter, Ear cushions.
- 1.2 Standards: National and International standards related to Pure tone Audiometry (ANSI, ISO, IEC, ASHA & IS/BIS), Permissible Ambient Noise levels in audiometric test rooms.
- 1.3 Audiogram, Symbols used, Interpretation of audiogram (degree, type & configuration), Usefulness of Audiogram
- 1.4 Bone conduction (BC) Audiometry: Importance, challenges in bone conduction testing
- 1.5 Methods to find threshold (AC & BC): Method of limits, Hughson & Westlake method, Modified Hughson Westlake Method, ASHA guidelines, ANSI guidelines
- 1.6 Factors affecting AC and BC threshold, Limitations of Pure tone Audiometry

Unit 2 Speech Audiometry-

15 Hrs

- 2.1 Historical developments, rationale and objectives
- 2.2 Different type of speech tests - Speech detection threshold (SDT), Speech recognition threshold(SRT), speech identification scores (SIS) - Definition, Material used, Procedure for obtaining SDT, SRT and SIS, Response mode and their clinical applications. BC speech Audiometry
 - Correlation between PTA and speech audiometry
 - PIPB function, Articulation Index,
 - National and International standards related to Speech Audiometry (ANSI, ISO, IEC, ASHA & IS/BIS)
- 2.3 Factors affecting speech audiometry, Limitations of speech Audiometry
- 2.4 Speech materials available in Indian languages and English for Speech Audiometry (SRT & SIS)
- 2.5 Loudness based tests - MCL, UCL, Dynamic range - Definition, Materials used, Procedure, and Clinical Applications.

Unit 3 Clinical Masking-

15 Hrs

- 3.1 Definition, Terminology related to masking: Test ear, non-test ear, masker, maskee, cross over, cross hearing, shadow curve and central masking.
- 3.2 Types of masking, Different types of stimuli used as maskers, Critical Band Concept,
- 3.3 Interaural attenuation (IA), factors affecting IA. Criteria for masking during AC, BC and factors considered.

3.4 Factors determining amount of masking noise- Minimum and Maximum effective masking level for AC and BC, speech

3.5 Procedures for masking – Methods to find masked threshold and factors to be considered in adequate masking, Naunton's Dilemma, Rainville, SAL tests and Fusion Inferred test (FIT)

Unit 4 Calibration-

15 Hrs

4.1 Calibration of audiometers:

- Subjective/real ear calibration methods for AC and BC
- Electro-acoustic/objective calibration of the output intensity of Puretone, NBN, WBN and Speech noise through the headphones, insert receiver loud speaker and bone vibrators and frequency calibration, free field speakers calibration

4.2 Calibration of speech stimulus

4.3 Daily listening checks, application of correction factors.

4.4 Artificial ear, Acoustic couplers and Artificial mastoid

Practicum

1. Daily listening check and trouble shoot of different clinical audiometers
2. Preparation of correction factor chart after biological calibration on individuals with normal hearing
3. Getting familiar with different clinical audiometers, parts of audiometers and their functions
4. Familiarization with different types of transducers – earphones/ear cushion combination, speakers, insert earphones, bone vibrators
5. Appropriate placement of various transducers on clients during Audiometry including masking
6. To get familiar with instructions for carrying out pure tone audiometry, Speech audiometry and masking in 3 different languages at least
7. Familiarization with different types of stimuli used in audiometry
8. Establishment of PT thresholds (AC & BC) using ascending, descending and modified Hughson Westlake procedures in 5 individuals with normal hearing
9. Estimation of bone conduction threshold with forehead and mastoid placements in 5 individuals with normal hearing
10. Familiarization with different symbols used on audiogram for unmasked and masked AC, BC, SRT, and SIS for different transducers for right and left ear.

11. Familiarization with materials used for speech audiometry in different Indian languages and English for adults and children
12. To observe the counselling before and after audiological testing
13. Establishing UCL, MCL, DR, SRT, SDT & SIS on 5 individuals with normal hearing
14. Administration of clinical masking on 5 individuals with normal hearing
15. Familiarization with different equipment used for objective calibration of audiometers
16. Observation of objective calibration procedure for audiometers as per standards
17. Administration of SAL and Rainville on 5 individuals with normal hearing.

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

1.2.3: Linguistics and Phonetics

60 Hrs

Objective: 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 Language and Linguistics-

15 Hrs

- 1.1 Introduction to Language- Definition, Characteristics of language, Functions of language, Difference between animal communication systems and human language.
- 1.2 An introduction to the language families of India and language families of the world.
- 1.3 Writing systems– History of writing systems, Types of writing systems, Indian writing systems

- 1.4 Introduction to Linguistics – Definition, brief introduction to different branches of linguistics such as Sociolinguistics, Psycholinguistics, Neurolinguistics and Clinical linguistics. Application of linguistics with special reference to communication disorders.
- 1.5 Transcription systems with special emphasis on International Phonetic Alphabet (IPA); Basic Transcription practices.

Unit 2 Phonetics and Phonology-

15 Hrs

- 2.1 Introduction to Phonetics and its different branches – articulatory, acoustic, auditory and experimental phonetics, air-stream mechanism, articulatory classification of sounds – segmentals and supra-segmentals, classification, description and recognition of vowels and consonants.
- 2.2 Introduction to Phonology, classification of speech sounds on the basis of distinctive features; phonotactics; Principles and practices of phonemic analysis; common phonological processes like- assimilation, dissimilation, metathesis, haplology, epenthesis, spoonerism, vowel harmony, nasalisation, neutralization.

Unit 3 Morphology, Syntax, Semantics and Pragmatics-

15 Hrs

- 3.1 Morphology – concepts of morph, allomorph, morpheme, bound and free forms, roots etc. Types of morphemes - inflection and derivation. Concept of word, content and function words, form classes, Processes of word formation, endocentric and exocentric constructions, grammatical categories, paradigmatic and syntagmatic relationship.
- 3.2 Syntax – Concept, Different methods of syntactic analysis – Immediate Constituent (IC) Analysis, Phrase Structure Grammar, Transformational Generative Grammar, Introduction to the major types of transformations. Types of Sentences, Notions of competence versus performance, deep structure versus surface structure, acceptability versus grammaticality, langue versus parole.
- 3.3 A brief introduction to Semantics- homonyms, synonyms and antonyms, Semantic Feature Theory.
- 3.4 A brief introduction to Pragmatics – discourse; intent of communication

Unit 4 Language acquisition and Language Learning-

15 Hrs

- 4.1 Issues in first language acquisition; Stages of language development - prelinguistic stage and linguistic stage, acquisition of phonology, acquisition of morphology, acquisition of syntax, acquisition of semantics, acquisition of pragmatics, language and cognition.
- 4.2 Issues in second language acquisition; differences between first language acquisition and second language acquisition/learning. Bilingualism in children-compound, coordinate, simultaneous, successive
- 4.3 Inter-language theory, Language transfer & Linguistic interference; Factors influencing second language acquisition/ learning

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1.2.4: Otolaryngology

60 hrs

Objective: 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.

- Causes, signs, symptoms, pathophysiology and management of diseases of laryngeal and articulatory system

Unit 1: External and Middle ear and their disorders-

15 Hrs

- 1.1. Clinical anatomy of the auditory system
- 1.2. Congenital anomalies
- 1.3. Diseases of the external ear
- 1.4. Perforation and ruptures of tympanic membrane
- 1.5. Eustachian tube dysfunction
- 1.6. Otitis media with effusion
- 1.7. Cholesteatoma and chronic suppurative otitis media
- 1.8. Otosclerosis
- 1.9. Trauma to temporal bone
- 1.10. Facial nerve and its disorder

Unit 2: Inner Ear and its Disorders-

15 Hrs

- 2.1 Congenital anomalies
- 2.2 Meniere's Disorder
- 2.3 Ototoxicity
- 2.4 Presbycusis
- 2.5 Disorders of vestibular system
- 2.6 Vestibular Schwannoma
- 2.7 Tinnitus and medical line of treatment
- 2.8 Pre-surgical medical and radiological evaluations for implantable hearing devices
- 2.9 Overview of surgical technique for restoration and preservation of hearing
- 2.10 Post-surgical care and complication of surgery for cochlear implants
- 2.11 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, Pharynx, Esophagus and their Disorders-

15 Hrs

- 3.1 Anatomy of the oral cavity
- 3.2 Common disorders of the oral cavity
- 3.3 Cleft lip and palate – medical aspects

- 3.4 Clinical anatomy and physiology of pharynx
- 3.5 Inflammatory conditions of the pharynx, tonsils and adenoids
- 3.6 Clinical anatomy and physiology of esophagus
- 3.7 Clinical examination of esophagus
- 3.8 Congenital and acquired diseases of esophagus
- 3.9 Airway management procedures

Unit 4 Larynx and its Disorders-

15 Hrs

- 4.1 Clinical anatomy of larynx
- 4.2 Difference between adult and infant larynx
- 4.3 Clinical examination of larynx
- 4.4 Stroboscopy - technique, procedure, interpretation and precautions
- 4.5 Congenital laryngeal pathologies
- 4.6 Inflammatory conditions of the larynx
- 4.7 Vocal nodule and other disorders of the vocal folds
- 4.8 Benign and malignant tumors of the larynx
- 4.9 Laryngectomy – overview of surgical procedure
- 4.10 Phono surgery and other voice restoration surgeries

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1.2.5: Pediatrics and Genetics

60 Hrs

Objectives: After studying the course a student will have:

- A basic idea about the role of genetics in Speech-Language and Hearing
- Knowledge about the various concepts related to growth and development in pediatrics

Unit 1: Basic Concepts and Terminologies in Genetics-**15 Hrs**

- 1.1 **Basics of genetics:** Genes, Chromosomes, Traits, DNA structure, DNA replication, Mutations, DNA repair, Protein synthesis, Genetic code, Mitosis, Meiosis
- 1.2 Symbols used in pedigree construction
- 1.3 Mendel's principles, Modes of inheritance, Mendelian Disorders, Exceptions to Mendel's principles, Non-traditional modes of inheritance
- 1.4 **Molecular techniques:** Polymerase Chain Reaction (PCR), Single nucleotide polymorphism (SNP), Restriction enzymes, Restriction fragment length polymorphism (RFLP), DNA sequencing, Microarray, Next generation sequencing, Cloning
- 1.5 Cytogenetics: Karyotyping, Fluorescence in situ hybridization (FISH), Comparative genomic hybridization (CGH), Numerical aberrations, Structural aberrations, Sex chromosome anomalies

Unit 2: Genetics in Communication Disorders-**15 Hrs**

- 2.1 **Identification of disease genes:** Single gene disorders, Complex genetic disorders, Linkage analysis, LOD score, Genetic association studies, Genome-wide association studies (GWAS), Meta-analysis, Human genome mapping project (HGMP), Reference Sequence Database
- 2.2 **Communication disorders:** Chromosomal syndromes, Single-gene syndromes, Polygenic multifactorial syndromes, Sporadic syndromes, Environmental syndromes
- 2.3 **Genetic components of communication impairment:** Autism, Dyslexia, Mental Retardation, Cerebral Palsy, Stuttering, Syndromic hearing impairment, Non-syndromic hearing impairment
- 2.4 Genetic counseling, Risk evaluation, Management of genetic disorders, Gene therapy

Unit 3: Basics Concepts in Pediatrics-**15 Hrs.**

- 3.1 Growth and development – basic concepts, growth from birth to puberty, growth during adolescent period.
- 3.2 Early identification of perinatal pediatric disorders leading to speech and hearing impairment.

