SunRise University

Approved by Govt. of Rajasthan vide Sunrise University Act, 2011
Recognized by UGC Act, 1956 u/s 2 (f)

SYLLABUS

OF

MASTER IN AUDIOLOGY AND SPEECH LANGUAGE-MASLP

FIRST SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL
MASLP101	Statistics and Research method	40	60	100
MASLP102	Technology- Application and Instrumentation in Speech & Hearing	40	60	100
MASLP103	Speech Language Processing	40	60	100
MASLP104	Language Acquisition and Language Disorders in Children	40	60	100
PRACTICAL				
MASLP105	Clinical Practical Speech Language Pathology Part-I	60	40	100
MASLP106	Clinical Practical Audiology Part-I	60	40	100
Total		**280**	**320**	**600**

SECOND SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL
MASLP201	Fluency Disorders	40	60	100
MASLP202	Voice disorder and Dysphagia	40	60	100
MASLP203	Psycho Physics	40	60	100
MASLP204	Auditory Physiology	40	60	100
PRACTICAL				
MASLP205	Clinical Practical Speech Language Pathology Part-II	60	40	100
MASLP206	Clinical Practical Audiology Part-II	60	40	100
Total		**280**	**320**	**600**

THIRD SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL
MASLP301	Neuro-cognition and Language	40	60	100
MASLP302	Clinical Phonology and Motor	40	60	100
MASLP303	Diagnostic Audiology	40	60	100
MASLP304.1	Speech Perception and its Disorder	40	60	100
MASLP304.2	Speech Science and Production			
PRACTICAL				
MASLP305	Clinical Practical Speech Language Pathology Part-III	60	40	100
MASLP306	Clinical Practical Audiology Part-III	60	40	100
Total		**300**	**300**	**600**

FOURTH SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL
MASLP401	Adult Language Disorders	40	60	100
MASLP402	Hearing Devices	40	60	100
MASLP403.1	Advances in Management of Persons with Hearing Disorder	40	60	100
MASLP403.2	Clinical Linguistics			
PRACTICAL				
MASLP404	Clinical Practical Speech Language Pathology Part-III	60	40	100
MASLP405	Clinical Practical Audiology Part-III	60	40	100
MASLP406	Dissertation			100
Total		**200**	**200**	**600**

I SEMESTER

SH 101 STATISTICS AND RESEARCH METHODS (60 hrs)

Objectives

1. To orient the student on the basics of statistics, and its application to the field of speech and hearing.
2. To enable the student to select and carry out appropriate statistical calculations as required for research in the field of speech and hearing.
3. To equip the students with necessary knowledge to be able to interpret the analysed statistical related data to the field of speech and hearing.
4. To familiarize the students on the importance and applications of research methods and techniques applicable to the field of speech and hearing.

SECTION 1
A. STATISTICS

UNIT 1 (12 hrs)

- Statistics – purpose – approach – methods – measures of central tendency – Dependability of these measures – research applications.
- Measures of variability – types and meaning of various measures – research applications.
- Standard score –normal distribution deviations – skewness and Kurtosis – conditions of applications – limitations in interpretation.

UNIT 2 (12 hrs)

- Theory of probability – principles and properties of normal distribution – binominal distribution – interpretation of data using the normal probability curve – causes of distribution – deviations from the normal forms.
- Correlation – meaning – coefficient of correlation – linear correlation – product moment correlation – rank correlation, biserial correlation, tetracoric correlation partial and multiple correlations – regression equation.
- Variance – concept – foundations – assumptions – one way classification. ANOVA MANOVA, ANCOVA, MANCOVA.

