



**UNIVERSITY OF MYSORE**

**M.Sc. (Speech-Language Pathology) CBCS and CAGP Regulations – 2016**

**1.0 Title and Commencement**

1.1 These Regulations shall be called the University of Mysore regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for M.Sc. (Speech-Language Pathology) Programme. These Regulations shall come into force from the academic year **2016-17**.

**2.0 Duration of the program**

2.1 Duration of the program: 4 Semesters

**Note:** Each semester shall extend over a minimum period of **eighteen weeks, excluding examination days**.

**3.0 Definitions**

**3.1 Course** Every course offered will have three components associated with the teaching-learning process of the course, namely (i) Lecture – L (ii) Tutorial- T (iii) Practicum (Clinical) - P, where

**L** stands for Lecture session.

**T** stands for Tutorial session consisting participatory discussion / self study/ desk work/ brief seminar presentations by students and such other novel methods that make a student to absorb and assimilate more effectively the contents delivered in the Lecture classes.

**P** stands for Practicum (Clinical) which would involve hands-on experience involving persons with communication disorders in clinical and other setups such as hospitals/clinics/ outreach centres.

A course shall have either or all the above components.

The total credits earned by a student at the end of the semester upon successfully completing the course are L + T + P. The credit pattern of the course is indicated as L: T : P.

Different courses of study are labelled and defined as follows:

**3.2 Core Course**

A course which should compulsorily be studied by a **student** as a core-requirement is termed as a Core course.

3.2.1 A Core course may be a **Soft Core** if there is a choice or an option for the **student** to choose a course from a pool of courses from the main discipline / subject of study or from a sister/related discipline / subject which supports the main discipline / subject. In contrast to the phrase Soft Core, a compulsory core course is called a **Hard Core** Course.



### 3.3 Elective Course

Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline / subject of study or which provides an extended scope or which enables an exposure to some other discipline / subject/domain or nurtures the **student's** proficiency/ skill is called an Elective Course. Elective courses may be offered by the main discipline / subject of study or by sister / related discipline / subject of study. A Soft Core course may also be considered as an elective.

An elective course chosen generally from an unrelated discipline / subject, with an intention to seek exposure is called an **open elective**.

An elective course designed to acquire a special/advanced knowledge, such as Supplement study/support study to a project work, and a **student** studies such a course on his own with an advisory support by a teacher is called a **Self Study Elective**.

A core course offered in a discipline / subject may be treated as an elective by other discipline / subject and vice versa.

### 3.4 Dissertation is a soft core of 7 credits involving **research on a specific topic and scientific report writing**

#### 4.0 Eligibility for admission.

4.1 Students with a B.ASLP / B.Sc. (Speech & Hearing) degree fulfilling all the following criteria are eligible for admission:

4.1.1 Degree from the University of Mysore or any other University/ Institute considered as equivalent.

4.1.2 The program should be **approved by Rehabilitation Council of India (RCI), excluding Institutes of National Importance and Foreign programs.**

4.1.3 An average of not less than 50% of marks or **Equivalent CGPA** in the qualifying examination.

[**Note:** 'Average' refers to the average of the aggregate marks/**CGPA** of all the years/semesters of B.ASLP/ B.Sc. (Speech & Hearing)/equivalent programme].

4.2 Admission shall be made only on the basis of the marks obtained in the entrance examination conducted by the training institutes for this purpose as per their stipulated rules and regulations. (eligibility differs for categories)

Further, only those students who qualify in the entrance examination are eligible for admission.



#### 4.3 Entrance Examination

- 4.3.1 The objective of entrance examination is to assess the knowledge and skill of the students in the subjects of B.Sc. (Speech & Hearing)/B.ASLP or equivalent.
- 4.3.2 The entrance examination shall be conducted as notified from time-to-time as per the rules and regulations of the training institute.
- 4.3.3 The selection committee shall consist of the Head of the Institution, as Chairperson, one faculty member of the institution nominated by Head of the Institution, and one member nominated by the Vice-Chancellor of University of Mysore.

#### 5.0 Scheme of Instruction

- 5.1 Details of the structure of the programme including the number of hours for the L:T:P components is provided in **Annexure I**.
- 5.2 The syllabus of every paper is divided into four units.
- 5.3 Students shall attend camps/extension programs tour conducted by the institution.
- 5.4 A Master's Degree program is of 4 semesters duration. A **student** can avail a maximum of 8 semesters – 4 years (in one stretch) to complete the Master's Degree (including blank semesters, if any). Whenever a **student** opts for blank semesters, he /she has to study the prevailing courses offered by the department when he / she continues his / her studies
- 5.5 A **student** has to earn a minimum of 76 credits for successful completion of the master's degree. The 76 credits shall be earned by the **student** by studying **Hard Core, Soft Core, Electives, and Clinical Practicum**, as specified in the program. The degree shall be awarded on **successful completion of the program**.
- 5.6 Only such **students** who register for a minimum of 18 credits per semester in the first two semesters and complete successfully 76 credits in 4 successive semesters shall be considered for declaration of ranks, medals and are eligible to apply for student fellowship, scholarship, free ships and hostel facilities.

#### 6.0 Attendance

- 6.1 Each course shall be taken, as a unit for purpose of calculating attendance and a **student** shall be considered to have put in the required attendance for the course, if he/she has attended not less than 80% in case of theory classes and 90% in case of clinical practicum.
- 6.2 A **student** who is having shortage of attendance in clinical practicum is permitted to make up this shortage by attending clinical work during vacation/s immediately after that semester and he /she has to study the prevailing courses offered by the department when he / she continues his / her studies.



**Note:** The candidates are permitted to avail this facility (6.2) in the I & III semesters only, with prior permission of the Head of the Institution.

6.3 A **student**, who fails to satisfy the requirement of attendance in a course, shall reregister for the same in case of HC, register for the same or alternative course in case of SC/OE when it is offered next. However not exceeding double the duration of the programme.

**Note:** This facility shall be available only **once** in the entire programme.

6.4 If a student represents his/her Institution in Sports/NSS/Cultural or any official activities, he/she is permitted to avail to a maximum of 15 days in a semester, based on the recommendation and prior permission of the Head of the Institution.

### 7.0 Medium of Instruction

The Medium of instruction shall be English.

### 8.0 Continuous assessments, earning of credits and award of grades

The evaluation of the students shall be based on continuous assessment. The structure for evaluation is as follows:

8.1 Assessment and evaluation processes happen in a continuous mode. However, for reporting purposes, a semester is divided into 3 discrete components identified as  $C_1$ ,  $C_2$ , and  $C_3$ .

8.2 The performance of a student in a course will be assessed for a maximum of 100 marks as explained below.

8.2.1 The first component ( $C_1$ ), of assessment is for 25 marks. This will be based on test, assignment, seminar. During the **first eight weeks of the semester**, the first 50% of the syllabus (**two units in a course**) will be completed. This shall be consolidated during the 8<sup>th</sup> week of the semester.

8.2.2 The second component ( $C_2$ ), of assessment is for 25 marks. This will be based on test, assignment, seminar. The continuous assessment and scores of second half of the semester will be consolidated during the 16<sup>th</sup> week of the semester. During the second half of the semester the remaining units in the course will be completed.

8.2.2.1 The outline for continuous assessment activities for Component-I ( $C_1$ ) and Component-II ( $C_2$ ) will be proposed by the teacher (s) concerned before the commencement of the semester and will be discussed and decided in the respective Departmental Council. The **students** should be informed about the modalities well in advance. The evaluated courses/assignments during component I ( $C_1$ ) and component II ( $C_2$ ) of assessment are immediately returned to the **students** after obtaining acknowledgement in the register maintained by the concerned teacher for this purpose.

8.2.3 During the 18<sup>th</sup> -20<sup>th</sup> week of the semester, a semester-end examination of 2 hours duration shall be conducted for each course. This forms the third/final component of assessment ( $C_3$ ) and the maximum marks for the final component will be 50.

**Note:** Model question paper pattern is as given in **Annexure - II**



### 8.3 Clinical Practicum

- 8.3.1 The clinical practicum examinations shall be in the main subjects of study, i.e., in Speech-Language Pathology.
- 8.3.2 Clinical practicum is part of all the semesters. The internal assessment will be conducted continuously, **throughout** the semesters. In the  $C_1$  and  $C_2$ , student will be assessed for Clinical skill/repertoire, **planning for assessment and management**, preparation and maintenance of clinical documents (test protocols, diary, lesson plans and progress report), Efficient use of time/skills in clinical work and Professional attitude/motivation/ aptitude for clinical work.  $C_3$  will be based on clinical viva-voce. In the **Odd Semester**, viva-voce **will be** conducted by three **internal examiners consisting of clinical staff/faculty**, who shall examine the **students'** clinical skills (prior to the commencement of the theory examination). In the **Even Semester**, viva-voce will be conducted by two internal faculty to examine the **students'** clinical skills (prior to the commencement of the theory examination). However, the BoE on its discretion can also invite external examiners, if required

### 8.4 Dissertation work

- 8.4.1 There shall be 100 marks for dissertation work. Dissertation would be conducted by each candidate over a period of 2 semesters (III and IV semesters). Dissertation I of the semester III and Dissertation II of the semester IV shall be in the same course. The results of Dissertation would be announced only at the end of the IV semester consolidating the continuous assessment of the both Dissertation I and II.
- 8.4.2 Right from the initial stage of defining the problem, the **student** has to submit progress reports periodically and also present **the progress and hold** regular discussions with the guide. Components of evaluation are as follows:
- In the **III Semester**,  $C_1$  **will be based on** Preparation of research proposal and will be assessed by the guide.  $C_2$  will be **based on Presentation of** research proposal and will be evaluated by a panel of two members consisting **of the guide and an internal examiner**.  $C_3$  **will be based on** Periodic progress and progress report following research proposal, to be awarded by the Guide. In the IV Semester,  $C_1$  will be based on periodic progress and progress report.  $C_2$  will be based on results of the study and draft report. Both  $C_1$  and  $C_2$  will be awarded by the guide.  $C_3$  will be based on final viva-voce and evaluation of the report. This will be awarded by a panel of two members consisting of the guide and an internal examiner. Report evaluation will carry a weightage of 60% while viva-voce examination will be of 40% weightage.
- 8.4.3 The **students** shall submit three copies of dissertation before the commencement of theory examination of that semester. **Students** who fail to submit their dissertations on or before the stipulated date shall not be permitted to appear for the final **dissertation viva voce**.
- 8.4.4 A student who is said to have DROPPED dissertation work has to re-register for the same subsequently within the stipulated period.



- 8.5** In case a **student** secures less than **40%** in  $C_1$  and  $C_2$  put together in a course, the **student** is said to have **DROPPED** that course, and such a **student** is not allowed to appear for  $C_3$  in that course.

In case a **student**'s attendance in a course is less than the stipulated percentage, the **student** is said to have **DROPPED** that course, and such a **student** is not allowed to appear for  $C_3$  in that course.

Teachers offering the courses will place the above details in the Department Council meeting during the last week of the semester, before the commencement of  $C_3$ , and subsequently a notification pertaining to the above will be brought out by the Chairman of the Department before the commencement of  $C_3$  examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).

In case a **student** secures less than **40% in  $C_3$** , he/she may choose **DROP/MAKEUP** option.

In case a **student** secures more than or equal to **40%** in  $C_3$ , but his/her grade (**G**) = **5**, as per section **8.9** below, then he/she may be declared to have been conditionally successful in this course, provided that such a benefit of conditional clearance based on **G = 5** shall not be availed for a maximum of 8 credits for the entire programme of Master's Degree.

In case a **student** secures more than **40%** in  $C_3$  but **G=5**, then he/she may choose **DROP/MAKE-UP** option. The **student** has to exercise his/her option immediately within 10 days from the date of notification of results. **A MAKE-UP examination for odd semester courses will be conducted along with next regular odd semester examinations and for even semester courses along with the next regular even semester examinations. If a student is still unsuccessful, he/she may opt to DROP or again take up a MAKE-UP examination. However, not exceeding double the duration norm in one stretch from the date of joining the course.**

A **student** has to re-register for the **DROPPED** course when the course is offered again by the department, if it is a hard core course. The **student** may choose the same or an alternate core/elective in case the dropped course is soft core / elective course. A **student** who is said to have **DROPPED the course** has to re-register for the same subsequently within the stipulated period. The details of any dropped course will not appear in the grade card.

**However, if a candidate secures less than 50% in  $C_3$  of the clinical courses, no make-up examination would be given and candidate shall be considered to have dropped the course and re-register for the course.**

**8.6 Setting questions papers and evaluation of answer scripts.**

- 8.6.1 I. Questions papers in three sets shall be set by internal / external examiners for a course.
- II. The Board of Examiners shall scrutinize and approve the question papers and scheme of valuation.



- III. There shall be single valuation for all theory papers by internal examiners. In case, the number of internal examiners falls short, external examiners may be invited. The marks awarded by the internal examiners shall be taken as the final marks for that particular course. The examination for **clinical work/dissertation** work will be conducted jointly by two internal examiners. However, the BoE on its discretion can also invite external examiners, if required.
- IV. Challenge valuation: A student who desires to apply for challenge valuation shall obtain a photocopy of the answer script by paying the prescribed fee within 10 days after the announcement of the results. He / She can challenge the grade awarded to him/her by surrendering the grade card and by submitting an application along with the prescribed fee to the Registrar (Evaluation) within 15 days after the announcement of the results. This challenge valuation is only for C<sub>3</sub> component.

The answer scripts for which challenge valuation is sought for shall be sent to another examiner. The marks awarded will be the higher of the marks obtained in the challenge valuation and in maiden valuation.

8.6.2 In case of a course with only practical component a practical examination will be conducted with two internal examiners. A student will be assessed on the basis of a) knowledge of relevant processes b) Skills and operations involved c) Results / products including calculation and reporting. The duration for semester-end practical examination shall be decided by the departmental council.

8.6.3 If a course has both theory and practical components with credit pattern L : T : P, then as parts of (C<sub>1</sub> and C<sub>2</sub>) both theory and practical examinations shall be conducted for 50 marks each. The final (C<sub>3</sub>) component marks shall be decided based on the marks secured by the student in the theory examinations. If **X** is the marks scored by the student out of 50 in C<sub>3</sub> in theory examination, if **Y** is the marks scored by the student out of 50 in C<sub>3</sub> in Practical examination, and if **Z** is the marks scored by the student out of 50 in C<sub>3</sub> for a course of (L=0):T:(P=0) type that is entirely tutorial based course, then the final marks M in C<sub>3</sub> is decided as per the following table.

| L.T.P distribution | Find mark M in C3                    |
|--------------------|--------------------------------------|
| L:T:P              | $\frac{[(L+T)*X]+[(T+P)*Y]}{L+2T+P}$ |
| L:(T=0):P          | $\frac{(L*X)+(P*Y)}{L+P}$            |
| L:T:(P=0)          | X                                    |
| L:(T=0):(P=0)      | X                                    |
| (L=0):T:P          | Y                                    |
| (L=0):(T=0):P      | Y                                    |
| (L=0): T:( P=0)    | Z                                    |

8.6.4 The details of continuous assessment are summarized in the following Table.

| Component      | Syllabus in a course                             | Weightage | Period of Continuous assessment   |
|----------------|--|-----------|---|
| C <sub>1</sub> | First 50%<br>(2 units of total units)            | 25%       | First half of the semester.<br>To be consolidated by 8 <sup>th</sup> week   |
| C <sub>2</sub> | Remaining 50%<br>(Remaining units of the course) | 25%       | Second half of the semester.<br>To be consolidated by 16 <sup>th</sup> week |



|  |  |     |   |
|--|--|-----|---|
| C <sub>3</sub>   | Semester-end examination (All units of the course) | 50% | To be completed during 18 <sup>th</sup> -20 <sup>th</sup> Week. |
| <b>Final grades to be announced latest by 24<sup>th</sup> week</b> |  |     |   |

- 8.6.5 A student's performance from all 3 components will be in terms of scores, and the sum of all three scores will be for a maximum of 100 marks (25 + 25 + 50).
- 8.6.6 **Finally, awarding the grades should be completed latest by 24<sup>th</sup> week of the semester.**
- 8.7 The tentative / provisional grade card will be issued by the Registrar (Evaluation) at the end of every semester indicating the courses completed successfully. This statement will not contain the list of PENDING or DROPPED courses.
- 8.8 Upon successful completion of Masters degree, a final grade card consisting of grades of all courses successfully completed by the student will be issued by the Registrar (Evaluation).
- 8.9 The grade and the grade point earned by the candidate in the course will be as given below.

| P      | G   | GP = V x G |
|--------|-----|------------|
| 40-49  | 5   | V*5        |
| 50-59  | 6   | V*6        |
| 60-64  | 6.5 | V*6.5      |
| 65-69  | 7   | V*7        |
| 70-74  | 7.5 | V*7.5      |
| 75-79  | 8   | V*8        |
| 80-84  | 8.5 | V*8.5      |
| 85-89  | 9   | V*9        |
| 90-94  | 9.5 | V*9.5      |
| 95-100 | 10  | V*10       |

Here, P is the percentage of marks ( $P = [(C_1 + C_2) + M]$ ) secured by a student in a course which is rounded to nearest integer. V is the credit value of course. G is the grade and GP is the grade point.

- 8.10 A student also has an option to withdraw a course even after final examination, if he / she feels that he / she should improve in the course in terms of grade. The withdrawal of a course can be either only for C<sub>3</sub> components, in which the student has to reappear for only C<sub>3</sub> component to improve, carrying the marks of C<sub>1</sub> and C<sub>2</sub> components (this option is called PENDING option), or for the entire course where the student has to reenrol for the course afresh or can chose an alternative course if the withdrawal course is a soft/elective core (this option is called DROPPED option). This act of withdrawing should be immediately within seven days after the announcement of final results.
- 8.11 Overall cumulative grade point average (CGPA) of a student after successful completion the required number of credits (76) is given by

$$\text{CGPA} = \Sigma \text{GP} / \text{Total number of credits (calculated up to 4 decimal places)}$$





**9. Classification of results:**

The final grade point (FGP) to be awarded to the student is based on CGPA secured by the student and is given as follows.

| CGPA                         | FGP             |                   |
|------------------------------|-----------------|-------------------|
|                              | Numerical Index | Qualitative Index |
| $4 \leq \text{CGPA} < 5$     | 5               | SECOND CLASS      |
| $5 \leq \text{CGPA} < 6$     | 6               |                   |
| $6 \leq \text{CGPA} < 7$     | 7               | FIRST CLASS       |
| $7 \leq \text{CGPA} < 8$     | 8               |                   |
| $8 \leq \text{CGPA} < 9$     | 9               | DISTINCTION       |
| $9 \leq \text{CGPA} \leq 10$ | 10              |                   |

Overall percentage =  $10 * \text{CGPA}$

**10.0 Provisions for Repeaters**

10.1 A student is allowed to carry all the previous unleared courses except **clinical practicum** to the subsequent semester/semesters subject to Regulation 8.5

**11 Provision for appeal**

11.1 If a student, is not satisfied with the evaluation of C1 and C2 components, he / she can approach the grievance cell with the written submission together with all facts, the assignments, test papers etc, which were evaluated. He/she can do so before the commencement of semester-end examination. The grievance cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the university on the student if his/her submission is found to be baseless and unduly motivated. This cell may recommend taking disciplinary/corrective action on an evaluator if he/she is found guilty. The decision taken by the grievance cell is final.

11.2 For every program there will be one grievance cell. The composition of the grievance cell is as follows.

- 1.The Registrar (Evaluation) ex-officio Chairman / Convener
- 2.One senior faculty member (other than those concerned with the evaluation of the course concerned) drawn from the department/discipline and/or from the sister departments/sister disciplines.
- 3.One senior faculty members / subject experts drawn from outside the University department.

**12.0 Barring of simultaneous study**

12.1 No student admitted to the degree programme in a College/Institution under the jurisdiction of this University shall be permitted to study simultaneously in any other programme leading to a degree (regular, evening & morning) offered by this or any other University.

12.2 If a student gets admitted to more than one programme, the University shall cancel without giving prior notice, his/her admission to all the programmes to which he/she has joined.



**13.0 Miscellaneous**

- 13.1 These revised regulations will apply to students admitted for the academic year 2016-17 and onwards.
- 13.2 Any other issue, not envisaged above, shall be resolved by the Vice Chancellor in consultation with the appropriate bodies of the university, which shall be final and binding.

