



TEHRAN UNIVERSITY
OF
MEDICAL SCIENCES

School of Rehabilitation

Master's Degree, Clinical and Experimental Neurolinguistics Program

Course Description:**Table of Optional Courses**

Code	Course Title	Number of Credits			Hours			Prerequisite	Term
		Theoretical	Practical	Total	Theoretical	Practical	Total		
01	Medical Information Technology	0.5	0.5	1	17	9	26	None	3
02	English Language for Neurolinguistics	2	-	2	34	-	34	None	1
03	Cultural Psychology of Language	2	-	2	34	-	34	None	2
04	Scientific writing and presenting	1	1	2	17	34	51	None	3
05	Introduction to Neuroscience	2	-	2	34	-	34	None	1
06	Language and Thought	2	-	2	34	-	34	None	1
07	Cognitive Linguistics	2	-	2	34	-	34	None	1

Prerequisite course:

08	Introduction to speech and language pathology	2	-	2	34	-	34	None
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Table of Compulsory Courses

Code	Course Title	Number of Credits			Hours			Prerequisite	Term
		Theoretical	Practical	Total	Theoretical	Practical	Total		
09	Neuroanatomy and Neurophysiology of Language	2	-	2	34	-	34	None	1
10	Language Development	2	-	2	34	-	34	None	1
11	Psycholinguistics	2	-	2	34	-	34	None	1
12	Bilingualism from a Cognitive Neuroscience Perspective	2	-	2	34	-	34	Language development	2

13	Child language disorders	2	-	2	34	-	34	None	2
14	Language Disorders with Focal and non-Focal Brain Damage	2	-	2	34	-	34	None	2
15	Clinical and Applied Linguistics	1.5	0.5	2	25	17	42	None	3
16	Statistical Techniques for researchers	1.5	0.5	2	25	17	42	None	1
17	Research Methods	2	-	2	34	-	34	Statistical Techniques for researchers	2
18	Seminar in Neurolinguistics	-	2	2	-	68	68	None	3
19	Neurolinguistics Lab.	-	4	4	-	136	136	Code 5 & 6	3
20	Thesis	-	4	4	-	-	-	-	4
	Total	17	11	28	288	238	526		

In the Name of God
Curriculum

Section I:

Title: *Clinical and Experimental Neurolinguistics*

Degree: M.Sc

Introduction

Speech and language are influenced by biological, environmental, neurological, psychological, linguistic, and educational factors. In some cases, various aspects of each type of speech and language disorder, under the influence of these factors, are changed into very complex and resistant problems; hence, their identification and remediation requires more knowledge.

Achieving sufficient knowledge requires research on all aspects of speech and language which itself requires the integration of both knowledge and research skills in clinical and experimental neurolinguistics.

Definition

In this program of study, students will learn accurate laboratory measurement of different components of speech and language, will study the complex and difficult aspects of their disorders, and become familiar with methods of identifying these disorders in children and adults. They will also be taught Laboratory skills and research methods.

The Aim of the Course

With regard to the fundamental differences in the components and structure of speech and language in different languages, and considering that natural indicators and criteria of this skill in biological and pathological aspects are determined according to the natural characteristics of speakers of any language, the necessity of establishing this program in order to increase global knowledge is self-evident. Students, by employing laboratory equipment used in the theoretical and actual aspects of language processing, gain necessary knowledge and skills about problems, features and disorders of language. In addition, by relying on the knowledge of neurolinguistics to explore the general parameters of speech and language as well as specific, local characteristics of language disorders, students will undertake research on normal and abnormal language.

General Competencies

- Identifying physical and environmental factors affecting language and its disorders
- Research, discovery and measurement of linguistic norms of society
- Developing indicators and methods of measuring and evaluating language skills
- Developing a research plan focusing on the theoretical foundations of language processing and its disorders
- Implementation of a local research project in the field of language and its disorders

Special qualifications for admission

Holding bachelor degree in any of the following fields is needed to enter this course:

- Communication Disorders
- Speech pathology and Audiology
- Speech and Language Pathology
- Linguistics
- Psychology

The Terms and Conditions of Admission to the Course are based on application forms, assessment of documents, research background of applicants and letters of recommendation.

Educational Strategies, Methods and Techniques

The educational strategies, Methods and Techniques are composed of below main issues:

- A combination of teacher-centered and student-centered learning
- Problem solving
- Self study
- Task-based learning
- Systematic learning

Student Assessment

Assessment methods

- Written Exam
- Oral Exam

Number of credits and classification

- The minimum number of credits required for obtaining a master's degree in Clinical and Experimental Neurolinguistics is 32.
- Based on the department's decision, students may have to pass Medical Information Technology (1 credit) and Special English Language (2 credit), too.

Ethical issues

Graduates should,

- Strictly observe Biosafety and Patient Safety Rules* concerning patients, personnel, experimental labs and workplace.
- Strictly observe the Regulations of Working in the Laboratories
- Carefully preserve resources and equipment.