Unit 4: Paediatric disorders-**15 Hrs**

- 4.1 Nutritional disorders in children – protein energy malnutrition, water soluble vitamins, fat soluble vitamins, trace elements
- 4.2 Childhood disabilities -developmental disabilities, cerebral palsy, attention deficit hyperactivity disorder, learning disability, childhood autism, intellectual disability

1.2.6. Clinical Practicum: (Speech-Language Pathology)

1. Make a list of speech language stimulation techniques and other therapy techniques for various speech disorders.
2. 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.
3. Observe the evaluation process and counselling of at least 5 different speech and language disorders in children.
4. Observe the evaluation process and counselling of at least 5 different speech and language disorders in adults.
5. Take case history of a minimum of 10 individuals (5 normal & 5 clients with complaints of speech-language problems).
6. Observation of diagnostic procedures.
7. Observe various therapeutic methods carried out with children and adults with speech and language disorders.

1.2.7. Clinical Practicum: (Audiology)

1. Calculate the relative intensities with different reference intensities.
2. Calculate decibels when sound intensities are doubled, increased by 4 times
3. Carry out pure tone and speech audiometry on 10 normal hearing individuals.
4. Carry out clinical masking on 10 normal hearing individuals with simulated conductive hearing loss
5. Observe clinical masking on 5 individuals with conductive hearing loss and 5 individuals with sensori-neural hearing loss.
6. Carryout daily listening checks and subjective calibrations 20 times and observe objective calibration once
7. Perform otoscopy and draw the tympanic membrane of 10 healthy normal individuals
8. Measure difference limen of intensity, frequency and duration on 10 normal hearing adults and plot it in graphical form and interpret the results
9. Measure equal loudness level contours at minimum level, 40 dB SPL, 70 dB SPL (1 kHz) in 5 normal hearing adults
10. 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
11. Administer different tuning fork tests on 5 simulated conductive and 5 sensori neural hearing loss individuals
12. Observe the pure tone audiometry being carried out on 10 clients.

13. Plot the audiogram, calculate the pure tone average and write the provisional diagnosis of observed clients.
14. Perform otoscopy (under supervision) on at least 1 client with following conditions: Tympanic membrane perforation, SOM, CSOM.

SEMESTER III

2.3.1. Voice and its Disorders

60 Hrs.

Objective After completing this course, the students should be able to

- Describe characteristics of good, normal and abnormal voice and identify voice disorders
- Explain etiology related to voice problems, and its pathophysiology.
- Assess good, normal and abnormal voice.
- Provide counselling and therapy to individuals with voice disorders

Unit 1: Voice Production and Correlates of Voice

15 Hrs

- 1.1 Review of anatomy of respiratory, laryngeal, resonatory systems and vocal folds (in detail).
- 1.2 Voice-definition and characteristics..
- 1.3 Physiology of voice – voice production, Theories of phonation, pitch and loudness change
- 1.4 Correlates of voice – acoustic, psycho-physical, aerodynamic and physiological correlates
- 1.5 Changes in voice with age (lifespan) and factors influencing voice development.

Unit 2: Voice Disorders and its Classification Systems

15 Hrs

- 2.1 Classification systems of voice disorders and their clinical applications.
- 2.2 Voice disorders- Organic, Neurological (vocal fold palsies, Spasmodic dysphonia, Essential voice tremor), Psychogenic, functional, mutational falsetto, puberphonia, Endocrinal- causes, signs, symptoms, vocal symptoms
- 2.3 Congenital conditions of larynx- characteristics, signs, symptoms, vocal symptoms
- 2.4 Resonatory voice disorders: Hyper nasality and hypo nasality-causes, signs, symptoms, vocal symptoms.
- 2.5 Aging of Voice: characteristics, signs, symptoms, vocal symptoms

2.6 Professional use of voice and its disorders.

Unit 3: Assessment of Voice

15 Hrs

3.1 Assessment of voice: Methods

3.2 Qualitative: pitch, loudness, quality assessment, rating scales, protocols (GRBAS, CAPE-V & others)

3.3 Quantitative-Multi dimensional analysis of voice: Acoustic (such as F0, jitter, shimmer, LTAS, optimum pitch, formant frequencies, H/N and S/N ratio), aerodynamic (such as vital capacity, MPD, MAFR, Sub-glottal pressure), laryngeal (Glottogram, Inverse filtering), myographic.

3.4 Measurement of nasality (Objective and subjective)

3.5 Invasive methods: Such as videokymography, videoendoscopy & videostroboscopy.

Unit 4: Management of Voice Disorders

15 Hrs

4.1 Voice therapy techniques/ methods: Facilitating Approaches, Establishing/ Modifying the Pitch, loudness, management of hyperfunctional, hypofunctional voice disorders, hypernasality & hyponasality

4.2 Medical and Surgical Management of voice disorders: Common classes of drugs used and surgical procedures used in treatment of some disorders of voice

Practicum

1. 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.
2. Make inferences on age and sex differences across the samples obtained in the previous experiment using perceptual voice profiling.
3. Make a note of differences in pitch, loudness, quality and voice control. Explain how voice reflects ones personality and other social aspects.
4. Analyze 5 male and 5 female voice (including your own voice) in terms of acoustic, aerodynamic, laryngeal and psycho-physical aspects, including the measures of MPT and s/z ratio.
5. Analyze the phonation samples of supra normal, normal and abnormal voice and generate a voice report based on these findings. Compare findings between men & women. Listen to the voice sample and identify the pitch and confirm the same by instrumental analysis.
6. Perform the acoustic analysis (in 4 & 5) using at least one software i.e. Praat, Dr. Speech, MDVP, Vaghmi
7. Observe and document findings from five laryngeal examinations (pre-recorded or live) such as VLS, stroboscopy or any other relevant.

8. Administer a PROM on five individuals.
9. Prepare a vocal hygiene checklist.
10. Demonstrate therapy techniques such as vocal function exercise, resonant voice therapy, digital manipulation, push pull, relaxation exercises.

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Benninger, M. S., & Murry, T. (2008). *The Singer's Voice*. Plural Publishing, San Diego

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Davies, D. G., & Jahn, A. F. (1998). *Care of the Professional Voice: A Management Guide for Singers, Actors and Professional Voice Users*. Butterworth-Heinemann, Oxford.

2.3.2 Speech Sound Disorders

60hrs

Objective: 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: Basic Concepts of Phonology and Distinctive Features and Acoustic Features 15 Hrs

1.1 Fundamentals of articulatory phonetics – phonetic description of vowels & consonants.

1.2 Phonology & phonological theories – generative phonology, natural phonology.

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

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

1.5 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

1.6 Acoustics of speech sounds

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

1.8 Co-articulation: types and effect.

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

Unit 2: Assessment of Speech Sound Disorders

15 Hrs

2.1 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.

2.2 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.

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

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

2.5 Review of tests in Indian and other languages - Single word articulation tests, deep test of articulation, and computerized tests of phonology, Influence of language and dialectal variations in assessment.

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

2.7 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).

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

2.9 Speech sound discrimination assessment, phonological contrast testing and Stimulability testing.

Unit 3: Management of Speech Sound Disorders-I

15 Hrs

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

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

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

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

3.5 Facilitation of generalization.

3.6 Maintenance and termination from therapy.

3.7 Motor-based treatment approaches – Principles of motor learning.

3.8 Discrimination/ear training and sound contrast training.

- 3.9 Establishing production of target sound – imitation, phonetic placement, successive approximation, context utilization.
- 3.10 Traditional approach, contextual/sensory-motor approaches.
- 3.11 General guidelines for motor-based treatment approaches.
- 3.12 Use of technology in articulation correction.

Unit 4: Management of Speech Sound Disorders -II

15 Hrs

- 4.1 Core vocabulary approach.
- 4.2 Introduction to linguistically-based treatment approaches- Distinctive feature therapy.
- 4.3 Minimal pair contrasts therapy.
- 4.4 Metaphon therapy, Cycles approach.
- 4.5 Broad-based language approaches.
- 4.6 General guidelines for linguistically-based approaches.
- 4.7 Phonological awareness and phonological disorders.
- 4.8 Phonological awareness intervention for preschool children.
- 4.9 Adapting intervention approaches to individuals from culturally and linguistically diverse backgrounds.
- 4.10 Role of family in intervention for speech sound disorders.

Practicum

1. List the vowels and consonants in your primary language and provide phonetic and acoustic descriptions for the speech sounds.
2. Identify the vowels and consonants of your language on the IPA chart and practice the IPA symbols by transcribing 25 words.
3. Make a list of minimal pairs (pairs of words which differ by only one phoneme) in English.
4. Make a list of minimal pairs in any language other than English.
5. Identify the stages of speech sound acquisition by observations from videos of children from birth to 5 years of age.
6. Record the speech of a two year old typically developing child, transcribe and analyze the speech sample.
7. 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.

8. Analyze transcribed speech samples of typically developing children – practice independent and relational analysis.
9. Practice instructions for phonetic placement of selected sounds.
10. Develop a home plan with activities for any one section of phonological awareness in English and in one Indian language.

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2.3.3 Diagnostic Audiology: Behavioral Tests

60 hrs

Objective: 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 Overview of Behavioral Diagnostic Tests-

15 Hrs

- 1.1 Introduction to diagnostic audiology: characteristics of a diagnostic test, difference between screening and diagnostic test, functions of a diagnostic test in Audiology
- 1.2 Need for test battery approach in auditory diagnosis and integration of results of audiological tests, cross-check principle
- 1.3 Concept of clinical decision analysis (sensitivity, specificity, true positive, true negative, false positive, false negative, and hit rate)
- 1.4 Definition of behavioral and physiological tests and their characteristics in diagnostic audiology
- 1.5 Theories and physiological bases of recruitment
- 1.6 Theories and Physiological bases of auditory adaptation
- 1.7 Clinical Indications for administering audiological tests to identify cochlear pathology
- 1.8 Clinical Indications for administering audiological tests to identify retrocochlear pathology

Unit 2: Cochlear, Retrocochlear Pathology and Pseudohypacusis

15 hrs

2.1 Tests to identify cochlear and retrocochlear pathology

- ABLB, MLB
- SISI and its variants
- STAT, TDT and its modification
- Bekesy audiometry
- Brief tone audiometry
- PIPB function
- HINT, QuickSIN
- Glycerol test
- Psychoacoustic tuning curves and TEN test

- Others

2.2 Tests to diagnose functional hearing loss

- Behavioral 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, Low level PB word test, Yes-No test, DAF test.
- Identification of functional hearing loss in children: such as Swinging story test, Pulse tone methods

2.3 Psycho-social aspects related to pseudohypacusis

Unit 3: Central Auditory Processing Disorders

15 Hr

3.1 Central auditory processing: definition, different behavioral processes

3.2 Behavioral and clinical indicators of central auditory processing disorders Bottle neck and subtlety, redundancy principles and their clinical interpretations.