UNIT 3 (12 hrs)

- Item analysis – item pool – its selection – item difficulty item variance – item conduction – time validity – difficulty index.
- Non – parametric statistics – its nature and condition and application – non parametric analysis of variance and measures of association – tests of difference with correlated and uncorrelated data – tests of similarity.
- Selection appropriate statistics methods in the research, receivers operating characteristics

SECTION 2

B. RESEARCH METHODS

UNIT 4 (12 hrs)

- Methods of research in behavioural sciences – research designs – measuring purpose – principles – needs – applications between group designs and single subject research designs.
- Basic of research – science scientific approach – problems – hypothesis – constructs – variables.
- Types of research- empirical rationale-experimental and export-factor research laboratory experiments - field studies – survey research - fundamental research epidemiology-clinical and applied research.

UNIT 5 (12 hrs)

- Technique of sampling – sampling and randomness-principles of randomization – random assignment – methods – random sampling-stratified sampling, incidental sampling – purposive samples of one to tone matched sampling – size of sample.
- Measurement – foundations – types – reliability – validity.
- Variance – implication to research – variance control.
- Techniques of equation – experimental and control groups – matching and randomization – advantages, disadvantages and limitations.
- Research designs – various types of group designs – various types of single subject research designs.
- Analysis and interpretation – principles, indices – cross breaks – factor analysis – multivariate statistics – time series analysis.
- The research report – cardinal characteristics – purpose – structure presentation and writing style.

LIST OF BOOKS

SH 101 STATISTICS AND RESEARCH METHODS

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

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

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

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

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

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

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

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SH 102: TECHNOLOGY - APPLICATION AND INSTRUMENTATION IN SPEECH & HEARING

(60 hours)

Objectives

1. To orient the student on the technological bases of instrumentation used in the field of speech and hearing.
2. To enable the student to carry out calibration, understand the working principles of instrumentation applicable to the field of speech and hearing

UNIT 1: Fundamentals of electronics and communication systems (12 hrs)

1. Basic principle of operation and working of
   - Diodes, Transistors, LED's, LCDs, ICs
   - D. C. Power supplies, A. C. voltage stabilizers and UPS
2. Fundamentals of Digital Electronics
3. Binary number system, Hex code, ASCH code, bit, byte, etc
4. Logic gates, counters, flip-flops etc
5. Fundamentals of communication systems
   - AM transmission and reception and its application in diagnostic equipments
   - FM transmission and reception and its application in FM hearing aids
6. Digital modulation techniques such as delta modulation, PCM,PPM, PWM and their application in speech analysis

UNIT 2: Fundamentals of Digital Signal processing and Tele-rehabilitation (12 hrs)

1. Analogue and digital systems
   - Analogue signal and digital signals
   - Analogue to digital and digital to analogue converters
   - Need and advantages of digital systems and digital signal processing
   - Digital filtering techniques
   - Digital Fourier transformation

2. Principles of digital signal processing
   - Digital signal processor – how it works?
   - Basics of IIR and FIR filters and their applications in speech and hearing
   - Technology of channel separation
   - Noise reduction using microphone technology and algorithms, blind technique,

blind source separation and beam forming technique

UNIT 3: Biomedical signals and signal processing (12 hrs)

1. Principles of generation and calibration of acoustic stimuli
    - Pure tone, tone bursts, clicks, filtered clicks and warble tones
    - Acoustic / physical characteristics of all stimuli
    - Generation, gating and filtering of stimuli
    - Calibration of pure tones

2. Electrodes and transducers
    - Signal acquisition technique from electrodes and transducers
    - Signal processing techniques such as differential application
    - Common mode rejection, artefact rejection, filtering, signal averaging, etc.
    - Addition and subtraction of waves

UNIT 4: Technology of hearing aids and speech processing and analysis (12 hrs)

1. Principles and working of
    - Analog, programmable and DSP based hearing aids.
    - Techniques of non linear amplification and their implementation in hearing aids

2. Evaluation of hearing aids
    - Electro acoustic characteristics
    - National and international standards
    - Hearing aid evaluation systems

3. Techniques of speech processing and analysis
    - Short time speech analysis techniques, speech coding techniques
    - Voice response system.
    - Speaker recognition system and speech recognition system
    - Speech synthesis methods – CEPSTRUM, LTASS, Auto correlation, inverse filtering

