

# BACHELOR IN AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY

## SYLLABUS

Norms, Regulations & Course Content

### ***REHABILITATION COUNCIL OF INDIA***

(Statutory Body under the Ministry of Social Justice and Empowerment)

B-22, Qutab Institutional Area , New Delhi – 110 016

e-mail [rehabstd@nde.vsnl.net.in](mailto:rehabstd@nde.vsnl.net.in) ; [rheabstd@ndc.vsnl.net.in](mailto:rheabstd@ndc.vsnl.net.in)

website : [www.rehabcouncil.org](http://www.rehabcouncil.org)

**2005**

# **SYLLABUS FOR BACHELOR IN AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY**

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I. **Nomenclature** : “BACHELOR IN AUDIOLOGY AND SPEECH-LANGUAGE PATHOLOGY”.

II. **Admission Criteria** :

a. **Education** :

Minimum requirement : Candidates who have successfully completed the pre-university examination of any recognised university (in India) or equivalent of 10+2 education in India or abroad.

b. **The subjects at the PUC or equivalent level** :

In combination with Physics and Maths or Physics and Biology with any subject given below :

Mathematics (M)  
Biology (B)  
Chemistry (C)  
Computer Science (CS)

c. **Age:**

Must be between 17-25 years on the last day set for receiving applications.  
The upper age limit is relaxable by two years in case of SC/ST.

III. **Medium of Instruction** :

English

IV. **Duration of the course** :

4 academic years including one year internship.

V. **Course Work** :

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

VI. **Award of Degree:**

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

VII. **Criteria for passing:**

Minimum marks for pass in each paper and practicum will be 40%.  
Aggregate will be 50%.

VIII. **Carryover System:**

Each paper must be successfully completed in 3 successive attempts including the first one. Internship will start only after the candidate has successfully completed all the papers including clinical practicum.

**IX. Attendance:**

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

**MINIMUM INFRASTRUCTURAL FACILITIES**

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

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

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

## 2. CLINICAL FACILITIES

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

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

## 3. LIBRARY FACILITIES

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

**d) Staff :**

(i) Library and Information Officer – One No.

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

(ii) Library Assistants: One

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

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

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

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

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

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

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

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

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

d)	Toys and Books		
e)	Mirrors - size 2' x 3'	4	6
f)	Speech Trainer	1	2
g)	Portable and Digital tape recorders	4	6
h)	Hi-Fi Ampli Deck with speakers and good microphone	1	2
i)	Expirograph/Aerophone	1	1
j)	Computer PC-AT with VGA Color Monitor	1	3
k)	Software for diagnostic/therapeutic use	1	1
l)	EGG	1	1
m)	Stop Watch	2	4
n)	Audio cassettes for training/CDs		
o)	Pitch pipe		
p)	Tongue depressors	3	5

## **FIRST YEAR GRADUATE COURSE**

### **OBJECTIVES**

After the completion of the first year course the student trainee will have

1. Orientation to the field of audiology and speech language pathology and other allied disciplines.
2. Knowledge about the normal aspects of speech, language and hearing.
3. Knowledge about the various disorders of speech, language and hearing.
4. Knowledge of basic anatomy and physiology of speech, language and hearing.
5. Knowledge of basic acoustics and electronics related to the field of ASLP.
6. Knowledge of developmental psychology and psychology of learning.
7. Knowledge of linguistics and practical skills in transcription.
8. Practical skills in obtaining audiograms, independently classifying various audiograms based on nature, degree and contour of audiograms.
9. Practical skills in identifying various aspects of typical (normal) and disordered speech language skills.
10. Practical skills in case history taking and preparing reports and maintaining the practicum records.

## FIRST YEAR GRADUATE COURSE

### COURSE CONTENT

	<b>Paper Title</b>	<b>Hrs./Wk</b>	<b>Total Marks</b>
Speech Pathology:			
B.1.1.1	Introduction to Speech & Language Pathology A. Normal aspects of speech, language and communication. B. Speech and language disorders	4	80 + 20
Audiology :			
B.1.2.1	Introduction to Audiology	4	80 + 20
Allied Subjects :			
B.1.3.1	Basic Human Anatomy and Physiology	4	80 + 20
B.1.3.2	Basic Acoustics and Electronics	4	80 + 20
B.1.3.3	Introduction to Linguistics	4	80 + 20
B.1.3.4	Psychology related to Speech and Hearing	4	80 + 20

### CLINICAL PRACTICUM:

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

**B.1.1.1 INTRODUCTION TO SPEECH AND LANGUAGE PATHOLOGY (75 hrs.)**

**Part A : Normal aspects of speech, language and communication.**

1. History and development of the profession of Speech-Language Pathology. (2 hrs.)
  - Major work activities of SLP
  - Various settings of service delivery.
  - Other professions concerned with communication disorders. (5 hrs.)
2. Human communication. (2 hrs.)
  - Definitions and components.
  - Distinctions and similarities between communication, speech and language.
  - Speech chain
  - Functions of communication, speech and language
  - Modes of communication.
  - Characteristics of good speech. (3 hrs.)
3. The physical mechanism of speech and language production. (3 hrs.)
  - Anatomy and physiology of respiratory system.
  - Respiration for life and speech (5 hrs.)
  - Anatomy and physiology of laryngeal system (3 hrs.)
  - Bases of pitch and loudness change mechanism (5 hrs.)
  - Anatomy and physiology of articulatory system (3 hrs.)
  - Anatomy of the nervous system related to speech and language (1 hr.)
  - Speech as an overlaid function (3 hrs.)
4. Acoustic aspects of speech (3 hrs.)
  - Source filter theory of speech production
  - Harmonics, formants, transients and aperiodic energy
  - Acoustic characteristics of normal voice and prosody (4 hrs.)
5. Interactive bases of human communication.
  - Social bases
  - Cognitive bases
  - Psychological bases

6.	Normal development of communication. (23 hrs.)	
	- Development of communicative intent	(2 hrs.)
	- Development of Voice	(1 hr.)
	- Development of Phonology	(2 hrs.)
	- Development of Semantics	(2 hrs.)
	- Development of Syntax	(3 hrs.)
	- Development of Pragmatics	(2 hr.)
	Prerequisites for language and speech development.	(1 hr.)
	Factors affecting language and speech development.	(2 hr.)
	Theories of language acquisition - Innate Vs Acquired - a brief introduction.	(3 hrs.)
	Models of Speech production.	(2 hrs.)
	Stages of language and speech development.	(3 hrs.)
	Speech and language skills of infants, toddlers, pre-schoolers, school-going children and adolescents.	(1 hr.)

**Part B : Speech and language disorders**

1.	Definitions, causes and characteristics of : (15 hrs.)	
	a) developmental language disorders	(3 hrs.)
	b) articulation disorders	(2 hrs.)
	c) fluency disorders	(2 hrs.)
	d) voice disorders	(2 hrs.)
	e) cerebral palsy	(2 hrs.)
	f) cleft lip and palate	(2 hr.)
	g) aphasia	(1 hr.)
	h) learning disability	(1 hr.)
2.	General Principles of assessment and intervention. (9 hrs.)	
	Definitions and goals of assessment and intervention	(2 hrs.)
	Basic procedures in assessment and intervention (interview, informal and formal procedures). Report writing and counseling – an introduction.	(3 hrs.)
	Informal assessment of pre-requisites for language, oral peripheral mechanism, child directed speech.	(4 hrs.)

## LIST OF BOOKS

### INTRODUCTION TO SPEECH AND LANGUAGE PATHOLOGY

#### Essential :

- 1) Speech Correction: An Introduction to Speech Pathology and Audiology (8<sup>th</sup> Ed.). Van Riper, C and Emerick, L. (1990). New Jersey: Prentice Hall Inc. ISBN 0-13-829573-5.
- 2) Human Communication Disorders: An Introduction (4<sup>th</sup> Ed.). Shames, G.H. Wiig, E.H. & Secord, W.A. (1994) New York: Merrill Publishing Co. ISBN 0-02-409471-4.
- 3) Speech and Hearing Science, Anatomy and Physiology (3<sup>rd</sup> ed.). Zemlin, W.R. (1988) New Jersey: Englewood Cliffs ISBN 0-13-827429-0.
- 4) Survey of Communication Disorders. Palmer, J.M. & Yantis, P.A., (1990). Baltimore: Williams & Wilkins. ISBN - 0-683-06743-5.
- 5) Human Communication & Its Disorders (2<sup>nd</sup> Ed.). Boone, D.R. & Plante, E. (1993). New Jersey: Prentice Hall Inc. ISBN – 0-13-444076-5.

#### Additional:

- 1) Speech, Language and Hearing disorders. Silverman, F. H. (1995). MA : Allyn & Bacon. ISBN 0-13-827445 – 2.
- 2) Basic Anatomy and Physiology in Speech and Hearing Schneiderman, C.R. (1984) California: College Hill Press ISBN-0-7099-3328-2.
- 3) Minifie, F.D., Hixon, T.J. & Williams, F. (1973). Normal Aspects of Speech, Hearing and Language. New Jersey: Prentice Hall Inc.
- 4) Skinner, P.H. & Shelton, R.L. (1978). Speech, Language & Hearing – Normal Processes and Disorders. (2<sup>nd</sup> Ed.). New York: John Wiley and Sons.
- 5) Fry, D.B. (1979). The Physics of Speech. NJ: Cambridge University Press.
- 6) Denes, P.B. and Pinson, E.N. (1963). The Speech Chain. USA: Bell Telephone Laboratories.

<b>B 1.2.1</b>	<b>: <u>INTRODUCTION TO AUDIOLOGY</u></b>	<b>(75 hrs.)</b>
1.	Audiology - Historical Aspects	(1 hr.)
2.	Anatomy and Physiology of the external ear, middle and inner ear - explanation of the threshold of hearing based on the anatomy of the ear - auditory pathway and central hearing mechanism - cochlear microphonics: action potential.	(15 hrs.)
3.	dB concept: power and pressure formulae: zero dB reference for pressure and power: calculation of actual SPL, reference and dB values with any two given values, calculation of overall dB when two signals are superimposed.	(5 hrs.)
4.	Phons and Sones: relation between phons and sones; use of phone and sonograph; computation of relative loudness of two given sounds using these graphs.	(2 hrs.)
5.	Frequency and intensity; their psychological correlates: DL for frequency and Intensity.	(2 hrs.)
6.	Role of hearing - binaural hearing - Head Shadow Effect, Pinna Shadow effect, special role in visual impaired - curve for threshold of hearing MAP and MAF.	(2 hrs.)
7.	Causes for aural deficiency. Hereditary deafness congenital deafness, acquired hearing loss in children and adults - causes of central auditory disorders.	(5 hrs.)
8.	Tuning fork tests - Rinne - Schwabach, Weber, Bing interpretation and duration to be observed, audiometric version of weber and Bing tests.	(3 hrs.)
9.	Puretone audiometry, Historical developments. Parts of an audiometer/ASA, ISO and ANSI, ISI norms - methods of obtaining puretone thresholds through air and bone conduction. Noise levels permissible in audiometric rooms - factors that affect a/c and b/c thresholds.	(15 hrs.)

- 10) Masking - Definition, types of masking, ipsi-lateral, contralateral, transcranial, remote and central, Masking of pure tones by pure tone. White noise and narrow band noise. Critical band concept. Effective masking level sound spectrum level. Application of masking in clinical audiometry, Clinical masking of the non-test ear need for, Criteria for masking during AC and BC testing. Cross hearing and I.A. How much to mask, Concepts of minimum necessary masking, factors determining the amount of masking noise. Occlusion effect, air bone gap in the masked ear. Masking dilemma in bilateral symmetrical conductive hearing loss cases. Other applications, Langenback's masking audiometry implications for theories of hearing aid use. (20 hrs.)
- 11) Orientation to: (5 hrs.)
- Speech Audiometry
  - Calibration of Audiometers: Demonstration

### **LIST OF BOOKS**

#### **Essential**

1. Beagly, H.A. (Ed.) (1981). Audiology and Audiological Medicine. Vol. 1, Oxford University Press.
2. Bess and Humes (1990) Audiology - Fundamental. Williams and Wilkins, London.
3. Davis and Silverman, (Latest Edition). Hearing and deafness. Holt, Rinehats & Winston, London.
4. Hodgson, H.R. (1980) Basic Audiologic Evaluation, London Williams and Wilkins.
5. Martin, F.N. (1991), Introduction to Audiology, IV Edition, New Jersey: Frentice Hall.
6. Martin, H (1987), Speech Audiometry. Whurr Publisher, London
7. Newby, H.A. (1985), Audiology, New York: Appleton-Century-Crofts.
8. Rose, D.M. (Ed.) 1978), Audiological Assessment, New Jersey: Prentice Hill.
9. Relevant IS documents

<b>B.1.3.1</b>	<b>: <u>BASIC HUMAN ANATOMY AND PHYSIOLOGY</u></b>	<b>(75 hrs)</b>
<b>Part A</b>	<b>: Basic human anatomy</b>	<b>(38 hrs.)</b>
1)	General Introduction. Definitions and subdivisions. Planes and systems of the body. The unit of structure and function: Cells, tissues and cartilages.	(2 hrs.)
		(1 hr.)
2)	Osteology – terminology –types of bones in the human body. (in brief)	(1 hr.)
3)	Anthrology – terminology – types of joints in the human body. (in brief)	(3 hrs.)
4)	Myology: Types of muscle tissue. Muscles of the neck, face and tongue. Detailed study of the muscles of the palate, pharynx and larynx in terms of their origin, insertion and nerve supply.	(1 hr.)
5)	Circulatory system – Heart, blood vessels, cardiac cycle, blood composition, tissue fluid – lymphatics, vascular anatomy of the brain, blood – brain barrier.	(9 hrs.)
6)	Nervous System: Divisions and functions of the nervous system. Nerve fibres. Synapse. Structure of the brain and divisions. Brief description of spinal cord and CSF. Cranial nerves, distribution and supply with special reference to II, V, VII, IX, X and XII. Broadmann's areas.	(4 hrs.)
7)	Respiratory System: General outline. Detailed study of trachea, larynx, and nasopharynx. Mechanism of respiration – internal and external influence, nervous control – vital capacity – tidal volume, residual air, artificial respiration. (in brief)	(2 hrs.)
8)	Digestive system: Detailed study of oral cavity, palate, oropharynx, pharynx and oesophagus. Swallowing mechanisms.	(4 hrs.)
9)	Audiovestibular System: Anatomy of the external, middle and internal ears. Ascending and descending auditory and vestibular pathways.	(3 hrs.)
10)	Anatomy of Voice and Speech Mechanisms.	(4 hrs.)
11)	Embryology: a) Development of the face. b) Development of the palate. c) Brachial arches and pouches and their derivatives. d) Development of the tongue and thyroid.	(4 hrs.)
12)	Genetics: Introduction. Karyotyping. Structural aberrations.	