3.3 Screening techniques for CAPD

3.4 Tests to detect central auditory processing disorders

- Monoaural low redundancy tests - Filtered speech tests, Time compressed speech test, Speech-in-noise test, SSI with ICM,
- Dichotic speech tests – Dichotic digit test, Staggered spondaic word test, Dichotic CV test, SSI with CCM, Competing sentence test,
- Binaural interaction tests – RASP, BFT, SWAMI, and MLD
- Tests of Temporal processing – Pitch pattern test, Duration pattern tests, Gap detection test, TMTF
- Screening test for auditory processing
- Overview about CAPD in older adults
- Review of CAPD tests with reference to site of lesion (Brainstem, cortical, hemispheric and interhemispheric lesion)

3.5 Diagnostic criteria for CAPD

3.6 Variables influencing the assessment of central auditory processing:

- Procedural variables
- Subject variables

Unit 4: Vestibular and Tinnitus Assessment

15 Hr

4.1 Vestibular assessment

- Overview of balance functioning
- Overview of nystagmus, giddiness, vertigo
- Behavioral tests to assess vestibular functioning (Fukuda stepping test, Tandem gait test, Finger nose pointing, Romberg test, sharpened Romberg test, head thrust test and head impulse test)

4.2 Tests to assess Tinnitus and Hyperacusis

- Overview of Tinnitus and Hyperacusis
- Pitch matching,
- Loudness matching
- Residual inhibition
- Feldmann masking curves
- Johnson Hyperacusis Dynamic Range Quotient

4.3 Variables influencing the assessment:

- Procedural variable
- Subject variables

Practicum

1. Administer ABLB, MLB and prepare laddergram (ABLB to be administered by blocking one ear with impression material)
2. Administer classical SISI on 3 individuals and note down the score
3. Administer tone decay tests (classical and its modifications) and note down the results (at least 3 individuals)
4. Plot PIPB function using standardized lists in any 5 individuals
5. Administer the tests of functional hearing loss (both tone based and speech based) by asking subject to malingering and having a yardstick of loudness.
6. Administer CAPD test battery to assess different processes on 3 individuals and note down the scores
7. 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.
8. Estimate the pitch and loudness of tinnitus in 2 persons with tinnitus (under supervision). Assess the residual inhibition in them.
9. Plot Feldman masking curves for a hypothetical case

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

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2.3.4 Educational Audiology

60 hrs

Objective After studying the paper the students are expected to realize the following:

- Effects of hearing loss on development and learning
- To analyse the client scenarios and decide what kind of intervention to be provided to the child with hearing loss in the school
- Become aware of criteria for selection of appropriate educational placement of the child
- To apply principles of effective management in classroom/school settings Roles of educational agencies and legal agencies for children with disability in India

Unit 1: **Importance of Early Identification and Different Approaches for Communication** **15 Hrs**

- Classification of hearing impairment and its importance in educational placement
- Role and responsibilities of Educational Audiologist and team members
- Early identification and its importance in aural rehabilitation.
- Unisensory vs. multisensory approach
- Manual vs. oral form of communication, manual communication systems that parallel English (Manual alphabet); interactive systems (cued speech: Rochester

method); Those alternative to English (ASL, Indian Sign Language), Contrived system (SEE-I, SEE-II, Signed English)

- Total communication

Unit 2 Methods of Teaching Language for Children with Hearing Impairment 15 Hrs

- Methods of teaching language to the hearing impaired and its application in Indian languages
- Natural method: maternal reflective method, Groth's method
- Structured method (grammatical method); Fitzgerald key, box technique APPLE TREE, Patterning
- Combined method (Natural and structured), Computer aided method.

Unit 3 Educational Placement 15 Hrs

- Educational placement of hearing impaired children: Preschool training, Integration, Partial integration, Segregation: day school vs. residential school, Inclusive vs intergrated school.
- Criteria for recommending the various educational placements
- Criteria for selecting the medium of instruction
- Factors affecting their outcome.
- Setting-up classrooms and the modifications for the individuals with hearing impairment: Acoustic, lighting, class strength and amplification and personal and group amplification devices
- Educational problems of the individuals with hearing impairment and the measures taken to overcome the problems in India

Unit 4 Educational Problems, Laws and Policies for Educating and Counseling Parents 15 Hrs

- Educational laws and policies with respect to education for children with disability by government and non-government agencies
- Recommendations of PWD and UNCRPD for education, Rehabilitation Council of India Act (1992), Persons with Disabilities Act (1995), Right to Education Act (RTE), IEDC Scheme 1992, DPEP scheme, Salamanca statement and Framework for Action on Special Needs Education (1994), Kothari Commission (1992), Rights of disabled, Sarva Siksha Abhiyan

- Education for children with multiple disabilities
- Counseling the parents, teachers and peers regarding the education of the individuals with hearing impairment in India
- Home training – need, preparation of lessons, long term vs short term plans and activities, correspondence programs, follow-up

Practicum

1. Prepare schedules for educational placement of 5 children with hearing impairment having different hearing capacities
2. Counsel parents regarding educational placement of the hearing impaired.
3. To prepare a model of an integrated classroom considering the factors affecting integration
4. To visit a school for children with special needs and note down the available facilities and the steps-to be taken to modify the same.

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2.3.5 Neurology**60 hrs**

Objective: 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 Essential Neurological Concepts & Relationship between Neuroscience and Speech-Language & Hearing 15 Hrs.

- Scope of Neuroscience and its branches
- Principles governing the human brain
- Orientation to technical terminology
- Terms related to the Neural structure
- Structure of the CNS
- Nervous system classification
- Techniques for learning Neuroscience

Unit 2 Gross Anatomy and Blood Supply to the Brain 15 hours

- Central and peripheral nervous system
- Anatomy of the brain
- Different lobes and their functions specifically for speech-language and hearing
- Spinal cord- structure and functions
- Networking of spinal nerves
- Meninges of the brain and spinal cord
- Autonomic nervous system
- Classification of spinal and cranial nerves, their numbers and functions
- Blood supply to the brain- various arteries supplying blood to various lobes of the brain and importance of Circle of Willis.

Unit 3 Common Causes of Neurological Conditions and Neurological Assessment 15 Hrs

- Classification of causes- infections, ageing, metabolic, tumors and technology related
- Preventive measures to reduce the neurological conditions
- High risk registers for neurological conditions
- Introduction to CT scan and MRI.

Unit 4 **Common Neurological Conditions Leading to Speech-language and Hearing Disorders – Signs, Symptoms and Behavioral Characteristics** 15 hours

- Cerebrovascular diseases – ischemic brain damage – hypoxic ischemic encephalopathy, cerebral infarction – intracranial haemorrhage –subarachnoid haemorrhage.
- Trauma to the CNS – subdural haematoma, epidural haematoma, parenchymal brain damages
- Demyelinating diseases, Degenerative, metabolic and nutritional disorders – multiple sclerosis, Alzheimer’s disease, Parkinsonism

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2.3.6.Clinical Practicum: Speech Language Pathology

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:

1. 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.

2. Methods to examine the structures of the oral cavity/organs of speech
3. The tools to assess language abilities in children (with hearing impairment, specific language impairment & mixed receptive expressive language disorder).
4. Development of speech sounds in vernacular and linguistic nuances of the language.

Know-how:

1. To evaluate speech and language components using informal assessment methods.
2. To administer at least two standard tests for childhood language disorders.
3. To administer at least two standard tests of articulation/ speech sounds.
4. To assess speech intelligibility.

Show:

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

Do:

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

2.3.7. Clinical Practicum: Audiology

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:

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

Know-how:

1. To obtain detailed case history from clients or parents/guardians.
2. To carryout commonly used tuning fork tests.
3. To administer pure tone audiometry including appropriate masking techniques on adults using at least techniques.
4. To administer tests to find out speech reception threshold, speech identification scores, most comfortable and uncomfortable levels on adults.

Show:

1. Plotting of audiograms with different degree and type with appropriate symbols-audiograms per degree and type
2. Detailed case history taken and its analysis
3. Calculation degree, type and percentage of hearing loss on 5 sample conditions

Do:

1. Case history on at least 5 adults and 3 children with hearing disorders
2. Tuning fork test on at least 2 individuals with conductive and 2 individuals with sensori-neural hearing loss
3. Pure tone audiometry with appropriate masking on 5 individuals with conductive, 5 individuals SN hearing loss and 3 individuals with unilateral/asymmetric hearing loss.

SEMESTER IV**2.4.1 Fluency and Its Disorders**

60 hrs

Objective: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

Introduction to Fluency and Stuttering**15 Hrs**

1.1.Fluency: definition, development of fluency, factors influencing fluency

- Definitions of intonation, rhythm, stress -development of intonation, rhythm, stress. Their implications to therapy
- Evaluation of fluency
- Other prosodic features in fluency disorders.

1.2. Stuttering :Definition, etiology, epidemiological findings, Characteristics

1.3 Nature of Stuttering

- Consistency, adjacency and Lee effect
- situational variability
- stuttering and heredity

1.4 Development of stuttering

- Bloodstein's phases,
- Van Riper's tracks,
- Conture's classification
- Guitar's classification

Unit 2 Theories and Assessment of Stuttering**15 Hrs**

2.1 Introduction to theories of stuttering – organic vs. functional Cerebral dominance

- Diagnosogenic theory
- Learning theories
- Demands – capacities model

2.2 Brief overview of recent theoretical advances

- Covert repair hypothesis
- EXPLAN theory
- Neuroscience model: DIVA model
- Communication – Emotional model

2.3 Assessment of stuttering and associated problems Tools for assessment of stuttering
Assessment of stuttering in children Assessment of stuttering in adults

2.4 Differential diagnosis of developmental stuttering from other fluency disorders

Unit 3 Management of Stuttering**15 hrs**

3.1 Counselling

3.2 Therapy for children who stutter: Direct/Indirect approaches Preventive,
Prescriptive and Comprehensive treatment program Use of analogies

- Time out and Response cost
- Lidcombe program,
- Parent – child interaction therapy

3.3 Therapy for adults who stutter: stuttering modification and fluency shaping
approaches and their rationale

- Prolonged speech therapy
- Airflow based therapy techniques
- Shadowing
- Habit rehearsal techniques
- DAF
- Masking
- Camper-down program
- Systematic Desensitization
- Cognitive- behavior therapy for adults who stutter

3.4 Steps/Sequence of therapy

- MIDVAS
- Establishment, transfer and maintenance

- 3.5 Relapse and recovery from stuttering
- 3.6 Measurement of therapy progress & naturalness rating
- 3.7 Group therapy

Unit 4 Other Fluency Disorders

15 Hrs

- 4.3 Cluttering: definition, characteristics, assessment and management
- 4.4 Neurogenic stuttering/SAAND: definition, characteristics, assessment and management
- 4.5 Psychogenic stuttering: definition, characteristics, assessment and management

Practicum

1. Assess the rate of speech in 5 normal adults.
2. Record and analyse the supra segmental features in typically developing children between 2 and 5 years.
3. Record audio visual sample of 5 typically developing children and 5 adults for fluency analysis.
4. Listen/see samples of normal non fluency and stuttering in children and document the differences.
5. Identify the types of dysfluencies in the recorded samples of adults with stuttering.
6. Instruct and demonstrate the following techniques: Airflow, prolongation, easy onset, shadowing techniques.
7. Record 5 speech samples with various delays in auditory feedback and analyse the differences.
8. Administer SPI on 5 typically developing children.
9. Administer SSI on 5 adults with normal fluency.
10. Administer self-rating scale on 10 adults with normal fluency.