**REGISTRAR**

**VICE-CHANCELLOR**



**Annexure - I**

**M.Sc. (Speech-Language Pathology) CBCS and CAGP Structure – 2016**

| Sl. No. | Course No. | Credit L:T:P | Credits | Total Credits | No. of Hrs (Hr x Cr = Hr) | No. of Hrs/wk     | Total hrs/Wk | HC/SC /OE | Title of the course   |
|---------|------------|--------------|---------|---------------|---------------------------|-------------------|--------------|-----------|---|
| I       | 1.1        | 2:1:0        | 3       | 18            | L=1x2=2<br>T=2x1=2        | 4                 | 35           | HC        | Research methods & Statistics in Speech-Language & Hearing  |
|         | 1.2        | 2:1:0        | 3       |               | L=1x2=2<br>T=2x1=2        | 4                 |              | HC        | Speech Production   |
|         | 1.3        | 2:1:0        | 3       |               | L=1x2=2<br>T=2x1=2        | 4                 |              | HC        | Child Language Disorders  |
|         | 1.4        | 2:1:0        | 3       |               | L=1x2=2<br>T=2x1=2        | 4                 |              | HC        | Neuroscience of speech and language   |
|         | 1.5        | 1:1:0        | 2       |               | L=1x1=1<br>T=2x1=2        | 3                 |              | SC        | <i>Clinical Linguistics &amp; Multilingual Issues in Communication</i><br><b>OR</b><br><i>Technology for speech-language and hearing</i>  |
|         | 1.6        | 0:0:4        | 4       |               | C=4x4=16                  | 15+1 <sup>^</sup> |              | HC        | Clinical Practicum I  |
| II      | 2.1        | 2:1:0        | 3       | 21            | L=1x2=2<br>T=2x1=2        | 4                 | 36           | HC        | <i>Phonological disorders &amp; Maxillofacial anomalies</i>   |
|         | 2.2        | 2:1:0        | 3       |               | L=1x2=2<br>T=2x1=2        | 4                 |              | HC        | <i>Motor speech disorders</i>   |
|         | 2.3        | 2:1:0        | 3       |               | L=1x2=2<br>T=2x1=2        | 4                 |              | HC        | Fluency and its Disorders   |
|         | 2.4        | 1:1:0        | 2       |               | L=1x1=1<br>T=2x1=2        | 3                 |              | SC        | Language, Cognition and Brain<br><b>OR</b><br>Gerontology & Communication Disorders   |
|         | 2.5        | 1:1:0        | 2       |               | L=1x1=1<br>T=2x1=2        | 3                 |              | SC**      | Endoscopic evaluation of lesions of the larynx<br><b>OR</b><br>Event related potentials in speech and language<br><b>OR</b><br>Dysphagia<br><b>OR</b><br>Clinical Behavior analysis |
|         | 2.6        | (4 credits)  | 4       |               |                           | 3                 |              | OE        | Any paper offered by the UOM  |
|         | 2.7        | 0:0:4        | 4       |               | C=4x4=16                  | 15+1 <sup>^</sup> |              | HC        | Clinical Practicum II   |



M.Sc. (Speech-Language Pathology) CBCS and CAGP Regulations – 2016

|                      |      |       |           |    |                    |                   |    |      |  |
|----------------------|------|-------|-----------|----|--------------------|-------------------|----|------|--|
| III                  | 3.1  | 2:1:0 | 3         | 20 | L=1x2=2<br>T=2x1=2 | 4                 | 38 | HC   | Aphasia  |
|                      | 3.2  | 2:1:0 | 3         |    | L=1x2=2<br>T=2x1=2 | 4                 |    | HC   | Voice and its Disorders  |
|                      | 3.3  | 2:1:0 | 3         |    | L=1x1=1<br>T=2x1=2 | 3                 |    | SC   | Speech & Language Processing<br>OR<br>Speech Language Perception   |
|                      | 3.4  | 2:1:0 | 3         |    | L=1x1=1<br>T=2x1=2 | 3                 |    | SC   | Dysphagia<br>OR<br><i>Behavioural Assessment and management of CAPD</i>  |
|                      | 3.5  | 1:1:0 | 2         |    | L=1x1=1<br>T=2x1=2 | 3                 |    | SC** | Event related potentials in speech and language<br>OR<br>Sign Languages<br>OR<br><i>Clinical Linguistics &amp; Multilingual Issues in Communication</i><br>OR<br><i>Technology for speech-language and hearing</i> |
|                      | 3.6* | D     | 2         |    | D=2x2=4            | 3+1 <sup>^</sup>  |    | SC   | Dissertation in Speech Sciences I<br>OR<br>Dissertation in Language Sciences I<br>OR<br>Dissertation in Speech Pathology I<br>OR<br>Dissertation in Language Pathology I   |
|                      | 3.7  | 0:0:4 | 4         |    | C=4x4=16           | 15+1 <sup>^</sup> |    | HC   | Clinical Practicum III   |
| IV                   | 4.1  | 2:1:0 | 3         | 17 | L=1x2=2<br>T=2x1=2 | 4                 | 33 | HC   | Adult Language disorders   |
|                      | 4.2  | 2:1:0 | 3         |    | L=1x2=2<br>T=2x1=2 | 4                 |    | HC   | Augmentative and Alternative Communication   |
|                      | 4.3  | 2:1:0 | 3         |    | L=1x1=1<br>T=2x1=2 | 3                 |    | SC   | Suprasegmentals & Music acoustics<br>OR<br>Prosody & Music acoustics   |
|                      | 4.4* | D     | 4         |    | D=1x5=5            | 5+1 <sup>^</sup>  |    | SC   | Dissertation in Speech Sciences II<br>OR<br>Dissertation in Language Sciences II<br>OR<br>Dissertation in Speech Pathology II<br>OR<br>Dissertation in Language Pathology II                                       |
|                      | 4.5  | 0:0:4 | 4         |    | C=4x4=16           | 15+1 <sup>^</sup> |    | HC   | Clinical Practicum IV  |
| <b>Total credits</b> |      |       | <b>76</b> |    |                    |                   |    |      |  |



**\*\* If the candidate has already taken the course earlier, he/she will not be allowed to take the same course.**

**\*Dissertation is a SC and mandatory for each of the student in the program registered for the course, wherein the students select topics of their choice and work for the dissertation in the 3<sup>rd</sup> and the 4<sup>th</sup> semester which should be linked with each other**

**^ One hour each would be used for Clinical Conference/Journal Club**

**Please note:-**

L: Lecture (1 hour =1 credit)

T: Tutorial (2 hours= 1 credit)

P: Clinical Practicum (4 hours= 1 credit)

D: Dissertation

**REGISTRAR**

**VICE-CHANCELLOR**



## SEMESTER I

### **Paper Code: SLP 1.1 - HC: Research Methods and Statistics in Speech-Language and Hearing**

#### **OBJECTIVES**

**After successful completion of this course the students should be able to:**

1. Understand and deduce the use of research methods.
2. Choose appropriate research designs to carry out research in the field.
3. Apply statistics in the field of Speech-Language Pathology and Audiology.
4. Critically evaluate the research designs and statistics in research publications.

#### **COURSE CONTENT**

Unit 1 : Research Strategies and Their Statistical Counterpart

(18 Hrs)

##### 1.1 Overview of variables

- Dependent
- Independent
  - Active and attribute
  - Continuous and categorical variables
- Extraneous and control variables

##### 1.2 Quantitative Research

- Experimental research
  - Bivalent
  - Multivalent
  - Parametric
- Descriptive research
  - Comparative research
  - Developmental research
  - Correlational research
  - Survey research
  - Retrospective research
- Combined experimental and descriptive research

##### 1.3. Qualitative research

- Observational research
- Interview research
- Narrative research
- Case study research

1.4. Documentation

- Organization
- Formatting
- Writing style: Theses and journal articles

**Unit 2 : Research Designs**

**(18 Hrs)**

2.1 Group designs

- Within group
- Between group
- Mixed designs

2.2 Single subject designs

- Withdrawal and reversal design
- Multiple base line
- Changing criterion design

2.3 Treatment Designs

- Pre-experimental
- Quasi experimental
- True experimental

2.4 Evidence based practice

- Generalization of research findings
- Levels of evidence
- Barriers to evidence-based practice

2.5 Validity of research designs

- Internal validity
- External validity

**Unit 3: Parametric Tests and its Application**

**(18 Hrs )**

3.1 Overview of basic statistics

- Measures of central tendency
- Measures of dispersion
- General properties of normal distribution
- Variants from normal distribution
- Methods of correlation

3.2 Simple and multiple linear regression (with numerical examples)



### 3.3 Hypotheses and testing of hypotheses

#### 3.3 Testing the significance between two means (with numerical examples)

- Independent samples t-test
- Paired sample t-test

#### 3.4 Analysis of variance (ANOVA)

- Types of ANOVA
- Basic model
- Assumptions underlying ANOVA
- One-way and two-way ANOVA (with numerical examples)
- Need for Post-hoc tests
- Concept of repeated measures ANOVA and ANCOVA

#### 3.5 Multivariate data analysis (concept only)

- Need for multivariate data analysis
- Introduction to various methods
  - Principal component analysis
  - Cluster analysis
  - Discriminant analysis
  - MANOVA

## **Unit 4: Non-parametric tests, qualitative data analyses and their application**

**(18 Hrs)**

### 4.1 Consequences of failure of assumptions underlying parametric tests

### 4.2 Need for transformations and non-parametric tests

#### 4.3 Non-parametric tests for independent samples (with numerical examples)

- Median test
- Mann-Whitney U test
- Kruskal-Wallis test

#### 4.4 Non-parametric tests for related samples (with numerical examples)

- Sign test
- Wilcoxon's signed-rank test
- Friedman's test

#### 4.5 Analysis of qualitative data (with numerical examples)

- Contingency tables
- Chi-square test for independence of attributes
- Measures of Association- contingency coefficient and Cramer's
- Measures of agreement - Kappa coefficient

**Practicum:**

- Review research methods and statistics used in publications in the field of communication disorders in blocks of 5 years from 1970.
- Two journal articles should be reviewed by each student for variables, research methods and appropriateness of statistics.

**References:**

**Unit 1: Research Strategies and Their Statistical Counterpart**

- Grosf, M.S., & Sardy, H. (1985). A research primer for the social & behavioral sciences. New York: Academic Press.
- Hegde, M.N. (2003). Clinical Research in Communicative Disorders. Principles and Strategies, Boston: College-Hill Press.
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- Schiavetti, N, Metz, D.E. & Orlikoff, R.F. (1997). Evaluating research in communication disorders. Boston: Allyn & Bacon.
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- Tucker (1981). Research in speech communication. Inglewood Cliffs: Prentice Hall.
- Ventry, I. M. & Schiavetti, N. (1980). Evaluating research in speech pathology and Audiology. London: Addison Wesley.

**Unit 2: Research Design**

- Broota (1989). Experimental design in behavioral research. Eastern New Delhi, Wiley.
- Doehring (1988). Research strategies in human communication disorders. Austin: Proed.
- Frey (1991). Investigating communication. An introduction to research methods. Inglewood Cliffs: Prentice Hall.
- Silverman, F.H. (1985). Research design and evaluation in speech language pathology, Audiology. Asking questions & answering. New Jersey: Prentice Hall.
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- Haynes, W. O. & Johnson, C. (2009). Understanding Research and Evidence based practice in communication disorders. Boston: Pearson.

### **Unit 3: Parametric Tests, Qualitative Data**

- Argyrous, G. (2014). Statistics for Research. 2nd Ed. New Delhi: SAGE Publications (SA).
- Cox, T.F. (2014). An Introduction to Multivariate Data Analysis. New Delhi: Wiley India (P) Ltd.
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- Field, A. (2013). Discovering Statistics using IBM SPSS Statistics. 4th Ed. New Delhi: SAGE Publications.
- Martin, W.E. & Bridgmon, K.D. (2012). Quantitative and Statistical Research Methods – From Hypothesis to Results. San Francisco: Jossey – Bass.
- Kapur, S.K. (2008). Elements of Practical Statistics. 3rd Ed. New Delhi: Oxford & IBH Publishing Co.
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- Michael, S.L. (Editor) (1993). Regression analysis – International handbooks of quantitative applications in the social sciences. Vol. 2. London: Sage Publications.
- Johnsonwichern (1992). Applied multivariate statistical analysis. New Jersey: Prentice Hall.
- Garrett, H.E., & Woodworth, R.S. (1979). Statistics in Psychology and Education. 9th Ed. Bombay: Feffer & Simons.
- Gupta, S.P. (1977). Practical Statistics. 3rd Ed. New Delhi: S. Chand & Company Ltd.

### **Unit 4: Non-Parametric Tests, Qualitative Data Analyses and Their Application**

- Argyrous, G. (2014). Statistics for Research. 2nd Ed. New Delhi: SAGE Publications.
- Gupta, K.R. (2014). Statistics – Vol. 2. New Delhi: Atlantic Publishers & Distributors (P) Ltd.
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- Leach, C. (1979). Introduction to Statistics – A Non-parametric approach for the social sciences. New York : John Wiley & Sons

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

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- Ferguson, G.A. (1976). Statistical Analysis in Psychology and Education. Tokyo: McGraw-Hill Kogakusha, Ltd.
- Seigal, S. (1956). Non-parametric Statistics for the Behavioral Sciences. Tokyo: McGraw Hill.

**Paper Code: SLP 1.2 - HC: Speech Production**

**OBJECTIVES**

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

- Describe the Physiology of Speech Production and Measurement of Aerodynamic Aspects
- Discuss the Acoustic Theories and Instrumentation in Speech Production
- Describe the Acoustic Characteristics of Various Speech Sounds
- Know the Application of Acoustic Analysis and Speech Synthesis

**COURSE CONTENT**

Unit 1: Introduction to the Study of Speech Physiology (18 Hrs)

1.1 The Physiological Aspects of Speech Production (Respiration, Laryngeal and Articulatory Subsystem)

1.2 Aerodynamics of Speech

- Mechanics of Airflow – Laminar, Orifice and Turbulent Flow
- Generation of Pressure in the Respiratory System – Resting Level, Relaxation Pressure Curve
- Maintenance of Airway Pressure for Speech – Elastic Recoil, Sub Glottal Pressure for Speech.

1.2 Speech Breathing

1.4 Lower Air Way Dynamics

- Size and Shape of Alveolar Sacs
- Constrictors in Lower Airway
- Laryngeal Activity in Speech
- Bernoulli's Principle
- Lung Volumes in Breathing
- Conversational Speech and Loud Speech
- Effect of Glottal Activity on Air Pressure and Air Flow
- Glottal Activity During Stop Consonants
- Glottal Resistance in Vowels and Consonants
- Glottal Activity in Whisper
- Sub Glottal Pressure Measurement

1.4 Upper Airway Dynamics

- Constrictors in Upper Airway

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

- Intraoral Pressure in Vowels and Consonants
- Relationship between Velopharyngeal Orifice Resistance and Oral Port Size
- Aerodynamics of Voiced and Voiceless Plosives, Fricatives, and Vowels, Effect of Velopharyngeal Orifice.

1.5 Measures of Respiratory Analysis and Instrumentation:

- Air Volume
- Air Flow
- Air Pressure Measurements Including Intraoral and Sub Glottal Pressure
- Instruments for Respiratory Analysis

Unit 2: Theories And Instrumentation In Speech Production (18 hrs)

2.1 Acoustic Theory of Speech Production:

- Source, Types and its Characteristics
- Filter / Transfer Function and its Characteristics
- Output Speech and its Characteristics
- Cavity Volume and Resonance Relationship
- Internal (Viscous Friction and Thermal Conduction) Losses in the Vocal Tract and their Effect on Spectra
- External Loss (Lip Radiation) and its Effect on Spectra
- Critical Evaluation of Acoustic Theory of Speech Production

2.2 Fundamental Aspects of Speech Acoustics

- Acoustic Wave
- Analog and Digital Signal
- Digitization
- Analog-To-Digital Conversion
- Sampling
- Quantization
- Bandwidth
- Frequency Resolution
- Window
- Block Duration
- Pre-Emphasis
- Filtering
- Block Shift
- Characteristics of Air Borne Acoustic Signal

2.3 Brief History on the Acoustic Analysis of Speech

- Oscilloscope

- Fourier Analysis
- Spectrograph
- Digital Signal Processing [Waveform Analysis, Fast Fourier Transformation (FFT) and Linear Prediction Correlation (LPC), Pitch Extraction, Auto Correlation, Digital Spectrogram, Inverse Filtering, Long Term Average Spectrum (LTAS), Cepstrum]

#### 2.4 Data Acquisition Systems- Acoustic Analysis Softwares

- Formant Analysis
- Formant Tracking
- F0 and Intensity Analysis
- Computerized Speech Lab (CSL)
- Speech Science Lab (SSL)
- Speech Filing System (SFS)
- PRAAT

### Unit 3: Acoustic Characteristics of Speech Sounds and Spectrography (20 hrs)

#### 3.1 Spectrogram

- Types of Spectrograms and their Uses
- Spectrograms of Vowels and Consonants
- Identifying Place of Articulation, Manner of Articulation, Voicing and Aspiration
- Identification of Vowels, Syllables, Words, Word Boundaries and Sentences

#### 3.2 Acoustic Characteristics of Vowels and Diphthongs

- Vowel Classification
- Vowel Formant Pattern
- Vowel Short-Term Spectrum
- Vowel Duration
- Vowel Fundamental Frequency
- Formant Bandwidth and Amplitude On Glide and Off Glide of Formants

#### 3.3 Acoustic Characteristics of Plosives

- Vocal Tract Configuration
- Five Distinct Characteristics of Plosives
- Closure Duration
- Release Burst
- Release Burst Spectrum
- Release Burst Amplitude
- Friction and Aspiration
- Voice Onset Time
- Formant Transitions

- Voicing Characteristics

### 3.4 Acoustic Characteristics of Nasal Consonants

- Vowel Tract Configuration
- Formant Frequencies
- Nasal Murmur
- Formant Damping
- Bandwidth
- Formant Transitions
- Antiformants

### 3.5 Acoustic Characteristics of Fricatives

- Vocal Tract Configuration
- Classification of Fricatives
- Acoustic Characteristics of Stridents and Non-Stridents

### 3.6 Acoustic Characteristics of Other Consonants

- Affricates: Vocal Tract Configuration, Acoustic Differences between Affricates and Plosives
- Glides: Vocal Tract Configuration, Formants, and Transitions
- Liquids: Vocal Tract Configuration, Formants, Anti Formants and Transitions.

### 3.7 Acoustic Effects of Context and Speaker

- Phonetic Context
- Gender and Age
- Women's Speech
- Children's Speech
- Iso vowel Lines

## Unit 4: Application of Acoustic Analysis and Speech Synthesis (16 hrs)

4.1 Applications of Acoustic Analysis in Speech Disorders: Speech of Persons with Hearing Impairment, Stuttering, Dysarthria, Cleft Lip and Palate

4.2 Forensic Applications: Semiautomatic and Automatic methods

4.3 Infant Cry Analysis- Characteristics of Normal and Abnormal Cries, Models, Infant Cry as a Tool for Early Identification of High-Risk Babies

4.4 Speech Synthesis:



- Types- Articulatory Synthesis, Parametric Synthesis and Analysis by Synthesis
- Applications of Speech Synthesis

**Practicum:**

- Measurement of Aerodynamic Parameters Using Spirometer and Aeroview
- Practical on FFT, LPC, Cepstrum and Inverse Filtering
- Acoustic Analysis of Vowels, Diphthongs, Plosives, Nasals, Fricatives, Affricates and Other Speech Sounds Using Spectrograms on PRAAT
- Vowel Synthesis Using Parametric and Analysis by Synthesis
- Demonstration of Articulatory Synthesis

**Reference:**

**Unit 1**

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- Borden, G. J., & Harris, K. S. (2003). Speech Science Primer. 4th Edition, Philadelphia. Lippincott, William & Wilkins.
- Daniloff. R. S., Gordon & Lawrence, (1980). The Physiology of Speech & Hearing: An Introduction. New Jersey, Prentice-Hall Inc.
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- Mac Neilage, P F. (1983). The Production of Speech. NY, Springer – Verlag.
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- Seikal, J. A., & King, D. W. (2005). Anatomy & Physiology for Speech, Language and Hearing. 4th Edition, NY, Thompson – Delmar Learning.

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- Barry, W. J., & Van Dommelen, W. A. (2005). Integration of Phonetic Knowledge in Speech Technology. New York, Springer.
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- Baken, R. J., & Daniloff, R. G. (1991). *Readings in Clinical Spectrography*. San Diego, Singular Publishing Group.
- Ball, M. J., & Lowry, O. M. (2001). *Methods in Clinical Phonetics*. London, Whurr Publishers.
- Barr, R. G. (2000). *Crying as a Sign, a Symptom and a Signal: Clinical, Emotional and Developmental Aspects of Infant and Toddler Crying*. Cambridge, Cambridge University.
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- Keller, E., Bailly, G., Monaghan, A., Terken, J., & Huckvale, M. (2002). *Improvements in Speech Synthesis*. West Sussex, England, John Wiley & Sons.
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- Tatham, M., & Morton, K. (2005). *Developments in Speech Synthesis*. West Sussex, England, John Wiley & Sons.
- Titze, I. R. (1994). *Principles of Voice Production*. New Jersey, Prentice – Hall Inc.

**Journals to be Referred:**

1. Journal of Acoustical Society of America
2. Journal of Logopedics Phoniatrics & Vocology,
3. Folia Phoniatica
4. Phonetica
5. Phonology
6. Journal of Phonetics
7. Journal of Speech Production
8. Journal of Speech, Language, and Hearing Research
9. Journal of All India Institute of Speech and Hearing
10. Journal of Indian Speech and Hearing Association
11. Speech Communication
12. Speech Language and Hearing

**Paper Code: SLP 1.3 - HC: Child Language Disorders**

**OBJECTIVES**

After completing this course, the student shall be able to:

- Know Various Theories and Models of Language Acquisition in Monolingual/Bi/Multilingual Children
- Describe Developmental and Acquired Language Disorders in Children
- Discuss Issues Related to Differential Diagnosis and Assessment of Child Language Disorders
- Describe Various Management Approaches for Child Language Disorders.
- Critically Evaluate Research Articles in the Area of Child Language Disorders

**COURSE CONTENT**

Unit 1: Theories and Models of Language Acquisition (20 hrs)

- 1.1 Critically Evaluate Theories of Language Acquisition-Biological Maturation, Linguistic, Cognitive, Information Processing and Social Theory.
- 1.2 Application of Models in Child Language Disorders - Dual-Route Cascaded Models, Connectionist Models, Hierarchical Models.
- 1.3 Psycholinguistic and Neurolinguistic Processes in Child Language Disorders.
- 1.4 Language Acquisition in Bilingual/Multilingual Children
  - Types of Bi/Multilinguals
  - Normal Process of Second Language Acquisition
- 1.5 Variables In Second Language Acquisition: Cognitive-Linguistic and Affective

Unit 2: Characteristics of Developmental and Acquired Child Language Disorders (16 hrs)

- 2.1 Linguistic, Prosodic, Behavioral and Literacy Characteristics in Children with:
  - Intellectual Disabilities
  - Hearing Impairment
  - Autism Spectrum Disorders
  - Specific Language Impairment
  - Acquired Aphasia / Dysphasia
  - Learning Disability
  - Attention Deficit Hyperactivity Disorders

Unit 3: Assessment Issues in Child Language Disorders (18 hrs)

3.1 Tools for Assessment of Child Language Disorders

- Developmental Scales such as REELS
- Norm-Referenced Tools such as LPT, KLT, MLT, ERS, RAP-K, CLAP-C, CELF, ELST, ELTIC, LARSP.