**Part B: Basic Human Physiology (37 hrs.)**

- 1) Introduction to human physiology. (1 hr.)
- 2) Muscular System: Classification and properties of muscles. Nerves and myoneural junction. Bioelectric phenomena. (4 hrs.)
- 3) Blood: Composition and functions. RBC, WBC, and platelets. Coagulation and blood groups. (4 hrs.)
- 4) Circulatory System: Structure of blood vessels and heart. Cardiac cycle and output. B.P. and shock. (3 hrs.)
- 5) Respiratory System: External and internal respiration. Mechanism of respiration. Lung volumes and composition of gases. Exchange of gases in the lungs and tissues. Hypoxia, asphyxia and cyanosis. Regulation of respiration. Respiratory efficiency tests and artificial respiration. (5 hrs.)
- 6) Nervous system: Nerve cell. Receptors and synapse. Types of nerves. Peripheral nervous system. Spinal cord. Nerve tracts – motor and sensory. Brain – general and lobes of cerebrum. Reticular formation. Basal ganglia and cerebellum. Reflex action and common reflexes. (7 hrs.)
- 7) Endocrine System: All glands with names and functions of hormones. Effects of increase and decrease and regulation of secretion. (3 hrs.)
- 8) Reproductive system: Primary and secondary sex organs. Hormonal controls and changes at puberty. (2 hrs.)
- 9) Auditory System: Functions of external, middle and internal ears. Mechanism of hearing: peripheral and central. Theories of hearing. Deafness, Types of and tests for. (4 hrs.)
- 10) Vestibular system: Functions of utricle, saccule and vestibular apparatus. Posture and equilibrium. Tests for posture and equilibrium. (2 hrs.)
- 11) Voice and Speech Mechanisms: General information about phonation, articulation and peripheral and central mechanisms of speech. Some common speech disorders. (2 hrs.)

## LIST OF BOOKS

### BASIC HUMAN ANATOMY AND PHYSIOLOGY

1. Datta, A.K. (1994). Essentials of Human anatomy (Head and Neck). (2<sup>nd</sup> Ed.). Current Books International.
2. Roomanes, G.G. Cunningham's Manual of Practical Anatomy, Vol. III: Head and Neck and Brain Oxford University Press.
3. Singh, I. (1996). Textbook of Anatomy with Color Atlas, Vol. III Jaypee Brothers.
4. Batemon and Manson. (1984). Applied Anatomy and Physiology of the Speech and Hearing Mechanisms.
5. Daniloff, R. and Schuckers, G. (1980). The Physiology of Speech and Hearing. An Introduction. Englewood Cliffs, New Jersey: Prentice Hall.
6. Kahane, J.C. and Polkina, J.F. (1984). Atlas of Speech and Hearing Anatomy. Ohio. Charles E. Merrill.
7. Palmer, J.M. (1984). Anatomy for Speech and Hearing, (3<sup>rd</sup> Ed.). New York: Harper and Row.
8. Perkins, W.H. and Kent, R.D. (1986). Textbook of Functional Anatomy of Speech, Language and Hearing. London: Taylor and Francis.
9. Schneiderman, C.R. (1984). Basic Anatomy and Physiology in Speech and Hearing.
10. Zemlin, W.R. (1981). Speech and Hearing Science: Anatomy and Physiology, (2<sup>nd</sup> Ed.). Englewood Cliffs, New Jersey: Prentice Hall.
11. Foundations of Anatomy and Physiology. Ross and Wilson (5<sup>th</sup> Ed.). (1985). Revised by K.J.W. Wilson. Eng. Language Booksty / Churchill Livingstone.
12. Anatomy for Speech and Hearing. (4<sup>th</sup> Ed.). John. M. Palmer (1993). Williams and Wilkins.
13. Human Anatomy – Regional and Applied. (Head, Neck and Brain – Vol.3). B.D. Chaurasia. (1980). CBS Publishers and Distributors.
14. Gray's Anatomy. (37<sup>th</sup> Ed.). Williams Warwick and Dyson Banniser. (1989). Churchill Livingstone.
15. Principles of Anatomy and Physiology. (6<sup>th</sup> Ed.) (1990). G.J. Tortora. N.P. Anagnostakos. NY: Harper and Row Publishers.

16. Textbook of Medical Physiology. Guyton. (8<sup>th</sup> Ed.). (1991). Prism Saunders.
17. Principles of Physiology. (1990). Berne and Levy. (Eds.) Wolfe Publishing Ltd.
18. Review of Medical Physiology. (15<sup>th</sup> Ed.). (199 ). W.F. Ganong.
19. Neuroscience for the Study of Communication Disorders. (1995). S.C. Bhatnagar and O.J. Andy. Williams and Wilkins.

**B.1.3.2 : BASIC ACOUSTICS AND ELECTRONICS (75 hrs.)**

**Part A : Basic Acoustics**

(Non-mathematical and Conceptual Treatment of subject matter)

- 1) Vibrating systems – Simple Harmonic Motion – Simple vibrating systems – Systems with two or more masses - systems with many modes of vibration – Complex vibrations – Vibration spectra
- 2) Waves – What is a wave? Progressive waves – Sound Waves – Wave propagation – Doppler effect – Reflection, Refraction, Diffraction, Interference, Absorption
- 3) Resonance of a mass-spring vibrator – standing waves – Partial, harmonics and overtones – Acoustic impedance – Helmholtz resonator – sympathetic vibrations - Couplers
- 4) Sound Pressure, Power and Loudness – Physical and psycho-physical scales – Critical bands – combined sources
- 5) Pitch and Timbre – Physical and psycho-physical scales – Fourier analysis of complex tones
- 6) Acoustics of Rooms – Sound propagation in outdoors and indoors – Direct, early and reverberant sound – Calculation of reverberation time – Air absorption – Background noise – Loudspeaker placement and directivity – Acoustic Feedback and equalization – Acoustics of small rooms – sound images and multiple sources – sound field in listening rooms – Quadraphonic sound – listening with earphones.

**Part B : Basic Electronics**

(Operational characteristics, types and specifications – No design aspects – concepts and block diagrams only)

- 1) Basics of electricity – Direct and alternating current – electrical energy and power – Power supplies.
- 2) Filters, Amplifiers and Oscillators
- 3) Microphones as transducers – Velocity microphones – uni-directional microphones – Microphone impedance and sensitivity
- 4) Loudspeakers as transducers – Structure of a dynamic loudspeaker – Air suspension – Baffles and enclosures – Horn speakers – Multi-speaker systems – Loudspeaker efficiency
- 5) Recording and Reproduction of sound – Recording characteristics – Dynamic Range – Stereophonic recording – Magnetic tape recording – Tape speed and frequency response – Bias and equalization – Tape noise – Digital Tape recording – CD ROM recording
- 6) High fidelity recording and playback – AM/FM tuners – Amplifier power and distortion – Loudspeaker power and distortion – Earphones (Headphones)
- 7) Development of micro-electronics - types of transistors – Passive circuit elements – Linear and digital Integrated circuits – micro – computers and micro – processors – micro – electronic devices
- 8) Measuring Instruments – Multi-meter – Cathode ray oscilloscope – Audio generator – Function Generator – Frequency counter – Sound Level Meter – Spectrum Analyzer – Distortion Analyzer – Level Recorder (Demonstration and handling of the above instruments.)

**LIST OF BOOKS**

**Essential:**

1. The Science of Sound – Thomas D. Rossing, Addison- Wesley Publishing Company.

<b>B 1.3.3 : <u>INTRODUCTION TO LINGUISTICS</u></b>	<b>(75 hrs.)</b>
1. Introduction to linguistics. Concept of linguistics. Linguistic analysis. Branches of linguistics.	(4 hrs.)
	(3 hrs.)
2. Language: Definition, nature, properties and functions of language, Sub-systems of language.	(2 hrs.)
3. Communication: Definition, nature, requirements and types of communication.	(2 hrs.)
4. Phonetics: Definition and branches. Brief sketch of articulatory, acoustic and auditory phonetics.	
- Speech: Formation of speech. Speech mechanisms: Air stream, phonatory, articulatory and resonatory mechanisms.	(5 hrs.)
- Classification of speech sounds: Segmentals and suprasegmentals.	
a) Segmentals: Vowels and Consonants. Classification of consonants: Place and manner of articulation, Voiceless and voiced consonants. Classification of vowels. Concept of cardinal vowels.	(5 hrs.)
b) Supra-segmentals: Stress, pitch, tone and intonation.	(1 hr.)
c) Semivowels and diphthongs: Formation and classification.	(1 hr.)
d) Sounds formed using non-pulmonic air stream: Ejectives, implosives and clicks.	
5. Phonology: Definitions of phoneme and allophones. Phonemic analysis with reference to Indian languages.	(8 hrs.)
- Distinctive feature analysis. Its application in articulatory disorders.	(2 hrs.)
- Syllable: Types and structure of syllables.	(1 hr.)
6. Fundamentals of acoustics. Acoustic theory of speech production. Acoustic properties of vowels and consonants. Sound spectrograph.	(8 hrs.)
7. Morphology: Concepts of morph, morpheme and allomorph and their relationship. Morphemic analysis. Morpheme types-Inflectional and derivational. Word: Definition, Types, Processes of word formation.	(5 hrs.)
8. Syntax, Syntactic analysis, I.C. analysis, Phrase structure grammar, Transformational grammar. Components and functions of grammar. Acceptability and Grammaticality of sentences.	(7 hrs.)
9. Semantics. Concept of meaning. Different types of meanings. Concepts of synonyms, homonyms and antonyms. Semantic ambiguity.	(2 hrs.)
10. Pragmatics: A Brief introduction to pragmatics.	(2 hrs.)

11. Psycholinguistics: Introduction to psycholinguistics. Competence and Performance distinctions. Language acquisition in children. Major theories. (2 hrs.)
12. Application of linguistics and psycholinguistics to the field of Speech Pathology with Special reference to testing. (1 hr.)

(Discuss phonological, morphological, semantic, syntactic and pragmatic aspects of Indian languages. )

### **PRACTICALS (12 HRS.) :**

1. I.P.A. symbols. Transcription of segmental sounds in isolation and connected speech. Transcription of deviant speech. (6 hrs.)
2. Basic morphological and phonological analyses. Identification of phonemes, morphemes and their distribution. (6 hrs.)

## **LIST OF BOOKS**

### **INTRODUCTION TO LINGUISTICS**

#### **Essential :**

1. Brosnahan, L.F. and Malmberg, B. (1970) Introduction to Phonetics. Cambridge: University Press.
2. Fromkin, V. and Rodman, R. (1993) An Introduction to Language. (5<sup>th</sup> Ed.). New York: Harcourt Brace Jovanovich.
3. O'Connor. (1993). Phonetics. Hammondsworth: Penguin Books.
4. Yule, G (1996). The Study of Language: An Introduction. (2<sup>nd</sup> Ed.). Cambridge: Cambridge University Press. (Low price edition. 1997)

#### **Additional :**

1. Akmajian. A. et al. (1990). Linguistics: An Introduction to Language and Communication. (3<sup>rd</sup> Ed.). MIT Press.
2. Catford, J.C. (1982). Fundamental Problems in Phonetics. Edinburg University Press.
3. Clark, J. and Yallop, C. (1995). An Introduction to Phonetics and Phonology. (2<sup>nd</sup> Ed.). Basil: Blackwell.
4. Fry, D.B. (1979). The Physics of Speech, Cambridge University Press.
5. Ladefoged P. (1992). A course in Phonetics. (3<sup>rd</sup> Ed.). New York: Harcourt Brace Jovanovich.
6. Lyons, J. (Ed.). (1970). New Horizons in Linguistics. Hammondsworth: Penguin Books.

<b>B 1.3.4</b>	<b>: <u>PSYCHOLOGY RELATED TO SPEECH AND HEARING</u></b>	<b>(75 hrs)</b>
<b>1. (a)</b>	Definition of Clinical Psychology - Historical development, modern history of clinical psychology, its current status and scope as a specialty in health sciences, role of clinical psychology in speech and hearing disorders.	(5 hrs.)
<b>(b)</b>	Concept of normality and abnormality, models of mental disorders, biological, psychological, social models.	(5 hrs.)
<b>2. (a)</b>	Methodology in clinical psychology – Case history, clinical interviewing, clinical observation, types of psychological assessments, considerations for speech and hearing disorders.	(5 hrs.)
<b>(b)</b>	Classification of abnormal behavior : History, need, rationale, present systems DSM and ICD.	(5 hrs.)
<b>3. (a)</b>	Motor development – Early motor development – stages in motor development – manipulative behavior, handedness, development of complex motor skills, motor development during later childhood, and adolescence, decline with age.	(5 hrs.)
<b>(b)</b>	Cognitive development – Evolutionary growth of intelligence, growth from early childhood to adolescence, decline with age, Piaget’s theory of cognitive development.	(6 hrs.)
<b>(c)</b>	Emotional and social development.	(7 hrs.)
<b>(d)</b>	Assessment of cognitive functions, personality, interpersonal relationships, diagnosis, and tests used and interpretation of test results.	(6 hrs.)
<b>4. (a)</b>	Introduction – Definition of learning – scope and methods – types of learning - importance of studying psychology of learning in communication disorders.	(6 hrs.)
<b>(b)</b>	Experimentation in learning – human and animal learning – Quantitative assessment of learning, learning curves.	(5 hrs.)
<b>(c)</b>	(b) Theories of conditioning – Classical conditioning by Pavlov and its principles, Operant conditioning by Skinner and its principles	(5 hrs.)
<b>5. (a)</b>	Biological, Neurochemical, Neurophysiological, Neuropsychological correlates of learning.	(5 hrs.)
<b>(b)</b>	Techniques derived based on operant conditioning, shaping, chaining, prompting, time-out, token economy, reinforcement and contingency management, aversive therapy.	(10 hrs.)