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2.4.2 Child Language Disorders

60hrs

Objective: 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: Overview of Theories of Language Acquisition and Neurobiological Correlates of Language Development in Children

15 Hrs

1.1. Overview of theories of language acquisition in children-Traditional and modern approaches in each

- Biological maturation approaches
- Cognitive approaches
- linguistic approaches

- Information processing theories
- Behavior theory
- Pragmatic approaches

1.2. Language acquisition including bilinguals/ multilingual- types (based on age, manner of acquisition, factors affecting language acquisition).

1.3. Role of Psychosocial and environmental factors in language development-Neglect and Abuse, Twins, Low Socioeconomic background

1.4. Neurobiological correlates – neuroanatomical, neurophysiological and neurochemical aspects of language development, Neurobiological underpinnings in child language disorders.

Unit 2. **Language disorders: definition, classification, causes and characteristics 15 Hrs**

2.1. Delayed speech and language development associated with:

- Sensory impairments and language disorders
- Intellectual disability
- Syndromes associated with child language disorders-Down Syndrome, Fragile X Syndrome, William's Syndrome, Klinefelter's Syndrome Autism Spectrum Disorders.
- Mixed receptive and expressive language disorders
- Developmental dysphasia/specific language impairment Acquired dysphasia/ Acquired Childhood Aphasia ADD and ADHD
- Language Learning disability/ Dyslexia
- Other developmental disabilities: deaf blind, Multiple disabilities

Unit 3. **Assessment of Developmental and Acquired Language Disorders in Children 15 Hrs**

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

3.2. 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

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

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

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

3.6. 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

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

3.8. 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

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

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

3.11. Differential diagnosis of language disorders in children

Unit 4 Management of Children with Language Disorders 15 Hrs

4.1. Approaches and techniques for management of language disorders in children – cognitive linguistic, behavioral, play therapy and Augmentative & alternative communication approaches.

4.2. Reinforcement in language therapy, types and schedules of reinforcement

4.3. 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

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

4.5. Communication Approaches to management of children with LD

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

4.7. Use of technology in language intervention

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

4.9. Importance of team approach-Other approaches such as medical/surgical/Physiotherapy/ Occupational therapy

4.10. Benefits, concessions and rights for children with language disorders

Practicum

1. Record mother-child interaction of one typically developing child in the age range of 0-1, 1-2, 2-4, 4-6 and 6-8 years of age. Compare linguistically the outputs from the mother and the child across the age groups. Make inferences on socio cultural influences in these interactions.
2. 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.
3. Discuss the influence of bi- or multilingualism on vocabulary.
4. 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.
5. Administer 3D LAT, ALD, LPT, Com DEALL checklist on 2 typically developing children.
6. Draft a diagnostic report and referral letter for a child with language disorder
7. Demonstrate general language stimulation techniques and discuss the clinical application.
8. Demonstrate specific language stimulation techniques with appropriate materials and discuss its clinical applications.
9. Draft Subjective Objective Assessment Plan (SOAP) for a pre-recorded sample of a 45 minute session of intervention for a child with language disorder.
10. Draft a lesson plan for a child with language disorder.
11. Draft a discharge summary report for a child with language disorder
12. Home plan and counselling for children with language disorders
13. Documentation specific to the disorder: pre-therapy; lesson plan; summary report, referral report

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2.4.3 Diagnostic Audiology: Physiological Tests

60 Hrs

Objective: 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, AEP's and OAE's as per the clinical need
- Make appropriate diagnosis based on the test results and suggest referrals.

Unit 1: Immittance Evaluation

15Hrs

1.1. Introduction: Definition of a physiological test, List of physiological tests in Audiology, overview of their clinical significance

1.2. Principle of immittance evaluation: Concept of impedance and admittance, their components, method to calculate the total impedance/admittance, resonant frequency, concept of acoustic impedance, justification for using admittance in clinical measurements, justification for using 226Hz probe tone Instrumentation

1.3. Tympanometry: definition, measurement procedure, response parameters (tympanometric peak pressure, static admittance, gradient /tympanometric width), their

measurement and normative, classification of tympanogram, clinical significance of tympanometry Esustachian tube functioning tests of tympanometry: overview on pressure equalization function of ET, Valsalva, Toynbee, William's pressure swallow Inflation-deflation test.

1.4. Overview on multicomponent and multi-frequency tympanometry

1.5. Reflexometry: Definition, acoustic reflex pathway, measurement procedure, concept of ipsilateral and contralateral acoustic reflexes, Jerger box pattern, clinical applications of acoustic reflexes, Reflex decay test.

1.6. Overview on wide band reflectance and wide band tympanometry

Unit 2. Auditory Brainstem Response -15Hrs

2.1. Introduction and classification of AEPs

Instrumentation-Principles of AEP recording techniques: Stimulus related, acquisition related: Near vs far field recording, Electrode Impedance, Electrode montage (Dipole orientation, Scalp distribution), Common mode rejection, Pre-amplification, Filtering, Time locked acquisition, Artifact rejection windowing, Averaging.

2.2. Introduction to Auditory brainstem responses (ABR), generators Protocol and procedure of recording auditory brainstem response Factors affecting auditory brainstem responses Analysis of ABR and clinical inferences Clinical applications of ABR

Unit 3. Middle and Long Latency Auditory Evoked Potentials-15 Hrs

3.1. Introduction to middle and late latency auditory potentials

- Generators of MLR, ALLR and other late auditory potentials (P300 and MMN, P600, N400, T-complex, CNV)
- Protocol for recording MLR, ALLR, P300 and MMN
- Analysis of MLR, LLR, P300 and MMN Factors affecting MLR and ALLR
- Interpretation of results and their clinical applications of MLR and cortical auditory evoked potentials

Unit 4. Otoacoustic Emissions and Tests of Vestibular functioning - 15 Hrs

4.1 Introduction to Otoacoustic emissions with a brief note on history

- Origin and classification of OAEs

4.2 Instrumentation Procedure of OAE measurement: SOAE, TEOAEs, and DPOAEs, Interpretation of results: SOAE, TEOAEs, and DPOAEs, Factors affecting OAEs: SOAE, TEOAEs, and DPOAEs, Clinical applications of OAEs: SOAE, TEOAEs, and DPOAEs, Contralateral suppression of OAEs and its clinical implications

4.3 Overview on structure and function of vestibular system

4.4. Overview on other systems involved in balance including VOR and VSR , Signs and Symptoms of vestibular disorders

4.5. Team in the assessment and management of vestibular disorders

4.6. Tests for Assessment

4.7. Electronystagmography and its clinical significance: Measurement procedure and interpretation: tests for peripheral and central vestibular function

4.8. Overview on VNG

4.9. VEMP: c-VEMP and o-VEMP, recording procedure, response interpretation and clinical inferences

Practicum

1. Measure admittance in the calibration cavities of various volumes and note down the observations
2. Calculate Equivalent ear canal volume by measuring static admittance in an uncompensated tympanogram (10 ears)
3. Do tympanogram in the manual mode and measure peak pressure, peak admittance and ear canal volume manually using cursor (10 ears).
4. Measure gradient of the tympanogram (10 ears)
5. Administer Valsalva and Toynbee and William's pressure swallow test(5 ears)
6. Record acoustic reflex thresholds in the ipsi and contra modes, (10 ears)
7. Plot Jerger box pattern for various hypothetical conditions that affect acoustic reflexes and interpret the pattern and the corresponding condition.
8. Carry out Acoustic reflex decay test and quantify the decay manually using cursor (5 individuals).
9. 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.
10. Record ABR using single versus dual channels and, note down the differences
11. 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.
12. 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.

13. Record ASSR for stimuli of different frequencies and estimate the thresholds
14. 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).
15. Record DPOAEs and note down the amplitude, SNR, noise floor and reproducibility at octave and mid-octave frequencies (10 ears)

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2.4.4. Rehabilitative Audiology

60 hrs

Objective: After completion of this course, candidate should be able to:

- List various types of auditory training approaches available for individuals with hearing impairment.
- Explain various types of speech reading tests and speech reading training procedures available.
- Select appropriate management option/s for Tinnitus and Hyperacusis.
- Select appropriate management technique/s for children with special needs. Select appropriate management strategies for older adults with hearing impairment

Unit 1: Auditory Learning

15 Hrs

1.1 Definitions and historical background, Auditory training Vs Auditory learning

1.2 Role of audition in speech and language development in normal children and its application in education of individuals with hearing impairment

1.3 Factors affecting outcome of auditory learning

1.4 Methods of auditory training

1.5 Individual Vs Group auditory training

1.6 Auditory training activities

- For individuals of different listening abilities / levels
- Verbal vs. nonverbal material
- For individuals Vs group activities

1.7 Computer based modules for auditory training

Unit 2: Speech Reading

15 Hrs

2.1 Definitions and Need of speech reading

2.2 Visibility of speech sounds – audiovisual perception vs. visual perception

2.3 Visual perception of speech by individuals with hearing impairment

2.4 Overview of speech reading tests, including Indian tests

- Analytic Vs Synthetic tests
- Adults Vs Children

2.5 Factors influencing speech reading.

2.6 Methods of speech reading training: analytical vs synthetic (including speech tracking)

2.7 Individual and group speech reading training

2.8 Speech reading activities

- For adults and children,
- For individual vs. group activities

Unit 3: Management of Tinnitus and Hyperacusis

15Hrs

3.1 Audiological management of tinnitus

- Overview on Models related to tinnitus management, TRT, Masking, others
- Devices used for management