3.2 Differential Diagnosis of Child Language Disorders

3.3 Relevance of Neuroimaging Methods and Cortical Potentials in the Assessment of Child Language Disorders

Unit 4: Management Issues in Child Language Disorders (18 hrs)

4.1 General Principles and Approaches to Management in Child Language Disorders.

4.2 Evidence-Based Practice (EBP) and Response-To-Intervention (RTI) in Child Language Disorders.

4.3 Team Approach, Guidance and Counseling

**Practicum:**

1. Record Language Samples of Two Typically Developing Children and Two Children with Language Disorders and Transcribe them using International Phonetic Alphabet (IPA).
2. Evaluate at least Two Children with Language Disorders using Kannada Language Test (KLT)/ Malayalam Language Test (MLT), Linguistic Profile Test (LPT), English Language Test for Indian Children (ELTIC).
3. Evaluate any Two Children with the following Language Disorders using Appropriate Tests/Protocols:
  - Autism Spectrum Disorders: Autistic Behaviour Composite Checklist Profile (ABCCP);
    - Differential Diagnosis for Autism Spectrum Disorders (DDC-ASD);
    - Indian Scale for Assessment of Autism (ISAA)
  - Learning Disability:
    - Early Reading Skills (ERS); Reading Acquisition Profile in Kannada (RAP-K);
    - Early Literacy Screening Tool (ELST);
    - Cognitive-Linguistic Assessment Protocol (CLAP);
    - Cognitive-Linguistic Quick Test (CLQT)

- Attention Deficit Hyperactivity Disorder (ADHD):
  - ADHD Checklist
- Specific Language Impairment (SLI):
  - LPT, KLT/MLT
- Mental Retardation:
  - Receptive Expressive Emergent Language Scale (REELS);
  - Three Dimensional Language Acquisition Test (3DLAT), LPT, KLT

**Reference:**

**Unit 1**

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**Unit 2**

- Angell, C. A. (2010). Language Development and Disorders- A Case Study Approach. LLC, Jones & Bartlett Publishers.
- Burack, J. A., Hodapp, R. M., & Zigler, E. (1998). Handbook of Mental Retardation and Development. London: Cambridge University Press.
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M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

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- Rass, P. & Swain, G. (1992). *Cognitive and Linguistic Improvement Program*. San Diego, Singular Pub Co.
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**Journals to be referred:**

- 1 American Journal of Speech Language Pathology
- 2 Bilingualism : Language and Cognition
- 3 Brain and Language
- 4 Communication Disorders Quarterly
- 5 Dyslexia
- 6 Evidence Based Communication Assessment and Intervention
- 7 Journal of All India Institute of Speech and Hearing
- 8 Journal of Communication Disorders
- 9 Journal of Indian Speech & Hearing Association
- 10 Journal of Learning Disabilities
- 11 Journal of Speech, Language and Hearing Research
- 12 Language, Speech, Hearing Service in Schools
- 13 Research in Autism Spectrum Disorders

**Paper Code: SLP 1.4 - HC: Neuroscience of Speech and Language**

**OBJECTIVES**

After completing this course, the student shall be able to:

- Describe the elements of Neuroscience pertaining to speech and language
- Discuss and interpret the neuro-diagnostic findings
- Explain the role of neurotransmitters in speech, language and its disorders
- Know the effect of aging on CNS structures and assess the functions related to speech and language
- Discuss research studies relevant to neuroscience in speech and language
- Know the use of few laboratory -based procedures

**COURSE CONTENT**

Unit 1: Anatomy and Physiology of Central Nervous System and Cranial Nerves, Related to Speech and Language (20 hrs)

1.1 Anatomical Directions, Gross Anatomy of Central Nervous System, Neuron Structure and Types, Microscopic Structural Divisions of Cerebral Cortex, Brain Plasticity and Blood Supply to CNS.

1.2 Classification of Hemisphere and Lobes, Functional Organization of Brain, Hemispheric Specialization, Interconnectivity of the Brain, Topographical Organization of Cortical Pathways, Sub-Cortical Structures, Connection and Pathways

1.3 Cerebellum- Structure, Connection and Pathways, Brainstem - Structure and Pathways

1.4 Origin and Pathways of Cranial Nerves

1.5 Spinal Cord- Organization and Functions, Sensori-Motor Pathways and Function, Overview of Centripetal and Centrifugal Fibers

Unit 2: Procedures for Understanding Neurological and Biological Status of Speech and Language Mechanisms (20 hrs)

2.1 Clinical Examination of Neurological Status - History, Physical Examination, Reflexes

2.2 Neuro-Diagnostic Procedures for Routine Clinical Examination – Cranial Nerve Examination, Sensory & Motor Examination, Examination of Mental Functions

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

- 2.3 Neuro-imaging Procedures: X-Ray, CT scan, MRI, fMRI, TMS, PET, SPECT and others - Advantages and Disadvantages
- 2.4 Neuro-physiological Procedures - Evoked potentials (Visual, auditory and somatosensory), Eye-tracking, Electromyography (EMG), Magnetoencephalography (MEG) - Advantages and disadvantages
- 2.5 Neuro-behavioral Procedures - Neurolinguistic Investigation, Priming and its Types, Reaction Time Measures and other Related Procedures

Unit 3: Role of Neurotransmitters in the Mediation of Speech and Language (16 hrs)

- 3.1 Neurotransmitters – Classification, Major Location, Functions and Synthesis / Chemical Composition
- 3.2 Signal Propagation in the Nervous System- Ion Channels, Transport across Cell Membranes, Resting Potential and Action Potential
- 3.3 Organization and Processing of Information in Brain, Receptors, Types of Synapses, Synaptic Transmission- Direct and Indirect, Exocytosis and Endocytosis
- 3.4 Role of Neurotransmitters in Neuropathological conditions leading to Speech and Related Disorders
- 3.5 Role of Neurotransmitters in Neuropathological conditions leading to Language and Related Disorders

Unit 4: Neuroscience of Aging and its Effect on Speech and Language (16 hrs)

- 4.1 Aging-Definition, Types- (Senescence and Senility, Primary and Secondary Aging, Biological and Psychological Aging), Phenomenon of Aging-(Neurological, Cognitive and Behavioral Correlates, Structural Changes with Age, Brain Weight, Ventricular Size, Microscopic Changes and Atrophy).
- 4.2 Theories of Aging - Cellular, Genetic, Cumulative, Random Cell Damage, Programmed Cell Death, High Level Control of Aging, Cellular Theories, Geriatric Theories and Other Theories
- 4.3 Neurophysiological /Functional Changes with Age: Accuracy, Speed, Range, Endurance, Coordination, Stability and Strength, Neurobehavioral Correlates of Aging - Lateralization of Functions across Life Span, Cerebral Asymmetry, Electrophysiological and Behavioral Evidences
- 4.4 Aging and its Effect on Speech and Language: Effects of Aging on Speech and Language across Life Span: in Typical and Pathological Conditions

**Practicum:**

1. Examination of Cranial Nerves
2. Sensory Motor Examination and Reporting
3. Observation of Audio Visual Materials on Neuro-Imaging Procedures, EEG, MEG & EMG
4. Stimulus Presentation Methods for Evoked Potentials Using Stim2, E-Prime and DMDX Software

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- Jenkins, I. (2000). *Biolinguistics: Exploring the Biology of Language*. New Delhi, Cambridge University Press.
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- Petrides, M. (2014). Neuroanatomy of Language Regions of the Human Brain. New York, Academic Press.
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- Singh, I. (2007). Textbook of Human Neuroanatomy. 5th Edition, New Delhi, Jaypee Publisher.
- Snell R. S. (2006). Clinical Neuroanatomy. 6th edition, New York, Lippincott W & W.
- Zemlin. W. (1998). The Nervous system, in Speech and Hearing Science: Anatomy and Physiology. 4th Edition, Boston, Ally & Bacon.

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- Edwin, R. B. & John, A. S. (1994). Neurological Examination in Clinical Practice. London, Oxford University Press.
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- Handy, T. C. (2005). Event-Related Potentials: A Methods Handbook. MIT press, London.
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- Mumenthaler, M. Mattle, H. & Taub, E. (2006). Fundamentals of Neurology. New York, Thieme Publisher.
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- Daniel, E. S. (1961). Electrical Stimulation of the Brain- An Interdisciplinary Survey of Neurobehavioral Integrative Systems. Austin, Hogg Foundation for Mental Health.
- Haase, H. J. & Janssen, P. A. J. (1965). The Action of Neuroleptic Drugs- A Psychiatric Neurologic and Pharmacological Investigation. Amsterdam, North Holland Press.
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- Sidman, R. L. & Sidman R. L. (1965). Neuroanatomy - Programmed Text. New York, Little, Brown & Company.
- Walshe, F. & Walshe, J. (1970). Diseases of the Nervous System. London, E & S Livingstone.

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- Frolkis, V.V. & Bezrukov, V. V. (1979). Aging of the Central Nervous System. New York, S. Karger.
- Guido, F. (1997). Brain Plasticity: Development and Aging. New York, Plenum Press.
- Hanna, K. U. (1985). Aging Brain: Communication in the Elderly. London, Taylor And Francis Ltd.
- Harman, D. & Mark, J. (1976). Aging: Clinical, Morphologic and Neurochemical Aspects in the Aging Central Nervous System. Amsterdam, Excerpta Media.
- Herbert, J. O. & Jane, E. O. (2011). Aging and Communication. Austin, Pro-Ed.
- James, E. B., & Warner, K. S. (1996). Hand Book of the Psychology of Aging. New York, Academic Press Inc.
- Kathryn, A. B., & Alfred W. K. (1987) Communication and Cognition in Normal Aging and Dementia. Austin, Pro-Ed.
- Louise, M. H. & Linda, E. W. (2003). Communication Disability in Aging. New York, Thomson Delmar Learning.
- Marcotte, T. D. & Grant I. (2010). Normal Aging and Everyday Functioning. In Neuropsychology of Everyday Functioning. Guilford Press, New York.
- Philip, F. R. (1986). Adult Development and Aging. Boston, Allyn & Bacon Publisher.
- Ripich, D. N. (1991). Handbook of Geriatric Communication Disorders. Austin, Pro – Ed.
- Robert, N. B. & Myrna I. L. (1982). Aging and Mental Health: Positive Psychosocial and Biomedical Approaches. St. Louis, C.V. Mosby Company.

#### Journals to be referred:

- 1 Brain and Language
- 2 Journal of Neuroscience
- 3 Cortex
- 4 Brain
- 5 Neuroscience
- 6 Journal of Neurophysiology



**Paper Code: SLP 1.5 - SC: Clinical Linguistics and Multilingual Issues in Communication**

**OBJECTIVES**

**After studying this paper the student should be able to:**

- Obtain the knowledge of basics of Clinical linguistics and clinical relevance of general linguistics.
- Discuss the acquisition process and related disabilities pertaining to various components of language
- Discuss general concepts, theoretical background and issues related to socio-linguistics
- Discuss the multilingual and multicultural issues in rehabilitation with special reference to India
- Carry out researches in the area of Linguistics and language disorders.

**COURSE CONTENT**

Unit 1: Introduction to Clinical Linguistics; Phonological acquisition and related disability (13 hrs)

- 1.1. Introduction of Clinical Linguistics, The Scope of Linguistics in clinical field.
- 1.2. Principles of General Linguistics and their clinical relevance.
- 1.3. Phonological acquisition
- 1.4. Phonological disability

Unit 2: Grammatical and semantic acquisition and related disabilities (13 hrs)

- 2.1. Grammatical acquisition
- 2.2. Grammatical disability
- 2.3. Semantic acquisition
- 2.4. Semantic disability

Unit 3 : Pragmatics, its acquisition and related disabilities; Sociolinguistic concepts relevant to Speech language pathologists (14 hrs)

- 3.1 Pragmatics – Theoretical background: Discourse, Deixis, Maxims and Truth relations
- 3.2 Pragmatic development
- 3.3 Pragmatic disability with respect to some clinical disorders
- 3.4 Sociolinguistic concepts relevant to Speech language pathologists
  - Language and dialects issues, various types and dialects

- Diglossia
- Stylistic variation of language-registers
- Language contact-Creoles, Pidgins
- Language maintenance, Language Shift and Language Death

3.5 Language Deficiency

Unit 4: Multilingual and multicultural issues in communication (14 hrs)

- 4.1. India as a multilingual nation– A brief introduction to the major language families of India
- 4.2. Relation between language and culture, Language and thought relationship in view of Sapir-Whorf hypothesis: Linguistic determinism and Linguistic relativity
- 4.3. Cultural issues- Cultural issues in verbal and non-verbal communication
- 4.4. Multicultural and multilingual issues in rehabilitation with special reference to India

**Reference:**

**Unit 1**

- Ball, M., J., Perkins, M., R., Müller, N. & Howard, S. (2008). The handbook of clinical linguistics. (Eds). Oxford: Blackwell Publishing.
- Crystal, D. (2001). Clinical Linguistics. In M. Aronoff & J. Rees-Miller, The Blackwell handbook Of linguistics (pp.673-82). Oxford: Blackwell.
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- Parker, F. & Riley, K. (1994). Linguistics for non-linguists. USA: Allyn And Bacon.
- Townend, J., & Walker, J. (2006). Structure of language spoken and written English. USA: Whurr Publishers Limited.

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- Bonvillian, N. (2011). Language, culture and communication. New Jersey: Pearson Education.
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- Austin, J. L. (1962). How to do things with words. UK: Oxford University Press.
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- Verschueren, J. (1999). *Understanding pragmatics*. London, New York: Arnold Publishers.
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- Watzlawick, P., Janet, H. B., & Don, D. J. (1967). *Pragmatics of human communication: A study of interactional patterns, pathologies, and paradoxes*. New York: Norton.
- Wei, L. (2014). *Applied linguistics*. UK: Wiley Blackwell. (Chapter: Part III)
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- Abbi, A. (2001). *A manual of linguistic field work and structure of Indian languages*. (LINCOS handbooks in linguistics 17). Munich: LINCOS Europa.
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**Journals to be referred:**

- 1 Clinical Linguistics and Phonetics
- 2 Applied Linguistics
- 3 Applied Psycholinguistics
- 4 International Journal of Applied Linguistics
- 5 Journal of Intercultural Communication
- 6 Journal of Pragmatics
- 7 Journal of Sociolinguistics
- 8 Journal of Advanced Linguistic Studies
- 9 Indian Linguistics
- 10 International Journal of Dravidian Linguistics
- 11 Corpus Linguistics and Linguistic Theory
- 12 Language Learning

**Paper Code: SLP 1.5 - SC- Technology for Speech-Language and Hearing**

**OBJECTIVES**

After going through this course the student will be able to explain:

- Latest technology involved in speech Acoustics, Signal processing, Instrumentation etc.
- fundamental concepts of the technology used in the instruments for diagnostics and therapeutics in Audiology, Speech Language Sciences and Pathology
- the basic technology used in hearing aids & cochlear implants.
- the principle of working and functioning of equipments used for measurement of sounds and calibration of diagnostic equipments.
- the procedure for calibration of diagnostic instruments..
- the foundation of ICT (Information and Communication Technology) concepts and illustrate the applications of ICT in Audiology, Speech & Language Sciences & Pathology

**COURSE CONTENT**

Unit 1 : Transducers, Signal Processing components & Power Supply (12 Hrs)

1.1 Transducers for Audiology, Speech-Language Sciences & Pathology

- Microphones – Basic structure & principle of operation of dynamic, condenser and electret microphones.
- Essential characteristics of microphones for recording, speech analysis and speech audiometry
- Loudspeakers – Basic structure & principle of operation of dynamic loudspeaker, moving coil and balanced armature type receivers
- Essential characteristics of headphones and insert receivers for audiometry

1.2 Signal Processing components

- Role of Preamplifiers and Power amplifiers
- Filters – different types and their role

1.3 Power supply

- Mains supply to clinics – Requirements
- Internal power supply of instruments
- Un interrupted Power Supply to clinics and instruments

Unit 2 : Introduction to Digital signal processing and Information & Communication technology  
(12 Hrs)

2.1 Digital signal processing

- Basic structure of a Digital signal processing system
- Process of Analog to Digital conversion
- Process of Digital to Analog conversion
- Basic concepts of Digital Signal Processing - Decomposition, Processing and Synthesis
- Implementation of Signal processing functions using DSP

2.2 Information Technology

- Introduction to Computers
- Role of Operating systems
- Role of RAM and Hard disk
- Structure and functioning of computer networks

2.3 Communication technology

- Frequency modulation & its applications in group hearing aids
- Basic structure of a Satellite communication system
- Concept of world wide web
- Internet connectivity – basic structure
- Telediagnosis & telerehabilitation system.

Unit 3 : Technology of hearing aids & cochlear implants, Speech processing and analysis  
(15 Hrs)

3.1 Technology of hearing aids

- Basic technology of a fully digital Hearing Aid
- Technologies for non-linear amplification
- Technologies for noise suppression
- Technology for feedback cancellation

3.2 Technology of cochlear implants

- Basic architecture of a cochlear implant system
- Basic technology of speech processor
- Speech processing strategies

3.3 Fundamentals of speech signal processing

- Representing a speech signal in time domain
- Converting from time domain to frequency domain
- Short time analysis techniques

### 3.4 Techniques of speech analysis & applications

- LPC Analysis
- Cepstrum analysis
- Speaker recognition
- Speech synthesis
- Speech to text conversion

## Unit 4 : Instrumentation in Audiology & Speech - Language (15Hrs)

### 4.1 Instrumentation in Speech - Language

- Speech Spectrograph and CSL
- Voice analysis systems
- Electro glotograph
- Articulograph
- Nasometer
- Fibre optic endoscope

### 4.2 Instrumentation in Audiology

- Audiometer
- Middle ear Analyzer
- Otoacoustic Emission Analyzer
- Instrumentation for Auditory Evoked Potential
- EEG & Neuroscan
- Equipments and components used for measurement of sound and calibration

### 4.3 Room acoustics, measurements & electric grounding

- noise auditing.
- measurement of reverberation time
- audiometric test room
- recording room
- procedure to make a perfect electric ground

### 4.4 Fundamentals of imaging technology

- X-Ray
- C-Arm
- CT scan
- MRI
- FMRI .



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**Paper Code: SLP 1.6 - HC: *Clinical Practicum I***

## SEMESTER II

### Paper Code: SLP 2.1 - HC: Phonological Disorders and Maxillofacial Anomalies

#### OBJECTIVES

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

- Explain the Nature and Measures of Coarticulation
- Describe the Nature of Phonological Development .
- Discuss the Recent Advances in Assessment and Treatment of Phonological Disorders
- Describe the Nature of Speech and Language Deficits in Persons with Cleft Palate
- Describe the Current Issues on Assessment of Velopharyngeal Closure and Resonatory Disorders
- Discuss the Current Issues in Rehabilitation of Persons with Cleft Palate from the Perspectives of Speech Language Pathology and Allied Profession

#### COURSE CONTENT

Unit 1:Coarticulation and its Aspects (20 hrs)

##### 1.1. Coarticulation

- Nature, Definition, Kinds (Anticipatory, Carryover)
- Models of Coarticulation - Feature Based, Syllabic, Allophonic, Target, Physiological and Degree of Articulatory Constriction Models
- Physiological / Acoustical / Perceptual Studies in Coarticulation
- Parameters of Coarticulation, Long Term Effects of Coarticulation (Position & Juncture Effect, Feature Effect, Transition Effect and Direction Effect)

1.2 Coarticulation in Speech Disorders with Phonological Impairment: Measurement of Coarticulation Including Locus Equation

1.3 Critical Evaluation of Research Articles in the area of Co Articulation

Unit 2: Assessment and Management of Persons with Phonological Disorders (16 hrs)

2.1. Theories of Phonological Development

2.2. Application of Phonological Theories in Evaluation and Management of Phonological Disorders

2.3. Phonological Analysis – Methods to Assess Phonological Aspects in Various Communication Disorders.

- 2.4. Phonological Awareness in Phonological Disorder
- 2.5. Various Therapy Approaches Including Evidence Based in the Rehabilitation of Persons with Phonological Disorders.