## LIST OF BOOKS

### PSYCHOLOGY RELATED TO SPEECH AND HEARING

#### Essential :

1. Psychology Lefton, L. III Ed. Allyn and Bacon, 1985.
2. Child Development Hurlock, EB, VI Ed. Mc Graw Hill International Book Co. 1981.
3. Introduction to Psychology. Morgon C.T., King R.A., Robinson N.M. Tata Mc Graw Hill Publishing Co.
4. Psychology 5<sup>th</sup> Ed. Dworetzky J.P.
5. Handbook of Treatment of Mental Disorders in Childhood and Adolescence – Wolman Prentice Hall, 1978.
6. Essential Psychotherapies. Theory and Practice. Gurman A.S., and Messer, S.B.
7. The Handbook of Psychological Testing, Kline, P. Routledge, 1993.
8. Psychological Testing from Early Childhood Through Adolescence. Editor Siegal M.G. International Universities Press, 1987.
9. Abnormal Psychology and Modern Life, Coleman J.C. Taraporevala Sons & Co.
10. DSM – IV 4<sup>th</sup> Ed. Jaypee Brothers, New Delhi (1<sup>st</sup> Indian Ed., 1995).
11. Aiken, L. R. Psychological Testing and Assessment IX Ed. 1997.

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

### **Objectives :-**

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

- 1) Acquire knowledge of the facilities and activities of the clinical set-up.
- 2) Acquire knowledge of the terminology used in the assessment and therapy in the clinical set up and develop proficiency in usage in discussion as per the list provided.
- 3) Acquire knowledge about normative aspects of speech and language and develop skills for perceptual and instrumental measurement of the same.

### **Clinical Practicum Work :-**

- 1) Taking case history of a minimum of 20 persons with complaints of speech-language problems.
- 2) Label and identify structures of the speech mechanism with the help of charts, models, specimen and computer software.
- 3) Conduct OPM examination on at least five children and adults without speech-language complaints.
- 4) Analyze characteristics of good and normal speech using recorded samples and speech samples of classmates.
  - a) Familiarization with vocal parameters
    - Pitch (High, Low)
    - Loudness (High, Low)
    - Quality (Pleasant, unpleasant, harsh, hoarse, breathy, hypo-nasal, hyper-nasal)
  - b) Familiarization with other parameters
    - Rate of Speech (Normal, Fast, Slow)
    - Enunciation (Clear, Unclear)
    - Prosodic aspects (adequate/inadequate)
  - c) Identify intelligible Vs unintelligible speech along the intelligibility rating scale (two samples).
- 5) Demonstrate and use varying range of pitch and loudness.
- 6) Carry out stop-watch assisted measures of
  - Phonation duration }
  - Rate of speech }

- AMR and SMR } in 5 normal individuals.
  - Maximum blowing time, }
  - s/z ratio. }
- 7) Analyze and interpret at least 2 samples in terms of
    - a) MLU
    - b) Syllable structure
    - c) Syntactic structures
    - d) Pragmatic intent
    - e) Semantic skills
    - f) Child directed speech
  - 8) Use the tape-recorder for purpose of collection of disordered speech samples.
  - 9) Familiarization of use of proformae for different disorders such as
    - Articulation
    - Voice
    - Fluency
    - CLP
    - Child language
  - 10)
    - a) Develop material for informal assessment of :
      - Rate of Speech
      - MLU
      - Articulation
      - Receptive language skills
      - Expressive language skills.
    - b) Develop therapy material specific to the cases observed and also in general.
  - 11) Familiarization with use of scales/tests
    - REEL Scale
    - 3-D scale of language development
    - LPT
    - PAT
    - Checklist for assessment of child directed speech.
    - Scale for assessment of pre-linguistic skills.
  - 12) Compiling relevant material pertaining to developmental milestones of
    - Communicative intent
    - Pre-linguistic skills
    - Speech
    - Hearing response
    - Phonology
    - Morphology
    - Syntax
    - Semantics
    - Pragmatics
    - Feeding skills
    - Attention.

- 13) Observation of a minimum of
  - 5 diagnostic cases
  - 5 therapy sessions for 3 cases with different speech language disorders.
  - Writing of observation reports of above.
- 14) Familiarization with available instruments for voice and speech analysis. Use of these instruments for measurement of own voice parameters (Fo, Ao, Fo range).
- 15) Maintenance of a clinical diary.
- 16) Maintenance of a journal to be submitted at the end of the term.
- 17) Introduction of self as an ASLP professional through modeling and role play.
- 18) Familiarization with computers.

### **CLINICAL PRACTICUM IN AUDIOLOGY**

1. Orientation to the field of Audiology by exposure to public information material (videos, pamphlets, booklets, etc.)
2. Case history: of Adults and Children with normal hearing, with hearing impairment with normal speech and language functions, with speech and hearing disorders. Taking case history information from clients/care-givers. (5 cases under supervision, 20 cases independently).
3. Under going puretone audiometry. Becoming familiar with different types to sound stimuli used for assessment of hearing.
4. Identifying the different types of audiometer and their accessories referring to their respective manuals. Familiarizing with the parts and their functions. Doing listening check. Trouble shooting with the audiometer. Listing the different earphone/earcushion combination, BC vibrator. Studying the same and reporting the status of the same.
5. Preparing 0 dBHL equivalent chart with different earphone/earcushion combination.
6. Obtaining audiograms using different types of audiometers, of 10 normal subjects.
7. Observation/Participation during audiological evaluation on a variety of cases under supervision. Plotting the audiograms, calculation of Interaural Attenuation, Occlusion effect, etc.
8. Obtaining audiograms independently - 20 with AC and 20 with AC & BC. (1/3 of these cases should be children)

9. Obtaining audiograms with masking. (5 cases)
10. Classification of given audiograms as per
  - nature of hearing loss
  - degree of hearing loss
  - contour of audiograms
11. Calibration of audiometers (Demonstration) - AC/BC/Sound Field, instruments used, identifying the instruments, combination of equipment for different types of calibration, preparing correction chart.

## **SECOND YEAR GRADUATE COURSE**

### **OBJECTIVES**

After the completion of the second year course the student trainee will have

1. The theoretical knowledge about the normal and disordered aspects of articulation and phonology.
2. Knowledge of various diagnostic audiological test batteries, different types of amplification devices, cochlear implants and assistive devices for the hearing impaired.
3. Knowledge about community oriented professional practices in the field of Audiology and Speech Language Pathology.
4. Knowledge of clinical psychology, psychology of the exceptional, psychodiagnostic and therapeutic methods.
5. Knowledge of basic otorhinolaryngology and its application to the field of Audiology and Speech Language Pathology.
6. Knowledge of basic statistics and research methods used in Audiology and Speech Language Pathology.
7. Practical skills in:
  - a) Assessment, reporting and intervention of children with communication disorders and individuals with articulation and phonological disorders under supervision.
  - b) Routine hearing assessment which includes pure tone audiometry, immitance audiometry, speech audiometry, pediatric audiological assessment and hearing aid trial.
  - c) Interpretation of these audiological tests and reporting.
  - d) Identifying various components of audiometers and hearing aids, trouble shooting and minor repairs of hearing aids and preparation of ear mould.
  - e) Counselling the case/caregiver regarding the care and maintenance of hearing aids , auditory training and developing speech reading skills.

## SECOND YEAR GRADUATE COURSE CONTENT

II B.Sc.	Paper Title	Hrs./Wk	Total Marks
Speech Pathology:			
B.2.1.2	Childhood Communication Disorders	3	80 + 20
B 2.1.3	Articulation and Phonological Disorders	3	80 + 20
B 2.1.4	Voice and Laryngectomy	3	80 + 20
Audiology :			
B.2.2.2	Diagnostic Audiology	3	80 + 20
B.2.2.3	Amplification and Assistive Devices for the hearing impaired.	3	80 + 20
B.2.2.4	Educational Audiology	3	80 + 20
:			
Allied Subjects			
B.2.3.5	a) Otorhinolaryngology	2	40+ 10
	b) Community Oriented Professional Practices in Speech Language Pathology/Audiology	1	40+ 10
B.2.3.6	Basic Statistics and Research Methods in Speech-Language Pathology and Audiology	3	80 + 20

### CLINICAL PRACTICUM:

	Clinical work Internal	Clinical Viva Internal + External
Speech Pathology	100	100
Audiology	100	100
Total	200	200

## SECOND YEAR GRADUATE COURSE

<b>B 2.1.2</b>	<b>: <u>CHILDHOOD COMMUNICATION DISORDERS</u></b>	<b>(75 hrs.)</b>
1.	Theories and models of language acquisition - Behavioral, Nativistic, Cognitive, Structural, Pragmatic, Biological. (in detail)	(6 hrs.)
2.	Genetic and neurological correlates of communicative development. Growth and developmental, Genetics – Autosomal and sex linked disorders – Fetology with special reference to speech and hearing, RH incompatibility – Kernicterus, Perinatal pediatrics including brain damage, APGAR score – Inborn errors of metabolism, congenital cerebral and cranial defects, infection of CNS, Tumors of CNS, Endocrinal disturbance – Developmental Neurological examination and evaluation – Neurology of Behavior.	(9 hrs.)
3.	Definitions, etiology, classification and characteristics of communication disorders in children with	
	a) Hearing impairment	(5 hrs.)
	b) Mental retardation	(2 hrs.)
	c) Pervasive developmental disorders	(6 hrs.)
	d) ADD and ADHD	(2 hrs.)
	e) SLI and LLD	(4 hrs.)
	f) Learning disability	(4 hrs.)
	g) Acquired childhood aphasia	(4 hrs.)
	h) Visual impairment	(1 hr.)
	i) Multiple impairments	(2 hrs.)
4.	Assessment of communication skills in children.	(15 hrs.)
	- Informal and formal procedures	
	- Specific assessment tools and protocols for above disorders.	
	- Differential diagnosis between childhood communication disorders.	
	- Team management.	
5.	Communication, language and speech intervention.	(15 hrs.)
	- General intervention approaches and principles.	
	- Specific intervention techniques.	
	- AAC	
	- Role of parents, caregivers and family.	
	- Team approach.	

## LIST OF BOOKS

### CHILDHOOD COMMUNICATION DISORDERS

#### Essential:

- 1) Childhood language disorders in Context. (1993). Nelson, N.W. New York: Macmillan.
- 2) An Introduction to children with language disorders. (1994) Reed, V. (2<sup>nd</sup> Ed.). New York: Macmillan.
- 3) An integrative approach to language disorders in children. (1982). Woolfolk, E. and Lynch J. New York: Grune and Stratton.
- 4) Treatment of Autistic Children. (1987). Howlin, P. and Rutter, M. London: John Wiley and sons. ISBN 1-870332-61-X.
- 5) Craft (ed.) Tredgold's Mental Retardation. (1979). USA: Cavell Ltd.
- 6) Introduction to Child Language Disorders. Hegde, M.N.

#### Additional:

- 1) Acquired Speech and Language Disorders. (1994). Murdoch, B.E. London U.K: Chapman Hall.
- 2) Acquired Childhood Aphasia. (1993) Lees J. London: Whurr Publishers
- 3) Mental Retardation. (1990). Drew C., Logan D., and Hardman, M. Merrill Publishing.
- 4) The Mentally Retarded Child - Development Training and Education. (1979). Huti and Givvy. Boutons: Allyn & Bacon Inc.

<b>B.2.1.3</b>	<b><u>ARTICULATION AND PHONOLOGICAL DISORDERS</u></b>	<b>(75 hrs.)</b>
<b>Part A</b>	<b>: <u>Articulation and Phonological Disorders</u></b>	<b>(40 hrs.)</b>
1.	Normal development of articulation and phonology. Models of phonological development.	(3 hrs.)
2.	Fundamentals of articulatory phonetics, Co-articulation, Acoustic considerations of speech and supra-segmentals. Transcription requirement related to perceptual analysis. Introduction to speech perception. Theories of Speech Perception – motor theory, analysis – by – synthesis theory, action theory, quantum theory. Brief introduction to Distinctive features, phonological processes. Acoustic aspects of production and perception of speech sounds.	(6 hrs.)
3.	Factors related to articulation and phonological disorders: Structural, Cognitive - linguistic and psychosocial factors.	(3 hrs.)
4.	Assessment procedures: Types of assessment (including phonological assessment), sampling procedures, scoring procedures, criteria for selection of assessment instruments, commercial instruments, construction of instruments. Assessment of associated skill areas such as oral peripheral mechanism, speech sound discrimination, stimulability and oral stereognosis.	(9 hrs.)
5.	Analysis and Interpretation of data: (1) intelligibility and severity judgements (2) normative data (3) error patterns. Guidelines for intervention.	(5 hrs.)
6.	Intervention: Stages of treatment and measuring improvement, Long term goals, Short-term goals and activities for achieving goals in cases with misarticulation. Issues in maintenance and generalization. Team approach and professional communication (Inter, intra professional and client oriented).	(4 hrs.)
7.	Approaches to treatment: Motokinesthetic, Traditional (Van Riper), Integral stimulation, Phonological, Distinctive feature, Minimal contrast therapy, Learning theories, Programmed, Paired-stimuli. Computerized intervention packages.	(10 hrs.)
<b>Part B</b>	<b>: <u>Cleft lip and palate</u></b>	<b>(31 hrs.)</b>
1.	Etiological factors	(1 hrs.)
2.	Developmental biology of the face and palate.	(2 hrs.)
3.	Syndromes - Pierre - Robin's, Treacher- Collin's, Crouzon's disease.	(2 hrs.)
4.	The velopharyngeal mechanism - muscles and functions.	(1 hr.)
5.	Type of cleft lip and cleft palate.	(1 hr.)
6.	Classification systems.	(3 hrs.)

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|---|----------|
| 7. Team management- composition, responsibilities, co-ordinator.                            | (1 hr.)  |
| 8. Speech and language problems of individuals with cleft.                                  | (2 hrs.) |
| 9. Associated problems of individuals with cleft - hearing, dental, psychosocial, physical. | (2 hrs.) |
| 10. Diagnostic procedures and instruments used in assessment of speech.                     | (5 hrs.) |
| 11. Treatment Concepts - Surgical repair of cleft lip, palate and velopharynx (Outline)     | (4 hrs.) |
| 12. Treatment procedures for speech.  | (5 hrs.) |
| 13. Prosthetic speech appliances for patients with cleft palate.                            | (2 hrs.) |

**Part C : Glossectomy (4 hrs.)**

1. Effect of partial and total glossectomy on speech.
2. Characteristics of glossectomy speech.
3. Rehabilitation of speech.
4. Prosthetic fitting, design, assessment.
5. Effects on swallow.
6. Rehabilitation of swallow.