3.2 Audiological management of hyperacusis

Unit 4 Management of Children with Special Needs and Rehabilitation of Older Adults with Hearing Impairment

15 Hrs

4.1 Management of the deaf-blind child

4.2 Management of other multiple disabilities like hearing loss associated with cognitive problems

4.3 Overview on management of children with central auditory processing problems. Special strategies used for rehabilitation of older adults with hearing impairment. Communication strategies

4.4 Anticipatory strategies

4.5 Repair strategies

Practicum

1. Evaluation of baseline auditory skills
2. Preparation of lesson plans for home training.
3. Carrying out auditory learning activities on clients with various degrees of hearing impairment

4. Use of communication strategies on clients
5. Observe the speech and language characteristics of individuals with hearing impairment
6. Knowledge on evaluating baseline auditory skills, lesson plan, concise report
7. Role play of auditory learning, speech reading, communication strategies
8. Observation of management of APD and Multiple disability
9. Observation of management of Tinnitus and Hyperacusis

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2.4.5 Statistics and Research Methods

60 hrs

Objective: 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

Unit 1 Unit I:Introduction to Research Methods-15Hrs

1.1 Meaning and purpose of research: meaning

1.2 Need for research in audiology and speech-language pathology

1.3 Funds/grants for research

1.4 Steps in research: identification, selection

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

1.6 Hypothesis

1.7 Types of variables; types of sampling procedures (random and non-random);

1.8 Types/ methods of data collection and their advantages and disadvantages

1.9 Reliability and validity (internal and external validity)

Unit 2 Research Design in Audiology and Speech-Language Pathology – 15 Hrs

2.1 Types of research: survey, ex-post facto research, normative research,

- 2.2 standard-group comparison
- 2.3 Experimental and quasi experimental research: group design & single subject design; Between groups vs. repeated measures design
- 2.4 Epidemiologic data sources and measurements
- 2.5 Epidemiologic methods – questionnaire survey, screening, personal survey, testing
- 2.6 Media - their advantages and disadvantages
- 2.7 Incidence and prevalence of hearing, speech, language disorders as per different
- 2.8 census (NSSO, WHO)
- 2.9 Internal and external validity of research
- 2.10 Documentation of research: scientific report writing, different formats or styles (APA, AMA and MLA),
- 2.11 Ethics of research

Unit 3 Introduction to Statistics and Data Collection – 15 Hrs

- 3.1 Application of statistics in the field of Audiology and speech-language pathology.
- 3.2 Scales of measurement: nominal, ordinal, interval, ratio
- 3.3 Classification of data: class intervals, continuous and discrete measurement
- 3.4 Normal distribution: general properties of normal distribution, theory of probability,
- 3.5 area under normal probability curve
- 3.6 Variants from the normal distribution: skewness and kurtosis
- 3.7 Measure of central tendency: mean, median, mode

Unit 4 Statistics and Research Designs- 15 Hrs

- 4.1 Choosing statistics for different research designs
- 4.2 Correlational techniques: Pearson's Product Moment Correlation Coefficient;
- 4.3 Spearman's Rank order correlation coefficient
- 4.4 Statistical inference: concept of standard error and its use; the significance of
- 4.5 statistical measures; testing the significance of difference between two means z-test,
- 4.6 t-test; analysis of variance, post hoc tests,
- 4.7 Non-parametric tests: Chi-square test, Wilcoxon test, Mann-Whitney U test,
- 4.8 Reliability and validity of test scores: reliability and validity, Item analysis

4.9 Analysis of qualitative data

4.10 Software for statistical analysis

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2.4.6 Clinical Practicum - Speech-Language Pathology

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:

1. Speech & language stimulation techniques.
2. Different samples /procedures required to analyse voice production mechanism (acoustic/ aerodynamic methods / visual examination of larynx/ self evaluation)
3. Different samples /procedures required to analyse speech production mechanism in children with motor speech disorders.

Know-how:

1. To administer at least two more (in addition to earlier semester) standard tests for childhood language disorders.
2. To administer at least two more (in addition to earlier semester) standard tests of articulation/ speech sounds.
3. To set goals for therapy (including AAC) based on assessment/test results for children with language and speech sound disorders.
4. To record a voice sample for acoustic and perceptual analysis.
5. To assess parameters of voice and breathing for speech.
6. Assessment protocol for children with motor speech disorders including reflex profile and swallow skills.
7. Counselling for children with speech-language disorders.

Show:

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

Do:

1. Case history - minimum of 2 individuals with voice disorders.
2. Case history - minimum of 2 children with motor speech disorders
3. Oral peripheral examination- minimum of 5 children
4. 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.
5. Exit interview and counselling - minimum of 2 individuals with speech language disorders.

2.4.7 Clinical Practicum- Audiology

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:

1. Indications to administer special tests
2. Procedures to assess the listening needs
3. National and international standards regarding electroacoustic characteristics of hearing aids

Know-how:

1. To administer at least 1 test for adaptation, recruitment and functional hearing loss.
2. Counsel hearing aid user regarding the use and maintenance hearing aids
3. To troubleshoot common problems with the hearing aid
4. To select test battery for detection of central auditory processing disorders.
5. Select different types of ear moulds depending on type of hearing aid, client, degree, type and configuration of hearing loss

Show:

1. Electroacoustic measurement as per BIS standard on at least 2 hearing aids
2. How to process 2 hard and 2 soft moulds
3. How to preselect hearing aid depending on listening needs and audiological findings on at least 5 clinical situations (case files)
4. How select test battery depending on case history and basic audiological information-3 situations

Do:

1. Tone decay test – 2 individuals with sensori-neural hearing loss
2. Strenger test – 2 individuals with unilateral/asymmetrical hearing loss
3. Dichotic CV/digit, Gap detection test – 2 individuals with learning difficulty or problem in hearing in noise
4. Hearing aid fitment for at least 5 individuals with mild to moderate and 3 individuals with mod-severe to profound
5. Hearing aid selection with real ear measurement system on 3 individuals with hearing impairment

SEMESTER V

3.5.1. Motor Speech Disorders in Children 60 hrs

Objective 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 Introduction to Neuromotor Organization and Sensorimotor Control of Speech and Motor Speech Disorders-15 Hrs

- 1.1 Central and peripheral nervous system in speech motor control (motor control by cortical, subcortical structures, centrifugal pathways, brainstem, cerebellum and spinal cord)
- 1.2 Neuromuscular organization and control and sensorimotor integration
- 1.3 Introduction to motor speech disorders in children
 - Motor speech disorders leading to developmental dysarthria
 - Cerebral palsy - definition, causes, associated problems, and classification
 - Syndromes leading to dysarthria (Juvenile progressive bulbar palsy, Congenital supranuclear palsy, Guillain-Barre syndrome, Worster-drought syndrome, Duchenne Muscular dystrophy)
 - Motor speech disorders leading to developmental apraxia of speech-definition, causes, associated problems, and classification

Unit 2 Nature of Motor speech Disorders in Children-15 Hrs

- 2.1 Neuromuscular development in normals and cerebral palsy
- 2.2. Reflex profile
- 2.3. Different types of cerebral palsy
 - Disorders of muscle tone – spasticity, rigidity, flaccidity, atonia
 - Disorders of movement – hyperkinesias and dyskinesia – Ballismus, tremor, tic disorder, myoclonus, athetosis, chorea, dystonia, hypokinesias.
 - Disorders of coordination – Ataxia
- 2.4. Speech and language problems in cerebral palsy

2.5. Different types of apraxia- verbal and nonverbal apraxia

2.6. Speech and language characteristics in developmental apraxia

Unit 3 Assessment of Motor Speech Disorders in Children-15 Hrs

3.1 Assessment of speech (acoustic, respiratory, resonatory, prosodic aspects)

3.2 Assessment of oromotor aspects and feeding

3.3 Assessment of speech in developmental apraxia

3.4 Differential diagnosis of motor speech disorders with other developmental speech disorder

Unit 4 Management of Motor Speech Disorders in Children-15Hrs

4.1 Team approach to rehabilitation and General principles of motor learning

4.2 Speech and oromotor rehabilitation in cerebral palsy

- Approaches to intervention-Behavioural (vegetative exercises, Oral sensorimotor facilitation techniques, compensatory and Facilitatory techniques for the correction of respiratory, phonatory, resonatory& articulatory errors) and prosthetic

4.3 Feeding intervention in cerebral Palsy

4.4 Motor approaches: Different approaches in neuromuscular education (such as Bobath, Temple Fay, Phelps)

4.5 Medical management of cerebral palsy (pharmacological and neurosurgical)

4.6 Management of developmental apraxia of speech: specific speech therapy techniques, other approaches

4.7 Augmentative and alternative communication (AAC)- Application of

AAC methods in children with motor speech disorders in the Indian context, available AAC options (systems and devices), symbol selection (access methods), assessment for AAC candidacy, AAC intervention (team approach in the advocacy of AAC, instructional strategies)

Practicum

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

2. Perform oro-motor examination in five children and adults and compare
3. Identify oro-motor reflexes (rooting, suckling, & phase bite) in 5 infants.
4. Demonstrate normal posture and breathing patterns required for varied speech tasks.
5. Alter the postures and breathing patterns and notice changes in speech patterns.
6. Assess DDK rate in five typically developing children.
7. Rate intelligibility of speech in five typically developing children. Discuss factors that influenced speech intelligibility and their ratings.
8. 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.
9. Perform oro-motor exercises – isotonic and isometric. Discuss strategies to modify exercises for children.
10. 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
11. 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.

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3.5.2. Maxillofacial Anomalies and Laryngectomy 60 hrs

Objective 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. Introduction to Cleft Lip and Palate and Associated Problems-15 Hrs

- 3.1 Embryology – development of the palate
- 3.2 Causes – genetic, environmental and other causes
- 3.3 Types of cleft lip and palate and classification of cleft lip and palate
- 3.4 Communication disorders : language and hearing
 - Feeding, psychological, and dental problems
 - Syndromes associated with cleft lip and palate

UNIT 2. Velopharyngeal Dysfunction and Assessment-15 Hrs

- 2.1 Velopharyngeal closure mechanism: Normal Physiology and types of different velopharyngeal closure
- 2.2 Velopharyngeal Dysfunction (VPD)
 - Definition, causes and classification
 - Effect of VPD on speech
 - Assessment of VPD: Subjective and objective methods

UNIT 3. Assessment and Management of CLP-15 Hrs

- 3.1 Assessment of cleft lip/palate : Cleft palate Perceptual protocols
- 3.2 .Management of cleft lip and palate – surgery, speech therapy, prosthesis.
- 3.3 Speech and language therapy for CLP: early intervention, therapy techniques to improve language, speech therapy techniques to reduce compensatory articulation, speech therapy methods to improve resonance and speech intelligibility

UNIT 4. Types of Oral and Laryngeal Cancer and Management-15 Hrs

- 4.1 Definition, Causes and symptoms of laryngeal cancers
- 4.2 Total laryngectomy – definition, characteristics, associated problems
- 4.3 Types of glossectomy and mandibulectomy
- 4.4 Assessment of patients with laryngectomy, glossectomy, mandibulectomy
- 4.5 Pre and post-operative counselling

- 4.6 Esophageal speech – anatomy, candidacy, different types of air intake procedure, speech characteristics in esophageal speech
- 4.7 Tracheo esophageal speech – anatomy, candidacy, different types of TEP, fitting of prosthesis, speech characteristics, complications in TEP
- 4.8 Artificial larynx – different types, selection of artificial larynx, ultra-speech, speech characteristics
- 4.9 Gastric pull up – issues and management
- 4.10 Glossectomy, mandibulectomy –management

Practicum

1. Identify the different types of cleft lip and palate by looking at illustrations and images
2. 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.
3. 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.
4. Perform oral peripheral mechanism examination on 10 individuals and document the structure and functions of the articulators.
5. Analyse the different types of occlusion in 10 individuals.
6. Identify the type of glossectomy by looking at pictures/illustrations.
7. Identify the different types of prosthesis in the management of head and neck cancer.
8. Analyse the speech profile of 5 individuals with laryngectomy.
9. Identify parts of an artificial larynx and explore its use.
10. Prepare a checklist / pamphlet illustrating care of the stoma and T- tubes in vernacular.