UNIT 5: Advanced technology for speech language disorders (12 hrs)

1. Electro physiological methods in diagnosis
    - Fundamental principles of EEG
    - Fundamental principles of EMG, ENG & EGG
2. Neuro radiological methods in diagnosis
    - Working principles of X-ray imaging, C-Arms, CT Scan etc.
3. Tools/ studies to understand the organisation of speech and language disorders and function
    - Cortical blood flow studies, magnetic resonance imaging
    - Functional MRI
    - Application of tools in studying genetic bases of speech language disorders.

4. Tele- rehabilitation
    - Internet and networking computers and its application in tele-rehabilitation and speech and hearing clinics.
    - Satellite communication and its application in tele-rehabilitation

LIST OF BOOKS

SH 102 Technology - Application and Instrumentation in Speech & Hearing

Ainsworth, W.A. (1988). Speech recognition by machine, London Peter Pen prints

Ainsworth W. A. (Ed.). (1990). Advances in Speech, Hearing and Language Processing Research Annuals: Vol. 1, London, Jaipress

Baber. C., & Noyes. J. M. (1993). Interactive Speech Technology Human latest technique with Application of Speech input output to computers. London Taylor and Francis

Bapat (1993). Electronic circuits and syntax, New Delhi: Mc. Graw Hill

Beraneck (1954). Acoustical Engineering, New York: Mc. Graw Hill

Daniloff. R. G. (1985). Speech Sciences: Recent advances. London: Taylor and Francis

Gottingen. M. R. S. (Ed.). (1985). Speech and Speaker Recognition, Basel: Kager

Greme (1973). Application of Opamps. New York: Mc. Graw Hill

Grob (1982). Electronic circuits and applications. London: Mc. Graw Hill

Hall. Microprocessor and interfacing programming hardware. New Delhi: Mc. Graw Hill

Hall. J. W. (1992) Handbook of Auditory evoked responses. Masschuseettes Allyn & Bausen

Haton. J. P. (Eds) (1981) Automatic speech analysis & Recognition. USA. D. Reidel Publishing Company

Hawley. M. E. (1977) Speech intelligibility & Speaker Recognition. Pennsylvania Dowden Hutchinson & Ross Inc.

Hillburn (1973). Manual of active filter design. New York Mc. Graw Hill Jacobson, J. T (Ed) (1994) Auditory brainsetem response. Taylor & Francis. London

Johnson (1992) Introduction to digital signal processing. New Delhi. Mc Graw Hill

Johnson K & Mullenmin. J. W. (Eds) (1997) Talker Variability in Speech processing San Diego: Academic Press.

Jowens, F. (1993) Signal processing of speech. The Macmillan Press. Ltd.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shansessy W. D. Computers in communication disorders.

SH 103 SPEECH LANGUAGE PROCESSING

[60 hours]

Objectives

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

UNIT 1 (12 hrs)

- Phonetic perception
- Perception of vowels - formants, F0, band width, duration, factors affecting vowel perception, static and dynamic cues, effect of co articulation.
- Consonant perception, cues for different consonants, static and dynamic cues, factors affecting consonant perception, effect of co articulation.

UNIT 2 (12 hrs)

- Spoken word recognition- Word under noise, filtered, truncated words, lexical decision, word spotting, phoneme triggered lexical decision, speeded repetition of words, continuous speech, tokens embedded in words and non words, rhyme monitoring, word monitoring, cross modal priming Issues

UNIT 3 (12 hrs)

- Stages of word recognition -lexical concept, lexical access, phonological encoding, production.
- The input to the lexicon-lexical access from spectra, constraints of temporal structure-Cohort models, interactive models of spoken word recognition – Logogen model lexical and phonetic processing-phonetic characterization task, phoneme restoration studies, phoneme monitoring task, sentence and word processing, Neighbourhood activation model.