**LIST OF BOOKS**

**ARTICULATION AND PHONOLOGICAL DISORDERS**

**Essential**

- 1) Articulation and Phonological Disorders. (3<sup>rd</sup> Ed.). Bernthal, J.E. and Bankson, N.W. (1988). New Jersey: Prentice Hall Inc.
- 2) Clinical Management of Articulation Disorders. Weiss, C.E., Lillywhite, H.S. and Gordon, M.E. (1980). St. Louis: C.V. Mosby
- 3) Cleft Palate Speech (1<sup>st</sup> Edition). Mc. Williams, B.J., Morris, H.L. and Shelton, R.L. (1984). Philadelphia: B.C. Decker Inc.
- 4) Cleft, Lip and Palate – A System of Management. Kernahan, D.A. and Rosenstein, S.W. (1990). Maryland (USA): Williams and Wilkins.
- 5) Clinical Manual for Laryngotomy and Head and Neck Cancer. Colton, R.H. and Casper, J.E. (1993). San Diego: Singular Publishing Group Inc.

**Additional :**

- 1) Nature and Treatment of Articulation Disorders. (1980). Johnson, J.P. Springfield: Charles C. Thomas.
- 2) Assessment and remediation of articulatory and phonological disorders. (1989). (2<sup>nd</sup> Ed.). Creaghead, N.A., Newman, A.W. and Secord, W.A. New York: Macmillan.
- 3) Working with Oral Cancer. (1995). Appleton, J. and Machin, J. UK: Winslow. ISBN: 0 86388 129 7.

## **B 2.1.4**      **VOICE AND LARYNGECTOMY**

**(75 hrs.)**

1.    **(A) Voice –**
  - Definition, Review of Anatomy of the respiratory, phonatory and resonant systems
  - Development of voice and factors influencing
  - Theories of phonation
  - Characteristics of normal voice. Physiological, acoustical, and Aerodynamic correlates of voice
  - Evaluation of voice and implication to abnormal voice.
  
2. (a) Definition of normal and abnormal voice
  - Causes and classification of abnormal voice
  - Incidence and prevalence of abnormal voice

(b) Causes, diagnosis, differential diagnosis, and therapy for

  - Hysterical Aphonia
  - Spasmodic dysphonia
  - Plica – Ventricularis
  - Mutational voice disorders
  - Diplophonia
  
3. (a) Vocal hyperfunctional disorders
  - Vocal abuse
  - Vocal Nodule, vocal polyp, contact ulcer

(b) Voice problems in geriatrics
  
4. (a) Neurological problems resulting in voice disorders
  
- (b) Paralysis of the vocal cords – causes, types, characteristics, differential diagnosis and management
  
- (c) Voice problems in hearing impaired
  
- (d) Congenital voice disorders
  
5. (a) Resonatory disorders – hypernasality, hyponasality, causes, characteristics and management.
  
- (b) Management of the problems of professional voice users

1. **(B) Laryngectomy**
  - Definition, incidence and prevalence
  - Causes and symptoms of laryngeal cancer
  - Types and characteristics of laryngectomy surgery
  - Total laryngectomy – definition, characteristics, associated problems
  - Assessment of laryngectomy
  
2. Management of laryngectomy
  - Esophageal speech – anatomy, candidacy, different types of air intake procedures, speech characteristics in esophageal speech.
  - Tracheo esophageal speech – anatomy, candidacy, different types of TEP, fitting of prosthesis, speech characteristics, complications in TEP
  - Artificial larynx – different types, selection of artificial larynx, speech characteristics
  - Pharyngeal speech, buccal speech, ASAI speech, gastric speech
  - Pre and postoperative counseling

### LIST OF BOOKS

### VOICE AND LARYNGECTOMY

1. Aronson, A.E. (1990): Clinical Voice Disorders, New York: Thieme, Inc.
2. Aronson, A.E. (1980): Clinical Voice Disorders: An interdisciplinary approach. New York: Thieme Stratton.
3. Boone, D. (1977). Voice and voice therapy (2nd Ed.). New Jersey: Prentice Hall Inc.
4. Boone, D.R. & McFarlane, S. C (1994): The Voice and Voice Therapy. (Fifth Ed.). Englewood Cliffs, Prentice-Hall, Inc. New Jersey.
5. Boone, D. R. (1994). Principle of voice production. NJ: Prentice- Hall Inc.
6. Case, J.L. (1991): Clinical Management of Voice Disorders, Pro-Ed, Austin.
7. Fawcus, M. (Ed.) (1991): Voice Disorders and Their Management. Singular Publishing. Group. San Diego
8. Greene, M.C.L. and Mathieson, L. (1989): The Voice and Its Disorders. Whurr publications, London.
9. Lushinger and Arnold (1967) : Voice and speech , language. Wads worth, California.
10. Moore, G P (1971) Organic voice disorders. Prentice Hall. New Jersey.
11. Prater, R.J. and Swift, R.W. (1984): Manual of Voice Therapy. Little, Brown and Co, Boston.

12. Van Riper, C. & Irwin, J.V. (1968). Voice and Articulation. New York. Prentice Hall Inc.
13. Daniloff, R. & Schuckers, G. (1980). The Physiology of Speech and Hearing. An introduction. New York. Prentice Hall Inc.
14. Hirano, M. (1981). Clinical examination of voice. New York. Springer-Verlag.
15. Judson, L.S.V. & Weaver, A.T. (1966). Voice Science. London. Vision Press Limited
16. Brown. W.M.s. and others (1996) (ed): Organic voice disorders. Singular publishing group, Sandiego.
17. Moore, G.P (1971) Organic voice disorders. Prentice Hall. New Jersey.
18. Andrews . M.L. (1995): Manual of Voice treatment, Singular publishing group, San diego.
19. Andrews, L M & Summers, A.C (1987) Voice therapy for adolescents. Singular Publishing group. Inc.
20. Andrews. M. L. (1991): Voice therapy for children, Singular publishing group, San diego.
21. Brown, O L (1996) Discover your voice. Singular publishing group inc.
22. Brown. W.M.s. and others (1996) (ed): Organic voice disorders. Singular publishing group, Sandiego.
23. Dworkin, J P & Meleca, R J (1997) Vocal pathologies; Diagnosis treatment and case studies. Singular publishing group. San Diego.
24. Joseph, C Stemple Leble, E Glaze, Bernick K Gerdeman. Clincial voice pathology. Theory & Management (II Edition)
25. Koschkee, D L, Rammage, L (1997) Voice care in the medical setting. Singular publishing group Inc.
26. Lushinger and Arnold (1967) : Voice and speech , language . Wads worth, California. Moore, G P (1971) Organic voice disorders. Prentice Hall. New Jersy.
27. Morrison, M. and Rammage, L. (1994). The Management of Voice Disorders. Singular Publishing. Group, Sandiego
28. Pindzola . R. H. (1987): Voice assesement protocol for children and adults manual Pro Ed, Austin
29. Prater, R.J. and Swift, R.W. (1984): Manual of Voice Therapy. Little, Brown and Co, Boston.

30. Stemple . J. C. (1993): Voice therapy . Mosby year book . St louis
31. Wilson, D.K. (1979). Voice problems of children (2nd Ed.) Baltimore: Williams and Wilkins.
32. Andrews, M.L (1995) Manual of voice treatment . Singular Publishing group., San Diego.
33. Andrews, L M & Summers, A.C (1987) Voice therapy for adolescents. Singular Publishing group. Inc.
34. Brown. W.M.s. and others (1996) (ed): Organic voice disorders . Singular publishing group, Sandiego.
35. Cooper, M (1977) Modern techniques of vocal rehabilitation. Charles Thomas. Springfield.
36. Dworkin, J P & Meleca, R J (1997) Vocal pathologies; Diagnosis treatment and case studies. Singular publishing group. Sandiego.
37. Joseph, C Stemple Leble, E Glaze, Bernick K Gerdeman. Clincial voice pathology. Theory & Management (II Edition)
38. Prater, R.J. and Swift, R.W. (1984): Manual of Voice Therapy. Little, Brown and Co, Boston.
39. Stemple . J. C. (1993): Voice therapy . Mosby year book . St louis
40. Wilson, D.K. (1979). Voice problems of children (2nd Ed.) Baltimore: Williams and Wilkins.
41. Brown, O L (1996) Discover your voice. Singular publishing group inc.
42. Brown. W.M.s. and others (1996) (ed): Organic voice disorders. Singular publishing group, Sandiego.
43. Prater, R.J. and Swift, R.W. (1984): Manual of Voice Therapy. Little, Brown and Co, Boston.
44. Sataloff . R.T.(1991) : Professionl voice. Raven Press,. Newyork.
45. Stemple . J. C. (1993): Voice therapy . Mosby year book . St louis

### **Laryngectomy**

1. Diedrich, W.M. & Youngstorm, K.A. (1966). A laryngeal speech. Springfield: Charles C Thomas.
2. Doyle, P C (1994) Foundation of voice and speech rehabilitation following laryngeal cancer. Singular publishing group. Sandiego.

3. Green, M.C.L. (1980). Voice and its disorders (4th Ed.). Kent: Pitman Medical Limited.
4. Keith, R L & Darley (III Edition) Laryngectomee rehabilitation. Pro. Ed. Autism
5. Luchisinger, R. & Arnold, G.E. (1965). Voice-speech-language clinical communicology: Its physiology and pathology. California: Wodsworths.
6. Prater, R J & Swift, R W (1984) Manual of voice therapy. Little. Brown & Co. Boston
7. Salmon, S.J. and Mount, K.H. (Eds.) (1991): Alaryngeal Speech Rehabilitation. Prof-Ed. Austin.
8. Snidecor, J.C. (1968). Speech rehabilitation of the laryngectomised. (2nd Ed.) Springfield: Charles C Thomas.
9. Travis, L.E. Ed (1971). Handbook of speech pathology and audiology. New Jersey: Prentice Hall Inc.
10. Van Riper, C. & Irwin, J.V. (1958). Voice and Articulation. New Jersey: Prentice Hall Inc.
11. Yvonne, E (Ed) (1983). Laryngectomy. Diagnosis to Rehabilitation. London: Croom Helm Ltd.

- B 2.2.2      DIAGNOSTIC AUDIOLOGY      (75 hrs.)**
1.      Speech Audiometry: Historical perspectives. Tests:      Speech Awareness Threshold (SAT), Speech Recognition Threshold (SRT), Word Recognition Score (WRS).      (8 hrs.)  
          Materials for each of these tests, Development of test material, available material in Indian and Western language, instrumentation, and calibration, administration of tests, recording and interpretation of test results, factors affecting the test results, role of Speech Audiometry in differential diagnosis, merits and demerits of Speech Audiometry.
  
  2.      Audiological Tests to Differentiate Site of Lesion      (9 hrs.)
    - A)      Test which use pure tone stimuli:  
          Historical perspectives - Difference Limen Tests, Bekesy Audiometry, Brief Tone Audiometry. Short Increment Sensitivity Index (SISI) Modifications of SISI. Loudness Balance Tests - ABLB, MLB. Tone Decay Test: Introduction, Terminology, Different procedures. STAT, continuous Tone Masking. Advantages and Disadvantages of different procedures.
  
    - B)      Tests which use Speech Stimulus PIPB Function
  
  3.      Immittance Audiometry      (15 hrs.)
    - Principle of Immittance Audiometry
    - Instrumentation
    - Tympanometry
    - Static Immittance
    - Reflexometry
    - Use of Immittance Audiometry in Clinical Population.
      - a) to detect middle ear pathology
      - b) to differentiate between cochlear and retrocochlear pathology.
      - c) to identify brain stem lesion
      - d) to identify 7th Nerve lesion
      - e) to identify pseudohypocosis
      - f) to predict thresholds.
  
  4.      Evoked Response Audiometry      (15 hrs.)  
          ECOG, Early Response, MLR, LLR
    - instrumentation and calibration
    - test procedure
    - interpretation
    - factors affecting ERR

5. Otoacoustic Emission (5 hrs.)
- origin
  - types of OAE
  - instrumentation & calibration
  - interpretation

6. Vestibular Function Tests (5 hrs.)
- Caloric Test
  - ENG - Instrumentation and calibration, test procedure,
  - interpretation and artefacts.

Group Testing: Group testing procedures, mass hearing screening  
Relevance of automatic audiometry.

7. Tests to detect Pseudohypoacusis: Terminologies, causes (in adults), incidence, importance of case history, indications for behavioral and test results, protocol of test procedures. (9 hrs.)
- Tests for identification:
    - Brief history of tests (delayed auditory feedback, electrodermal response audiometry, lip reading test, story test).
    - Tone in noise test
    - Stenger Test - Pure Tone & Speech
    - Lombard Test
    - Doerfler - Stewart Test
    - Electrophysiological Tests.
  - Reporting the test result
  - Referral

8. Tests to detect Central Auditory Dysfunction: (9 hrs.)
- Definition, terminologies used, incidence and causes, indications for administration of CAD Tests, Rationale for CAD Tests, Material, Instrumentation, Procedure, Interpretation of the following tests:
- Masking level
  - Pitch Pattern Test
  - Binaural Beats
  - Filtered Speech Test
  - Dichotic binaural fusion test
  - Time altered speech test
  - Rapidly alternating speech test
  - Speech with alternate masking index
  - Staggered spondee word test
  - Synthetic sentence identification with ipsilateral competing messages, synthetic sentence identification with contralateral competing message.
  - Dichotic digit test
  - Dichotic consonant vowel test
  - Speech in Noise test.
- Standardized Test Material available in Indian and other languages. Referrals.

**LIST OF BOOKS**  
**DIAGNOSTIC AUDIOLOGY**

**Essential:**

- 1) Jerger, J. (1963). Modern developments in Audiology, New York: Academic Press.
- 2) Jerger, J. (1987). Diagnostic Audiology: Historical Perspectives, Ear and Hearing, 8 7s-12s
- 3) Katz, J. et al (Ed.) (1994). Handbook of Clinical Audiology, Baltimore: Williams and Wilkins.
- 4) Martin, F.N (1994), Introduction to Audiology, New Jersey: Prentice Hall.
- 5) Silman S. and Silman C.A. (1991). Auditory Diagnosis Principles and Application. New York: Academic Press, Inc.
- 6) Rupp, Stockdell (1980). Speech Protocols in Audiology, New York: Grune & Stratton.
- 7) Keith, R.M. (Ed.). (1981). Central Auditory Dysfunction. New York: Grune & Stratton.
- 8) Musiek, and Baran, J.A. (1987). Central Auditory Assessment: Thirty years of challenge and change. Ear and Hearing 3, 225-355.
- 9) Pinherio, H.L. Kusiak, F.E. (Eds) (1985). Assessment of Central Auditory Dysfunction Foundations and Correlates. Baltimore: Williams and Wilkins.
- 10) Willsford J.A. (1987), Handbook of Central Auditory Processing Disorders in Children. Drando, Grune & Stratton.
- 11) Feldman, A.S., & Willber, L.A. (Eds), (1976), Acoustic Impedance, Immittance: Measurement of Middle Ear Function, Baltimore: Williams & Wilkins.
- 12) Popelka, B.R. (Ed) (1981). Hearing Assessment with acoustic reflex. New York: Grune and Stratton.
- 13) Jacobson, J.T. (Ed) (1985). Auditory Brain Stem Response. Taylor and Francis, London.
- 14) Musiek, F.E. and Rintlemann, W.F. (1999). Contemporary Perspective in Hearing Assessment. USA: Allyn & Bacon.