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3.5.3 Amplification Devices 60 hrs

Objective After completion of this course the students should be able to

- Identify different types of hearing aids and explain their components
- Carry out Electro-acoustic measurement and categorize the hearing aids accordingly
- Describe different signal processing strategies and their relevance in different listening conditions
- Cross check whether the hearing aids meet the standards

UNIT 1 Basics and Classifications of Hearing Aids-15 Hrs

- 1.1 Historical development of hearing aids- Mechanical, Analogue, Digital Hearing aid
- 1.2 Basic components of hearing aids –microphones, amplifier, receiver/vibrator, cords, volume control, telecoil, and batteries.
- 1.3 Body level, ear level hearing aids (BTE, ITE, ITC, CIC, IIC, RIC, RITE)
- 1.4 Analogue, Programmable and Digital Hearing aid
- 1.5 Binaural, pseudobinaural, monoaural
- 1.6 Master hearing aids
- 1.7 Modular hearing aids
- 1.8 Group Amplification - hard wire, induction loop, FM, infrared

UNIT 2 Signal Processing in Hearing Aids-15 Hrs

- 2.1 Artificial Intelligence in Hearing aids
- 2.2 Signal processing in hearing aids - BILL, TILL PILL

2.3 Signalenhancing technology- Digital Noise reduction, Directionality of Microphones, Speech cue enhancement

UNIT 3 Compression in Hearing Aids and other Signal Processing - 15 Hrs

- 3.1 Outputlimiting: peak clipping, compression (Input/output compression, compression ratio, compression knee point, WDRC, Compression limiting, high level compression, low level compression), Expansion Hearing Aid
- 3.2 Extended low frequency amplification, frequency lowering techniques
- 3.3 Routing of signals, head shadow/baffle/ diffraction effects

UNIT 4 Electroacoustic Measurement of Hearing aids - 15 Hrs

- 4.1 Electro-acousticmeasurements for hearing aids Purpose, parameters, instrumentation, procedure (analogue and digital), variables affecting EAM
- 4.2 Standards on Electro-acoustic measurements of Hearing aids (BIS, IEC and ANSI standards).
- 4.3 Environmental tests for Hearing aids

Practicum

- 1 Listen to the output of different types and classes of hearing aids (monaural, binaural, analog, digital hearing aids), in different settings
- 2 Troubleshoot hearing aids: Check the continuity of the receiver cord using multimeter, measure the voltage of different sized batteries using multi meter, Check voltage of batteries different types and sizes
- 3 Carry out electroacoustic measurements for the body level and ear level hearing aids
- 4 Program the hearing aid for different configuration and degrees of hearing loss (at least 5 different audiograms) using different rescriptive formulae Program the hearing aid for different listening situations (at least 3 different situations)
- 5 Vary the compression settings in a digital hearing aid and note down the differences in the output
- 6 Perform real ear insertion measurements using different hearing aids (body level and ear level, hearing aids of different gains)
- 7 Compare speech perception through conventional BTE and RIC hearing aids using a rating scale
- 8 Observe assistive listening devices such as telephone amplifier, vibro-tactile alarms, note down the candidacy and their utility.

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3.5.4 Pediatric Audiology

60hrs

Objective 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 pediatric behavioral and physiological/electrophysiological evaluation

UNIT 1 Development of Human Auditory System-15 Hrs

- 1.1 Introduction to paediatric audiology and basic terminologies.
- 1.2 Embryological development of the human auditory and vestibular systems, and the relevance of this information with special reference to syndromes
- 1.3 Maturation of the auditory nervous system and its relevance in paediatric hearing
- 1.4 Development of auditory behaviour – prenatal hearing, newborn hearing, auditory development (minimum response level, localization, perception of speech, need for multiple cues).

UNIT 2 Early Identification of Hearing Loss and Hearing Screening-15 Hrs

- 2.1 Need for early identification with special reference to conductive and sensorineural hearing loss, mild hearing losses, sloping hearing losses, fluctuating hearing losses and unilateral hearing loss
- 2.2 Recommendations of the Joint committee on infant screening- various position statements showing its evolution
- 2.3 High risk registers and its utility in early identification.
 - Commonly used high risk registers
 - Sensitivity and specificity
 - Relevance in Indian scenario
- 2.4 Universal newborn hearing screening- concept, history, present scenario and hurdles
- 2.5 Behavioral screening tests (awakening test, bottle feeding test, behavioral observation audiometry)- stimuli, procedures, recording of response, interpretation of results.
- 2.6 Objective screening tests (e.g., Crib-OGram, auditory cradle, accelerometer recording system, reflex inhibition audiometry, immittance, reflectometry, wide-band reflectance, OAE, evoked potentials)
- 2.7 School screening
 - Screening for hearing sensitivity- behavioral and objective tests
 - Screening for (C)APD- Need, tests used (checklists & behavioral screening tests)

UNIT 3 Diagnostic Evaluations- Behavioural Tests-15 hrs

- 3.1 Behaviour observation audiometry
- 3.2 Conditioning techniques:

-Visual reinforcement audiometry and its modifications including

CORA

- PIWI and peep show audiometry
- TROCA
- Play audiometry
- 3.3 Modifications required for multiple disabilities
- 3.4 Speech audiometry
 - Modifications required while carrying out speech audiometry in children
 - Speech detection threshold
 - Speech recognition threshold
 - Speech recognition scores – PBK, WIPI, NU Chip, Early speech perception test, Ling’s six sound tests, auditory number test, tests available in Indian languages
- 3.5 Functional hearing loss- signs & symptoms and tests used
- 3.6 Balance assessment: need, causes, behavioral tests

UNIT 4 Diagnostic Evaluations- Objective tests-15 hrs

- 4.1 Immittance evaluation- including high frequency probe-tone tympanometry, reflexometry, wide-band reflectance
- 4.2 OAEs (TEAOAE & DPOAE)
- 4.3 Evoked potentials (ABR, ASSR & ALLR)
- 4.4 Objective tests for vestibular assessment (cVEMP, oVEMP, vHIT, Calorics & tests for central vestibular assessment)

Practicum

1. Observe a child with normal hearing (0-2 years) in natural settings. Write a report on his/her responses to sound.
2. 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
3. Administer HRR on at least 3 newborns and interpret responses
4. Based on the case history, reflect on the possible etiology, type and degree of hearing loss the child may have.
5. Compare ABR wave forms in children of varying ages from birth to 24 months.
6. 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.
7. Observe OAE in a child with normal hearing and a child with hearing loss. Write a report on the instrumentation, protocol used and interpretation

8. 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
9. 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
10. 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

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3.5.5. Speech-Language Pathology and Audiology in Practice

60 Hrs

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

- List and describe the highlights of legislations relating to speech and hearing disabilities
- Incorporate ethical practices in professional activities.

- Provide information on the facilities available for the speech and hearing disabled including welfare measures and policies of government.
- Describe different strategies to create awareness of speech and hearing impairment and facilities available to take care of them.
- Familiarizing different clinical setups for the rehabilitation of speech and hearing disorders, with reference to their requirement, protocols and role and responsibility of the professionals.
- Familiarizing terminology, technology and methods used in public education, clinical practice including tele-practice and camps
- And their application in speech and hearing service delivery.

Unit 1 Introduction to the Speech –Language Pathology and Audiology in Practice- 15 Hrs

- 1.1 Epidemiology of speech and hearing disorders
- 1.2 Need for rehabilitation and steps involved in rehabilitation.
- 1.3 ICD and ICF
- 1.4 Levels of prevention: Primary, secondary and tertiary
- 1.5 National programs and efforts by the professionals including India in the process of rehabilitation.
- 1.6 Organizing camps, screening (need, purpose, planning, organizing and conducting including providing remedial measures to the needy)
- 1.7 Public education and information (media, radio broadcasts, street plays)
- 1.8 Functions of speech & hearing centers in different set-ups
- 1.9 Private practice, evidence based practice
- 1.10 Government organizations, NGOs
- 1.11 Role of itinerant speech therapist, anganwadis, resource teachers etc.
- 1.12 Community based rehabilitation and other methods of integration of the disabled in the society.

Unit 2 Public Laws Related to Disability-15 Hrs

- 2.1 Scope of practice in speech and hearing (National & International bodies)
- 2.2 Professional ethics
- 2.3 Rehabilitation Council of India and Disability related acts in India
- 2.4 Consumer protection Act and other public laws.
- 2.5 Disability related Acts pertaining to Education and welfare of persons with disability in International perspective-UNCRPD.
- 2.6 Welfare measures available for persons with speech language and hearing disability
- 2.7 Certification of persons with speech language and hearing disability
- 2.8 Concept of barrier free access and universal design relating to individuals with speech and hearing impairment

Unit 3 **Organization and Administration of Speech-Language and Hearing Centers and Public Education-15 Hrs**

- 3.1 Setting up a speech-language and hearing center
- 3.2 Organization of space, time, personnel and audiometric rooms.
- 3.3 Budgeting and, financial management
- 3.4 Purchase formalities
- 3.5 Recruiting personnel – rules and salary
- 3.6 Leave rules and other benefits for professionals and personnel
- 3.7 Documents and record keeping – different types
- 3.8 Public education methods
- 3.9 Organizing workshops, seminars and conferences.