Unit 3: Phonological Development and Velopharyngeal Function in Persons with Maxillofacial Anomalies (18 hrs)

- 3.1. Phonological Development in Children with Cleft Lip and Palate (CLP).
- 3.2. Development of other Language Attributes (Semantics and Syntax)
- 3.3. Velopharyngeal Closure
  - Normal Physiology
  - Parameters Affecting Velopharyngeal Closure
  - Velopharyngeal Dysfunction in Persons with CLP
- 3.4. Measurement of Velopharyngeal Closure:
  - Subjective: Perceptual Protocols
  - Aerodynamic Measurements
  - Acoustic Measurements
  - Imaging Techniques

Unit 4: Assessment and Management of Persons with Maxillofacial Anomalies (18 hrs)

- 4.1. Early Intervention for Persons with CLP – Methods and Studies Related to Efficacy
- 4.2. Speech Therapy for Persons with Velopharyngeal Dysfunction
- 4.3. Evidence Based Practices in Speech Language Therapy
- 4.5. Relevance of Surgical, Orthodontic and Prosthodontic methods in the Management of Persons with CLP.
- 4.6. Assessment and Management of Persons with Glossectomy and Mandibulectomy

**PRACTICUM:**

1. Phonological Analysis - Pattern Analysis, ACI, PCC and Other Parameters.
2. Observe and Interpret the Ultrasound Images of the Tongue & EMMA
3. Use Recent Tests to Analyze Phonological Aspects in the Indian Context
4. Perceptual Analysis of Speech Samples of Persons with CLP
5. Observe and Interpret the Acoustic and Aerodynamic Measures and Correlate with the Subjective Methods
6. Plan Intervention Strategies and Activities for Persons with Maxillofacial Anomalies

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**Phonological Disorders**

- 1 Applied Linguistics
- 2 Australian Review of Applied Linguistics
- 3 Clinical Linguistics and Phonetics
- 4 First Language
- 5 Folia Phoniatica
- 6 International Journal of Speech Language Pathology
- 7 Journal of Speech Language and Hearing Research
- 8 Language in India
- 9 Journal of Phonetics

**Maxillofacial Anomalies**

- 1 Journal of Cleft Lip and Palate
- 2 Indian Journal of Cleft Lip and Palate
- 3 The Cleft Palate and Craniofacial Journal
- 4 Journal of Cleft Lip Palate and Craniofacial Anomalies
- 5 Folia Phoniatica
- 6 Journal of Indian Speech and Hearing Association
- 7 Journal of All India Institute of Speech and Hearing
- 8 Journal of Speech Hearing and Language Research

**Paper Code: SLP 2.2 - HC: Motor Speech Disorders**

**OBJECTIVES**

**After completing the course, the student shall be able to:**

- Describe the Neuroanatomical Bases for Speech Motor Control
- Explain the Models Relevant to Speech Motor Control
- Know the Methods for Assessment and Management of Speech Motor Disorders
- Critically Evaluate Research Articles Related to Speech Motor Disorders

Unit 1: Neuroanatomical and Physiological Substrates of Speech Motor Control (16 hrs)

1.1 Neuroanatomical Substrates of Speech Motor Control

- Role of Motor and Sensory Cortex
- Role of Subcortical, Cerebellar and Brain Stem Structures and their Pathways
- Cranial Nerves and Peripheral Nervous System
- Types of Mechanoreceptors and their Topography in Speech

1.2 Speech Motor Control: Typical, Developmental & Degenerative

- Acquisition of Speech Motor Control in Typical Children
- Models (Netsell, Diva)
- Neural Substrates in the Maturation of Speech Motor Control – Prenatal to Postnatal
- Aging and Speech Motor Control in Typical and Disordered Population

Unit 2 Models of Speech Motor Control (16hrs)

2.1 Terminologies and Concepts of Speech Motor Control:

- Motor Equivalence,
- Variability,
- Covariability,
- Spatio Temporal Index,
- Trajectory,
- Normalized Curves etc

2.2 Models of Speech Motor Control – their Relevance in Understanding Speech Motor Disorders

- Closed Loop, Open Loop, Associative Chain and Serial Order Model
- Schema Theory



- Task Dynamic Model
- Van Der Merwe's Model
- Mac Kay's Model
- Adaptive Model
- Gracco's Model

### Unit 3: Assessment and Management of Dysarthria (20 hrs)

#### 3.1 Assessment of Developmental and Acquired Dysarthrias

- Subjective Methods: Rating Scales and Tests for Speech Parameters, Prosody, Speech Intelligibility and Naturalness.
- Objective Methods: Aerodynamic, Acoustic and Physiological

#### 3.2 Management of Developmental and Acquired Dysarthrias

- Methods to Correct Posture, Tone, and Strength and Sensori-Motor Treatment Techniques
- Application of Behavioural Approaches in Developmental Dysarthria: McDonald's Approach and Hardy's Approach
- Application of Facilitatory Approaches in the Management of Developmental Dysarthrias: Neurodevelopmental Approach and Methods for Reflex Inhibition
- The "For and Against" Schools of Thought for Facilitatory Approaches
- Aids and Appliances to Facilitate Good Posture and Speech
- Programmed Sub System Approach in the Treatment of Dysarthria

### Unit 4: Developmental and acquired apraxia (20 hrs)

#### 4.1 Assessment of Developmental and Acquired Apraxia

- Assessment for Suspected Apraxia of Speech, Apraxia of Speech and Non-Speech Apraxias: Subjective and Objective Methods

#### 4.2 Management of Developmental and Acquired Apraxia

- Techniques for Correction of Non Verbal Apraxias
- Techniques for Correction of Verbal Apraxia: Specific, Programmed and Non Specific Approaches

#### 4.3 Differential Diagnosis :

- Dysarthria and Apraxias
- Language Disorders and Apraxia
- Language Disorders and Dysarthria

**Practicum:**

1. Observe the Subjective and Objective Procedures for Assessment of Persons with Speech Motor Disorders and Dysphagia
2. Submission of a Capstone (Diagnostic and Therapeutic Profile along with Information about the Disorder) on any One Individual with Motor Speech Disorder/Dysphagia
3. Assess atleast one Person with Developmental and Acquired Speech Motor Disorder /Dysphagia using Suitable Subjective &/ Objective Procedures
4. Observe the Subjective/ Objective Procedures for Management of Persons with Speech Motor Disorders and Dysphagia

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M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

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1. Seminars in Speech and Language
2. Journal of Phonetics
3. Journal of Speech and Hearing Research
4. Journal of Speech, Language and Hearing Research
5. Journal of Communication Disorders
6. British Journal of Communication Disorders

**Paper Code: SLP 2.3 - HC: Fluency and its Disorders**

**OBJECTIVES**

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

- Explain the Nature and Types of Fluency Disorders
- Discuss the Theories and Models of Stuttering
- Describe, Diagnose and Treat Persons with Various Fluency Disorders
- Describe the Procedures Involved in Counseling and Guidance to Persons with Fluency Disorders and their Parents/Caregivers
- Critically Evaluate the Research Work in the Area of Fluency and its Disorders

Unit 1: Fluency and Stuttering (16 hrs)

- 1.1 Definitions and Dimensions of Fluent Speech
- 1.2 Development and Factors Affecting Fluency
- 1.3 Evaluation of Fluency and Other Prosodic Features in Fluency Disorders
- 1.4 Characteristics of Stuttering
- 1.5 Onset and Development of Stuttering
- 1.6 Normal Nonfluency & Stuttering – Early Identification
- 1.7 Speech Naturalness Based on Dimensions of Fluency

Unit 2: Theories of Stuttering (20 hrs)

- 2.1 Theories of Stuttering: Organic/ Physiological/Psychological Theories/ Nature/Nurture Theories
- 2.2 Linguistic and Prosodic Basis of Fluency Disorders
- 2.3 Auditory and Neurological Processing
- 2.4 Speech Motor Control in Stuttering
- 2.5 Articulatory and Laryngeal Dynamics
- 2.6 Timing and Sequencing in Fluency Disorders



- 2.7 Genetic Aspects of Stuttering
- 2.8 Other Theories/Models on Stuttering- Covert Repair Hypothesis, EXPLAN, DIVA/GODIVA, Neuropsycholinguistic, Communication-Emotional, Personal Construct Theory and Others

Unit 3: Assessment and Management of Stuttering (20 hrs)

- 3.1 Assessment of Stuttering in Children and Adults –Tools and Procedures
- 3.2 Approaches to Management of Stuttering in Children and Adults
- 3.3 Group Therapy and Counselling
- 3.4 Recovery and Relapse of Stuttering and Related Issues
- 3.5 Management/Prevention of Relapses
- 3.6 Efficacy of Stuttering Therapies and EBP

Unit 4: Other Fluency Disorders (16 hrs)

- 4.1 Sub-Grouping Fluency Disorders
- 4.2 SAAND – Causes, Characteristics, Assessment and Management
- 4.3 Cluttering – Causes, Characteristics, Assessment and Management
- 4.4 Psychogenic and Other Fluency Disorders
- 4.5 Differential Diagnosis of Fluency Disorders including Fast Rate of Speech

**Practicum:**

1. Administer SSI 4 (Both Manual and Computerized), SPI & Fluency Tests
2. Measure Rate of Speech –WPM, SPM, SPS
3. Disfluency Assessment - Type, Percent, Naturalness Rating Scale
4. Assessment of Naturalness
5. Assessment of Cluttering and Neurogenic Stuttering
6. Differential Diagnosis of Stuttering Vs Cluttering Vs Neurogenic Stuttering
7. Assessment of Evoked Response Potential in Persons with Fluency Disorders
8. Instrumental Assessment: DAF, Vital Capacity, F0, F0 Range, EGG
9. Demonstration of Therapy Techniques:
  - Prolonged Speech Techniques
  - Modified Airflow

- Response Cost
  - Fluency Shaping
  - Analogies
10. Acoustical Analysis of Speech of Persons with Stuttering  
11. OASES-Quality Of Life

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#### **Journals to be referred:**

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2. Journal of Speech Language And Hearing Research
3. American Journal of Speech Language and Hearing
4. Journal of Communication Disorders
5. Contemporary Issues in Communication Sciences and Disorders
6. British Journal of Communication Disorders
7. Journal of All India Institute of Speech and Hearing
8. Journal of Indian Speech and Hearing Association

**Paper Code: SLP 2.4 - SC: Language, Cognition and Brain**

**OBJECTIVES**

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

- List the terminology and describe the definitions used in the area of language, cognition and brain
- Describe the various cognitive process involved in the information processing
- Describe and assess various cognitive behaviours related to the study of language
- Lists different tests of Cognitive-Linguistic skills and independently design appropriate test protocol for clients with cognitive-communicative problems (in children and adults)
- Discuss the role of Meta-cognition, and evaluation of cognitive and meta-cognitive Behaviours
- Describe the various intervention for cognitive-communicative rehabilitation in children and adults

**COURSE CONTENT**

Unit 1: Concepts in Language, Cognition and Brain (16 hrs)

1.1 Overview of different parameters of Language

1.2 Cognition- Description of Cognitive Processes, Cognitive Mapping, Cognitive Mechanisms, Concept, Schema and Properties

1.3 Attention-Description and Types -Focused, Sustained, Divided, Alternating and Selective

1.4 Memory-Description and Types -Sensory, Echoic, Iconic, Working, Eidetic, Long Term, Declarative, Procedural, Episodic and Semantic Memory

1.5 Recognition and Recall

- Reasoning -Inductive And Deductive
- Thinking-Convergent And Divergent
- Interference-Proactive and Retroactive
- Metacognition

Unit 2: Cognitive process models and Implications of Information processing for speech and language (20 hrs)

2.1 Models of Attention

- Broadbent's Bottleneck Model
- Norman and Bobrow's Model

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

- The Treisman Model
- The Deutsch and Deutsch Model.

2.2 Models of Memory

- Atkinson and Shiffrin's multistore Model
- Craik and Lockhart's Levels of Processing Model
- Baddley's Working Memory Model

2.3 Role of Attention and Memory in the Development of Speech and Language

2.4 Models of Cognitive-Linguistics Process

- Hierarchical
- Process
- Interactive
- Computational,
- Neural Network
- Bilingual Models: Simultaneous and Sequential Processing

Unit 3: Assessment of Cognitive –Linguistic Functions ( 20 hrs)

3.1 Formal Tools for Assessment of Children and Adults

- Test of Everyday Attention (TEA),
- Stroop Test
- Vigilance Test
- Digit Span
- Fruit Distraction
- Scattered Scanning
- Paced Auditory Serial Attention
- Ross Information Processing Assessment
- Cognitive–Linguistic Assessment Profile (CLAP),
- Cognitive–Linguistic Improvement Program (CLIP),
- Illinois Test of Psycholinguistic Abilities (ITPA)
- Addenbrooke's Cognitive Examination – ACE-R
- Montreal Cognitive Assessment (MOCA)
- Trail Making Test (TMT)
- Cognitive-Linguistic Quick Test (CLQT)
- Software for Cognitive Assessment

3.2 Informal assessment of cognitive process like attention, discrimination, perception, memory, reasoning, problem Solving and organization in children and adults

3.3 Assessment of Play as Part of Cognitive Development – Tools Used

Unit 4: Team Intervention for Cognitive- communicative rehabilitation (16 hrs)

4.1 Concepts, Approaches and Models of Cognitive Communicative Intervention

4.2 Team Approach in Cognitive-Linguistic Function and its need and importance

4.3 Effect of Pharmacological, Neuro-surgical, and Neuro-stimulation techniques on Cognitive Linguistic behavior (evidence from clinical population)

4.4 Cognitive, Communicative and Alternative treatment approaches in children and adults

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- Horrocks, J. E. (1962). *Psychology of Adolescence Behavior and Development*. Boston; Houghton, Mifflin.
- Howard, C. S. (2011). *Enhancing Communication for Individuals with Autism: A Guide to the Visual Immersion System*. Baltimore, Paul H Brookes Publishing Co.
- Kroese, S. (1997). *Cognitive-Behavior Therapy for People with Learning Disability*. New York, Academic Press.
- Luria, A. R. (1963). *Restoration of Function After Brain Injury*. Oxford, Pergamon Press.

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

- McClelland, J. L. & Siegler, R. S. (2001). *Mechanisms of Cognitive Development: Behavioral and Neural Perspectives*. New Jersey, Lawrence Publisher.
- Michela, R. (2011). *Communication in Cognitive Behavioral Therapy*. New York, Springer – Verlag.
- Thal, L. J. (1992). *Cognitive Disorders-Pathophysiology and Treatment*. New York, Marcel Dekker Inc.

**Journals to be referred:**

1. *Bilingualism: Language and Cognition*
2. *Brain*
3. *Brain and Language*
4. *Journal of Cognition and Development*
5. *Journal of Cognitive Neurosciences*
6. *Journal of Neurolinguistics*
7. *Language and Cognitive Process*
8. *Research in Autism Spectrum Disorder*

**Paper Code: SLP 2.4 - SC: Gerontology & Communication Disorders**

**OBJECTIVES**

**After the completion of the course, students should be able to:**

- Demonstrate the nature of gerontology.
- Demonstrate the diversity involved with aging and minority populations including older women's needs, health status, and social status.
- Demonstrate the cognitive communication issues due to aging and disordered population
- Demonstrate the social contexts and consequences of physical aging.
- Describe the social policies addressing social problems related to older adults.

**COURSE CONTENT**

Unit 1: Demographic trends of an aging society and Social Gerontology (12 hrs)

- 1.1 India: An aging society
- 1.2 Global aging
- 1.3 Gender and age
- 1.4 Race and Aging
- 1.5 Geographical distribution : Where Indian older adults live
- 1.6 Marital status and Economic status
- 1.7 Health care-Long term care
- 1.8 Gerontology- Historical perspective on aging
- 1.9 Ageism-Ageist stereotypes, Myths about aging, Ageist Language
- 1.10 Ageist attitudes of healthcare Professionals
- 1.11 Social Roles in later life- Cultural perspectives on care giving and older adults. Social relationships
- 1.12 Social influence on aging – Income and financial resources , work and retirement
- 1.13 Health, Wellness , and Health care- Health promotion and disease prevention, Healthcare finances

Unit 2: Physiology, Pathology and cognitive psychological changes with Aging (12 hrs)

- 2.1 Theories Aging- Biological, Genetic and Environmental
- 2.2 Age related changes of the organ system- Nervous system, special senses, respiratory.
- 2.3 Cognition- Orientation, delirium, attention, memory and learning
- 2.4 Psychological- Death and bereavement, personality development and quality of life
- 2.5 Physical changes and Performance- range of motion, strength, endurance praxis, performance work

Unit 3: Communication changes with Aging (12 hrs)

- 3.1 Aging Speech- Voice, Resonance and Articulation
- 3.2 Aging and swallowing
- 3.3 Language aging : Primary and Tertiary aging factors
- 3.4 Language and aging: secondary aging factors- Language disorders in older adults
- 3.5 Cognitive aging : Secondary aging factors- Cognitive Disorders of communication in older adults

Unit 4: Policy, ethical and future concerns in aging society (12 hrs)

- 4.1 Policy overview- Ever evolving nature of policy, Historical perspectives on elderly policy.
- 4.2 Policy issues- Social security, medical, aging network, PWD act
- 4.3 Ethical issues- decision making, elderly abuse and neglect
- 4.4 Significant Demographic shifts- older adults today, future older adults, work life, retirement and finances
- 4.5 Living options and continuum care – Housing and health connection- independence, empowerment, independent living, living options for older people, various long term care options, old age care ideas from India and around the world

**Reference:**

**Unit 1**

- Chop, C. W. (2015). Demographic trends of an aging Society. In Chop, C. W & Robnett, H. R (3rd Eds.). Gerontology for health care professional. MA: Jones and Bartlett Learning Burlington.
- Brossoie, N., & Chop, C. W. (2015). Social gerontology. In Chop, C. W., & Robnett, H. R (3rd Eds.). Gerontology for health care professional. MA: Jones and Bartlett Learning Burlington

**Unit 2**

- Gregory, J. C., & Sandmire, A. D. (2015). The physiology and pathology of aging. In Chop, C. W., & Robnett, H. R (3rd Eds.). Gerontology for health care professional. MA: Jones and Bartlett Learning Burlington
- Robnett, H. R., & Bolduc, J. J. (2015). The cognitive and psychological changes and associated with aging. In Chop, C. W., & Robnett, H. R (3rd Eds.). Gerontology for health care professional. MA: Jones and Bartlett Learning Burlington

**Unit 3**

- Toner, A. M., & Skladany, A. (2011). Aging speech: Voice, resonance and articulation. In Toner, A. M., Shadden, B. B., & Gluth, B. M. (2nd Ed.). Aging and communication. Austin Texas: Pro-ed.

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

- Toner, A. M. (2011). Aging and swallowing. In Toner, A. M., Shadden, B. B., & Gluth, B. M. (2nd Ed.). Aging and communication. Austin Texas: Pro-ed.
- Youmans, R. S., & Youmans, L. G. (2011). Cognitive aging: Secondary aging factors-cognitive disorders of communication in older adults. In Toner, A. M., Shadden, B. B., & Gluth, B. M. (2nd Ed.). Aging and communication. Austin Texas: Pro-ed.
- Shadden, B. B. (2011). Language and aging: Primary and tertiary Aging factors. In Toner, A. M., Shadden, B. B., & Gluth, B. M. (2nd Eds.). Aging and communication. Austin Texas: Pro-ed.
- Shadden, B. B. (2011). Language and aging: Secondary aging factors- Language disorders in older adults. In Toner, A. M., Shadden, B. B., & Gluth, B. M. (2nd Eds.). Aging and communication. Austin Texas: Pro-ed.

**Unit 4**

- Bruner- Canhoto, A. L. (2015). Policy and Ethical issues for older adults (2015). In Chop, C. W., & Robnett, H. R (3rd Ed.). Gerontology for health care professional. MA: Jones and Bartlett Learning Burlington
- Ewald, D. P (2015). Future concerns in an aging society. In Chop, C. W., & Robnett, H. R. (3rd Ed.). Gerontology for health care professional. MA: Jones and Bartlett Learning Burlington
- Robnett, H. R., & O'Sullivan, A. (2015). Living options and continuum of care. In Chop, C. W., & Robnett, H. R (3rd Eds.). Gerontology for health care professional. MA: Jones and Bartlett Learning Burlington

**Journals to be referred:**

1. Aging, Neuropsychology and Cognition
2. Brain and Language
3. Communication Disorders Quarterly
4. Journal of Cognitive Neuroscience

**Paper Code: SLP 2.5 - SC: Endoscopic Evaluation of Lesions of the Larynx**

**Objectives**

**After Completing this Course, the Student shall be able to:**

- Understand the Lesions & Pathological Conditions of the Larynx
- Observe Pre and Post Surgical Conditions of the Larynx.
- Observe Live Surgical Procedures of the Larynx (in the Operation Theatre).

**COURSE CONTENT**

**Unit 1 (12hrs)**

- 1.1 Anatomy of Mouth, Pharynx
- 1.2 Anatomy of Larynx, Functions and Mechanisms of Laryngeal Movements

**Unit 2 (12hrs)**

- 2.1 Congenital Abnormalities of Mouth and Pharynx
- 2.2 Congenital Abnormalities of the Larynx
- 2.3 Infections and Inflammation of Oral Cavity and Larynx

**Unit 3 (12hrs)**

- 3.1 Trauma and Stenosis of the Larynx
- 3.2 Neoplasms of Oral Cavity, Pharynx and Larynx (Malignant & Benign)
- 3.3 Vocal Cord Paralysis and its Management

**Unit 4 (12hrs)**

- 4.1 Phonosurgery
- 4.2 Types of Laryngectomy
- 4.3 Voice Conservation Procedures, & Rehabilitation Procedures.