**B 2.2.3      AMPLIFICATION AND ASSISTIVE DEVICES FOR THE HEARING IMPAIRED      (75 hrs.)**

**A)      HEARING AIDS:**

- i)      Historical development of hearing aids.      (2 hrs.)
  - Non-electrical hearing aids.
  - Electrical hearing aid.
  
- ii)     Types of hearing aids      (15 hrs.)
  - Body level AC, BC, body baffle effect
  - Ear level: BTE, Spectacle (AC/BC), AITE, Canal aid
  - Binaural, Pseudobinaural, Monaural
  - Directional hearing aids, modular hearing aids.
  - Routing of signals, head shadow/baffle/diffraction effects.
  - Output limiting: Peak clipping, compression.
  - Extended low frequency amplification, frequency transposition.
  - Programmable hearing aids, bone anchored hearing aid.
  - Signal processing - Digital hearing aids.
  - Master hearing aids.
  - Group amplification - hard wire, induction loop, FM, infra red. Merits and demerits of each.
  
- iii)    Mechano - acoustic couplers: (2 hrs)      (2 hrs.)
  - Types,
  - Procedures
  - Effect of acoustic couplers on the characteristics of hearing aid output.
  
- iv)    Electro-acoustic characteristics measurements for hearing aid:      (8 hrs.)
  - a)    Instrumentation. Analysis of all styles of hearing aids:
    - According to ISI procedure
    - According to IEC and ANSI procedure.
  
  - b)    Interpretation of the analysis.

- v) Hearing Aid Selection: (20 hrs.)
- a) Pre-selection factors: which ear to fit? monoaural or binaural? Which type of receiver? Which style?
  - b) Prescriptive and comparative procedure.
  - c) Functional gain and insertion gain methods: Instrumentation, prescription formulae, Articulation Index, Speech- banana. Merit and demerits of each of these.
  - d) Hearing aids for conductive hearing loss: congenital malformation, chronic middle ear disorders.
  - e) Hearing aids for infants/ children/multiply handicapped.
  - f) Hearing aids for elderly: Recruiting ears, poor Word Recognition Scores (WRS).
  - g) Hearing aids for the sightless.
  - h) Procuring hearing aids under various schemes of Govt. Of India/State.

vi) Dispensing Hearing Aid. (2 hrs.)

vii) Ear moulds: Importance, Types (Hard moulds and soft moulds) procedure of making each type of ear moulds, styles of ear moulds, criteria for selection of one style over the other, ear moulds modifications, EAC of hearing aid along with ear moulds. (8 hrs.)

viii) Trouble shooting of hearing aid. (2 hrs.)

ix) Counseling and orienting the hearing aid user (patients and significant others) - importance of harness, BTE loops etc.; Tips to facilitate acceptance of hearing aids; Battery life, battery charger, etc. (2 hrs.)

**B) ASSISTIVE LISTENING DEVICES:** (4 hrs.)

TV listening aid, alarm devices, telephone listening aids, vibrotactile aids.

**C) COCHLEAR IMPLANTS:** (10 hrs.)

Historical review, parts and working of cochlear implant, Candidacy for the cochlear implant (changing criteria), team members and their roles for rehabilitation after cochlear implant, pre implant evaluations, surgical procedure, post- Surgical management, complications, mapping the implant, rehabilitation after implant, merits and demerits of cochlear the implant, current trend outside and in India.

## LIST OF BOOKS

### AMPLIFICATION AND ASSISTIVE DEVICES FOR THE HEARING IMPAIRED

1. Loavenbruck All and Madell IR (1981), Hearing aid dispensing for audiologists: A guide for clinical service. New York: Grune and Stratton.
2. Bess et al (1981). Amplification in Education, Alexander Graham Bell Association for the Deaf, Washington.
3. Hull, R.H. (1982). Rehabilitation Audiology, New York: Grune and Stratton.
4. Donnelly K (1974), Interpreting hearing aid technology, CC, Thomas, Springfield.
5. Markides A (1977) Binaural hearing aids, Academic Press Inc., London.
6. Hodgson HR and Skinner (PH) (1977, 1981), Hearing aid Assessment and use in audiologic habilitation, Williams and Wilkins, Baltimore.
7. Pollack M (1980) Amplification for the hearing impaired. Grune and Stratton, NY.
8. Cooper (1991), Practical aspects of Audiology: Cochlear implants: A practice guide. Whurr Publisher, London.
9. Skinner HW (1988), Hearing aid evaluation, Prentice Hall, Englewood Cliffs, HJ.
10. Mueller HG, Hawkins DB., Northern JL. (1992), Probe microphone measurements: Hearing aid selection and assessment, Singular publishing group. Inc., California.
11. ANSI & IEC Specifications

**B.2.2.4 : EDUCATIONAL AUDIOLOGY****(75 hrs.)**

1. (a) Definitions and goals in aural rehabilitation, classification of hearing handicap  
(b) Early identification and its importance in aural rehabilitation
2. (a) Unisensory Vs Multisensory approach:  
(b) Acoupedic approach  
(c) 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).  
(d) Total Communication
3. (a) Methods of teaching language to the hearing impaired  
(b) Natural method : maternal reflective method  
(c) Structured method (grammatical method) : Fitzgerald key, box technique, others  
(d) Computer aided method
4. (a) Educational placement of hearing impaired children :
  - Preschool training
  - Integration
  - Partial integration
  - Segregation : day school Vs residential school  
(b) Criteria for recommending the various educational placements  
(c) Factors affecting their outcome
5. (a) Educational problems of hard of hearing in India  
(b) Counseling the parents and teachers regarding the education of the hearing handicapped  
(c) Setting up class rooms for the hearing handicapped  
(d) Home training – need, preparation of lessons, correspondence programs, follow up.
6. (a) Classroom acoustics, preferential seating and adequate illumination  
(b) Classroom amplification devices

## LIST OF BOOKS

### EDUCATIONAL AUDIOLOGY

1. Sanders, D. A. (1993). *Management of Hearing Handicap; Infants to Elderly*, 3rd Ed., New Jersey, Prentice Hall.
2. Davis, J.M. and Hardick, E.J. (1981). *Rehabilitative Audiology for Children and Adults*. New York: John Wiley and Sons.
3. Ross, M. Brackett, D. and Maxon, A.B. (1991). *Assessment and management of mainstreamed hearing-impairment children: Principles and practice*. Austin: Pro.Ed.
4. Lynas, W. (2000). Communication options. In J. Stokes (Ed. ), *Hearing impaired infants – Support in the first eighteen months*. London: Whurr Publishers Ltd.
5. Sims, L.G., Walter, G.G., and Whitehead, R.L. (1981). *Deafness and Communication: Assessment and Training*. Baltimore: Williams and Wilkins.
6. Tucker, I., & Nolan, M. (1984). *Educational Audiology*. London: Croom Helm, Chap.10.
7. Alpiner, J.G. (1982). *Handbook of Adult Rehabilitative Audiology*. Baltimore: Williams and Wilkins.
8. Chermak, G.D. (1981). *Handbook of Audiological Rehabilitation*. C.C.Thomas.
9. Ebbin, J.B. (1974). Critical Age in Hearing. In C.Griffiths (Ed), *Proceeding of the International Conference on Auditory Techniques*. Illinois: Charles C. Thomas.
10. Griffiths, C. (1974). Early Identification - Plus the Auditory Approach. In C. Griffiths (Ed.), *Proceeding of the International Conference on Auditory Techniques*. Illinois: Charles C. Thomas.
11. Borastein, H. (1977). Systems of Sign. In L.J. Bradford & W.G. Hardy (Eds.), *Hearing and Hearing-Impairment*. New York: Grune and Stratton Inc.
12. Hull, R.H. (Ed). (1982). *Rehabilitative Audiology*. New York: Grune and Stratton Inc.
13. Fitzgerald, E. (1929). *Straight Language for the Deaf*. McClure.
14. Jackson, A. (1981). *Ways and Means-3. Hearing-Impairment a Resource Book of Information, Technical Aids, Teaching Material, and Methods used in the Education of Hearing-Impaired Children*. Hong Kong: Somerset Education Authority.

15. Tebbs, T. (1978). *Ways and Means: A Resource Book of Aids, Methods, Materials, Materials and Systems for use with the Language Retarded Child*. Hong Kong: Somerset Education Authority.
16. *Correspondence Program for Parents of the Deaf*, John Tracy clinic.
17. Nix, G.W. (1976) *Mainstream Education for Hearing-Impaired Children and Youth*. New York: Grune and Stratton Inc.
18. Ross, M. Brackett, D. and Maxon, A.B. (1991). *Assessment and management of mainstreamed hearing-impairment children: Principles and practice*. Austin: Pro.Ed.
19. Webster, A. & Ellwood, J. (1985). *The Hearing-Impaired Child in the Ordinary School*. London: Croom Helm.

- B.2.3.5 : A : OTORHINOLARYNGOLOGY (50 hrs.)**  
**B : COMMUNITY ORIENTED PROFESSIONAL PRACTICES (25 hrs.)**  
**IN SPEECH LANGUAGE PATHOLOGY AND AUDIOLOGY**

**Part A : OTORHINOLARYNGOLOGY (50 hrs.)**

**I. OTOLOGY**

1. Introduction – Anatomy and Physiology (Hearing and Balance systems)
2. Diseases of the External Ear : Congenital malformations, otitis externa, neoplasm, miscellaneous – Keratosis, Obturans, Foreign bodies
3. Disease of the middle ear : Congenital malformations, traumatic lesions, inflammatory diseases – Non-suppurative otitis media and its sequelae, Acute suppurative otitis media, chronic suppurative otitis media complications of suppurative otitis media, neoplasms
4. Diseases of the Inner Ear : Congenital deformities, traumatic lesions labyrinthitis, Meniere's disease, prebycusis, ototoxicity, noise induced hearing loss
5. Space occupying and degenerative lesions of the central auditory nervous system.

**II. RHINOLOGY**

1. Anatomy of the nose – paranasal sinuses
2. Congenital diseases of the nose: Complete absence, cleft lip, probosis lateralis, cysts, and nasal choanal atresis.
3. Sinusitis

**III. LARYNGOLOGY**

1. Anatomy and physiology of laryngeal structures
2. Diseases of the tonsils and adenoids: Acute tonsillitis, Acute Lingual tonsillitis, acute Adenoiditis, Chronic nonspecific peritonsillar abscess (Quinsy)
3. Tumours of oropharynx, nasopharynx, laryngopharynx (benign and malignant)
4. Pharyngeal Pouch (Hypopharyngeal Diverticulum)

5. Congenital Diseases of Larynx. Differences between an infant and an adult larynx. Stridor, causes of infantile stridor. Disorders of structure – Laryngomalacia. Bifid epiglottis, Laryngeal web, Atresia, Subglottic stenosis, posterior laryngeal cleft. Disorders of function – paralysis of vocal fold. Tumors and Cysts
  6. Laryngeal Trauma and Stenosis: Open injuries, closed injuries. Burns, Scalds, Foreign bodies, Trauma due to intubation, Stenosis
  7. Acute Laryngitis  
Acute infective laryngitis in the adult: Simple laryngitis, acute supraglottic laryngitis (Epiglottitis) Acute infective laryngitis in infancy and childhood. Simple laryngitis, Acute laryngotracheobronchitis, Acute epiglottitis, Laryngotracheal diphtheria, Non-Diphtheretic membranous laryngitis, Acute perichondritis, chondral neurosis, abscess of larynx Acute non-infective laryngitis
  8. Chronic laryngitis  
Non-specific: Chronic laryngitis without hyperplasia. Atrophic laryngitis. Vocal cord polyps. Reinke's Oedema. Vocal nodules. Chronic laryngitis in childhood.  
Specific-tuberculosis, lupus, syphilis, leprosy, scleroma, mycoses
- (Demonstration either live or video of above).

**Part B : COMMUNITY ORIENTED PROFESSIONAL PRACTICES IN SPEECH LANGUAGE PATHOLOGY AND AUDIOLOGY (25 hrs.)**

1. Epidemiology of Speech, language and hearing disorders. (2 hrs.)  
Environmental, Social, Economic Implications. Preventive education. (3 hrs.)
2. Approaches to service delivery  
– Institution based  
– Camp based  
– Community based.  
– Role of NGOs.  
  
Review of services in India.  
Integration of disabled into the community (3 hrs.)
3. Duties and responsibilities of SLP in various settings. (3 hrs.)  
Professional ethics for SLPs. Interacting with allied professionals and community health workers
4. Planning services for the communication disabled: (4 hrs.)  
Philosophy, planning, establishment of services for communication disorders – infrastructure, budget, staffing, equipment, furniture, policy-making, record keeping, proposal-writing, etc. Making services user- friendly,

5. Legislative support for rehabilitation. (5 hrs.)
  - RCI Act (1992)
  - PWD Act (1995)
  - National trust Act for autism, CP and MR (1999)
  - Environment Act.
  - MRTP Act.
  - FCRA
  - Consumer Protection Act.
  - Schemes and concessions under state and central government.
  - Vocational rehabilitation.
6. Strategies for awareness, public education and information. (Camps, Print and audiovisual media, Surveys, Radio broadcast, Street plays, etc.) (3 hrs.)
7. Empowering parents, persons with disabilities and community. Skill transfer to parents, grass-root level workers, teachers, health workers. (2 hrs.)
- 8) Levels of prevention: (2 hrs.)
  - a) Health promotion
  - b) Specific protection
  - c) Early diagnosis and Treatment – high risk infants
  - d) Disability limitation
  - e) Rehabilitation
- 9) The professional as a witness. Documentation. Handling legal issues. (1 hr.)