- Truly respect faculty members, the staff, classmates and other students and work for creating an intimate and respectful atmosphere.
- Observe social and professional ethical considerations in criticism.

* Biosafety and Patient Safety Rules will be set out by the Educational Departments and will be available to the students.

Section II

Prerequisite Credit:

Title of the Course: Introduction to speech and language pathology

Code of the course: 01

Number of Credits: 02

Type of the course: optional

Prerequisite: None

Principle objective(s) of the course:

The purpose of this course is to introduce communication, speech, Language, and swallowing disorders.

Course description

- 1- Definition of Speech , Language and communication
- 2- Introduction to speech impairment
- 3- Introduction to Language impairment
- 4- Introduction to swallowing disorder
- 5- Introduction to communication disorder
- 6- Introduction to professional roles of speech and Language pathologist

Main topic: 34 hours

Theoretical: 2 units

Practical: -

Principal reference(s):

Fogle P.T. Essentials of Communication Sciences and Disorders. Cengage Learning; First edition. 2012

Student assessment practices:

- Written Exam

Core Credits

Title of the Course: Neuroanatomy and Neurophysiology of Language

Code of the course: 01

Number of Credits: 02

Type of the course: Compulsory

Prerequisite: None

Principal objective(s) of the course:

Introduction to neuroanatomy and the neuropsychology of brain structure regarding language from a neuroscience perspective

Course description:

- 1- Gross Anatomy of CNS
- 2- Development of the CNS
- 3- Basic physiology of nerve cells
- 4- Somatosensory system
- 5- Visual system
- 6- Auditory system
- 7- Motor system
- 8- Vestibular system
- 9- General Cortex: higher mental functions
- 10- Neuroimaging of language

Main topic: 34 hours

Theoretical: 2 units

Practical: -

Principal reference(s):

Bhatnagar, Subhash Chandra. *Neuroscience for the study of communicative disorders*. Lippincott Williams & Wilkins, 2002.

Student assessment practices:

- Written Exam
- Oral Exam

Title of the Course: Language Development

Code of the course: 02

Number of Credits: 02

Type of the course: Compulsory

Prerequisite: None

Principal objective(s) of the course:

Introduction to language development in children

Course description:

- 1- Properties of language
- 2- Components of language
- 3- Linguistic theory
- 4- Issues in the study of child language
- 5- Cognitive, Perceptual, and motor bases of early language and speech
- 6- Child learning strategies
- 7- First word and word combinations in Toddler talk
- 8- Preschool pragmatic and semantic development
- 9- Preschool Development of language form
- 10- Early school- age language development
- 11- school- age language development
- 12- Adolescent and adult language

Main topic: 34 hours

Theoretical: 2 units

Practical: -

Principal reference(s):

Owens Jr, Robert E. *Language development: An introduction*. Pearson, 2015.

Student assessment practices:

- Written Exam
- Oral Exam

Title of the Course: Psycholinguistics

Code of the course: 03

Number of Credits: 02

Type of the course: Compulsory

Prerequisite: None

Principal objective(s) of the course:

Introduction to models of language processing including comprehension and production components.

Course description:

- 1) Introduction to the perception and production of speech
- 2) Language and cognition
- 3) Lexicon and Word meaning
- 4) Understanding the structure of sentences
- 5) Models of word naming
- 6) Models of speech recognition
- 7) Models of text representation and processing
- 8) Models of visual word recognition
- 9) Language production
- 10) Modules of language

Main topic: 34 hours

Theoretical: 2 units

Practical: -

Principal reference(s):

Harley TA. The psychology of language: From data to theory. Psychology press; 2013 Dec 17.

Student assessment practices:

- Written Exam
- Oral Exam

Title of the Course: Bilingualism from a Cognitive Neuroscience Perspective

Code of the course: 04

Number of Credits: 02

Type of the course: Compulsory

Prerequisite: None

Principal objective(s) of the course:

This course analyzes how language is processed by bilinguals

Course description:

- 1) An overview of Bilingualism: nature and theories
- 2) Bilingual Brain
- 3) Perspectives on language, Bilingualism, and language proficiency
- 4) Cognition in Bilinguals
- 5) Bilingualism in Children
- 6) Bilingualism in Adults

Main topic: 34 hours

Theoretical: 2 units

Practical: -

Principal reference(s):

Kohnert K. Language disorders in bilingual children and adults. Plural Publishing; 2013 Mar 1.

Kroll JF, De Groot AM, editors. Handbook of bilingualism: Psycholinguistic approaches. Oxford University Press; 2009 Feb 16.

Kecskés I, Albertazzi L, editors. Cognitive aspects of bilingualism. The Netherlands: Springer; 2007 Aug 19.