Unit 4 **Scope and Practice of Tele-Assessment & -Rehabilitation-15 Hrs**

- 4.1 Introduction to tele-health: definition, history of tele-health
- 4.2 Terminologies-tele-health, tele medicine, tele practice
- 4.3 Connectivity: internet, satellite, mobile data
- 4.4 Methods of tele-practice-store and forward and real time
- 4.5 Ethics and Regulations for tele practice
- 4.6 Requirements/Technology for tele- practice: Web based platforms, Video conferencing, infrastructure
- 4.7 Manpower at remote end and speech-language pathologist/audiologist end, training assistants for tele-practice
- 4.8 Audiological screening using tele-technology: new born hearing screening, school screening, community screening, counselling.
- 4.9 Diagnostic services using tele-technology: video otoscopy, pure tone audiometry, speech audiometry, oto acoustic emission, tympanometry, auditory brainstem response.

Practicum

1. Attend camps, seminars, workshops, conferences, school screening, community based screening.
2. Undertake the activities such as _ Dangerous decibell program (www.dangerousdecibels.org)
3. Visit an speech pathologist/audiologist in different practice settings and provide a report
4. Administer ICF protocols for patients with different disorders
5. Explore websites of various institutions, hearing aid companies, NGOs working with disabled and describe the accessibility features and information provided
6. Develop one pamphlet/poster/ in local language that would address some aspect of speech and hearing practice.
7. Perform accessibility ability of your institute/center and prepare a report.

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3.5.6 Clinicals in Speech Language Pathology

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:

1. Procedures to assess speech fluency and its parameters using standardized tests for children and adults.
2. Differential diagnosis of motor speech disorders in children.
3. Procedures to assess individuals with cleft lip and palate, and other oro-facial structural abnormalities.
4. Procedures to assess laryngectomy and provide management options.

Know-how:

1. To administer at least two more (in addition to earlier semesters) standard tests for childhood language disorders.
2. To record a speech sample for analysis of fluency skills (including blocks & its frequency, rate of speech, prosody, etc.).
3. To assess posture and breathing for speech in children with motor speech disorders.
4. To consult with inter-disciplinary medical/rehabilitation team and counsel the individual/family regarding management options and prognosis.

Show:

1. Rating of cleft, speech intelligibility and nasality – minimum of 2 individuals with cleft lip and palate.
2. Language assessment - minimum of 2 individuals with cleft lip and palate.
3. Transcription of speech sample and assessment of percentage dis/dysfluency–minimum of 2 individuals with stuttering.
4. Assessment of rate of speech on various speech tasks – at least on 2 children & adults.

Do:

1. Voice assessment report - minimum of 2 individuals with voice disorders.
2. Fluency assessment report - minimum of 2 individuals with fluency disorders.
3. Oral peripheral examination on minimum of 2 individuals with cleft lip and palate.
4. 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.

3.5.7 Clinicals in Audiology**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:

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

Know-how:

1. To administer auditory brainstem responses for the purpose of threshold estimation and site of lesion testing
2. To administer high frequency tympanometry and calculate resonance frequency
3. To administer high risk register
4. To modify the given environment to suit the needs of hearing impairment

Show:

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

Do:

1. Threshold estimation on 5 infants (< 2 years)
2. TEOAE and DPOAE on 5 infants (<2 years)
3. BOA on 5 infants (<2 years)

4. VRA on 2 infants (6 month – 3 year)
5. Conditioned play audiometry – 3 children (3-6 years)
6. Hearing aid fitment on 1 infant (< 3 years) 2 children (3-6 years)
7. Listening age of 3 children with hearing impairment
8. Appropriate auditory training on 5 children with hearing loss

SEMESTER VI

3.6.1 Motor Speech Disorders in Adults and Dysphagia 60 Hrs

Objective: 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 Introduction to Motor Speech Disorders in Adults -15 Hrs

1.1 Dysarthria in adults:

- . Definition and different classification systems of dysarthria in adults
- . Types of dysarthria in adults and their neurological bases
- . Nonspeech and speech characteristics in different types of dysarthria
- . Acoustic and physiological findings in different types of dysarthria

1.2 Apraxia of speech in adults (AOS):

- . Definition of verbal and nonverbal apraxia of speech
- . Different types of apraxia in adults and their neurological bases
- . Nonspeech and speech characteristics of AOS
- . Acoustic and physiologic findings in AOS

1.3 Physiology of normal swallow and its characteristics in different neurological conditions such as ALS, Parkinsons disease, Huntintons disease, multiple sclerosis, apraxia

Unit 2 Etiologies of Dysarthria and Apraxia of Speech-15 Hrs

2.1 Common causes leading to any of the dysarthria and apraxia: Traumatic brain injury (TBI), Cerebrovascular accident (CVA), Infections as meningitis, encephalitis, and HIV, Neoplasms, Toxic agents.

2.2 Common neurogenic conditions leading to dysarthria

- Flacid dysarthria: Muscular dystrophy, polymyositis, myasthenia gravis, Poliomyelitis, polyeuritis (Guillian-Barre syndrome)
- Ataxic dysarthria: Ataxic telangiectasia, Von-Hippel Lindau disease, Freidrich's ataxia
- Hypokinetic dysarthria: Parkinson's disease
- Hyperkinetic dysarthria: Tardive dyskinesia, Huntington's and Syndenham's chorea, Meige syndrome, Tourett's syndrome.
- Mixed dysarthria: Motor neurone disease [Amyotrophic lateral sclerosis (ALS), Primary lateral sclerosis (PLS), Multiple sclerosis, Progressive bulbar and pseudobulbar palsy], Corticobasal Degeneration (CBD), Wilson's disease, Neurosyphillis.

Unit 3 Assessment of Dysarthria and Apraxia of Speech-15 Hrs

3.1 Assessment of dysarthria

- Perceptual analysis- examination of the speech systems during speech and nonspeech (oromotor and orosensory) activities, standard tests and methods, speech intelligibility assessment scales.
- Instrumental analysis-
 - Aerodynamics
 - Electromyographic
 - Kinematic
 - Acoustic

3.2 Advantages and disadvantages of instrumental and perceptual analysis of speech.

3.3 Assessment of apraxia of speech-standard tests and scales, subjective methods and protocols

3.4 Differential diagnosis of dysarthria from functional articulation disorders,

apraxia of speech, aphasia and allied disorders

3.5 Evaluation of swallowing disorders (Dysphagia)- An overview to subjective and objective methods.

Unit 4 Management of Dysarthria and Apraxia of Speech-15 Hrs

4.1 Management of dysarthria

- General intervention principals
- Behavioural approaches (vegetative exercises, oral sensorimotor facilitation techniques, compensatory and facilitatory techniques for the correction of respiratory, phonatory, resonatory, articulatory and prosodic errors)
- Prosthetic and medical (surgical and pharmacological approaches)

4.2 Management of apraxia of speech-principles of motor learning, different behavioural management approaches including articulatory kinematic approaches, rate and / or rhythm approaches.

4.3 Application of Augmentative and Alternative Communication (AAC) systems for adult dysarthric and apraxic individuals- assessment for AAC candidacy, choosing an appropriate system and technique, training communication partners, generalization of learning and effective use of AAC in adult dysarthrics and apraxics.

4.3 Management of swallowing disorders (Dysphagia)- An overview to rehabilitative and compensatory approaches.

Practicum

1. Identify the cranial nerves and mention its origin and insertion from a picture/ model.
2. Demonstrate methods to assess the cranial nerves.
3. Assess the respiratory system using speech and non-speech tasks in 10 healthy adults.
4. Assess the phonatory system using subjective and acoustic analysis in 10 healthy adults.

5. Looking at a video identify the clinical signs and symptoms of different neurological conditions resulting in Dysarthria.
6. Record the speech sample of 5 normal adults and compare with the audio sample of individuals with Dysarthria.
7. Administer Duffy's intelligibility rating scale on 5 healthy adults.
8. Administer Frenchay's Dysarthria Assessment on 5 healthy adults.
9. Demonstrate activities to improve the functions of speech subsystem.
10. Identify the signs of UMN and LMN based on a video.
11. Prepare a low tech AAC for functional communication for an individual with apraxia.

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3.6.2. Language Disorders in Adults**60 Hrs**

- Objective 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 **Neurosciences of Adult Language Disorders & Aphasiology-15 Hrs**
- 1.1 Neuroanatomical, neurophysiological and neurochemical correlates for language function
 - 1.2 Neurolinguistic models and language processes – connectionists, hierarchical, global, process and computational models
 - 1.3 Historical aspects of aphasia
 - 1.4 Definitions, causes, classifications (cortical and subcortical aphasias), approaches to classification systems, types of aphasia-speech, language, behavioral and cognitive characteristics of varieties of aphasia
- Unit 2 **Non-Aphasic Language Disorders/ Cognitive Communication Disorders in Adults-15 Hrs**
- 2.1 A brief overview of Speech, language and cognitive characteristics in
 - TBI (Traumatic Brain Injury)
 - RHD (Right Hemisphere Damage)
 - Dementia
 - PPA (Primary Progressive Aphasia)
 - Schizophrenia
 - Metabolic disorders
 - Alcohol induced disorders
- Unit 3 **Assessment of Aphasia and Other Cognitive Communication Disorders -15 Hrs**
- 3.1 Assessment of cognitive-linguistic behavior of adults with aphasia – Screening, Diagnostic and performance assessment tools (Scoring, interpretation and rationale) –BST, WAB, RTT, BAT, LPT, CLAP, CLQT
 - 3.2 Assessment of speech, language, linguistic and cognitive behavior of adults with Non-aphasic language disorders/ Cognitive communication disorders–
MMSE, ABCD, CLAP, CLQT, MIRBI
 - 3.3 Reflections on approaches to assessment in bi/multilingual situation
 - 3.4 Theories of spontaneous recovery and prognostic indicators of aphasia and other cognitive-communication disorders
- Unit 4 **Intervention Strategies for Aphasia and Cognitive-Communication Disorders -15 Hrs**
- 4.1 Principles of language intervention

- 4.2 Speech-Language Management Approaches- Deblocking, VCIU, LOT, MAAT, PACE, Stimulation Facilitation Approach, RET, VAT, Semantic Feature Analysis, TAP, TUF
- 4.3 Team approach in rehabilitation of adult language disorders
- 4.4 Counseling and home management for aphasia and other cognitive-communication disorders
- 4.5 Rights of persons with aphasia

Practicum

1. Identify different lobes of in the brain by looking at a model/ image and label the language areas.
2. Administer a standardized test battery on 3 normal individuals to assess language and cognition.
3. Administer bilingual aphasia test on 3 healthy normal adults.
4. List the language characteristics in different types of aphasia from a video.
5. Analyse the speech, linguistic and non-linguistic features seen in Right hemisphere damaged individual from a video.
6. In a given brain model mark the subcortical structures involved in language processing/ production.
7. Demonstrate various facilitatory and compensatory therapy techniques in the management of aphasia.
8. Formulate activities to assess linguistic abilities in dementia and aphasia.
9. Counsel by a role play for a given profile of an individual with adult language disorder.
10. Prepare a counselling checklist /guideline that can be used with the family members of an individual with aphasia and traumatic brain injury.