### **LIST OF BOOKS**

#### **COMMUNITY ORIENTED PROFESSIONAL PRACTICES IN SPEECH LANGUAGE PATHOLOGY AND AUDIOLOGY**

1. Administration and Management of Programs for Young Children. (1995) Shoemaker, C. J. New Jersey : Prentice Hall Inc. ISBN : 0-02-410041-2
2. Management of Child Development Centres. (1993) Hildebrand, V. (3<sup>rd</sup> Ed.). MacMillan Publishing Company. ISBN : 0-02-354524-0
3. Status of Disability in India – (2000), Editor : Kundu C.L., RCI,
4. Professional Issues in Speech-Language Pathology and Audiology - A Text book. (1994). Lubinski R. and Frattali C. California: Singular Publishing Group. ISBN : 1-56593-171-8
5. Private Practice in Communication Disorders. (1991). Wood, M. L. (2<sup>nd</sup> Ed). California: Singular Publishing Group.
6. Enabling the Disabled. Thakur Hariprasad Institute.

**B.2.3.6 BASIC STATISTICS AND RESEARCH METHODS IN (75hrs.)  
AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY**

**A. Basic Statistics:**

1. What is statistics – Importance of statistics in behavioural sciences – descriptive statistics and inferential statistics – usefulness of quantification in behavioural sciences – application to speech and hearing.
2. Measurement – scales of measurements – nominal, ordinal, interval and ratio scales.
3. Data collection – classification of data – class intervals – continuous and discrete measurements – drawing frequency curve – drawing inference from graph.
4. Measures of central tendency – need – types: mean, median, mode – working out these measures with illustrations.
5. Measures of variability – need – types of: Range, deviation average deviation, standard deviation, variance – interpretation.
6. Normal distribution – general properties of normal distribution – theory of probability – illustration of normal distribution – area under the normal probability curve.
7. Variants from the normal distribution – skewness – quantitative measurement of skewness – kurtosis – measurement of kurtosis – factors contributing for non-normal distribution.
8. Correlation – historical contribution – meaning of correlation – types of :  
- product, moment, content correlation, variation of product moment correlation, rank correlation.
9. Standard error, sampling distribution, type I and type II errors,  $\chi^2$ , t and f tests. Methods of significant – need for – significance of the mean – sampling error - significance of differences between means – interpretation of probability levels – small samples – large samples.

**B. Research Methods in Audiology and Speech Language Pathology**

1. Introduction – science and common sense – methods of knowing science and its functions – Aims of science understanding, classification and prediction scientific approach – observation and inference analysis and synthesis, imagination and analogy.
2. Methods of sampling – use of sampling – use of sampling method in various situations – types of sampling inference.

3. Hypothesis – what is hypothesis? Need for hypothesis, development of hypothesis – characteristics of hypothesis, its conditions and verifiability.
4. Methods of experimentation – variables –dependent and independent variables – concept of casualty in experimentation – methods of identifying causes – methods of agreement – difference – joint method, concomitant variation, methods of residue – their values and limitations – methods of inference.
5. Nature of bias and control – general types of bias – need for controls – ways of handling bias.
6. Need for research in Audiology and Speech - Language Pathology.
7. Choosing the research problems – stating the problems –questions stating the hypothesis.

### **LIST OF BOOKS**

#### **BASIC STATISTICS AND RESEARCH METHODS IN AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY**

##### **Essential:**

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

##### **Additional:**

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

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

### **Objectives :**

At the end of the year, the student clinician shall be able to:

- 1) Carry out informal and formal procedures for assessment of following aspects of speech and language :-
  - Pre-linguistic skills
  - Child directed speech
  - Semantics
  - Morphology
  - Syntax
  - Pragmatics
  - Non-verbal communication
  - Velopharyngeal competency
  - Phonological processes
  - Intelligibility
  - Reading, Writing and Spelling.
  - Phonological analysis of disordered speech
- 2) Analyze and interpret information obtained during assessment to arrive at a provisional diagnosis.
- 3) Differentially diagnose.
  - a) childhood communication disorders
  - b) articulation and phonological disorders.
- 4) Plan and execute intervention programs for
  - a) Delayed speech and language development.
  - b) Deviant speech and language development.
  - c) Deficient speech and language skills.
  - d) Misarticulations.
  - e) Cleft lip and palate.
  - f) Phonological disorders.
- 5) Compile a comprehensive report for appropriate referral of clients.
- 6) Communicate relevant test findings to clients and significant others in a professional manner.
- 7) Obtain information about different types of set-ups dealing with communication disorders.

### **Clinical Practicum Work :**

- 1) Complete informal and formal assessment of all aspects of speech and language in a minimum of 15 cases including children and adults (emphasis on childhood communication disorders and articulation and phonological disorders), under supervision.
- 2) Familiarization with checklists, tests, scales such as :
  - Clinical evaluation of language function (CELF)

- Program for Acquisition of language for the severely impaired (PALS)
  - Test of language development (TOLD)
  - Bankson's language screening test (BLST)
  - Screening Speech Articulation Test (SSAT)
  - Northwestern Syntax Screening Test (NSST)
  - Checklist for Autism Assessment
  - Pragmatic Assessment Protocols.
  - Boder Test of Reading - Spelling Patterns.
- 3) Using available instruments for :-
- Fo and Intensity information for sentences produced with different supra-segmentals.
  - Measuring AMR and SMR using any two methods of measurement.
  - Measuring s/z ratio, MPD using any two methods of measurement.
  - Comparing the performance of hearing impaired subjects on a task of auditory discrimination using a hearing aid and a tactile aid.
  - Analyzing different types of spectrograms.
  - Obtaining Nasalance measures for standard stimuli for normal subjects.
- 4) Planning and executing intervention programs for a minimum of 5 cases (including children and adults) for at least 5 sessions each. The student clinician should :
- Carry out and report baseline evaluation.
  - Develop proficiency in using various therapy techniques appropriately.
  - Develop proficiency in adopting various reinforcement strategies.
  - Provide guidelines for home-based intervention.
  - Report progress in therapy appropriately.
  - Participate in case discussion with supervisor.
  - Participate in parent counseling meeting.
  - Make appropriate referrals, where necessary.
- 5) Familiarization with general guidelines about counseling clients with communication disorders and significant others.
- 6) Visits to centers such as
- a) School for the HI
  - b) School for the MR
  - c) School for the LD
  - d) District Rehabilitation Centre
  - e) Centre for the Cerebral Palsied
  - f) Centre for laryngectomee and head-neck cancer rehabilitation.
  - g) Centre for the autistic
  - h) School for deaf-blind.
- 7) Maintain a clinical diary.
- 8) Maintain a journal for the diagnostic and therapy reports and clinical assignments.

## **CLINICAL PRACTICUM IN AUDIOLOGY**

### **Section A:**

- I. Familiarization of instrumentation for speech audiometry, immittance audiometry, sound field-testing.
- II. Complete pure tone audiometry (with AC/BC, unmasked/masked), interpretation of audiograms, identifying indicators for special/further diagnostic testing, writing case review. (25 cases)
- III. Speech Audiometry: familiarizing with speech test material in at least 2 languages, mastering live voice presentation/recorded presentation, administering SAT, SRT, WRS. MCL, UCL, PI/PB Function Test.
- IV. Collection of Speech Audiometry Test material in Indian languages.
- V. Speech Audiometry on normal subjects (5 cases), and cases with conductive hearing loss, S.N. Hearing Loss and Functional Hearing Loss. Interpretation of speech audiometry results.(20 cases)
- VI. Immittance Audiometry: - PVT, Tympanometry, Acoustic Reflex Testing (ipsi & contra). Interpretation of the findings taking into consideration the ENT reports.

### **Section B:**

#### **Pediatric Audiological Assessment:**

- I. Informal screening - purpose, material used, noisemakers, their spectral Characteristic, procedures. (5 normal hearing and 5 hearing impaired children)
- II. Sound field testing: BOA, VRA, Play Audiometry (5 cases each)

### **Section C:**

#### **HEARING AID TRIAL POSTING:**

- I. Hearing aid trial: pre-selection of hearing aids: style, EAC, other issues, inspection of ear moulds. Functional gain method - (10 children and 10 adults)  
Concept of Speech banana, aided audiogram
- II. Observing Real Ear Insertion Gain measurement. (10 cases)
- III. Counseling patients/care-givers regarding hearing aid: Care, maintenance, adjustments, tips to the caregiver regarding acceptance of hearing aid. (5 children and 5 adults.)

- IV. Electro acoustic evaluation of hearing aids. (body level & ear level), with and without ear moulds. Equipment for analysis. Calibration of hearing aid analyser.
- V. Models makes available in the market, their EAC, cost of hearing aid its suitability to different contours of audiograms, age, etc.
- VI. Specification sheets - BIS, ANSI, IEC with respect to hearing aid.

#### **Section D:**

##### Posting in Electronic Lab:

- I. Types of microphone, amplifiers, receivers and batteries used with different hearing aids.
- II. Parts of hearing aids: of different types, makes and models.
- III. Familiarization with group hearing aid system used in institutions/schools. Available makes and models, their cost, etc.; Assistive listening devices, FM System.
- IV. Hearing Aid trouble shooting, using multi-meter and other simple methods.

#### **Section E:**

##### Ear mould:

- I. Types of ear moulds, indication for each type with respect to style of hearing aid, amplification requirement. Inspection of different types of prepared moulds. Indications for Ear-mould modification - venting and plumbing.
- II. Material used at each stage of preparation.
- III. Equipment required at each stage.
- IV. Procedure for the preparation of the mould. ( one pair of mould has to be prepared)

## **THIRD YEAR GRADUATE COURSE**

### **OBJECTIVES:**

At the end of the third year the student trainee will have:

1.
  - a) Knowledge of anatomy and physiology of voice production, normal and abnormal aspects of voice.
  - b) Practical skills for assessment and intervention for individuals with voice disorders.
2.
  - a) Knowledge of various types of adult neurocommunication disorders.
  - b) Practical skills for assessment and intervention of individuals with neurocommunication disorders.
  - c) Knowledge of different types of neuromotor speech disorders.
  - d) Practical skills for assessment and intervention of individuals with motor speech disorders.
3. Both theoretical and practical aspects of AAC for above groups, skills to counsel the clients/caregiver with language, articulation and phonological disorders.
4.
  - a) Knowledge and practical skills of various electrophysiological tests, such as ABR and OAE.
  - b) Compiling the results of audiological test batteries, interpretation of results and indicating referrals.
  - c) Practical skills in calibration of audiometer, noise measurement and hearing conservation.
  - d) Practical skills in counseling the case/caregiver regarding the care and maintenance of hearing aids, auditory training and developing speech reading skills.

### III B.Sc COURSE CONTENT

III B.Sc	Paper Title	Hrs./Wk	Total Marks
<b><u>Speech Pathology:</u></b>			
B.3.1.5	Fluency and its disorders	4	80 + 20
B.3.1.6	Adult Neurocommunication disorders	4	80 + 20
B.3.1.7	Neuromotor Speech disorders	4	80 + 20
<b><u>Audiology :</u></b>			
B.3.2.5	Rehabilitative Audiology	4	80 + 20
B.3.2.6	Noise measurement and hearing conservation.	4	80 + 20
B.3.2.7	Paediatric Audiology	4	80 + 20

#### **Clinical Practicum :**

	Clinical work internal	Clinical Viva Internal + External
Speech Pathology	100	100
Audiology	100	100
Total	200	200

### THIRD YEAR GRADUATE COURSE

#### **B 3.1.5 : FLUENCY AND ITS DISORDERS**

**(75 hrs.)**

1. (a) Fluency : Definition, development of factors influencing
  - (b) Definitions of intonation, rhythm, stress – Development of intonation, rhythm, stress – their implications to therapy
  - (c) Evaluation of Fluency
  - (d) Others Prosodic features in fluency disorders
2. (a) Stuttering
  - Definition, Epidemiological findings, prevalence and incidence
  - Stuttering, Block, nature of stuttering, adaptation effect, consistency effect, situational variability, stuttering and heredity.
  - (b) Normal non-fluency primary stuttering – secondary stuttering
  - (c) Development of stuttering
  - (d) Differential diagnosis of developmental stuttering from neurogenic stuttering, cluttering, normal non-fluency.
3. (a) Introduction to theories of stuttering – organic Vs functional, cerebral dominance, diagenosogenic and learning theories, demands – capacities model.
  - (b) Assessment of stuttering and associated problems – Prevention of early stuttering.
4. (a) Therapy of stuttering –
  - Rationale, Prolongation, shadowing, habit rehearsal techniques, DAF, masking, shock therapy desensitization highlighting, time out – air flow and modified air flow , sequence of therapy –
  - MIDVAS, transfer and maintenance – relapse and recovery from stuttering, measurement of therapy progress, naturalness rating.
5. (a) Cluttering – Definition, characteristics, Differential diagnosis, associated problems and assessment procedure, therapeutic consideration.
  - (b) Neurogenic stuttering – characteristics, etiology, differential diagnosis and management issues.

## LIST OF BOOKS

### FLUENCY AND ITS DISORDERS

1. Bloodstein, O. (1975). A Handbook on stuttering. Chicago: National Easter Seal Society for crippled children and adults
2. Bloodstein, O. (1993): Stuttering. Allyn and Bacon, Boston.
3. Conture (1990): Stuttering. Prentice Hall, New Jersey.
4. Curlee (1993): Stuttering and related disorders of fluency. Thieme Medical Publisher, New York.
5. Curlee and Perkins (Ed.). (1985): Nature and treatment of stuttering. Taylor and Francis, London.
6. Eisenson, J. (1975). Stuttering: A symposium. New York: Harper and Row.
7. Hahn, E.F. & Hahn, E.S. (1973). Stuttering significant theories and therapies. (2nd Ed.) California: Stanford University Press.
8. Myers, Louis, Ko (1992): Cluttering. Kibworth, Far Communication.
9. Silverman, F.H. (1992). Stuttering and other fluency disorders. Prentice Hall, Inglewood Cliffs.
10. Starkweather, D. (1987). Fluency and stuttering. Prentice-Hall, New Jersey.
11. Van Riper, C. (1973). Treatment of stuttering. New Jersey: Prentice Hall.
12. Van Riper, C. (1982). Nature of Stuttering. (2nd Ed.) New Jersey: Prentice Hall Inc.
13. Wells (1987). Stuttering treatment - A C. Prentice-Hall, New Jersey.
14. Weiss (1964). Cluttering. Prentice Hall, New Jersey.
15. Wingate, M.E. (1976). Stuttering theory and treatment. New York: Irvington.
16. Johnson, W. & Leytenegger, R.B. (1963). Stuttering in children and adults. Thirty years of research at the University of IOWA. Minneapolis: University of Minnesota.
17. Dalton, Phardcastle, W.J. (1993): Disorders of fluency. Whurr Publishes, London.
18. Fawcus, M. (1995): Stuttering. Whurr Publishers, London.
19. St. Louis (1986). Atypical stutter. Orlando, Academic Press.
20. Barbara, D.A. (1965). New directions in stuttering theory and practice.