**Reference:**

**Unit 1 to 4**

- Gleeson, M. J., & Clarke, R. C. (2008). Scott Brown's Otorhinolaryngology: Head and Neck Surgery. FL, USA; CRC Press.
- Dhingra, P. L. (2013). Diseases of Ear, Nose and Throat. Chennai, Elsevier.
- Hazarika, P., Nayak, D. R., Balakrishnan, R. (2010). Textbook of Ear, Nose, Throat and Head and Neck Surgery. New Delhi, CBS Publishers & Distributors.
- Khalid, Z. H. (2008). Manual of Clinical Otorhinolaryngology. Bengaluru, Karnataka, India; Paras Medical Publishers.
- Paparella, M. M. (1991). Otolaryngology. MI, USA; Saunders.
- English, G. M. (1976). Otolaryngology: A Textbook. New York, Harper & Row.



**Paper Code: SLP 2.5 - SC: Event Related Potential in speech and language**

**Objectives**

**After going through this course the student will be able to explain:**

- Basic issues in event related potentials
- Recording, analysis, and interpretation various ERP data
- Application of various ERPS in speech and language

**COURSE CONTENT**

Unit 1: Introduction to ERPS (12 hrs)

- Basic principles of ERP recording
- Basic analysis techniques – filtering, averaging, artifact rejection, baseline correction
- Classification and generation of evoked potentials – exogenous and endogenous potentials

Unit 2: Factors affecting recording and interpretation of long latency responses (12 hrs)

- Subject variables
- Stimulus variables
- Recording variables
- Applications of LLR in speech and language research

Unit 3 (12 hrs)

- Endogenous potentials – MMN, P300, N400, CNV, P600, ELAN ETC.,
- Subject variables
- Stimulus variables
- Recording variables

Unit 4 (12 hrs)

1. Advanced analysis techniques for endogenous potentials – source localization, noise removal,
2. Applications of endogenous potentials in speech and language research
  - Evoked potentials in speech and language development
  - Evoked potentials in stuttering
  - Evoked potentials in aphasia
  - Evoked potentials in learning disability

**Reference:**

**Unit 1**

- Luck, S. J. (2005). An Introduction to the event – related potential technique. London: The MIT Press.
- Burkard, R. F., Don, M., & Eggermont, J. J. (2007). Auditory Evoked Potentials: Basic Principles & Applications. Baltimore: Lippincott Williams & Wilkins.

**Unit 2**

- Burkard, R. F., Don, M., & Eggermont, J. J. (2007). Auditory Evoked Potentials: Basic Principles & Applications. Baltimore: Lippincott Williams & Wilkins.
- Hall, J. W. (2007). New Handbook of Auditory Evoked Responses. Boston: Pearson.
- McPherson, L. D. (1995). Late Potentials of the auditory system. London: Singular Publishing Group

**Unit 3 & 4**

- Burkard, R. F., Don, M., & Eggermont, J. J. (2007). Auditory Evoked Potentials: Basic Principles & Applications. Baltimore: Lippincott Williams & Wilkins.
- Hall, J. W. (2007). New Handbook of Auditory Evoked Responses. Boston: Pearson.
- McPherson, L. D. (1995). Late Potentials of the auditory system. London: Singular Publishing Group. Katz, J. (2014). Handbook of Clinical Audiology. Baltimore: Lippincott Williams & Wilkins.

**Journals to be referred:**

- Brain and Language
- Neuroscience
- Cognition
- Journal of Neuroscience

**Paper Code: SLP 2.5 - SC: Dysphagia**

**Objectives**

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

- Describe the neuroanatomical and neurophysiological bases for swallowing and its development
- Know the physiology of swallowing,
- Know the types of disorders leading to dysphagia
- Know the methods for assessment and management of dysphagia
- Critically evaluate research articles related to dysphagia

**COURSE CONTENT**

Unit 1: Neuroanatomical and physiological substrates and life span development of swallowing (12 Hrs)

1.1 Neuroanatomical substrates of swallowing mechanism

- Role of motor and sensory cortex
- Role of subcortical and brain stem structures
- Cranial nerves
- Mechanoreceptors

1.2 Physiology of swallowing in typical children and adults

1.3 Acquisition of feeding

1.4 Ageing and swallowing functions

Unit 2: Dysphagia in children and adults (12 Hrs)

2.1 Dysphagia in children and adults (oral, pharyngeal and esophageal stages of swallow)

- (a) Congenital
- (b) Acquired:
  - Structural
  - Behavioral
  - Nutritional
  - Neurogenic
  - Traumatic

- Degenerative
- Post-Medical (Surgical and Pharmacological)

Unit 3 : Assessment of dysphagia (12 Hrs)

3.1 Team approach – Roles and Responsibilities

3.2 Evaluation of dysphagia in children and adults

- Subjective methods: Protocols and tests
- Objective methods: Radiological, endoscopic & physiological procedures.

3.3 Differential diagnosis:

- oral
- pharyngeal
- esophageal

Unit 4: Management of Dysphagia (12 Hrs)

4.1 Treatment strategies in children and adults

- Indirect/ compensatory techniques
- Direct/ Facilitatory techniques
- Aids and Appliances to facilitate feeding
- Other alternate methods for feeding

4.2 Alternate approaches in the management of dysphagia- surgical, medical and others

4.3 Treatment efficacy: Evidence based approaches

**Reference:**

**Unit 1**

- Arvedson, J. C., & Brodsky, L. (2002). Pediatric Swallowing and Feeding: Assessment and Management. (2nd Edition). Canada, Cengage Learning.
- Burda, A. N. (2011). Communication and Swallowing Changes in Healthy Aging Adults. Chapter 7 & 8. MA, Jones & Barlett Learning.
- Carrau, R. L., & Murray, T. (1999). Comprehensive Management of Swallowing Disorders. San Diego, Singular Publishing Group.
- Corbin-Lewis, K., & Liss, J. M. (2015). Clinical Anatomy & Physiology of the Swallow Mechanism. (2nd Ed.). USA, Cengage Learning.
- Ekberg, O. (2012). Dysphagia: Diagnosis and Treatment. Springer Heidelberg. New York, London.
- Groher, M. E. (1997). Dysphagia: Diagnosis and Management (3rd Ed.). USA, Butterworth-Heinemann.

- Hall, K. D. (2001). *Pediatric Dysphagia: Resource Guide*. Clifton Park; NY, Delmar Learning.
- Leonard, R., & Kendall, K. (2008). *Dysphagia Assessment and Treatment Planning: A Team Approach*. San Diego, Plural Publishing Inc.
- Miller, A. J. (1999). *Neuroscientific Principles of Swallowing and Dysphagia*. San Diego, Singular Publishing Group Inc.
- Murray, T., & Carrau, R. L. (2006). *Clinical Manual of Swallowing Disorders*. University of Michigan, Plural Publishing.
- Perlman, A. L., & Schulze-Delrieu, K. S. (1997). *Deglutition and its Disorders: Anatomy, Physiology, Clinical Diagnosis and Management*. San Diego, Singular Publishing Group Inc.
- Rosenthal, S. R., Sheppard, J. J., & Lotze, M. (1995). *Dysphagia and the Child with Developmental Disabilities: Medical, Clinical, and Family Interventions*. University of Michigan, Singular Publishers.
- Rubin, J. S., Bronitowski, M., & Kelly, J. H. (2000). *The Swallowing Manual*. University of Michigan, Singular Publishing Group.
- Tuchman, D. N., & Walter, R. S. (1994). *Disorders of Feeding and Swallowing in Infants and Children: Pathophysiology, Diagnosis, and Treatment*. University of Michigan, Singular Publishers.

## Unit 2

- Hall, K. D. (2001). *Pediatric Dysphagia: Resource Guide*. Clifton Park; NY, Delmar Learning.
- Miller, R. M., & Britton, D. (2011). *Dysphagia in Neuromuscular Diseases*. San Diego, Singular Publishing Group Inc.
- Murray, T., & Carrau, R. L. (2006). *Clinical Manual of Swallowing Disorders*. University of Michigan, Plural Publishing.
- Perlman, A. L., & Schulze-Delrieu, K. S. (1997). *Deglutition and its Disorders: Anatomy, Physiology, Clinical Diagnosis and Management*. San Diego, Singular Publishing Group Inc.
- Rosenbek, J. C., & Jones, H. N. (2009). *Dysphagia in Movement Disorders*. San Diego, Plural Publishing Inc.
- Rosenthal, S. R., Sheppard, J. J., & Lotze, M. (1995). *Dysphagia and the Child with Developmental Disabilities: Medical, Clinical, and Family Interventions*. University of Michigan, Singular Publishers.
- Rubin, J. S., Bronitowski, M., & Kelly, J. H. (2000). *The Swallowing Manual*. University of Michigan, Singular Publishing Group.
- Smith, B. S., & Adams, M. (2012). *Dysphagia: Risk Factors, Diagnosis and Treatment*. New York, Nova Science Publishers Inc.
- Tuchman, D. N., & Walter, R. S. (1994). *Disorders of Feeding and Swallowing in Infants and Children: Pathophysiology, Diagnosis, and Treatment*. University of Michigan, Singular Publishers.
- Ward, E. C., & Morgan, A. T. (2009). *Dysphagia Post Trauma*. San Diego, Plural Publishing Inc.

### Unit 3

- Arvedson, J. C., & Brodsky, L. (2002). *Pediatric Swallowing and Feeding: Assessment and Management*. (2nd Edition). Canada, Cengage Learning.
- Carrau, R. L., & Murray, T. (1999). *Comprehensive Management of Swallowing Disorders*. San Diego, Singular Publishing Group.
- Ekberg, O. (2012). *Dysphagia: Diagnosis and Treatment*. Springer Heidelberg. New York, London.
- Groher, M. E. (1997). *Dysphagia: Diagnosis and Management* (3rd Ed.). USA, Butterworth-Heinemann.
- Hall, K. D. (2001). *Pediatric Dysphagia: Resource Guide*. Clifton Park; NY, Delmar Learning.
- Leonard, R., & Kendall, K. (2008). *Dysphagia Assessment and Treatment Planning: A Team Approach*. San Diego, Plural Publishing Inc.
- Logemann, J. A. (1986). *Manual for Videofluorographic Study of Swallowing*. London, Taylor & Francis Ltd.
- Longemann, J. A. (1983). *Evaluation and Treatment of Swallowing Disorders*. Austin, TX; Pro-Ed.
- Mills, R. H. (2000). *Evaluation of Dysphagia in Adults: Expanding the Diagnostic Options*. Austin, Pro-Ed Inc.
- Murray, J. (1999). *Manual of Dysphagia Assessment in Adults*. San Diego, Singular Publishing Group, Inc.
- Murray, T., & Carrau, R. L. (2006). *Clinical Manual of Swallowing Disorders*. University of Michigan, Plural Publishing.
- Perlman, A. L., & Schulze-Delrieu, K. S. (1997). *Deglutition and its Disorders: Anatomy, Physiology, Clinical Diagnosis and Management*. San Diego, Singular Publishing Group Inc.
- Rubin, J. S., Bronitowski, M., & Kelly, J. H. (2000). *The Swallowing Manual*. University of Michigan, Singular Publishing Group.
- Smith, B. S., & Adams, M. (2012). *Dysphagia: Risk Factors, Diagnosis and Treatment*. New York, Nova Science Publishers Inc.
- Tuchman, D. N., & Walter, R. S. (1994). *Disorders of Feeding and Swallowing in Infants and Children: Pathophysiology, Diagnosis, and Treatment*. University of Michigan, Singular Publishers.

### Unit 4

- Arvedson, J. C., & Brodsky, L. (2002). *Pediatric Swallowing and Feeding: Assessment and Management*. (2nd Edition). Canada, Cengage Learning.
- Carrau, R. L., & Murray, T. (1999). *Comprehensive Management of Swallowing Disorders*. San Diego, Singular Publishing Group.
- Dikeman, K. J., & Kazandjian, M. S. (1995). *Communication and Swallowing Management in Tracheotomized and Ventilator Dependent Adult*. Chapter 7 & 8. San Diego, Singular Publishing Group.
- Ekberg, O. (2012). *Dysphagia: Diagnosis and Treatment*. Springer Heidelberg. New York, London.
- Gallender, D. (1979). *Eating Handicaps: Illustrated Techniques for Feeding Disorders*. Springfield II: US. Charles C. Thomas.

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

- Groher, M. E. (1997). *Dysphagia: Diagnosis and Management* (3rd Ed.). USA, Butterworth-Heinemann.
- Hall, K. D. (2001). *Pediatric Dysphagia: Resource Guide*. Clifton Park; NY, Delmar Learning.
- Huckabee, M. L., & Pelletier, C. A. (1999). *Management of Adult Neurogenic Dysphagia*. San Diego, Singular Publishing Group.
- Kazandjian, M. S. (1997). *Communication and Swallowing Solutions for the ALS/MND Community*. San Diego, Singular Publishing Group Inc.
- Leonard, R., & Kendall, K. (2008). *Dysphagia Assessment and Treatment Planning: A Team Approach*. San Diego, Plural Publishing Inc.
- Longemann, J. A. (1983). *Evaluation and Treatment of Swallowing Disorders*. Austin, TX; Pro-Ed.
- Murray, T., & Carrau, R. L. (2006). *Clinical Manual of Swallowing Disorders*. University of Michigan, Plural Publishing.
- Perlman, A. L., & Schulze-Delrieu, K. S. (1997). *Deglutition and its Disorders: Anatomy, Physiology, Clinical Diagnosis and Management*. San Diego, Singular Publishing Group Inc.
- Rubin, J. S., Bronitowski, M., & Kelly, J. H. (2000). *The Swallowing Manual*. University of Michigan, Singular Publishing Group.
- Shaker, R., Easterling, C., Belafsky, P.C., & Postma, G.N. (2013). (Eds.). *Manual of Diagnostic and Therapeutic Techniques for Disorders of Deglutition*. NY, Springer.
- Smith, B. S., & Adams, M. (2012). *Dysphagia: Risk Factors, Diagnosis and Treatment*. New York, Nova Science Publishers Inc.
- Tuchman, D. N., & Walter, R. S. (1994). *Disorders of Feeding and Swallowing in Infants and Children: Pathophysiology, Diagnosis, and Treatment*. University of Michigan, Singular Publishers.
- Yorkston, K. M., Miller, R. M., & Strand, E. (1995). *Management of Speech and Swallowing in Degenerative Diseases*. Austin, Texas; Pro-Ed Inc.

**Journals to be referred:**

1. *Dysphagia*
2. *American Journal of speech language pathology*
3. *Perspectives on Swallowing and Swallowing Disorders*

**Paper Code: SLP 2.5 - SC: Clinical Behavior Analysis**

**Objectives**

After completion of the course, the student shall be able to:

- Describe the Specific Area of Clinical Behavior Analysis, Therapy or Change Programs for Affected Individuals with Communication Disorders.
- Define the Practical Skills and Competencies Required for Mastering Basics of Clinical Behavior Analysis in their Practice for Identification and Management of Persons with Communication Disorders.
- Know the Ethical Aspects of Clinical Behavior Analysis when Dealing with Individuals or their Families with Communication Disorders.
- Explain the Integration of Clinical Behavior Analysis and Counseling Based Aspects in the Field of Research in Communication Disorders.

**COURSE CONTENT**

Unit 1: Introduction (12 hrs)

- 1.1 Learning: Meaning and Types
- 1.2 Behavioral Perspectives: History to Current Trends in Behavior Medicine
- 1.3 Behavioral Theories: Pavlov, Skinner and Watson
- 1.4 Concept of Behavior Therapy and Behavior Modification
- 1.5 Behavioral Assessment: Meaning & Characteristics – Behavioral Perspective
- 1.6 Recent Variations: Applied Behavior Analysis and Dialectical Behavioral Counseling – ABC Model

Unit 2: Behavior Assessment (12 hrs)

- 2.1 Behavior Assessment Scales: Western and Indian-AAMD Adaptive Behavior Scale, *PBCL*, Basic-Mr, ACPC-DD, MDPS, Etc.
- 2.2 Skills, Steps and Strategies: Procedure of Behavior Assessment & Management: Skill Training and Problem Behavior Remediation
- 2.3 Shaping, Chaining, Prompting, Fading, Modeling, Contingency Contracting, Reward Training, Token Economy, Activity Scheduling, Systematic Desensitization, Flooding, Aversion Techniques



2.4 Self Management Techniques: Correspondence Training

Unit 3: Behavior Change Techniques (12 hrs)

3.1 Behavior Change Techniques: Shaping, Chaining, Prompting, Compliance Training, Stress Management/Relaxation Techniques: JPMR, Yoga – Habit Reversal Techniques – Paradoxical Intention – Negative Practice

3.2 Operant Procedures and Techniques: Counter-Conditioning, Desensitization, Aversive Conditioning Procedures

3.3 Self-Control Procedures and Cognitive Procedures

3.4 Time Out, Over-Correction

Unit 4: Allied Behavioral Procedures (12 hrs)

4.1 Biofeedback: EEG, EMG, GSR, EKG and Thermal – Polygraph.

4.2 Cognitive Behavior Techniques: Beck and Ellis – Reality Therapy and Transactional Techniques

**Reference:**

**Unit 1**

- Feldman, M. P., & Broadhurst, A. (1976). Theoretical and Experimental Bases of the Behavior Therapy. London, Wiley.
- Housten, R.V., Axelrod, S. (1993). Behavior Analysis and Treatment. New York: Springer.
- Kearney, A. J. (2007). Understanding Applied Behavior Analysis: An Introduction. London, Jessica Kingsley.
- Malott, R., Tillema, M. & Glenn, S. (1978). Behavior Analysis and Behavior Modification: An Introduction. Kalamazoo, MI; Behaviordelia.
- Hersen, M. (2005). Encyclopedia of Behavior Modification and Cognitive Behavior Therapy. California, Sage Publications.
- Bellack, S. (1985). International Handbook of Behavior Modification and Therapy. New York, Plenum Press.
- Venkatesan, S. (2004). Children with Developmental Disabilities: A Training Guide for Parents, Teachers and Caregivers. New Delhi: Sage.
- Peshawaria, R., & Venkatesan, S. (1992). Behavior Approach in Teaching Mentally Retarded Children: A Manual for Teachers. Secunderabad, NIMH.

## Unit 2

- Ramnero, J., & Törneke, N. (2008). *ABCs of Human Behavior: Behavioral Principles for the Practicing Clinician*. Oakland, CA: New Harbinger & Reno, NV: Context Press.
- Miltenberger, R. G., (2008). *Behavior Modification: Principles and Procedures*. Pacific Grove, CA: Thomson/Wadsworth.
- Woods, D. W., & Kanter, J. W. (Eds.). (2007). *Understanding Behavior Disorders: A Contemporary Behavioral Perspective*. Reno, NV: Context Press.
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied Behavior Analysis*. NY, Prentice Hall.
- Baum, W. M. (2004). *Understanding Behaviorism: Behavior, Culture, and Evolution*. NY, Wiley-Blackwell.
- Pierce, W. D. & Cheney, C. D. (2003). *Behavior Analysis and Learning*. NY, Lawrence Erlbaum.

## Unit 3

- Baldwin, J.D. & Baldwin, J.I. (2000). *Behavior Principles in Everyday Life*. US, Prentice Hall.
- Dougher, M. J. (Ed.). (2009). *Clinical Behavior Analysis*. Reno, NY, Context Press.
- Chiesa, M. (1994). *Radical Behaviorism: the Philosophy and Science*. Cambridge, Cambridge Center.
- Leigland, S. (1992). *Radical Behaviorism: Willard Day on Psychology and Philosophy*. Reno, NV: Context Press.
- Catania, C. (1992). *Learning*. NY, Prentice Hall.
- Hayes, S. C. (Ed.). (1989/2004). *Rule Governed Behavior: Cognition, Contingencies, and Instructional Control*. New York, Plenum / reprinted in 2004 by Context Press.
- Skinner, B.F. (1965). *Science and Human Behavior*. NY, Free Press.

## Unit 4

- Culbert, T.P. (1999). Biofeedback with Children and Adolescents. In C. Schaefer (Ed). *Innovative Psychotherapy Techniques in Child and Adolescent Therapy*. New York, John Wiley.
- Nichols, F. H., & Humenick, S. S. (2000) (Ed). Biofeedback. in *Childbirth Education: Practice, Research and Theory*. Philadelphia, W. B. Saunders.
- Schwartz, M. S. (1987). *Biofeedback: A Practitioner's Guide*. New York, Guilford.
- Spencer, J. W., & Jacobs, J. J. (1999). *Complementary/ Alternative Medicine: An Evidence-Based Approach*. Baltimore, Mosby.
- Stoyva, J. M., & Thomas H. B. (1993). Biofeedback Methods in the Treatment of Anxiety and Stress Disorders. In P. M. Lehrer & R. L. Woolfolk (Ed). *Principles and Practice of Stress Management*. New York, Guilford Press.