UNIT 4 (12 hrs)

- Visual word recognition - models and theories; word and non word naming, acquired dyslexia and role of phonology in word recognition.
- Sentence comprehension and processing of components of language - parallel and serial models of processing, modularity and information sources, accounts of parsing, parsing issues, ambiguity in parsing, strategies for disambiguation. Reference and anaphora. Discourse comprehension and expression.

UNIT 5 (12 hrs)

- Sentence processing – basic capacities for perceiving phonetic contrasts - native language contrasts, foreign language contrasts, coping with variability in speech signal.
- Role of memory and attention
- Prosodic organization in native language
- Related developments in speech perception
- Processing of phonological, morphological, syntactic, semantic and pragmatic aspects of language.

LIST OF BOOKS

SH 103: SPEECH LANGUAGE PROCESSING.

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

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

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

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

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

Saeed, I.J., (1997). Semantics. Blackwell Publishers, Massachussets.

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SH 104 LANGUAGE ACQUISITION AND LANGUAGE DISORDERS IN CHILDREN

[60 hrs]

Objectives

1. To equip the student with thorough knowledge of acquisition of language.
2. To equip the student to differently diagnose various child language disorders.
3. To understand the current advances in assessment and intervention for child language disorders.

UNIT 1 [12 hrs]

Critical review of current theories of language acquisition and its applications to assessment and intervention. Overview of genetic, neuro-anatomical and neuro-physiological correlates of language development.

UNIT 2 [12 hrs]

Language development in exceptional circumstances; extreme deprivation, bilingual language acquisition, visual handicap, Mental retardation, Williams's syndrome, hearing loss, language learning disabilities and dysphasia and acquired childhood aphasia.

UNIT 3 [12 hrs]

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

UNIT 4 [12 hrs]

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

UNIT 5 [12 hrs]

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

LIST OF BOOKS

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

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

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

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

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

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

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

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

II SEMESTER

SH 201 FLUENCY DISORDERS (60 hrs)

Objectives

1. To equip the student regarding various aspects related to the diagnosis, management and maintenance of skills to overcome dysfluencies in various disorders.

UNIT 1 (12 hrs)

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

UNIT 2 (12 hrs)

- Perspectives in fluency disorders (developmental, childhood and adult)
- Neuro-anatomical, neuro-physiologic aspects of fluency disorders.
- Linguistics, auditory processing, articulatory dynamics, laryngeal dynamics, prosodic, speech motor control viewpoints in stuttering.

UNIT 3 (12 hrs)

- Nature, characteristics, differential diagnosis, and current status of:
  - Normal Non fluency
  - Cluttering
  - Neurogenic stuttering
  - Drug-Induced stuttering

UNIT 4 (12 hrs)

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

UNIT 5 (12 hrs)

- Spontaneous recovery
- Prevention, relapse of stuttering and related issues
- Review of therapy in stuttering and recent advances in evidence based management of children and adults with stuttering.
- Efficacy and outcome measures of stuttering therapy

LIST OF BOOKS

SH 201: FLUENCY DISORDERS

Bloodstein, o., (1993), Stuttering, Allyn and Bacon, Boston.

Curlee & Perkins., (1995), Nature and treatment of shuttering: New directions

Curlee (1993). Stuttering and related disorders of fluency, Thieme Medical Publishers, New York.

Curlee, R.F. & Siegel, g.m. (2 Edn) (1996). Nature and treatment of stuttering. Allyn and Bacon, Boston.

Fawcus, M., (1995), Stuttering. Whurr Publishers, London.

Lass, N.J. (Ed) (1979). Speech and Language advances in basic research and practice. Academic Press, New York, Vol 1-9.

Perkins, W.L. (1992). Stuttering prevented. Whurr Publishers, London.