Springfield: Charles C Thomas.

21. Dalton, Phardcastle, W.J. (1993): Disorders of fluency. Whurr Publishes, London.
22. Fawcus, M. (1995): Stuttering. Whurr Publishers, London.
23. Gregory H (1986) Stuttering: Differential evaluation & therapy. Autism Pro-ed.
24. Perkins, W. L. (1992): Stuttering prevented. Whurr Publishers, London.
25. Riley (1981). Stuttering prediction instrument for young children. Pro.Ed. Austin.
26. Riley (1986). Stuttering severity instrument for children and adults. Pro.Ed. Austin.
27. Rustin, L. and others (1996). Assessment and therapy for young dysfluent children. Whurr Publishers, London.
28. St. Louis (1986). Atypical stutter. Orlando, Academic Press.
29. Wall & Nters (1995) Clinical management of childhood stuttering (II Edition) Pro-Ed. Autism
30. Austin, L. and Others (Ed.) (1991): Progress in the treatment of fluency disorders. Whurr Publishers, London.
31. Corder, Akingham, R.J. (1998): Treatment efficacy for stuttering. Singular Publishing Group, San Diego.
32. Dalton, Phardcastle, W.J. (1993): Disorders of fluency. Whurr Publishes, London.
33. Gregory H (1986) Stuttering: Differential evaluation & therapy. Autism Pro-ed.
34. Mark Onslow (1996) Behavioural management of stuttering. Singular Publishing Group Inc.
35. Richard Ham (1986) Techniques of stuttering therapy. Prentice Hall. New Jersey
36. Riley (1981). Stuttering prediction instrument for young children. Pro.Ed. Austin.
37. Austin, L. and Others (Ed.) (1991): Progress in the treatment of fluency disorders. Whurr Publishers, London.
38. Corder, Akingham, R.J. (1998): Treatment efficacy for stuttering. Singular Publishing Group, San Diego.

**B 3.1.6 : ADULT NEUROCOMMUNICATION DISORDERS (75 hrs.)**

**Adult Neurocommunication Disorders. (75 hrs.)**

1. Neuro-anatomical bases of language – Cerebral blood supply - Neuro-physiological, Neuro-chemical and Neuro-psychological aspects of language in the adult brain (Hemispheric functions, cerebral dominance, models of language processing). (10 hrs.)
2. Pathophysiology of neurological lesions affecting speech, language and hearing – Reorganization, relearning and recovery. (3 hrs.)
3. General and specific neurological examination (Higher functions, cranial nerves, motor and sensory systems, reflexes and fundus). Neurological investigations – Electrophysiology (EEG, Evoked potentials) and imaging (CT and MRI). (5 hrs.)
4. Theoretical considerations in neuro-communication disorders (competence Vs performance, loss Vs interference, regression hypothesis, multi-lingualism, unidimensional Vs multidimensional break down. (5 hrs.)
5. Definitions of aphasia. (1 hr.)
6. Etiology of aphasia. (2 hrs.)
7. Clinical features (linguistic, psycho-social and neurobehavioral) (6 hrs.)
8. Classification of aphasia based on anatomical, linguistic and psycholinguistic aspects. (7 hrs.)
9. Assessment of skills (linguistic, cognitive and communicative) Informal and formal procedures. (10 hrs.)
10. Intervention : Prognostic indicators - Spontaneous recovery - General Principles - Specific approaches / techniques - Group therapy – AAC - Role of family. (10 hrs.)
11. Linguistic investigations in aphasia. (3 hrs.)
12. Associated problems in aphasia. Definition, classification, clinical features, assessment and management of : a) Agnosia, b) Alexia c) Agraphia (6 hrs.)
13. Right Hemisphere Language Disorders (3 hrs.)
14. Primary Progressive Aphasia. } (1 hr.)
15. Language Disorders in Dementia. } (1 hr.)
16. Differential Diagnosis of Adult Neuro-communicative Disorders. (2 hrs.)

## LIST OF BOOKS

### ADULT NEUROCOMMUNICATION DISORDERS

#### Essential:

- 1) Understanding Aphasia. (1993). Goodglass, H. Academic Press Inc.
- 2) A Survey of Adult Aphasia and Related Language Disorders. (1993). Davis, G. A. Prentice Hall Inc.
- 3) Speech and Language Evaluation in Neurology: Adult Disorders. (1985). Ed. Darby, J. K. Grune and Stratton Inc.
- 4) Acquired Speech and Language Disorders. (1994). Murdoch, B. E. London: Chapman and Hall.
- 5) Aphasia. (1982). Darley, F. L. W. B. Sanders Co.

#### Additional :

- 1) Handbook of Speech Pathology. (1971). (5<sup>th</sup> Ed.). Travis, L.E. Prentice Hall Inc.
- 2) Aphasia and Related Language Disorders. (1990). LaPointe, L. L. Theime Medical Publishers.

**B 3.1.7 : NEUROMOTOR SPEECH DISORDERS****(75 hrs.)****Part A : Childhood Motor Speech Disorders**

1. Cerebral Palsy
  - Definition and etiology (1 hr.)
  - Classification (2 hrs.)
  - Primitive postural and oropharyngeal reflexes (3 hrs.)
  - Associated problems (3 hrs.)
  - Communication problems (4 hrs.)
  - Assessment of communication skills (3 hrs.)
  - Intervention - Early communication development. Speech language therapy. Neurodevelopmental approaches (Bobath's, Phelps's, and Temple-Fay's). AAC (8 hrs.)
  - Inter and Trans disciplinary approach. (1 hr.)
2. Other neuromotor developmental disorders such as (2 hrs.)
  - Gilles de la Tourette syndrome
  - muscular dystrophy
  - worster – Drought Syndrome etc.
3. Developmental dyspraxia.
  - Definitions, etiology, classification and characteristics (2 hrs.)
  - Assessment: informal and formal. (1 hrs.)
  - Differential diagnosis of dysarthria, aphasia and apraxia. (1 hrs.)
  - Intervention : General and specific techniques. AAC, Team approach (2 hrs.)

**Part B : Adult Motor Speech Disorders**

1. Neuroanatomical correlates of speech – Nervous system – divisions and functions of the nervous system – nerve fibers – synapse – neural transmission – structure of the brain – brief descriptions of spinal cord, CSF, cranial nerves, PNS and muscles. Nerve cell, reflex arc, nerve tracts, motor and sensory pathways. Cerebral cortex –auditory and visual sensations. (5 hrs.)
2. Dysarthrias: (4 hrs.)
  - a) Definitions, etiology, classification.
  - b) Clinical features of dysarthrias associated with
    - LMN lesions (3 hrs.)
    - UMN lesions (2 hrs.)
    - Cerebellar lesions. (1 hrs.)
    - Extrapyrmidal lesion (4 hrs.)
    - Lesions in two or more of the above (ALS, Multiple Sclerosis Wilson's Disease etc.) (2 hrs.)
  - c) Assessment of dysarthria – perceptual and instrumental. (2 hrs.)
  - d) Intervention - General principles, Specific techniques, AAC (7 hrs.)

- |    |   |          |
|----|---|----------|
| 3. | Acquired apraxia  |          |
|    | - Definition, etiology, classification and characteristics. | (2 hrs.) |
|    | - Assessment : informal and formal                          | (1 hr.)  |
|    | - Differential diagnosis                                    | (1 hr.)  |
|    | - Intervention : General and specific techniques AAC        | (2 hrs.) |
| 4. | Swallowing disorders:                                       |          |
|    | - Definition and phases of normal swallow                   | (1 hr.)  |
|    | - Development of feeding                                    | (1 hr.)  |
|    | - Etiology abnormal patterns of swallow                     | (1 hr.)  |
|    | - Assessment  | (1 hr.)  |
|    | - Intervention.   | (2 hrs.) |

### **LIST OF BOOKS**

#### **NEUROMOTOR SPEECH DISORDERS**

##### **Essential:**

- 1) Neurology for Speech-Language Pathology. (1986). (2<sup>nd</sup> ed.) Love, R.J. and Webb, W.G. Butterworth. ISBN 0-705-9076-3.
- 2) Clinical Management of Motor Speech Disorders in Children. (1999). Caruso, F. J. and Strand, E. A. New York: Thieme. ISBN 86577 – 7624 (TNY). ISBN 3-13-111381-2 G.T.V.
- 3) Motor Speech disorders - A Treatment guide. (1991). Dworkin, P.J. St. Louis: Mosby Year Book. Inc. ISBN 155664-223-7.
- 4) Clinical Management of Neurogenic Communication Disorders. (1985). Johns, D.E. Boston: Allyn & Bacon.
- 5) Acquired Speech and Language disorders - A Neuroanatomical and Functional Neurological Approach. (1994). Murdoch, B.E. London: Chapman and Hall. ISBN 04R 33440-2.
- 6) Dysarthria and Apraxia. (1983). Perkins, W. H. New York: Thieme – Strotton Inc. (Current therapy of communication disorders)
- 7) Motor Speech Disorders: Substrates, Differential diagnosis and Management. (1995). Duffy, J. R. St. Louis: Mosby.
- 8) Handling the Young Cerebral Palsied Child at Home. (1974). (2<sup>nd</sup> Ed.) Minifie, N.R. Williams Heinemann Medical Books.
- 9) Cerebral Palsy: The child and the Young Person. (1992). Eds. Cogher, L., Savage, E. and Smith, M.T. London: Chapman and Hall Medical. ISBN 0412309 009

- 10) Cerebral Palsy. (1983). Hardy, J. Remediation of Communication Disorder Series by F.N. Martin. Englewood Cliffs, Prentice Hall Inc.
- 11) Working with Swallowing Disorders. Langley. J. U.K.: Winslow ISBN 0-86388-049-5
- 12) Pre feeding skills. Morris. S. and Klein. M. U.K.: Winslow ISBN 04-562
- 13) Dysphagia and the child with developmental disabilities. Resenthal. S., Shipp and Lotze.

**B 3.2.5 : REHABILITATIVE AUDIOLOGY**

**(75 hrs.)**

1. Management of hearing impaired children with special needs
  - (a) Management of Multi Handicapped Hearing Impaired Children (MHHI)
  - (b) Management of children with central auditory processing problems
2. Speech reading
  - (a) Definitions
  - (b) Need
    - (i) For those with hearing aids; tactile devices; cochlear implants
    - (ii) For those without sensory aid
    - (iii) For children
    - (iv) For adults
  - (c) Visibility of speech sounds – Audiovisual perception Vs Visual perception
  - (d) Visual perception of speech by the hard of hearing
  - (e) Tests for speech reading ability
    - Denver Quick test of lip reading ability
    - John Tracy clinic test
    - Utlay test
    - Helen test
    - Mason multiple choice test
3. (a) Factors influencing speech reading:
  - Related to the speech reader
  - Related to the speaker
  - Related to the environment
- (b) Methods of training: Analytical Vs Synthetic; (including speech tracking)
- (c) Individual and group training
  - Purpose
  - Requirement for each – i.e. space, number, selection of participants
  - Other consideration

4. Auditory learning
  - (a) Definitions and historical background
  - (b) Role of audition in speech and language development in normal children and its application in education of the hearing impaired.
  - (c) Factors in auditory training : Motivation of the case, intelligence, age, knowledge of progress, etc.
  - (d) Methods of auditory training.
  - (e) Individual Vs Group auditory training
5. (a) Communication strategies
  - Anticipated strategies
  - Repair strategies
  - (b) Speech reading activities
    - For adults and children
    - For individual Vs Group activities
  - (c) Auditory training activities
    - For patients of different age groups
    - In patients with congenital and acquired hearing losses
    - Verbal Vs Nonverbal material
    - For individual Vs Group activities
6. Rehabilitation of the hearing impaired – Elderly population

## LIST OF BOOKS

### REHABILITATIVE AUDIOLOGY

1. Bellis, T.J. (1996) *Assessment and Management of Central Auditory Processing Disorders in Educational Setting: From Science to Practice*. San Diego: Singular Publishing Group, Inc.
2. Plant, G. and Spens, K.E (1995). *Profound Deafness and Speech Communication*. London: Whurr Publishers Ltd.
3. Trehur, S.E. and Schneider, B. (1985) (Ed.) *Auditory Development in Infancy*. New York: Plenum Press.
4. Walsh, S.R. and Holzberg, R. (1981). *Understanding and Educating the Deaf-blind severely and profoundly handicapped - An international perspective*. Springfield: Charles C Thomas Publishers.
5. Willeford, J.A. and Burleigh, J.M (1985). *Handbook of Central Auditory Processing Disorders in Children*. San Diego; Grune & Stratton, Inc.

6. Balkany, I. (1986). *Cochlear Implant*. The Otolaryngologic Clinics in North America.
7. Berger, K.W. (1972). *Speech Reading, Principles and Methods*. National Educational Press.
8. Nielsen, H.b., and Kampp, E. (1974). *Visual and audio-visual perception of speech*. Sixth Denavox Symposium, Denmark.
9. O'Neill, J.J., and Oyer, H.J. (1961). *Visual communication for the Hard of Hearing*. New Jersey: Prentice Hall.
10. Plant, G and Spens, K.E (1995). *Profound Deafness and Speech Communication*. London: Whurr Publishers Ltd.
11. Sanders, D.A. (1993). *Management of hearing handicap infants to elderly*. 3rd Ed. New Jersey: Prentice Hall.
12. Erber, N.P. (1982). *Auditory Training*. Washington: A.G. Bell Association for the deaf.
13. Flexer C., (1994). *Facilitating Hearing and Listening in Young children*. California: Singular Publishing Inc.
14. Griffiths, C. (1974). *Proceedings of the international conference on auditory technique*. Illinois: Charles.C. Thomas.
15. Oyer, H.J. (1966). *Auditory communication for the hard of hearing*. New Jersey: Prentice Hall.

- B 3.2.6 : NOISE MEASUREMENT AND HEARING CONSERVATION (75 hrs.)**
1. Noise in the environment: (5 hrs.)
    - Types - continuous, impulse, intermittent
    - Sources - Community, Industrial, Traffic and others.
  
  2. Effects of Noise: (12 hrs.)
 

Noise - induced Hearing Loss (NIHL) Acoustic Trauma:  
Incidence/prevalance, Audiological and Otological characteristics.