**Paper Code: SLP 2.6 - OE: *Any paper offered by the UOM***

**Paper Code: SLP 2.7 - HCC: *Clinical Practicum II***

## SEMESTER III

### Paper Code: SLP 3.1 - HC: Aphasia

#### Objectives

After completing this course, the student shall be able to:

- Describe the History of Aphasias
- Describe the Classification Systems in Aphasias
- Acquire Skills in Understanding the Linguistic and Non-Linguistic Impairments in Aphasias
- Acquire Skills in Differential Diagnosis and Assessment of Different Types of Aphasias
- Acquire Skills in Management of Persons with Aphasia
- Critically Analyze Scientific Articles Related to Various Aspects in the field of Aphasiology

#### Course Content

Unit 1: Landmarks in the History, Classification and Description of Aphasias (15 hrs)

- 1.1 Views of Brain-Language Relationship
- 1.2 Early Studies –Broca, Wernicke, Lichtheim –Connectionism
- 1.3 Decades following Wernicke and Lichtheim
- 1.4 Luria, Geschwind –Return of Connectionism
- 1.5 Contribution of Psychology to Aphasiology
- 1.6 Linguists & Aphasia
- 1.7 Present Day Approaches
- 1.8 Aphasia: Signs, Symptoms, Linguistics, Extra-Linguistics and Non-Linguistics Deficits in Aphasias & Types
- 1.9 Reinterpretation and Reclassification of Aphasic Syndromes:

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

- Aphasia Classifications, Factors Underlying Different Aphasic Syndromes (According to Luria, 1976)
- Classification of Aphasic Syndromes (According to Benson & Ardila, 1996)
- Two Major Aphasic Syndromes (Broca's and Wernicke's Aphasia) and their Issues
- Sub-Cortical Aphasia
- Issues in Variability of Aphasic Syndromes

1.10 Primary Progressive Aphasia (PPA), Aphasia In Multilinguals, Illiterates, Left-Handers & Sign Language Users- Symptoms and Deficits in Linguistics, Extra-Linguistics and Non-Linguistics

Unit 2: Aphasia: Neuroanatomical Basis and Impairments (20 hrs)

2.1 Neuroanatomical Basis of Major Aphasia Types, Key Brain Regions, Aphasia Case Studies – Lesion-Deficit Relationships

2.2 Phonological Aspects of Aphasia

- Sound Structure of Language: A Theoretical Framework
- Speech Production
- Speech Perception

2.3 Neural Basis of Speech Perception: Evidence from Patients- Phonetics & Phonology, Auditory Word Recognition, Deficits in Processing Sound Structure –Deficits in Acoustic-Phonetic Processing Deficits in Phonological Processing, Deficits in Processes Contributing to Word Recognition –Graded Activation –Lexical Competition

2.4 Lexical Deficits In Aphasia

- Functional Architecture of the Lexical System
- Aspects of the Internal Structure of the Functional Components

2.5 Neural Basis of Semantic Processing:

- Evidence from Patients- Organization of Semantic Memory, Category-Specific Semantic Disorders, Sensory-Functional Theory, Domain-Dependent Theory, Semantic Processing in Aphasia
- Evidence from EEG- N400, Lexical Characteristics Affecting the N400, Lexicality, Vocabulary Class, Word Frequency, Concreteness, Neural Basis of the N 400

2.6 Syntactic Deficits in Aphasia

- Sentence Production: Conceptions of Normal Production
- Models to Understand Syntactic Deficits in Aphasia

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- Sentence Comprehension: A Framework for Normal Comprehension, Sentence Comprehension Impairment in Aphasia
- Neural Basis of Sentence Comprehension: Evidence from Patients, Neuroimaging

2.7 Neural Basis of Reading & Writing

2.8 Neural Basis of Bilingualism and L2 Acquisition- Bilingualism, L2 Acquisition Theories, Neural Representation of L2 –Syntactic Processing –Phonological Processing –Lexical-Semantic Processing, Neural Control of Two Languages

Unit 3: Assessment and Recovery in Aphasia (15 hrs)

3.1 Formal and Informal Assessment of Aphasia- Behavioural

- Formal Assessment Purpose
- Formal Assessment: Test Constructs and Procedures
- Informal Assessment : Logic, Purpose and Procedures
- Do's and Don'ts in Assessment Procedures
- Formal Assessment Tools Indian and Western Versions - WAB, RTT, LPT, ABA, BDAE, PICA, Bedside Assessment – their Rationale, Scoring and Interpretation

3.2 Methods for Studying Language & the Brain- Neuroimaging and Cortical Potentials

- Electroencephalography (EEG)
- Magnetoencephalography (MEG)
- Positron Emission Tomography (PET)
- Functional Magnetic Resonance Imaging (Fmri)
- N400 and T-Complex

3.3 Plasticity and Recovery in Aphasia

- Concepts of Plasticity and Recovery
- Prognostic Factors of Recovery
- Bio-Chemical and Physiologic Mechanisms of Recovery
- Structural Mechanisms of Recovery
- Behavioral Mechanisms of Recovery
- Language Recovery in Brain
- Link Between Plasticity, Behavior and Therapy
- Re-Conceptualizing Aphasia and Aphasia Therapy

3.4 Differential Diagnosis of Aphasia with other Language Disorders Viz. Right Hemisphere Disorders (RHD), Schizophrenia, Traumatic Brain Injury (TBI) and Dementia

Unit 4: Management of Persons with Aphasia (22 hrs)

- 4.1 Introduction to Language Intervention Strategies in Adult Aphasia
- 4.2 Principles of Language Intervention- Research Principles for Clinicians, Delivering Language Intervention Services
- 4.3 Psychosocial/Functional Approaches to Intervention –Life Participation Approach to Aphasia, Social Approaches to Aphasia
- 4.4 Traditional Approaches to Language Intervention – Schuell’s Stimulation Approach, Thematic Language Simulation Approach, Context Based Approach.
- 4.5 Specialised Approach to Language Intervention- MIT, Language Oriented Treatment, PACE, VAT, HELPSS, VCIU
- 4.6. Manual for Adult Aphasia Therapy (MAAT) in Indian Context
- 4.7 Computer Applications in the Treatment of Aphasia
- 4.8 Rehabilitation of Sub-Cortical Aphasia
- 4.9 Tele-Rehabilitation in Persons with Aphasia.
- 4.10 Quality of Life Approach to Aphasia
- 4.11 Medical Aspects of Rehabilitation in Persons with Aphasia.
- 4.12 Team and Partnerships in Aphasia Intervention.
- 4.13 Rights of Persons with Aphasia.

**Practicum:**

Learn to:

1. Use Taxonomy and Classify Different Types of Aphasias
2. Different Proformae used in the Assessment of Persons with Aphasia
3. Independently Carry Out the Bedside Evaluation, Formal and Informal Assessment of Persons with Aphasia
4. Administer, Interpret, Score and Diagnose Persons with Aphasia Using WAB and BDAE, LPT, RTT, PICA
5. Use Different Language Intervention Approaches used in the Treatment of Aphasia
6. Use Manual for Adult Aphasia Therapy
7. Carry out Individual and Group Therapy
8. Prepare a Diagnostic Report of Persons with Aphasia for -
  - Referral

- Employers Of PWA
  - Medico-Legal
9. Counsel the PWA and their Family Members
  10. Set up Adult Aphasia Rehabilitation Center
  11. Assess and Treat the Co-Morbid Deficits in Persons with Aphasia
  12. Develop a Network of Professionals at District, State, National and International Levels

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- Scott, S.K. (2012). Neural Basis of Speech Perception: Phonology, Streams, and Auditory Word Forms. In M. Spivey, K. Mcrae, & M. Joanisse (Eds.). *The Cambridge Handbook Of Psycholinguistics* (Pp. 26-41). Cambridge: Cambridge University Press.
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- Ward, J. (2010). The Literate Brain. In J. Ward. *The Student's Guide To Cognitive Neuroscience* (Pp. 260-287). New York: Psychology Press.

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- Ansaldo, A., Coppens, P. & Murray, L. (2013). Plasticity and Recovery in Aphasia. In Papathanasiou, I., Coppens, P., & Potagas, C. (Eds.) *Aphasia and Related Neurogenic Communication Disorders*. (pp 49-63). Burlington, Jones and Bartlett Learning.
- Coppens, P. & Murray, L. (2013). Formal and Informal Assessment in Aphasia. In Papathanasiou, I., Coppens, P., & Potagas, C. (Eds.) *Aphasia and Related Neurogenic Communication Disorders*. (pp 67-82). Burlington, Jones & Bartlett Learning.
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- Ward, J. (2010). The Electrophysiological Brain. In J. Ward, *The Student's Guide to Cognitive Neuroscience* (pp. 32-47). New York: Psychology Press.
- Ward, J. (2010). The Imaged Brain. In J. Ward. *The Student's Guide to Cognitive Neuroscience* (pp. 48-77). New York: Psychology Press.

### Unit 4

- Chapey, R. & Hallowell, B. (2008). Introduction to Language Intervention Strategies. In Chapey, R. (4th Eds). *Language Intervention strategies in aphasia and related neurogenic communication disorders* (pp 3-20). Philadelphia: Lippincott Williams and Wilkins

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

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- Sharp, L.V., Scott. A., Tompkins A. R. (2008). Principles of Language Intervention. In Chapey, R. (4th Eds). Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders. (pp 186-229). Philadelphia: Lippincott Williams & Wilkins.
- Simmons-Mackie, N. (2008). Social Approaches to Aphasia in Chapey, R.(4th Eds). Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders. (pp 279-290). Philadelphia: Lippincott Williams & Wilkins.

**Journals to be referred:**

1. Aphasiology
2. Journal of Speech- Language and Hearing Research
3. Brain and Language
4. Stroke Rehabilitation
5. Cortex
6. Journal of All India Institute of Speech and hearing
7. Journal of Indian Speech and Hearing Association

**Paper Code: SLP 3.2 - HC: Voice and its Disorders**

**OBJECTIVES**

After completion of this course, the student shall be able to:

- Describe Vocal Anatomy and Physiology
- Explain and Measure the Parameters of Voice and its Disorders Using Various Tools
- Differentially Diagnose Various Voice Disorders
- Describe the Therapy Protocols for Persons with Voice Disorders
- Critically Evaluate Research Articles Related to Voice Disorders.

**COURSE CONTENT**

Unit 1: Anatomy & Physiology of Human Larynx (16 hrs)

- Review Of Anatomy & Neurophysiology Of The Adult Larynx
- Development of Larynx (Phylogenic and Ontegenic) From Infancy to Geriatrics – Vocal Fold, Musculoskeletal Changes
- Development of Voice
- Models of Vocal Fold Vibration – One Mass Model, Two Mass Model, Multiple Mass Models, Vibratory Pattern Related To Vocal Registers
- Effects of Hormones on Voice in Various Conditions (Mutational Voice Conditions, Menstruation, Pregnancy, Endometriosis, Hypothyroidism Etc.)
- Genetic Aspects of Voice

Unit 2 : Voice in Different Laryngeal Conditions (20 hrs)

- Congenital Conditions of Voice Problems
- Differential Diagnosis of: Inflammations, Mass Lesions of Vocal Folds, Paralysis, Hemorrhage, Ulcer, Spasm, Tremor, Tumor, Muscle Tension Dysphonia (MTD), Laryngo Pharyngeal Reflux (LPR) & Gastro Esophageal Reflux Disorders (GERD), Bowing of Vocal Folds, Sulcus Vocalis, Transsexual Voice, Irritable Larynx
- Laryngectomy – Types and Characteristics
- Voice Characteristics in Ageing Population
- Voice in Professional Voice Users & Safety Measures
- Effect of Medication on Voice

Unit 3: Assessment of Voice Disorders (18 hrs)

- Aerodynamic Measures – Various Lung Volume, Maximum Phonation Duration (MPD), Mean Airflow Rate (MAFR), S/Z Ratio, Nasalance, Oral and Nasal Pressure, Flow Related Measures Specific to Sub Glottal Measures.

- Perceptual Assessment (Children and Adult): Grade, Roughness, Breathiness, Asthenia, Strain (GRBAS), Consensus Auditory Perceptual Evaluation–Voice (CAPE-V), Buffalo Voice Assessment Scale, Self Assessment Scales (Voice Handicapped Index (VHI), Voice Related Quality of Life, (V-RQOL), and Iowa Patient's Voice Index, (IPVI)
- Objective Assessment: Non Invasive - Frequency, Intensity, Perturbation, Noise, Tremors, Voice Quality, Voice Load, Voice Fatigue, Voice Range Electrolottogram (EGG), Electromyogram (EMG), Inverse-Filtering, Multiparametric Approach Spectral Measures; Invasive - Laryngeal Mirror, Indirect Laryngoscope, Endoscopy, Ultra Sound Imaging, Stroboscopy, High-Speed Image Capture.

**Unit 4: Management of Different Voice Disorders (18 hrs)**

- Principle of Voice Therapy – Hygienic, Symptomatic, Physiologic, Psychogenic, Eclectic Approaches.
- Voice Therapy for Hyper & Hypo Functional Conditions – Facilitation Techniques, Resonance Voice Therapy (RVT), Vocal Functional Exercise (VFE), Semi-Occluded Vocal Tract (SOVT), Lee Silverman Voice Treatment (LSVT), Laryngeal Manipulation, Laryngeal Manual Therapy (LMT), Etc.
- Voice Therapy for Glottal Incompetence & Irritable Larynx
- Voice Therapy for Functional Voice Disorders
- Management of Neurogenic Voice Disorders
- Voice Therapy for Geriatric Voice Conditions
- Voice Enhancement Methods for Professional Voice Users (Non Singers)
- Phonosurgery
- Voice therapy for laryngectomy
- Evidence Based Voice Practice

**Practicum:**

- Measurement of Voice and Aerodynamic Parameters on 2 Normal Persons
- Observation of Stroboscopy Procedure
- Submit Profiles of 2 Persons with Voice Disorder Undergoing Voice Therapy

**Reference:**

**Unit 1**

- Aronson, A. E., (1990). Clinical Voice Disorders: An Interdisciplinary Approach. (3rd Ed.), New York, Thieme Inc.
- Baer, T. (1991). Laryngeal Functions in Phonation and Respiration. San Diego, Singular Publication.
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- Arnold, G. E., Winckel, F., & Wyke, B. D., (1982). *Dynamics of the Singing Voice*. New York, Spriger-Verlag Wien Publishers.
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- Sataloff, R. T. (2005). Professional Voice: The Science and Art of Clinical Care. Volume I-V, (3rd Ed), San Diego, Oxford, Plural Publishing, Inc.

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- Watson. A. C. H., Sell. D. A., & Grunwell. P. (2001). Management of Cleft Lip and Palate. London, Whurr Publishers Ltd.

**Journals to be referred:**

1. Journal of Voice
2. Journal of Logopedics Phoniatrics Vocology,
3. Journal of Folia Phoniatica et Logopaedica
4. Journal of Phonetica
5. Journal of Speech, Language, and Hearing Research
6. Journal of All India Institute of Speech and Hearing
7. Journal of Indian Speech and Hearing association

**Paper Code: SLP 3.3 - SC: Speech and Language Processing**

**Objectives**

After going through this course the student will be able to explain

1. Fundamentals of Speech and language processing
2. Theoretical understanding of speech language processing
3. Methods used in research on speech and language processing
4. Speech and language processing in clinical population

**COURSE CONTENT**

Unit 1: Introduction to Speech Processing (12 hrs)

1.1 Introduction to speech Processing

- Basic issues in speech perception: Linearity, segmentation, lack of invariance, units of perceptual analysis – phoneme, syllable, word or beyond,
- perceptual constancy in speech – talker variability, variability in speaking rate,
- McGurk effect,
- perceptual organization in speech – Gestalt principles of perceptual grouping, phonetic organization

1.2 Theoretical approaches to speech perception

- Acoustic theory of speech perception,
- Motor theory of speech perception,
- Analysis by synthesis theory,
- Auditory theory of vowel perception,
- Quantal theory,
- Neurological theories,
- Pandemonium model,
- Direct-realistic approach,
- Machine based computation models – TRACE, dual stream model,

1.3 Speech processing in the auditory system

- Overview of the anatomy of the auditory system,
- analysis of speech in the auditory periphery,
- representation of speech in the central auditory system – place representation, intensity model,
- multistage representation,
- categorical perception



Unit 2: Phonetic perception (12 hrs)

- 2.1 Perception of vowels: Cues of vowels – formants, f<sub>0</sub>, bandwidth, duration
- 2.2 Perception of stop consonants: Cues of voicing, place and manner, voice onset time, transition duration, closure duration, burst duration, preceding vowel duration, F<sub>0</sub>, formants
- 2.3 Perception of nasals: Formants, duration of nasal murmur
- 2.4 Perception of fricatives: Formants, frication duration, voicing and place cues
- 2.5 Perception of other speech sounds: Temporal and spectral cues

Unit 3: Spoken word recognition and sentence comprehension (12 hours)

3.1 Spoken word recognition

- Introduction to spoken word recognition
- Methods used in spoken word recognition research:
  - 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-model priming,
  - ERPs,
  - FMRI,
  - McGurk effect

3.2 Models and Issues in spoken word recognition:

- The input to the lexicon - lexical access from spectra, constraints of temporal structure –
- Cohort model,
- interactive models of spoken word recognition - Logogen model, lexical and phonetic processing – phonetic categorization task, phoneme restoration studies, phoneme monitoring task, sentence and word processing,
- Processing of ambiguous words.
- Neighbourhood activation models,
- Elman's simple recurrent networks,
- Distributed cohort model,
- Plaut and Kello's model,
- Adaptive resonance theory,
- TRACE model

3.3 Stages and word recognition –

- Lexical concept,
- Lexical access,
- Phonological encoding,
- production.

3.4 Sentence comprehension

- Goal of sentence comprehension research
- Various methods/techniques used for sentences comprehension research
- Syntactic category ambiguity
- Attachment ambiguity: Models of attachment ambiguity resolution – Garden-path model, Referential theory, Constraint-based approaches
- Empirical studies – (1) structural preferences, eye fixation duration, regressive eye movements, (2) verb information, (3) thematic fit and argument assignment, (4) referential context – prepositional phrase attachment ambiguity, sentence clause/relative clause ambiguity, main clause/ relative clause ambiguity, (5) intonation and prosody.
- Event related potentials in sentence comprehension research
- Discourse comprehension

Unit 4: Spoken word recognition in clinical population, development of spoken word recognition, and cross language speech perception (12 hrs)

- Speech perceptual deficits in learning disability, aphasia, dysarthria, individuals with hearing loss
- Issues in infant speech perception, methods used in infant speech perception, development of speech perception, relationship between early speech perception and later language development, Empirical studies
- Issues in cross-language speech perception, models –Native language magnet model, Perceptual assimilation model,
- perception of disordered speech – perception of hearing impaired speech, dysarthric speech, cleft palate speech, laryngectomized speech

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**Unit 1**

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- Pisoni D. B. and Remez R. E.(2005). Introduction. In Pisoni, D. B., & Remez, R. E. (2005). *Handbook of Speech Perception* (pp.1-3). New Jersey: John Wiley & Sons.
- Remez, R. E.(2005). *Perceptual Organization of Speech*. In Pisoni, D. B., & Remez, R. E. (2005). *Handbook of Speech Perception* (pp.1-3). John Wiley & Sons

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- Best, C. T. (1991). The Emergence of Native-Language Phonological Influences in Infants: A Perceptual Assimilation Model. Haskins Laboratories Status Report on Speech Research, SR-107/108,1-30.
- Borrie, S. A., McAuliffe, M. J., & Liss, J. M. (2011). Perceptual learning of dysarthric speech: A review of experimental studies. *Journal of Speech Language Hearing Research*, 55(1), 290-305.
- Hayakawa, et al. (2010). Perception of Cleft Palate speech by Japanese Listeners- an assessment of palatalized articulations. *Journal of Maxillofac Oral Surg*, 9(3), 251-255.

**Journals to be referred:**

1. Brain
2. Brain and Language
3. Folia Phoniatica
4. International J of Language & Communication Disorder
5. J of Acoustic Society of America
6. J of Child Language
7. J of Communication Disorders
8. J of Fluency Disorders
9. J of Speech language & hearing Research
10. J of Voice
11. Language Learning
12. Language Speech & hearing Services in Schools
13. Linguistics Language Behavior Abstract
14. Otolaryngologic clinic of North America
15. Phonetica
16. Seminars in Speech and Language

**Paper Code: SLP 3.3 - SC: Speech and Language Perception**

**OBJECTIVES**

After going through this course the student will be able to explain

- Fundamentals of Speech and language perception
- Theoretical understanding of speech language perception
- Methods used in research on speech and language perception
- Speech and language perception in clinical population

**COURSE CONTENT**

Unit 1: Introduction to Speech perception (12 hrs)

1.1 Introduction to speech perception

- Definition of speech perception
- Basic issues in speech perception: Linearity, segmentation, lack of invariance, units of perceptual analysis – phoneme, syllable, word or beyond,
- perceptual constancy in speech – talker variability, variability in speaking rate,
- McGurk effect,
- perceptual organization in speech – Gestalt principles of perceptual grouping, phonetic organization

1.2 Theoretical approaches to speech perception

- Any five theories of speech perception

1.3 Speech processing in the auditory system

- Overview of the anatomy of the auditory system,
- analysis of speech in the auditory periphery,
- representation of speech in the central auditory system – place representation, intensity model,
- multistage representation,
- categorical perception

Unit 2: Acoustic characteristics of different speech sounds (12 hrs)

- 2.1 Perception of vowels: Cues of vowels – formants, f0, bandwidth, duration
- 2.2 Perception of stop consonants: Cues of voicing, place and manner, voice onset time, transition duration, closure duration, burst duration, preceding vowel duration, F0, formants
- 2.3 Perception of nasals: Formants, duration of nasal murmur
- 2.4 Perception of fricatives: Formants, frication duration, voicing and place cues
- 2.5 Perception of other speech sounds: Temporal and spectral cues

Unit 3: Spoken word recognition and sentence comprehension (12 hrs)

- 3.1 Spoken word recognition
- 3.2 Introduction to spoken word recognition
- 3.3 Methods used in spoken word recognition research:
  - 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-model priming,
  - ERPs,
  - FMRI,
  - McGurk effect
- 3.4 Models and Issues in spoken word recognition:
  - Any five models of spoken word recognition
- 3.5 Stages and word recognition –
  - Lexical concept,
  - Lexical access,
  - Phonological encoding,
  - Production.