Schwartz, H.D. (1999). A primer for stuttering therapy. Allyn and Bacon,

Boston. Starkweather, D., (1987). Fluency and stuttering. Prentice-Hall, New

Jersey Weiss (1964). Cluttering. Prentice-Hall, New Jersey.

SH 202 VOICE DISORDERS AND DYSPHAGIA [60 hrs]

Objectives

1. To equip the student to understand the characteristics, diagnosis and rehabilitation aspects of voice and related disorders.
2. To equip the student to understand the characteristics, diagnosis and rehabilitation aspects of swallowing disorders

UNIT 1 (12 hrs)

- Vocal fold physiology, neurophysiology of the larynx, vibratory modes of vocal folds.
- Models of vocal fold vibration – one mass model, two mass model, multiple mass model, EGG Model, simple Unitary mass model, triangular Unitary mass model.
- Development of the vocal fold
- Mechanical properties of the vocal fold vibration (stress strain relation, whip like motion, effects of impact stress).
- Issues related to professional voice and its care

UNIT 2 (12 hrs)

Recent advances in measurement, assessment and management of voice and its disorders

- Voice Evaluation - perceptual and instrumental.
- Aerodynamic tests - vital capacity, mean airflow rate, maximum duration of sustained blowing.
- Tests for assessing functions of the resonatory system; acoustic analysis, psychoacoustic evaluation and tests for laryngeal measurements (model frequency, frequency range, F0 perturbation, intensity, intensity range, Amplitude perturbation, glottogram, harmonic analysis) and other measures (LTAS, nasality measurements etc using instruments)
- Measurement of vocal fold vibration - invasive procedures - stroboscopy, videokymography; noninvasive procedures - EGG, inverse filtering.

UNIT 3 (12 hrs)

- Pathophysiological changes in different voice disorders.
- Acoustic, aerodynamic and perceptual aspects of pathological voices
- Paediatric voice disorders
- Effects of ageing in voice
- Neurogenic voice disorders- Differential diagnosis and management.
- Endocrinal Voice disorders and voice disorders related to transsexuals.

UNIT 4 (12 hrs)

- Laryngectomy
- Pathophysiology of laryngeal cancers
- Treatment-medical, surgical and therapeutic (including radiation therapy, chemo therapy, pre-postoperative counseling)
- Team approach for rehabilitation of laryngectomee.
- Considerations in rehabilitation – adjustment to disability, reaction to alaryngeal speech etc
- Acoustical, perceptual and physiological aspects of alaryngeal speech
- Factors influencing intelligibility of alaryngeal speech

UNIT 5 (12 hrs)

- Dysphagia – Anatomical & Maturational considerations, Role of respiration. Physiology of suck- swallow- breath sequence, overview of phases of swallowing, Development of feeding skills, Alternate methods of nutritional intake.
- Disorders of swallowing in children and adults
- Etiological classification: Medical, GI tract, respiratory, CNS/PNS damage, cardiac effects, structural, abnormalities and iatrogenic.
- Assessment – Clinical examination, subjective evaluation of swallow function, feeding skills, GERD. Objective methods - Radiological and Instrumental evaluation
- Multidisciplinary management of dysphagia - Issues and concerns, Medical and Non-medical treatment.

LIST OF BOOKS

SH 202 VOICE DISORDERS AND DYSPHAGIA

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

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

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

Diagnosis and Treatment of Voice Disorders [1995], Rubin J. S. Sataloff R. T. Korovin, G. S and Gould, W. J. NY:IGAKU-SHOIN Medical Publishiers, Inc.

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

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

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

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

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

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

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

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

DYSPHAGIA

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

Michael E Groher, 1992, Dysphagia: Diagnosis and Management, 2nd Edition, Butterworth – Heincmann, USA.

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

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SH 203 PSYCHOPHYSICS [60 hrs]

Objectives

1. To equip the student with acoustical and psycho acoustical parameters of speech
2. To familiarize the students on psycho acoustic approaches to measurement and analysis.