    - a) Auditory effects:
      - Historical aspects
      - Acute over pressure
      - Chronic noise injury
      - TTS and recovery patterns
      - Injury to the middle ear
      - Damage to the organ of Corti and resulting symptoms.
      - Histopathological changes
      - Effects of noise on communication, SIL
      - PTS
  
    - b) Non-Auditory Effects:
      - Semantic responses; stress and health; sleep; audio-  
analgesia; effects on CNS and other senses.
      - Effects of noise on performance.
      - Annoyance:NQY, PNDB, PNL,EPNL,NC curves
  
  3. Audiometry in NIHL: (3 hrs.)
    - Calibration - subjective calibration - real ear method - loudness  
balance method. Artifical ear methods - use of hearing aid  
analyser and 2cc coupler. Calibration of BC vibrator, various  
methods of BC calibration. NBS 9A coupler - performance of  
different types of earphones - WF 705, TDH - 39, PDR permoflux -  
ear cushions
  
    - Pure tone audiometry, high frequency audiometry; brief tone  
audiometry; base line and periodic monitoring tests.
  
    - Instrumentation: Manual audiometry, automatic audiometry.
  
    - Speech Audiometry; Speech discrimination tests with and  
without the presence of noise, filtered speech tests, time  
compressed speech tests.

- Immitance audiometry.
  - ERA
  - Tests for susceptibility, OAE measurements.
  - Correction for presbyacosis
4. Noise Measurement: (10 hrs.)
- Instruments: Sound Level Meter (SLM) - types, parts and functioning, Digital, Non-digital, portable, system settings for different types of measurements. Transducers, Noise Dose Meters, Analyzers, recorders, read-out devices. Purpose, utility and requirements.
  - Instrumentation and procedure for indoor and outdoor measurements of ambient noise, traffic noise, air-craft noise, community noise, and industrial noise.
5. Ear Protective Devices (EPDs): (8 hrs.)
- Ear plugs; ear muffs, helmets; special hearing protectors.
  - Properties of EPDs: Attenuation, Comfort, Durability.
  - Evaluation of attenuation characteristics of EPDs.
  - Implementation for effective use of EPDs.
6. Hearing Conservation: (8 hrs.)
- Public education with respect to hazardous effects of noise, need for hearing conservation programs; measurement of noise considered hazardous, steps in noise control.
7. Legislations related to noise: (10 hrs.)
- DRC - Definition: historical aspects; Use of TTS and PTS: Information in establishing DRC, CHABA; AFR 160-3 AAOO, ASA Z 24X2. Damage Risk contours Walsh - Healy Act. OSHA, Noise Control Act. DRC for impulse noise.
  - Claims for hearing loss. Fletcher point eight formula; 1947, AMA method; AAOO AMA formula, California variation of AAOO formula. Factors in claim evaluation, variations in laws and regulations, date of Injury, evaluation of loss. No. of tests.
  - Acts and regulations with respect to noise in India - Central and State-wise, BMC Act, 1999, The Bombay Police Act 1951, Motor Vehicles Act 1939, The Cinematograph Act, 1952, Noise pollution control regulation rules, 1999, Environment protection Act, 1986, The consumer protection Act, 1995.

## LIST OF BOOKS

### NOISE MEASUREMENT AND HEARING CONSERVATION

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

IS Specifications - Noise Measurements.

IS:7194-1973 Specification for assessment of noise exposure during work  
For hearing conservation purposes.

IS:9167-1979 Specification for ear protectors.

IS:6229-1980 Method for measurement of real-ear protection of hearing  
Protectors any physical attenuation of earmuffs.

IS:9876-1981 Guide to the measurement of airborne acoustical noise and  
Evaluation of its effects on man.

IS:7970-1981 Specification for sound level meters.

IS:9989-1981 Assessment of noise with respect to community response.

IS:10399-1982 Methods for measurement of noise emitted by Stationary road  
vehicles.

<b>B 3.2.7</b>	<b>: <u>PAEDIATRIC AUDIOLOGY</u></b>	<b>(75 hrs.)</b>
1.	Development of the human auditory system - Basic embryology - Embryology of the auditory system - Relevance of the information with special reference to syndromes.	(8 hrs.)
2.	Development of auditory behavior - Prenatal hearing - New born hearing - Auditory development from 0-2 yrs.	(8 hrs.)
3.	Causes of hearing loss in children: a) Genetic : - Congenital - of late onset - Progressive - Syndromic/Non-syndromic b) Non -Genetic: Congenital / Acquired c) Importance of case history	(5 hrs.)
4.	Early Identification of Hearing Loss - Need, with specific reference to conductive hearing loss and sensori-neural hearing loss.	(5 hrs.)
5.	Screening for hearing loss: i) a) High risk registers b) Behavioral Tests: stimuli, procedure, recording of responses, interpretation of results and validation of results. c) Mass Media Tests. d) Objective Tests: Historical review, Immittance Screening, BERA, Otoacoustic Emission (OAE)  ii) School screening: - Objectives: Screening for hearing sensitivity, screening for middle ear effusion. Need, criteria, instrumentation, Tests: Individual, Group. Importance of follow up.	(16 hrs.)
6.	Hearing Testing in neonates and infants: - Behavioral Observation Audiometry (BOA) - Conditioning Techniques including CORA, VRA and its modifications, - TROCA, play audiometry.	(8 hrs.)

7. Speech Audiometry in Children: (10 hrs.)
  - a) Tests and material used to obtain:
    - Speech Detection Threshold (SDT)
    - Speech Reception Threshold (SRT)
    - Speech Recognition Tests including VASC, WIPI; NuChip, Glendonald Auditory Screening Procedure (gasp), Early Speech Perception Test (EST), available Indian Material.
    - Response elicitation
  - b) Factors affecting these measures;
  - c) BC Speech Audiometry
8. Physiological/Electrophysiological Measures: (8 hrs.)
  - Immittance,
  - Evoked Response Audiometry including ECOG, BSERA, MLR, LLR, CNV, P300, FFR.
  - Otoacoustic emission
9. Functional Hearing Loss in children: (5 hrs.)
  - Signs/Symptoms
  - Tests
10. Central Auditory Processing Disorders in children: (15 hrs.)
  - Signs/Symptoms
  - Tests.

### **LIST OF BOOKS**

#### **PAEDIATRIC AUDIOLOGY**

1. Davis, J.H., and Hardick, E.J. (1981). Rehabilitative Audiology for children and adults, New York: John Wiley and Sons.
2. Erber, N.P. (1982), Auditory Training, Washington: A.G. Bell Association for deaf.
3. Fulton, R.L. and Lloyd, L.L. (1975), Auditory assessment of the difficult to test, Baltimore: Williams and Wilkins, Co.
4. Gerber, S.E. (1982). Audiology in infancy. New York: Grune and Stratton.
5. Gerber, S.E., and Mencher., S.T. (1978). Early diagnosis of hearing loss, New York, Grune and Stratton.
6. Ling, D. (1978). Speech and hearing impaired child. Washington: Alexander Graham Bell Association for the deaf.
7. Martin, F.N. (1978). Paediatric Audiology, New Jersey: Prentice Hall.
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## **CLINICAL PRACTICUM IN SPEECH-LANGUAGE PATHOLOGY**

### **Objectives:**

At the end of the year, the student clinician should be able to:

- 1) Carry out informal and formal procedures for assessment of :
  - Voice disorders
  - Fluency disorders
  - Neurogenic language disorders
  - Motor speech disorders
  - Alaryngeal speech
  - Swallowing
  - Resonance
  - Breathing and breath support.
- 2) Analyze and interpret the obtained findings to arrive at a provisional diagnosis.
- 3) Differentially diagnose
  - Acquired/neurogenic language disorders.
  - Voice disorders
  - Fluency disorders
  - Neuromotor speech disorders
- 4) Plan and execute intervention programs for different types of speech and language disorders. (emphasis on voice disorders, fluency disorders, neuromotor speech disorders, neurogenic language disorders).
- 5) Compile a comprehensive diagnostic and intervention report for referral of clients.
- 6) Counsel and refer clients appropriately.
- 7) Have information about various centers across the country for rehabilitation of speech and language disorders.
- 8) Be cognizant of legislation pertaining to the speech language disorders.

### **Clinical Practicum Work:**

- 1) Undertake complete diagnostic assessment for minimum of 20 cases with different types of speech language disorders. (Emphasis on voice disorders, fluency disorders, neurogenic language disorders and motor speech disorders) with minimal supervision.
- 2) Familiarizing with tests and procedures such as :
  - Western Aphasia battery (WAB)
  - Revised token test (RTT)
  - Illinois test of Psycholinguistic Abilities (ITPA)
  - Apraxia Battery for Adults (ABA)
  - Frenchay's Dysarthria Assessment (FDA)
  - Voice rating scales

- Stuttering Severity Index (SSI)
  - Boston Diagnostic Aphasia Examination (BDAE)
- 3) Using available instrumentation for
    - Acoustic measures such as Fo, intensity, jitter, shimmer. H/N ratio and other related measures for phonation and speech.
    - Measures of laryngeal contact for steady phonation.
    - Measures of aerodynamic parameters.
    - Analysis of dysfluencies.
  - 4) Plan and execute intervention program for minimum of 10 cases for at least 5 session each. The student clinician should :
    - Carry out and report baseline evaluation.
    - Develop proficiency in using various therapy techniques appropriately.
    - Develop proficiency in adopting various reinforcement strategies.
    - Provide guidelines for home-based intervention.
    - Report progress in therapy appropriately.
    - Participate in case discussion with supervisor.
    - Participate in parent counseling meeting.
    - Make appropriate referrals, where necessary.
    - Demonstrate production of esophageal speech.
    - Be familiar with different AAC approaches and its implementation.
  - 5) Undertake counseling and appropriate referrals independently (with minimal support)
  - 6) Maintain a clinical diary.
  - 7) Maintain a journal for the diagnostic and therapy reports and clinical assignments.

### **CLINICAL PRACTICUM IN AUDIOLOGY**

- 1) Familiarization of instrumentation for pure tone and speech special tests, Imminence audiometry.
- 2) Holistic audiological assessment for differential diagnosis:
  - a) Routine pure tone & speech audiometry
  - b) Administering special tests using pure tone: TDT, STAT, SISI, ABLB, MLB, Stenger
  - c) Speech: PI/PB Function, Stenger, CAD tests.
  - d) Noise: SAL, SPIN (20 cases)
  - e) Immittance audiometry. Basic tests
    - Acoustic reflex decay
    - Eustachian tube function
  - f) Compiling the reports for overall case reports.
3. ABR & OAE testing
  - Preparation of the patient. Informing caregiver/patient with respect to preparation. Electrode montage.
  - Observing the procedure with respect to test protocol (5 cases each)

4. Hearing Aid Trial:
  - a) Functional gain, REIG, other methods with:
    - Monaural fitting.
    - Binaural fitting
    - Programmable hearing aid - Analog Digital
  - b) Explaining the benefits of the hearing aid to the patient/caregiver.
  - c) Counseling for care & maintenance of hearing aid, preparation of harness, cleaning the ear moulds.
5. Calibration of pure tone audiometer (AC, BC and Speech).
6. Noise measurement and attenuation measurement of ear protection devices.

## APPENDIX A (1)

### SCHEME OF CURRICULUM FOR FIRST YEAR GRADUATE COURSE

Sr. No.	Subject Code	Subject	Credits (clock hours) (Minimum required)	Scheme of the Examination			
				Duration of the paper	Main Exam.	Marks I.A	Total Marks
1.	B 1.1.1	Introduction to Speech and Language Pathology	75	3 hrs	80	20	100
2.	B 1.2.1	Introduction to Audiology	75	3 hrs	80	20	100
3.	B 1.3.1	Basic Human Anatomy and Physiology	75	3 hrs	80	20	100
4.	B 1.3.2	Basic Acoustics and Electronics	75	3 hrs	80	20	100
5.	B 1.3.3	Introduction to Linguistics	75	3 hrs	80	20	100
6.	B 1.3.4	Psychology related to Speech and Hearing	75	3 hrs	80	20	100
7.		Clinical Work (Speech Pathology)	250	Practical & Oral	100	100	200
8.		Clinical Work (Audiology)	250	Practical & Oral	100	100	200

**APPENDIX A (2)**

**SCHEME OF CURRICULUM FOR SECOND YEAR GRADUATE COURSE**

Sr. No.	Subject Code	Subject	Credits (clock hours) (Minimum required)	Scheme of the Examination			
				Duration of the paper	Main Exam.	Marks I.A	Total Marks
1.	B.2.1.2	Childhood Communication Disorders	75	3 hrs	80	20	100
2.	B 2.1.3	Articulation and Phonological Disorders	75	3 hrs	80	20	100
3.	B 2.1.4	Voice and Laryngectomy	75	3 hrs	80	20	100
4.	B 2.2.2	Diagnostic Audiology	75	3 hrs	80	20	100
5.	B.2.2.3	Amplification and Assistive Devices for the hearing impaired.	75	3 hrs	80	20	100
6.	B.2.2.4	Educational Audiology	75	3 hrs	80	20	100
7.	B.2.3.5	a) Otorhinolaryngology b) Community Oriented Professional Practices in Speech-Language Pathology	50 25	} } 3 hrs	40 40	10 10	50 50
8.	B.2.3.6	Basic Statistics and Research Methods in Speech-Language Pathology and Audiology	75	3 hrs	80	20	100
9.		Clinical Work (Speech Pathology)	250	Practical & Oral	100	100	200
10.		Clinical Work (Audiology)	250	Practical & Oral	100	100	200

### APPENDIX A (3)

#### SCHEME OF CURRICULUM FOR THIRD YEAR GRADUATE COURSE

Sr. No.	Subject Code	Subject	Credits (clock hours) (Minimum required)	Scheme of the Examination			
				Duration of the paper	Main Exam.	Marks I.A	Total Marks
1.	B.3.1.5	Fluency and its disorders	75	3 hrs	80	20	100
2.	B.3.1.6	Adult Neurocommunication disorders	75	3 hrs	80	20	100
3.	B.3.1.7	Neuromotor Speech disorders	75	3 hrs	80	20	100
4.	B.3.2.5	Rehabilitative Audiology	75	3 hrs	80	20	100
5.	B.3.2.6	Noise measurement and hearing conservation.	75	3 hrs	80	20	100
6.	B.3.2.7	Paediatric Audiology	75	3 hrs	80	20	100
7.		Clinical Work (Speech Pathology)	250	Practical & Oral	100	100	200
8.		Clinical Work (Audiology)	250	Practical & Oral	100	100	200