### 3.6 Sentence comprehension

- Methods/techniques used for sentences comprehension research
- Syntactic category ambiguity
- Attachment ambiguity: Models of attachment ambiguity resolution – Garden-path model, Referential theory, Constraint-based approaches
- Empirical studies – (1) structural preferences, eye fixation duration, regressive eye movements, (2) verb information, (3) thematic fit and argument assignment, (4) referential context – prepositional phrase attachment ambiguity, sentence clause/relative clause ambiguity, main clause/ relative clause ambiguity, (5) intonation and prosody.
- Event related potentials in sentence comprehension research
- Discourse comprehension

Unit 4: Spoken word recognition in clinical population, development of spoken word recognition, and cross language speech perception (12 hrs)

- 4.1 Speech perceptual deficits in learning disability, aphasia, dysarthria, individuals with hearing loss
- 4.2 Issues in infant speech perception, methods used in infant speech perception, development of speech perception, relationship between early speech perception and later language development, Empirical studies
- 4.3 Issues in cross-language speech perception, models –Native language magnet model, Perceptual assimilation model.
- 4.4 Perception in disordered population - hearing impaired dysarthria cleft palate laryngectomee, stuttering, SLI, dyslexia, etc.

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3. Folia Phoniatica
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5. J of Acoustic Society of America
6. J of Child Language
7. J of Communication Disorders
8. J of Fluency Disorders
9. J of Speech language & hearing Research
10. J of Voice
11. Language Learning
12. Language Speech & hearing Services in Schools
13. Linguistics Language Behavior Abstract
14. Otolaryngologic clinic of North America
15. Phonetica
16. Seminars in Speech and Language

**Paper Code: SLP 3.4 - SC: Dysphagia**

**Syllabus as given in II semester (2.5)**

**Paper Code: SLP 3.4 - SC: Behavioural Assessment and Management of Central Auditory Processing Disorders**

**OBJECTIVES**

After Completing this Course, the Student Shall be able to:

- List the Types of CAPD and Explain their Physiological Bases.
- List the Signs and Symptoms of CAPD and Correlate them with Different Central Auditory Processes.
- List Different Behavioural Tests of CAPD for Clients with Different Signs and Symptoms.
- List and Explain the Factors Affecting Behavioural Assessment.
- Explain Management Strategies And Techniques For Improving Different Central Auditory Processes.

**COURSE CONTENT**

Unit 1: Introduction to Central Auditory Processing Disorder (CAPD) & Screening (15 Hrs)

1.1 Overview to CAPD

- Critical Evaluation of Definitions of CAPD
- Processes and Cognition Involved in CAPD: Binaural Integration, Binaural Separation, Temporal Processing, Auditory Closure, Binaural Interaction, Phoneme Synthesis, Auditory Memory and Sequencing, Sound Localization and Lateralization

1.2 Neural Maturation and Auditory Processing; Neural Degeneration and Auditory Processing

1.3 Signs and Symptoms in Individuals with Specific Central Auditory Deficits

1.4 Classification of Auditory Processing Disorder; CAPD as a Co-Morbid Disorder

1.5 Screening for CAPD

- Need / Utility of Screening for CAPD
- Screening Questionnaires / Check Lists for Children and Adults; Sensitivity and Specificity
- Screening Tests for Children and Adults; Sensitivity and Specificity
- Sub-Tests of Speech / Language Tests, Audiological Tests

Unit 2: Diagnostic Behavioural Assessment of CAPD (15 hrs)

2.1 Behavioural Tests in Assessment of CAPD/ Cognition:

- Temporal Processing
- Binaural Interaction
- Binaural Integration
- Auditory Separation / Closure
- Tests for Assessing Auditory Memory and Sequencing

## 2.2 Factors Affecting Assessment of CAPD

- Factors Related to Subject
- Factors Related to Procedure

## 2.5 Performance on Tests of CAPD/ order Cognition in:

- Children
- Young Adults
- Older Adults

## Unit 3: Overview to Management of CAPD (15 hrs)

### 3.1 Direct Remediation Techniques

- Bottom-Up Approaches
- Top-Down Approaches
- Environmental Modifications in School Set-Ups, Work Place; Compensatory Strategies for Children and Adults

### 3.2 Devices for Subjects with Auditory Processing Disorder; Outcome Measures of Devices for CAPD

### 3.3 Phoneme Synthesis Training; Vigilance Training; Auditory Memory and Sequencing Training

### 3.4 Meta-Cognitive and Meta-Linguistic Approaches

## Unit 4: Techniques and Outcome of Process Specific Management of CAPD (15 hrs)

### 4.1 Auditory Perceptual Training for Binaural Integration and Binaural Separation

### 4.2 Auditory Perceptual Training for Temporal Processing (Temporal Ordering, Temporal Resolution, Etc)

### 4.3 Auditory Perceptual Training for Auditory Closure

### 4.4 Auditory Perceptual Training for Binaural Interaction & Sound Localization and Lateralization



4.5 Factors Affecting Management of CAPDS; Team Approach for Assessment and Management of CAPD

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**Paper Code: SLP 3.5 - SC: Event Related Potential in speech and language**

**Syllabus as given in II semester (2.5)**

**Paper Code: SLP 3.5 - SC: Sign Languages**

**OBJECTIVES**

After Completion of this Course, the Student Shall be able to:

- Explain the structure of Sign Languages
- Describe the finger spelling and basic vocabulary of sign languages
- Explain the morphology, syntax and phonology of sign languages

**COURSE CONTENT**

Unit1: History and introduction to Sign languages (10 hrs)

1.1 Definition and characteristics: Gestures, Manual languages, Sign based Augmentative systems & Sign languages

1.2 Evolution of Sign languages and its development

1.3 Various approaches used in the Education of the deaf using sign based languages: Total communication, Simultaneous communication & Sign languages

Unit 2: Linguistic structure of Sign languages - I (12 hrs)

2.1 Finger spelling: American Sign language, British Sign Language and Indian Sign Language

2.2 Signing Basic vocabulary in American Sign language, British Sign Language and Indian Sign language

2.3 Phonological structure of:

- American Sign language,
- British Sign Language
- Indian Sign language

2.4 Dialectal differences in phonology of Sign languages

Unit 3: Linguistic structure of Sign languages - II (12 hrs)

3.1 Syntactic structure of American Sign language, British Sign Language and Indian Sign language

- Word order & Topicalization
- Negation
- Pronouns

- Plurals
- Tenses
- Questions

### 3.2 Dialectal differences in syntax of Sign languages

## Unit 4: Language Attributes of Sign languages (14 hrs)

### 4.1 Language Attributes in Sign languages

- Linguistic competence
- Neural representation
- Comprehension
- Use

### 4.2 Relevance of gestures in Symbolic learning

### 4.3 Language issues in:

- Deaf aphasics
- Children of Deaf adults (CODA)

### 4.4 Tests to assess efficiency of sign language use

## Reference:

### Unit 1 to 4

- Acredolo, L., & Goodwyn, S. (1996). *Baby Signs: How to Talk to your Baby before your Baby can talk*. Chicago, NTB/Contemporary.
- Battison, R. (1978). *Lexical Borrowing in American Sign Language*. Maryland, Linstok Press Inc.
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- Wilbur, R. B. (1987). *American Sign Language*. San Diego, College Hill Press.

Journals to be referred:

1. Gesture
2. Sign language and Linguistics
3. Sign Language studies
4. Indian Journal of Applied Linguistics
5. Sign language and the Brain
6. Journal of deaf studies and deaf education
7. Brain and Cognition
8. Cognition
9. Brain and Language
10. Brain Research



**Paper Code: SLP 3.5 - SC: Clinical Linguistics and Multilingual Issues in Communication**

**Syllabus as given in I semester (1.5)**

**Paper Code: SLP 3.5 - SC: Technology for Speech-Language and Hearing**

**Syllabus as given in I semester (1.5)**

**Paper Code: SLP 3.6 - HC: Dissertation**

**Paper Code: SLP 3.7 - HC: Clinical Practicum III**

## SEMESTER IV

### Paper Code: SLP 4.1- HC: *Adult language disorders*

#### Objectives

After completing the course, the student shall be able to:

- Describe Various Conditions in Adults Leading to Cognitive Communication Disorders
- Acquire Skills in Cognitive Linguistic Communicative Impairments and Differential Diagnosis of Cognitive Communication Disorders
- Acquire Skills in Issues Related to Assessment of Cognitive Communication Disorders
- Acquire Skills in Management of Cognitive Communication Disorders
- Critically Evaluate Research Articles Related to Cognitive Communication Disorders

#### COURSE CONTENT

Unit 1: An Overview of Cognitive Communication Disorders - Aphasia Related, Traumatic Brain Injury (TBI) and Right Hemisphere Damage (RHD) (16 hrs)

##### 1.1 Non-Aphasia and Aphasia Related Disorders

- Alexia and Agraphia
- Acalculia
- Finger Agnosia
- Right-Left Disorientation
- The Gerstmann Disorders

##### 1.2 Communication Disorders Associated with TBI

- Neurology and Neuropathology of TBI
- Epidemiology of TBI
- Disability Following TBI- WHO-ICF Classification
- Cognitive Communication Deficits beyond Aphasia
- Discourse in Adults with TBI
- Assessment for Planning Functional Context-Sensitive Intervention
- Principles of Cognitive Rehabilitation of TBI

##### 1.3 Nature , Assessment and Management of RHD

- Theoretical Accounts of Cognitive Communication Deficits In RHD
- Symptomatology of Cognitive Communication Disorders in RHD
- Assessment of Persons with RHD
- Generalization of Treatment Gains
- Evidence Based Practices in the Management of RHD

1.4 Treatment for:

- Coarse Coding Deficits and Related Difficulties
- Suppression Deficits and Related Difficulties
- Social Cognition Deficits
- Prosody
- Discourse and Pragmatics
- Reading and Writing
- Cognition

Unit 2: Dementia and Related Cognitive Disorders (18 hrs)

2.1 Various Syndromes of Dementia

- Neuropathology in Alzheimer's Disease (AD)
- Mild Cognitive Impairment Symptomatology of Cognitive Communications Disorders in AD
- Evaluation of Cognitive Communication Disorders in AD and other Dementias
- Cognitive Communication Intervention in Dementia
- Role of Speech- Language Pathologist Working with Persons with Dementia.

2.2. Cognitive Communicative Aspects in Primary Progressive Aphasia.

- Basic Definition and Terminology Related to PPA
- Historical Perspective of PPA
- Diagnostic Criteria for PPA
- Issues of Classification and Nomenclature in PPA
- Clinical Presentation And Characteristics of PPA
- Management of PPA

Unit 3: Disorders of Reading, Writing, Alcohol Induced Language Disorders and Metabolic Disorders of Language (16 hrs)

3.1 Disorders of Reading

- Overview of Reading Disorders
- Classification of Reading Disorders and their Neuro-Anatomical Substrates
- Models – Dual-Route and Connectionist
- Assessment
- Intervention

3.2 Disorders of Writing

- Overview of Writing Disorders

- Models -Dual-Route and Connectionist
- Acquired Agraphia
- Assessment
- Intervention

### 3.3 Alcohol Induced Language Disorders

- Overview of Alcohol Induced Language Disorders
- Cognitive Communication Deficits in Alcohol Induced Language Disorders
- Assessment
- Intervention

### 3.4 Metabolic Disorders of Language

- Overview of Metabolic Disorders of Language
- Assessment
- Intervention

### 3.5 Differential Diagnosis of Cognitive Communication Disorders in Adults on the Basis of Neurodiagnostic, Cognitive, Linguistic, Communicative Speech - Motor and Behaviour Deficits.

## Unit 4: Ethno-Cultural Dynamics in Cognitive Communication Disorders and Cognitive Communication Approaches. (22 hrs)

### 4.1 Language as Socio-Cultural Phenomena in Aging

### 4.2 Culture and Ethnic Perception of Acquired Illness and Disability

### 4.3 Role of Supportive Relationships in Cognitive Communication Disorders

### 4.4 Implications in Rehabilitation

### 4.5 Cognitive Communicatio Approaches:

- Objectives of Cognitive Approach
- Assessment of Cognitive Operations
- Cognitive Stimulation: Stimulation of Recognition/Comprehension, Memory, Convergent Divergent and Evaluative Thinking
- Relationship of Cognitive Intervention to Life Participation Approach

### 4.6 Team and Partnerships in Cognitive Communication Disorders

### 4.7 Rights of Persons with Cognitive Communication Disorders

**Practicum:**

Learn to use:

1. Different Proforma used in the Assessment of Persons with Cognitive Communication Disorders
2. Independently Carry Out the Bedside Evaluation, Formal and Informal Assessment of Persons with Cognitive Communication Disorders
3. Diagnose Persons with Cognitive Communication Disorders using WAB and BDAE, LPT, RTT, PICA, ABCD, MIRBI, BAT, CLQT
4. Different Language Intervention Approaches used in the Treatment of Cognitive Communication Disorders
5. Individual and Group Therapy
6. Prepare a Diagnostic Report of Persons with Cognitive Communication Disorders
  - Referral
  - Employers Of PWA
  - Medico-Legal
7. Counsel the PWA and their Family Members
8. Setting up a Center for Cognitive Communication Disorders
9. Assess and Treat the Co-Morbid Deficits in Persons with Cognitive Communication
10. Develop a Network of Professionals at District, State, National and International Levels

**Reference:**

**Unit 1**

- Glosser, A., Gallagher, E.R., & Kaplan. E. (1998). Aphasia Related Disorders. In Sarno, T.M (3rd Eds). Acquired Aphasia (Pp 309-333). San Diego, Academic Press.
- Ylvisaker, M., Szekeres, F.S., & Feeney, T. (2008). Communication Disorders Associated With Traumatic Brain Injury. In Chapey, R. (4th Eds). Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders (Pp 879-956). Philadelphia, Lippincott Williams & Wilkins.
- Tompkins, A. C., Klepaousniotou, E., & Scott, G. A. (2013). Nature and Assessment of Right Hemisphere Disorders. In I. Papathanasiou, P. Coppens, & C. Potagas (Eds.), Aphasia and Related Neurogenic Communication Disorders (Pp.297-327). Burlington, Jones & Bartlett.
- Tompkins, A., C. & Scott, G.A (2013). Treatment of Right Hemisphere Disorders. In P. Papathanasiou, P. Coppens., & C. Potagas (Eds.), Aphasia and Related Neurogenic Communication Disorders (Pp.345-359). Burlington, Jones & Bartlett.

**Unit 2**

- Mahendra, N., & Hopper. A. (2013). Dementia and Related Cognitive Disorders. In I. Papathanasiou, P. Coppens, & C. Potagas (Eds.), Aphasia and Related Neurogenic Communication Disorders. (Pp.397-421). Burlington, Jones & Bartlett.

- Duffy, R. J., & McNeil, R. M. (2008). Primary Progressive Aphasia and Apraxia of Speech. In R. Chapey, (4th Eds). Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders (Pp 543-566). Philadelphia: Lippincott Williams & Wilkins.

### Unit 3

- Riley, A. E., & Kendall, L. D. (2013). Acquired Disorders of Reading. In I. Papathanasiou., P. Coppens., & C. Potagas., (Eds.) Aphasia and Related Neurogenic Communication Disorders. (Pp 17-168). Burlington: Jones & Bartlett Learning.
- Csefalvay, Z., & Papathanasiou, I. (2013). Written Language and its Impairments. In I. Papathanasiou., P. Coppens., & C. Potagas., (Eds.). Aphasia and Related Neurogenic Communication Disorders. (Pp 173-192). Burlington, Jones & Bartlett Learning.
- Morris, J. C. (1994). Handbook of Dementic Illnesses. (Pp-134-172). NY, Marcel Dekker Inc.

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- Payne, C.J. (2013). Ethno-Cultural Dynamics and Acquired Aphasia. In I. Papathanasiou, P. Coppens, & C. Potagas (Eds.), Aphasia and Related Neurogenic Communication Disorders. (Pp. 551-564). Burlington, Jones & Bartlett.
- Chapey, R. (2008). Cognitive Stimulation: Stimulation of Recognition/Comprehension, Memory, and Convergent, Divergent, and Evaluative Thinking. In R. Chapey (4th Eds). Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders (Pp 469-506). Philadelphia, Lippincott Williams & Wilkins.
- Simmons-Mackie, N. (2008). Social Approaches to Aphasia. In Chapey, R. (4th Eds). Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders (Pp 279-290). Philadelphia, Lippincott Williams & Wilkins.

### Journals to be referred:

1. Aphasiology
2. Journal of Speech- Language and Hearing Research
3. Brain and Language
4. Stroke Rehabilitation
5. Cortex
6. Journal of All India Institute of Speech and hearing
7. Journal of Indian Speech and Hearing Association

**Paper Code: SLP 4.2- HC: Augmentative and Alternative Communication**

**OBJECTIVES**

After Completion of this Course, the Student Shall be able to:

- Explain the Various Approaches and Methods Used in Augmentative and Alternative Communication (AAC)
- Describe the Assessment and Management of Candidates for AAC
- Explain The Role of AAC in Acquisition of Language Attributes
- Discuss The Role of AAC in the Indian Context and Relevance of Research.

**COURSE CONTENT**

Unit 1: Types, Classification and Description of AAC (20 hrs)

1.1 Definition, History, Need and Classification of AAC

1.2 Team Approach in AAC: Types, Team Members and their Roles

1.3 Aided Systems and Symbols in AAC: Different Types and their Details

1.4 Unaided Systems and Symbols in AAC: Different Types and their Details

1.5 Technology in AAC:

- Communication Boards: Types and Decision Making
- Low and High Tech Aids & Devices: Types, Interfaces, Selection and Decision Making

Unit 2: Assessment for AAC (14 hrs)

2.1 Assessment of AAC Candidates: Models, Standard Tests and Scales

2.2 Assessment of Abilities in the following Domains:

- Physical/ Motor and Seating Requirements
- Cognition
- Vision & Hearing
- Sensory Perception

2.3 Selection of Vocabulary and Symbol Representation of the Vocabulary:



- Types of Vocabulary
- Factors Affecting Choice of Vocabulary

Unit 3: *AAC Intervention: Principles and Procedures* (22 hrs)

3.1 General Principles and Strategies

- Aided AAC
- Unaided AAC

3.2 Strategies for Selection of Symbols in AAC, their Types and Factors Affecting Decision Making:

- Direct Selection
- Scanning
- Encoding
- Word Prediction

3.3 Specific Intervention Strategies for Children with Complex Communication Needs: Mental Retardation, Cerebral Palsy, Child Language Disorders and Children with Dual and Multiple Disabilities.

3.4 Specific Intervention Strategies for Adults with Complex Communication Needs:

- Temporary Conditions: Laryngectomy, Voice Disorders
- Neurological Conditions: Degenerative and Non Degenerative Conditions, Aphasia, TBI
- Structural Disorders and Disorders Affecting Speech Intelligibility

3.5 Adaptation of AAC in Different Settings: Home, Schools, Work Place, and other Social Situations

3.6 Training in the Use and Application of AAC for Parents and Caregivers

Unit 4: Language Attributes, Evidenced Based Practices and Contemporary Issues (16 hrs)

4.1 Language Attributes in AAC (Neurobiological, Comprehension, Competence & Use)

- Aided AAC

4.2 Current Status of AAC in India and Scope for Research

4.3 Evidence Based Practices and Outcome Measures in AAC

**Practicum:**

1. Fabricate a Communication Board and Communication Book. Adapt the Same for use with a Client.
2. Practice and Learn to use the Strategies of Direct Selection, Scanning, Encoding and Word Prediction in Simulated Situation and / or on a Client.
3. Practice and Learn to use the Following Aided Symbols:
  - Blissymbols
  - Rebus
  - PECS
4. Practice and Learn to use the Following Combined Symbol:
  - Cued Speech
5. Practice and Learn to use the following in ASL, BSL and ISL Sign Languages:
  - Finger Spelling
  - Basic Vocabulary for Few Lexical Categories Such as Family and Siblings, Household Articles, Flowers, Animals, Birds, Numbers Etc.
6. Learn to Operate the AAC Devices and Aids (Hardware and Software)

**Reference:**

**Unit 1**

- Acredolo, L., & Goodwyn, S. (1996). *Baby Signs: How to Talk to your Baby before your Baby can talk*. Chicago, NTB/Contemporary.
- Battison, R. (1978). *Lexical Borrowing in American Sign Language*. Maryland, Linstok Press Inc.
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#### **Journals to be referred:**

1. Journal of Augmentative and Alternative Communication
2. Journal of Speech, Language and Hearing
3. Journal of Communication Disorder
4. Seminars in Speech & Language

**Paper Code: SLP 4.3- SC: Suprasegmentals and Music Acoustics**

**OBJECTIVES**

After going through this course the student will be able to explain

- Models of intonation, rhythm, and stress, and the various scales of music
- Methods used in research on suprasegmentals
- Aprosodia in clinical population
- Music acoustics

**COURSE CONTENT**

Unit 1: Introduction to suprasegmentals, components of prosody (12 hrs)

- 1.1 Introduction to suprasegmentals – Definition, components
- 1.2 Stress – Definition, characteristics of stressed syllables, level and types of stress, stressed timed and syllable timed languages, level stress, crescendo stress, diminuendo stress, crescendo-diminuendo stress, word stress, bound stress phonemic stress, morphological stress, sentence stress, primary stress, contrastive stress, emphatic stress.
- 1.3 Changes in stress – Perceptual, syntactic lexical, pragmatic, development of stress, perception, production, physiological mechanisms of stress, perceptual, acoustic correlates, measurement of stress, mechanical recognition, computer aided recognition.
- 1.4 Intonation – Introduction, elements of intonation, tones, pitch phonemes, and pitch levels, pitch movements, configurations and nuclear tone, pitch accents, phrase tones and boundary tones, intonation groups / boundary markers, other boundary markers,
- 1.5 Models in intonation- the British school, the American school, intonation in generative grammar, the Lund school, the Dutch school, intonation in Nonlinear phonology, Phonological models, acoustic phonetic models, Gronnum's model, Lund intonational model, super positional intonation model, Bell labs intonation model.
- 1.6 Issues related to the analysis of intonation, levels versus configuration, structure of intonation pattern, declination.
- 1.7 Function of intonation – lexical functions, phrase and sentence functions, discourse and dialogue functions.