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3.6.3 Environmental Audiology

60 Hrs

Objective After studying the paper the students are expected to realize the following:

- Explain the effects of noise on various systems in the body, with special reference to auditory system
- Select appropriate test/s and assess the effects of occupational noise.
- Independently assess various kinds of noise in the environment and its possible effects.
- Identify people at-risk of developing occupational hearing loss and plan effective hearing conservation program.
- Assess eligibility for compensation in individuals with NIHL.

Unit 1 Overview, Types and Effects of Environmental Noise-15 Hrs

- 1.1 Definition of noise, sources –community, industrial, music, traffic and others, types – steady and non-steady
- 1.2 Effects of noise:
 Auditory effects of noise exposure: Historical aspects, TTS, factors affecting TTS, recovery patterns, PTS, Histopathological changes, Effect on communication, SIL, AI, Noy, PNdB, PNL, EPNL, NC curves, NRR, SNR. Effects on central auditory processing.
 Non-auditory effects of noise exposure: Physiological/somatic including vestibular effects, Psychological responses, stress and health, sleep, audio-analgesia effects on CNS and other senses, effects on work efficiency and performance.

Unit 2 Audiological Evaluation of Individuals Exposed to Occupational Noise-15 Hrs

- 2.1 Case history
- 2.2 Audiometry in NIHL
- Pure tone audiometry
 - Hearing screening
 - Baseline and periodic monitoring tests, brief tone audiometry, correction for presbycusis
 - Testing environment
 - Extended high frequency audiometry
 - Speech audiometry
 - Speech perception tests in quiet and in presence of noise
- 2.3 Other audiological evaluations: immittance evaluation, AEP, OAE, Tests for susceptibility.

Unit 3 Noise and Vibration Measurements-15 Hrs

- 3.1 Instrumentation
- 3.2 Procedure for indoor and outdoor measurement of ambient noise, noise survey, traffic noise, aircraft noise, community noise and industrial noise
- 3.3 Factors affecting noise and vibration measurement, Reporting noise measurement including noise mapping.
- 3.4 DRC – definition, historical aspects, use of TTS and PTS, information in establishing DRC
- 3.5 CHABA, AFR 160-3, AAOO, damage risk contours, Walsh-Healey Act, OSHA, EPA, Indian noise standards for fire crackers
- 3.6 Claims for hearing loss: Fletcher point-eight formula, AMA method, AAOO formula, California variation in laws, factors in claim evaluation, variations in laws and regulations, date of injury, evaluation of hearing loss, number of tests
- 3.7 Indian acts/regulations.

Unit 4 Hearing Conservation-15 Hrs

- 4.1. Need for hearing conservation program
- 4.2. Steps in hearing conservation program
- 4.3. Noise control: Engineering and administrative controls

4.4. Hearing protective device (HPDs)

- Types: ear plugs, ear muffs, helmets, special hearing protectors, merits and demerits of each type
- Properties of HPDs: attenuation, comfort, durability, stability, temperature, tolerance
- Outcome measures and evaluation of attenuation characteristics of HPDs

4.5 Noise conditioning/ Toughening

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3.6.4 Implantable Hearing Devices and Hearing Aid Fitting

60Hrs

Objective After studying the paper the students are expected to realize the following:

- Select hearing aids based on pre selection factors and appropriate tests
- Select different assistive listening devices.
- Take ear impression and prepare the ear mould.
- Decide candidacy and select appropriate implantable device
- Trouble shoot hearing aids and counsel.

Unit 1 **Hearing Aid Selection and Fitting-15 Hrs**

1.1 Pre-selection factors

1.2 Selection and programming of linear and non-linear digital hearing aids using prescriptive and comparative procedures

1.3 Verification using functional gain and insertion gain methods

1.4 Use of impedance, OAEs and AEPs

Unit 2 **Hearing Aid Fitting in Different Population, Assistive Listening Devices and Outcome Measures-15 Hrs**

- 2.1 Hearing aids for conductive hearing loss
- 2.2 Hearing aids for children
- 2.3 Hearing aids for elderly
- 2.4 Outcome measures of Hearing aid benefits
- 2.5 Assistive listening devices – types and selection

Unit 3 **Implantable Hearing Devices -15 Hrs**

- 3.1 Middle ear implants Implantable hearing aids- Types components, Types, components, surgical approaches, risks, complications, candidacy and contraindications
- 3.2 Implantable bone conduction devices
Types, components, surgical approaches, risks, complications, candidacy and contraindications
- 3.3 Cochlear implants
Components, terminology, speech coding strategies, candidacy, contra- indications, advantages and complications, Mapping and issues related to CI.
- 3.4 Overview of Brainstem and Midbrain implants

Unit 4 **Mechano-Acoustic Couplers, Counselling and Troubleshooting-15 Hrs**

- 4.1 Types of ear moulds
- 4.2 Various procedures of making different types of ear moulds
- 4.3 Various modifications of ear moulds and its effect on acoustic characteristics
- 4.4 Counseling on care and Maintenance of ear molds
- 4.5 Counseling on care, maintenance and troubleshooting of hearing aids and implantable devices
- 4.6 Troubleshooting of hearing devices

Practicum

1. Administer a questionnaire to assess hearing aid benefit on 2 persons using hearing aids.
2. Carry out a role play activity of counselling a hearing aid user
3. 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
4. Watch videos of BAHA, middle ear implant, cochlear implant
5. Create hypothetical cases (at least 5 different cases) who are candidates for cochlear implantation. Make protocol for recording an EABR
6. List down the technological differences across different models of cochlear implants from different companies, their cost
7. Observation of mapping
8. Watching of videos on AVT
9. Watch video on cochlear implant surgery

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3.6.6 Clinical Practicum-Speech-Language Pathology

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:

1. Procedures to assess motor speech disorders in adults.
2. Differential diagnosis of motor speech disorders in adults.
3. Procedures to assess individuals with adult language disorders, and other related abnormalities.

Know-how:

1. To administer at least two standard tests for adult language disorders.

2. To administer at least two standard tests/protocols for motor speech disorders in adults.
3. To record a sample for analysis of language and speech skills in adults with neurocommunication disorders.
4. To assess posture, breathing, speech and swallowing in adults with motor speech disorders.
5. To consult with inter-disciplinary medical/rehabilitation team and counsel the individual/family regarding management options and prognosis.

Show:

1. Language assessment - minimum of 2 individuals after stroke.
2. Associated problems in individuals after stroke and its evaluation.
3. Dysphagia assessment – minimum of 2 children & adults.
4. Goals and activities for therapy (including AAC) based on assessment/test results for adults with neuro-communication disorders.

Do:

1. Voice therapy - Minimum of 2 individuals with voice disorders.
2. Fluency therapy - Minimum of 2 individuals with fluency disorders.
3. Bed side evaluation of individuals with neuro-communication disorders – Minimum of 2 individuals.
4. 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.

3.6.7 Clinical Practicum -Audiology

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:

1. National and international standards related to noise exposure.
2. Recommend appropriate treatment options such as speech reading, AVT, combined approaches etc.

Know-how:

1. To carryout noise survey in Industry and community
2. To carryout mapping of cochlear implant in infants and children using both objective and subjective procedures
3. To trouble shoot cochlear implant

Show:

1. Analysis of objective responses like compound action potential, stapedial reflexes on at least 3 samples
2. Comprehensive hearing conservation program for at least 1 situation

Do:

1. AVT on at least 1 child with hearing impairment
2. Trouble shooting and fine tuning of hearing aids on at least 5 geriatric clients
3. At least one activity for different stages involved in auditory training

SEMESTER VII & VIII

4.1 Clinical -Speech Language Pathology

General considerations:

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:

General:

1. Diagnosis and management of speech, language, and swallowing disorders across life span.
2. Report evaluation findings, counsel and make appropriate referrals.
3. Plan and execute intervention and rehabilitation programs for persons with speech language, communication, and swallowing disorders
4. Develop and maintain records related to persons with speech-language, communication, and swallowing disorders
5. Engage in community related services such as camps, awareness programs specifically, and community based rehabilitation activities, in general.
6. Make appropriate referrals and liaise with professionals from related fields.
7. Gain experience in different set ups and be able to establish speech centers in different set-ups
8. Demonstrate that the objectives of the B.ASLP program have been achieved.
9. Advise on the welfare measures available for their clinical clientele and their families.
10. Advise and fit appropriate aids and devices for their clinical population.

4.2 Clinical Practicum- Audiology**General considerations:**

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:

General:

1. Diagnosis and management of hearing disorders across life span.
2. Report evaluation findings, counsel and make appropriate referrals.
3. Plan and execute intervention and rehabilitation programs for persons with hearing

4. Disorders
5. Develop and maintain records related to persons with hearing disorders
6. Engage in community related services such as camps, awareness programs specifically, and community based rehabilitation activities, in general.
7. Make appropriate referrals and liaise with professionals from related fields.
8. Gain experience in different set ups and be able to establish hearing centres in different set-ups
9. Demonstrate that the objectives of the B.ASLP program have been achieved.
10. Advise on the welfare measures available for their clinical clientele and their families.
11. Advise and fit appropriate aids and devices for their clinical population.

**LIST OF JOURNALS FOR REFERENCE IN SUBJECTS RELATED TO
AUDIOLOGY AND SPEECH LANGUAGE PATHOLOG**

1. JASA (Journal of the Acoustical Society of America)
2. Ear and Hearing
3. Trends in Amplification
4. American Journal of Audiology
5. American journal of speech language pathology
6. Language speech and hearing sciences in schools
7. Journal of Speech and Hearing Research
8. Seminars in Hearing
9. Journal of American Academy of Audiology
10. International journal of speech language pathology
11. Journal of voice
12. Journal of communication disorders
13. Journal of child language
14. Journal of Rehabilitation Council of India
15. Journal of Indian Speech and Hearing Association

FOURTH YEAR APPRAISAL FORM

Name of the trainee :
 Posting duration : From20 To20
 Number of days attended / allotted :
 Name of Supervisor :
 Date :
 Hours of work done :
 • Speech Diagnosis :
 • Speech Therapy :
 • Audiological Evaluation :
 • Survey / Field work :

Mention the rating in the box corresponding to each item * (1/2/3/4)		
Proficiency in diagnostic procedures		Rating
1.	Selection of diagnostic tools	
2.	Interpretation of subjective and objective diagnostic data	
3.	Writing skills	
Proficiency in management services		
1.	Goal setting	
2.	Application of theory to practice	
3.	Therapy skills	
4.	Creativity	
5.	Flexibility	
6.	Organisation	
7.	Use of materials	
Personal and Professional qualities		
1.	Punctuality	
2.	Appearance	
3.	Reliability	
4.	Communication skills	
5.	Sincerity	
Any other suggestions/remarks		

***NB: 4: Outstanding, 3: Good, 2: Satisfactory, 1: Unsatisfactory**