UNIT 1 (12 hrs)

- Theory of signal detection,
- Concept and application including ROC
- Methods in psychophysics- classical & adaptive
- MAP & MAF underwater hearing, relation to calibration Loudness perception, equal loudness level contours loudness and loudness level, scaling
- Factors affecting loudness, Theories, models of loudness
- Weber's Law, Differential sensitivity for intensity, absolute and relative DL,
- Loudness perception in pathological ears, recruitment, dynamic range, loudness adaptation
- Florentine theory of softness imperceptions,
- Relevance in clinical Audiology

UNIT 2 (12 hrs)

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

UNIT 3 (12 hrs)

Temporal perception,

- Temporal acuity, temporal DL, temporal order,
- Gap detection (in broad band noise, in narrow band noise, sinusoid) temporal integration
- Duration discrimination
- Temporal modulation transfer function
- Factors affecting temporal perception

- Clinical application.

Adaptation and fatigue,

- Levels of adaptation & physiology
- Pathophysiology of auditory fatigue
- Methods to study
- Parameters affecting
- Clinical applications

UNIT-4 (12 hrs)

Pitch perception, factors affecting

- Ohm's law, Neurophysiologic basis
- Theories and models, consonance
- Dissonance, pitch of complex tones
- Differential sensitivity for frequency, Absolute and relative DLF's, methods to study,

Timbre perception - Factors affecting

- Object perception – Object identification, , auditory scene analysis,
- Clinical application

UNIT 5 (12 hrs)

Binaural hearing

- MLD
- Lateralization, binaural integration, binaural advantage
- Binaural DLF,DLI, DLT, squelch, beats, rotating tones
- Time intensity trade
- Durlach and Jeffress models
- Clinical application

Space perception

- Localization
- Minimal audible angle
- Role of pinna
- Cone of confusion
- Monaural localization
- Clinical application

LIST OF BOOKS
SH 203 PSYCHO PHYSICS

Yost, WA & Neilson DW – "Fundamentals of Hearing" Holt Rinehart & Winston 1977

Yost; W.A Popper A. N, Fay R.R – "Human Psychophysics" – Springer Verlag – 1993

Gelfand. S A "Hearing, An Introduction to Psychological & Physiological acoustics" Marcel Dekker Inc. 1990 & 1981

Pickles, J.O "An Introduction to the physiology of hearing" Academic Press London, 1984

Zwicker E. Fastl H. "Psychoacoustics – Facts & Models" Springer – 1999

Durrant – Lovrinic 1997 "Basics of Hearing Sciences" – Williams & Wilkins 3rd Edition Maore B C J (Eds) 1995 Hearing – Academic Press, San Diego

Gullick W.C 1971. Hearing Physiology & Psychophysics, Oxford University Press N.Y

Palmer A.R. Rees A, Summerfield AQ Meddis K "Psychophysical and physiological advances in hearing – Whurr Publication 1998

Syka Joel. "Acoustical Signal Processing in the Central Auditory System" Plenum Press 1997.

Bekersy G.Von "Experiments in Hearing" Mc Graw Hill 1960

Hanghton Piter "Acoustics for Audiologists" Academic Press 2002

Warren R.M 1999. Auditory Perception-A new Analysis and synthesis U

Rosenthal DF & Okiano H G "Computational Auditory Scene Analysis" Lawrence Erlbaun Associates, Publishers 1998.

Hawkins H L, Mc Muller TA, Popper A N, Fay R R "Auditory Computation" Springer Verlag 1996.

Yost "Directional Hearing" – Wiley 2000

Hirsh S K, Eldredge DH, Hirsh F J & Silverman R. "Hearing & Davis". Washington University Press 1976. K: Cambridge University Press, U.K.

SH 204 AUDITORY PHYSIOLOGY [60 hrs]

Objectives

1. To equip the student to understand the physiological basis of auditory system, inter-relation and dependency of structure and function with nervous system.