- 1.8 Application of intonation – technical application, speech synthesis, speech recognition, speaker verification, language identification, educational application, prosodic training, foreign language training, providing feedback for the hearing impaired.
- 1.9 Dimensions of tonal contrasts, acquisition of intonation by infants: Physiology and neural control, tone language, basic characteristics of tone, transcription of tones, contrastive tones, register tone language, contour tone language, representation of tone language. Tone Sandhi, physiological correlate of intonation pattern,
- 1.10 Tests of intonation – T – TRIP test, synthetic test of intonation pattern, intonation in pathological conditions, neurological lesions, hearing impairment.
- 1.11 Rhythm – Introduction, definition, development of rhythm, models of rhythm, comb model, chain model, isochrony foot model, tests of rhythm, T-TRIP test, synthetic test of rhythm, rhythm in non- Indian Languages and in Indian Languages, Rhythm class hypothesis and testing the hypothesis, Pair-wise Variability Index, rhythm in disordered population

Unit 2: Neural basis of suprasegmentals (12 hrs)

Neural basis of suprasegmentals and dysprosody, Functional localization hypothesis, Differential cue lateralization hypothesis (RH Hypothesis, F0 hypothesis and supporting studies), processing of prosodic features, hemispheric lateralization, types of dysprosody in various disorders.

Unit 3: Suprasegmentals in different communication disorders (12 hrs)

Prosodic feature in various speech and language disorders, hearing impairment – voicing control, pitch control, pitch range and level length, pauses, apraxia, SLI, autism, stuttering, flaccid dysarthria, spastic dysarthria, unilateral UMN dysarthria, ataxic dysarthria, hyper kinetic dysarthria, hypo kinetic dysarthria, mixed dysarthria, amyotrophic lateral SC lesions, Wilson's disease, multiple sclerosis, multilingual and multicultural variations in prosody, cross-language use of pitch, pitch and expressive vocalization / intonation.

Unit 4 (12 hrs)

- 4.1 Introduction, definitions, historical development of Indian music
- 4.2 Components of music – Melody, rhythm, tonality, harmony, scale, tuning, temperament and intonation
- 4.3 Musical scales – Scale of Just Intonation / Just diatonic / Musical diatonic scale / Pythagorean, Mean tone temperament / Quarter – Common Mean tone temperament / scale of pitch sensation, Equal temperament scale, Comparison of scales.
- 4.4 Physiology of singing – Definition, physiological factors, posture of breathing in singing, Respiratory basis of singing – Respiratory requisites in singing  
Phonatory bases of singing – Phonatory and resonatory requisites for singing  
  
Articulatory basis of singing- singing formant,
- 4.5 prerequisites of singing – Humidity, noise, speaker-listener distance, stance / posture, breathing support, laryngeal position, jaw position, tongue position, perception, artistry
- 4.6 Aging in professional voice – Physiology and acoustics
- 4.7 Singer's voice problems – prevention of voice problems and care of singing voice. Warm up exercises – Exercises for changing voice pitch and loudness

**Unit 1**

- Johns – Lewis, C. (1986) Intonation in discourse. San Diego: College –Hill Press, Inc.
- Phonetica (2009) – Speech issues on speech rhythm.
- Funded research projects reports in AIISH Library and information center.

**Unit 2**

**\*List of Journals**

1. Asia Pacific J of Speech Language and Hearing
2. Brain
3. Brain and Language
4. Cleft Palate
5. Cortex
6. Edn & Tg in MR & Developmental Disability
7. Folia Phoniatica
8. International J of Language & Communication Disorder
9. J of Acoustic Society of America
10. J of Child Language
11. J of Communication Disorders

12. J of Fluency Disorders
13. J of Learning Disability
14. J of Speech language & hearing Research
15. J of Voice
16. Language Learning
17. Language Speech & hearing Services in Schools
18. Linguistics Language Behavior Abstract
19. Otolaryngologic clinic of North America
20. Phonetica
21. Seminars in Speech and Language
22. Speech communication
23. J of Medical Speech – Language Pathology

### Unit 3

#### \*List of Journals

1. Asia Pacific J of Speech Language and Hearing
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18. Linguistics Language Behavior Abstract
19. Otolaryngologic clinic of North America
20. Phonetica
21. Seminars in Speech and Language
22. Speech communication
23. J of Medical Speech – Language Pathology

### Unit 4

- Leeuwen, T. V. (1999). Speech, music and sound. Hong Kong: Macmillan Press Ltd.
- Bunch, M. A. (1982). Dynamic of singing voice. New York: Springer – Verlag/Wien.
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**Paper Code: SLP 4.3- SC: Prosody and Music Acoustics**

**OBJECTIVES**

After going through this course the student will be able to explain

1. Models of intonation, rhythm, and stress, and the various scales of music
2. Methods used in research on suprasegmentals
3. Aprosodia in clinical population
4. Music acoustics

**COURSE CONTENT**

Unit 1: Introduction to Prosody, components of prosody (12 hrs)

**1.1 Introduction to prosody – Definition, components**

1.2 Stress – Definition, characteristics of stressed syllables, level and types of stress, stressed timed and syllable timed languages, level stress, crescendo stress, diminuendo stress, crescendo-diminuendo stress, word stress, bound stress phonemic stress, morphological stress, sentence stress, primary stress, contrastive stress, emphatic stress.

1.3 Changes in stress – Perceptual, syntactic lexical, pragmatic, development of stress, perception, production, physiological mechanisms of stress, perceptual, acoustic correlates, measurement of stress, mechanical recognition, computer aided recognition.

1.4 Intonation – Introduction, elements of intonation, tones, pitch phonemes, and pitch levels, pitch movements, configurations and nuclear tone, pitch accents, phrase tones and boundary tones, intonation groups / boundary markers, other boundary markers,

1.5 models in intonation- the British school, the American school, intonation in generative grammar, the Lund school, the Dutch school, intonation in Nonlinear phonology, Phonological models, acoustic phonetic models, Gronnum's model, Lund intonational model, super positional intonation model, Bell labs intonation model.

1.6 issues related to the analysis of intonation, levels versus configuration, structure of intonation pattern, declination.

1.7 Function of intonation – lexical functions, phrase and sentence functions, discourse and dialogue functions.

- 1.8 Application of intonation – technical application, speech synthesis, speech recognition, speaker verification, language identification, educational application, prosodic training, foreign language training, providing feedback for the hearing impaired.
- 1.9 Dimensions of tonal contrasts, acquisition of intonation by infants: Physiology and neural control, tone language, basic characteristics of tone, transcription of tones, contrastive tones, register tone language, contour tone language, representation of tone language.  
Tone Sandhi, physiological correlate of intonation pattern.
- 1.10 Tests of intonation – T – TRIP test, synthetic test of intonation pattern, intonation in pathological conditions, neurological lesions, hearing impairment.
- 1.11 Rhythm – Introduction, definition, development of rhythm, models of rhythm, comb model, chain model, isochrony foot model, tests of rhythm, T-TRIP test, synthetic test of rhythm, rhythm in non- Indian Languages and in Indian Languages, Rhythm class hypothesis and testing the hypothesis, Pair-wise Variability Index, rhythm in disordered population

Unit 2: Neural basis of prosody (12 hrs)

Neural basis of suprasegmentals and dysprosody, Functional localization hypothesis, Differential cue lateralization hypothesis (RH Hypothesis, F0 hypothesis and supporting studies), processing of prosodic features, hemispheric lateralization, types of dysprosody in various disorders.

Unit 3: Prosody in different communication disorders (12 hrs)

Prosodic feature in various speech and language disorders, hearing impairment – voicing control, pitch control, pitch range and level length, pauses, apraxia, SLI, autism, stuttering, flaccid dysarthria, spastic dysarthria, unilateral UMN dysarthria, ataxic dysarthria, hyper kinetic dysarthria, hypo kinetic dysarthria, mixed dysarthria, amyotrophic lateral SC lesions, Wilson's disease, multiple sclerosis, multilingual and multicultural variations in prosody, cross-language use of pitch, pitch and expressive vocalization / intonation.

Unit 4 (12 hrs)

- 4.1 Introduction, definitions, historical development of Indian music
- 4.2 Components of music - Rhythm, melody, tonality, harmony, scale, tuning, temperament and intonation
- 4.3 Musical scales – Pythagorean, Mean tone temperament / Quarter – Common Mean tone temperament, Scale of Just Intonation / Just diatonic / Musical diatonic scale / scale of pitch sensation, Equal temperament scale, Comparison of scales.
- 4.4 Physiology of singing – Definition, physiological factors, posture of breathing in singing, Respiratory basis of singing – Respiratory requisites in singing  
Phonatory bases of singing – Phonatory and resonatory requisites for singing

Articulatory basis of singing- singing formant,

- 4.5 Prerequisites of singing – Humidity, noise, speaker-listener distance, stance / posture, breathing support, laryngeal position, jaw position, tongue position, perception, artistry
- 4.6 Aging in professional voice – Physiology and acoustics
- 4.7 Singer’s voice problems – prevention of voice problems and care of singing voice. Warm up exercises – Exercises for changing voice pitch and loudness

**Reference:**

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## Unit 2

### Journal articles:

- Balasubramanian. T. (1981). Emphasis in Tamil. *Journal of phonetics*, 9, 139-150.
- Baum, S. (1998). The role of fundamental frequency and duration in the perception of linguistic stress by individuals with brain damage. *Journal of Speech, Language, and Hearing Research*, 41, 31– 40.
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### **Unit 3**

#### **List of Journals**

1. Asia Pacific J of Speech Language and Hearing
2. Brain
3. Brain and Language
4. Cleft Palate
5. Cortex
6. Edn & Tg in MR & Developmental Disability
7. Folia Phoniatica
8. International J of Language & Communication Disorder
9. J of Acoustic Society of America
10. J of Child Language
11. J of Communication Disorders
12. J of Fluency Disorders
13. J of Learning Disability
14. J of Speech language & hearing Research
15. J of Voice
16. Language Learning
17. Language Speech & hearing Services in Schools
18. Linguistics Language Behavior Abstract
19. Otolaryngologic clinic of North America
20. Phonetica
21. Seminars in Speech and Language
22. Speech communication
23. J of Medical Speech – Language Pathology

### **Unit 4**

- Brodnitz, F.S. (1988). *Keep Your Voice Healthy: Guide to the Intelligent Use and Care of the speaking and singing voice* (2nd ed.). Austin: Pro-ed.
- Bunch, M. (1982). *Dynamics of Singing Voice* (3rd ed.). New York: Springer – Verlag
- Callaghan, J. ( 2000). *Singing and Voice Science*. San Diego: Singular Publishing Group.
- Chapman, J. L. (2006). *Singing and Teaching Singing: A Holistic Approach to Classical Voice*. San Diego: Plural Publishing.
- Hixon, T. H. (2006). *Respiratory Function in Singing: A Primer for Singers and Singing Teachers*. Readington Brown

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- Kent, E. L. (1977). Musical Acoustics: Piano and Wind Instruments. Pennsylvania: Dowden Hutchinson And Ross
- Leeuwen, T. V. (1999). Speech, Music and sound. Hong Kong: Macmillan Press Ltd.
- Miller, R. (1996). Structure of Singing: system and art in Vocal Technique. Australia:Schirmer.
- Nair, G. (2007). Craft of singing. San Diego: Plural Publishing.
- Proctor, D. F. (1980). Breathing, Speech and Song. New York: Springer – Verlag/Wien.
- Punt, N. A. (1979). Singer`s And Actor`s Throat: Vocal Mechanism of The Professional Voice User and its Care in Health And Disease. London: William Heinemann.
- Sataloff, R. T. (2005). Professional Voice: The Science and Art of Clinical Care. Sandiego: Plural Publishing.

**Paper Code: SLP 4.4 - SC: Dissertation**

**Paper Code: SLP 4.4 - HC: Clinical Practicum IV**

**Paper Code: SLP 2.6 - OE: Computer Science**

**OBJECTIVES**

After Completion of this Course, the Student shall be able to:

- Explain the Applications of Information and Communication Technology in Speech Analysis, Speech Signal Processing, Instrumentation Etc.
- Define Fundamental Concepts of Computers & Information Technology– Hardware and Software.
- Know the Principle of Operation and Functioning of Computer Based Diagnostic Equipments.
- Discuss the Technology to Employ ICT in Tele-Diagnosis and Tele-Rehabilitation.
- Know the Foundation of ICT (Information and Communication Technology) Concepts and Understand the Applications of ICT in Speech & Language Sciences & Pathology.

Unit 1: Introduction to Computers (12 hrs)

1.1 Computer Hardware

- Hardware Architecture
- SMPS
- Hard Disk
- RAM
- Processor, Mother Board & Chipset
- Interface Ports – DVI, VGA, HDMI, USB etc.

1.2 Types of Computing Systems.

- Desk Top
- Workstation
- Server
- Laptop
- Tablet

1.3 Computer Software

- Role of Operating System
- Types of Operating System
- Comparison of Operating Systems
- Role of Application Software

Unit 2: Introduction to Information and Communication Technology (12 Hrs)

2.1 Computer Networks

- Function of a Computer Network
- Types of Network
- Topology and Structure of Each Type
- Implementing a Computer Network

2.2 Internet

- Basic structure and functioning
- World wide web
- Types of internet connectivity
- Comparison of different types
- Basic structure and functioning of e-mail

2.3 Satellite communication

- Basic Structure
- Implementation
- Merits and Demerits
- Applications

Unit 3: Applications of Computers in Speech Language Sciences and Pathology. (15 hrs)

3.1 Computer Based Instruments

- Speech Spectrograph and CSL
- Voice Analysis Systems
- Articulograph
- Nasometer
- Neuroscan

3.2 Computer Based Tools for Analysis

- PRAAT
- Adobe Audition
- SALT
- Matlab

3.3 Computer Based Tools for Attributes of Language

- Few Tools for Assessing Language
- Few Tools for Learning Language
- Web Based Tools

Unit 4: Clinical Applications of Information and Communication Technology (15 hrs)

4.1 Database Management and Storage

- Mass Storage Devices
- Client Based Storage Devices
- Network Storage Devices
- Data Base – Types, Organization & Structure
- Data Base Management Systems
- Data Centre – Types, Organization & Structure

4.2 Video Conference Techniques

- Point to Point Video Calls
- One to Many Video Conferencing
- Many to Many Video Conferencing
- Desk Top Sharing Software
- Group Meeting Software

4.3 Tele Diagnosis & Tele-Rehabilitation

- Setup for Tele-Diagnosis
- Implementation of Infrastructure for Tele-Diagnosis
- Infrastructure & Set Up for Tele-Rehabilitation

**Practicum:**

1. Computer Hardware Components
2. Video Conference Techniques
3. Implementing Computer Networks
4. Data Base – Types, Organization & Structure

**Reference:**

**Unit 1**

- Nagpal, D. P. (2009). Computer Fundamentals: Concepts, Systems and Applications. New Delhi, S. Chand & Company
- Malvino, A. P. (1979). Digital Computer Electronics. Bombay, Tata Mcgraw Hill.

**Unit 2**

- Stewart, J. Michael (2014) Network Security, Firewalls, and VPNs. Boston, Jones & Bartlett Learning.

- Raj Kamal (2010) Internet & Web Technologies. New Delhi, Tata McGraw Hill Education Private Limited.

### Unit 3

- Kent, R. D. (1995). The Acoustic Analysis of Speech. Delhi, AITBS Publishers Inc.
- Decker, T., Carrell, N., & Thomas D. (2004). Instrumentation: An Introduction for Students in the Speech and Hearing Sciences. London, Taylor & Francis Ltd.
- Khirwadka, Pushpanadham, K. A., (2005). Information and Communication Technology in Education: Interactive Multi-Media Instructional Strategies for Teaching-Learning Process. New Delhi, Sarup & Sons.
- Auger, E., & Francois, A. (2014) Signal Processing with Free Software: Practical Experiments. New York , John Wiley & Sons.

### Unit 4

- Mrero, A., Rice, M., Ronald E. (2006). Internet and Health Care: Theory, Research, and Practice, London, Lawrence Erlbaum Inc.
- Ullman, S., & Jeffrey, D. (1994). Principles of Database Systems. New Delhi, Galgotia Publications Pvt Ltd.
- Jasco, A., & Peter Lancaster, F.W. , (2010). Build Your Own Database. New Delhi, Ess Ess Publications.

### Journals to be Referred:

1. IEEE Transactions on Biomedical Engineering
2. Journal of Instrumentation.
3. International School for Advanced Studies.
4. Institute of Physics Publishing
5. Journal of Instrumentation Technology & Innovation.

**Paper Code: SLP 2.6 - OE: Information Management in Speech, Language and Hearing**

**OBJECTIVES**

After completion of the course, the student shall be able to:

- Utilize Speech & Hearing Related Information Resources
- Know the Techniques of Information Literacy
- Know the Legal and Ethical Issues in Using Information
- Explain Scholarly Metrics, Tools and Techniques
- Critically Evaluate Information
- Resources and Quality Research Reports

**COURSE CONTENT**

**Unit 1: Information Resources in Speech, Language and Hearing (15 hrs)**

**1.1 Overview of Traditional Information Resources Pertaining to Speech, Language and Hearing**

- Primary
- Secondary
- Tertiary

**1.2 Types and Characteristics of Electronic Information Sources**

- E-Books
- E-Journals
- Online Digital Research Repository
- Subject Gateways and Portals
- Bibliographic and Full Text Databases

**1.3 Evaluation Of Information Resources Using Various Criteria-**

- Timeliness
- Authenticity
- Reliability

**Unit 2: Search Strategies and Techniques for Information (15 hrs)**

**2.1 Basic Searching and Advanced Searching Techniques**

**2.2 Search Strategy**



- Search formulation
- Search statement

### 2.3 Search Techniques

- Boolean Logic
- Truncation
- Weighted term logic

### 2.4 Search Tools

- Subject Indices
- Search Directories
- General Search Engines
- Meta Search Engines

### 2.5 Vocabulary Control tool –Thesaurus

## Unit 3: Information Communication and Management (15 hrs)

### 3.1 Basics of Academic Writing

### 3.2 Introduction to Style Guides

- APA Manual
- Chicago Manual
- MLA Style Guide

### 3.3 Scientific Publication Life Cycle

### 3.4 Bibliographic Management using Software

- Zotero
- Mendeley
- Endnote

### 3.5 Creation and Sharing of Information

- Need for sharing research information
- Creation and sharing of information using Social Media tools such as blogs and wikis
- Author Identifiers: Open Researcher and Contributor ID (ORCID), Researcher ID

### 3.6 Tools for Updating Information

- RSS Feeds
- E-Alert Service

### 3.7 Digital Object Identifier (DOI)

## Unit 4: Measuring Scientific Productivity (15 hrs)

### 4.1 Tools and Techniques

- Impact Factor
- Scimago Journal Ranking (SJR)
- Source Normalized Impact per Paper (SNIP)
- h-index
- Immediacy index

### 4.2 Citation Databases

- Web of Science
- Google Scholar
- Scopus

### 4.3 Ethical and Legal Issues in Publication

- Concept of Academic Integrity
- Plagiarism – Basics, Tools for plagiarism Checking
- Basics of Intellectual Property Right
- Copyright Laws

### 4.4 Research Ethics- International Guidelines and Standards

## **Practicum:**

1. Database Searching on Topics in Communication Disorders using PUBMED, COMDISDOME and Google Scholar Databases
2. Managing Digital Information Resources on Communication Disorders using Zotero and Mendeley Software
3. APA Style Referencing for Various Types of Information Sources
4. Creation of Personal Profiles Using Free Online Tools Like Word Press

## **Reference:**

### **Unit 1 to 4**

- Ahuja, V. K. (2010). Law Related to Intellectual Property Rights. New Delhi, Lexis, Nexis.
- Bruce. C., Donald, M., & Trevor, S. (2009). Search Engines: Information Retrieval in Practice. Boston, Pearson.

M.Sc. (Speech-Language Pathology) CBCS Scheme - 2 years programme

- Gonzalez-Brambila, C. (2011). Exploring Academic Scientific Productivity. Saarbrücken, VDM Verlag.
- Hersh, W. (2010). Information Retrieval: A Health and Biomedical Perspective. New York, Springer.
- Huber, J. T., & Swogger, S. (2014). Introduction to Reference Sources in the Health Sciences. Chicago, Medical Library Association.
- Notess, G. R. (2006). Teaching Web Search Skills: Techniques and Strategies of Top Trainers. NJ, Information Today Inc.
- American Psychological Association. (2015). Publication manual of the American Psychological Association. Washington, DC: Author.
- Thompson, L.L., Tobia, R., Higa, M. L., & Carrigan, E. (2011). The Medical Library Association's Master Guide to Authoritative Information Resources in the Health Sciences. New York, Neal-Schuman Publishers Inc.