UNIT 1 (12 hours)

1) External ear:
   - Anatomy & Physiology of lower animals and humans. Role of Pinna & external auditory meatus in hearing. Resonance properties of external ear &

auditory canal
- Non auditory physiology of external ear
- Developmental changes
- Application to clinical audiology
- Temporal bone anatomy - role in hearing

2) Middle ear:
   - Anatomy & Physiology.
   - Middle ear transformer action
   - impedance
   - Acoustic and non acoustic reflex pathways
   - Anatomy and physiology of the Eustachian tube

UNIT 2 –

Cochlea: Anatomy in lower animals and humans (12 hrs)
- Macro & Microanatomy
- Blood supply
- Innervations
- Cochlear models

Cochlear fluids – origin, absorption, composition, dynamics and functions, Proteins in the cochlea

Physiology of the Cochlea
- Cochlear mechanics – basilar membrane mechanics - historical and current status
- Cochlear transduction
- Cochlear electrophysiology
- Pathophysiology & perception
- Repair, regeneration, protection in the cochlea

Cochlear non-linearity-two tone suppression, otoacoustic emission & other recent advances

Theories of hearing
- Historical aspects
- Place theory – resonance & non resonance
- Frequency theory
- Travelling wave theory
  - Other recent advance like motor theory etc
  - Modes of bone conduction

UNIT 3 (12 hrs)

Vestibular System
- Anatomy and physiology of vestibular structures and vestibular nerve
- Integration of senses in balance

- Vestibule ocular reflex
- Vestibule spinal reflex

Auditory nerve

- Structure and tonotopic organization
- Structure and contents of internal auditory meatus
- Refractory period, adaptation, firing rates, types of responses
- Electrophysiology – action potential, generation and properties
- Stimulus coding, frequency, intensity, time, complex signals, speech
- Non linearity

UNIT 4 – (12 hrs)

Brain stem

- Anatomy of CN, types of cells distribution
- Anatomy of SOC, LL,IC,MGB
- Non classical pathway
- Tonotopic organization
- Neurophysiology at different levels
- Localization
- Stimulus coding, neurotransmitters
- Medial and lateral efferent effect on cochlear physiology ,Auditory Nerve and CN Plasticity

UNIT 5 – (12 hrs)

Auditory cortex

- Anatomy and tonotopic organization of primary and secondary auditory areas and efferent pathways, neurotransmitters
- Neurobiological relationship between auditory cortex and other areas
- Neurophysiology of auditory areas
- Stimulus coding – frequency, intensity and time
- Role of auditory cortex in localization
- Plasticity

LIST OF BOOKS
SH 204 Auditory Physiology

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Davis (1990): Hearing, Washington University.

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

SH 205 CLINICAL PRACTICUM – I & II SEMESTERS

SPEECH LANGUAGE PATHOLOGY [15 hrs/week]

Objectives

1. The student should be able to assess, diagnose, plan and execute therapy for children and adults with various communication disorders.
2. To maintain clinical record.

1. Assessment of clients with voice / dysphagic disorders.
2. Assessment of clients with Fluency disorders
3. Assessment of children with language disorders
4. Use of instrumentation in clients with language disorders, voice / dysphagic disorders and fluency disorders
5. Plan and execute therapy in clients with Language disorders, voice / dysphagic disorders and fluency disorders
6. Maintain clinical records.

SH 206 CLINICAL PRACTICUM – I & II SEMESTERS

AUDIOLOGY [15 hrs/week]

Objectives

1. To give practical bases for interpretation of test results and test battery approach in different conditions and relate it to structural anatomy, physiology and alterations in diseased auditory mechanism.

1. To test individuals with cochlear hearing loss cases using test battery approach.
2. To test clients of retro cochlear pathology using special and conventional auditory test battery
3. To test children using special and conventional auditory test battery
4. To prescribe and set hearing aid in clients (children and adults) as per their hearing need.

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