Student assessment practices:

- Written Exam
- Oral Exam

Title of the Course: Child language disorders

Code of the course: 05

Number of Credits: 03

Type of the course: Compulsory

Prerequisite: language development

Principal objective(s) of the course:

Introduction to developmental language disorders from infancy through adolescence

Course description:

- 1- Models of child language disorders
- 2- Language development in exceptional circumstances: Autism spectrum disorders, specific language impairment, Down Syndrome , hearing impairment
- 3- Child language disorders in a pluralistic society
- 4- language disorders in preschool years
- 5- language disorders in school years

Main topic: 51 hours

Theoretical: 3 units

Practical: None

Principal reference(s):

Paul R. Language disorders from infancy through adolescence: Assessment & intervention. Elsevier Health Sciences; 2007.

Owens RE. Language disorders: A functional approach to assessment and intervention. New York: Merrill; 2010.

Student assessment practices:

- Written Exam
- Oral Exam

Title of the Course: Language Disorders with Focal and non-Focal Brain Damage

Code of the course: 06

Number of Credits: 03

Type of the course: Compulsory

Prerequisite: None

Principal objective(s) of the course:

The aim of this course is to study the impairments of adult language disorders including aphasia and dementia.

Course description:

- 1) An overview of Focal and non-Focal acquired communication disorders
- 2) Cognitive deficits in aphasia
- 3) Cognition and Communication in Ageing
- 4) Minimal Cognitive Impairment
- 5) Cognitive-Communication Disorders of Dementia

Main topic: 51 hours

Theoretical: 3 units

Practical: -

Principal reference(s):

- 1) LaPointe LL, Murdoch BE, Stierwalt JA. Brain-based communication disorders. Plural Publishing; 2010 Jul 1.
- 2) Bayles KA, Tomoeda CK. Cognitive-communication disorders of dementia: Definition, diagnosis, and treatment. Plural Publishing; 2013 Dec 26.
- 3) Peach RK, Shapiro LP. Cognition and Acquired Language Disorders-E-Book: An Information Processing Approach. Elsevier Health Sciences; 2012 May 14.
- 4) Stemmer B, Whitaker HA, editors. Handbook of the Neuroscience of Language. Academic Press; 2008 Apr 29.
- 5) Bayles KA, Tomoeda CK. MCI and Alzheimer's dementia: Clinical essentials for assessment and treatment of cognitive-communication disorders. Plural Publishing; 2013 Jul 1.

Student assessment practices:

- Written Exam
- Oral Exam

Title of the Course: Clinical and Applied Linguistics

Code of the course: 07

Number of Credits: 02

Type of the course: Compulsory

Prerequisite: None

Principal objective(s) of the course:

Students will become familiar with the linguistic features (or, components) of clinical studies and will be able to put theoretical analyses into practice; employing theory as applied to different clinical cases, students will find the underlying cause of linguistics problems of these clinical cases.

Course description:

- 1) discourse analysis and communication impairment
- 2) conversational implications and communication impairment
- 3) relevance theory and communication disorders
- 4) Chomskyan syntactic theory and language disorders
- 5) Formulaic sequences and language disorder
- 6) Syntactic processing in developmental and acquired language disorders
- 7) Morphology and language disorder
- 8) Instrumental analysis of articulation in speech impairment

- 9) Instrumental analysis of resonance in speech impairment
- 10) Instrumental analysis of phonation
- 11) Acoustic analysis of speech
- 12) Clinical phonetic transcription
- 13) Phonological analysis , phonological processes
- 14) Introducing optimality theory and working on some examples including Persian
- 15) Introducing different speech-to-text systems as well as some acoustic ones.

Main topic: 42 hours

Theoretical: 1.5 units (25 hours)

Practical: 0.5 units (17 hours)

Principal reference(s):

1. Perkins MR, Müller N, Howard S. The handbook of clinical linguistics. Ball MJ, editor. Oxford: Blackwell; 2008.
2. Hornstein N, Nunes J, Grohmann KK. Understanding minimalism. Cambridge University Press; 2005 Dec 15.
3. Bijankhan M. Phonology: Optimality Theory. Tehran: Samt. 2005.

Student assessment practices:

- Witten Exam

Title of the Course: Statistical Techniques for researchers

Code of the course: 08

Number of Credits: 02

Type of the course: Compulsory

Prerequisite: None

Principal objective(s) of the course:

Introduction to advanced statistical methods in health research.

Course description:

- 1) Descriptive and Inferential statistics
- 2) Descriptive methods

- 3) The standard normal distribution
- 4) Probability
- 5) Parametric and non-parametric statistics
- 6) Hypothesis testing
- 7) Analysis of Variance: one way analysis
- 8) Measure relationships: correlations
- 9) Making prediction: regression
- 10) Categorical analysis: Chi-square tests
- 11) Introducing statistical software (SPSS)

Main topic: 38 hours

Theoretical: 1.75 units (29.5 hours)

Practical: 0.25 units (8.5 hours)

Principal reference(s):

1. Satake E. Statistical methods and reasoning for the clinical sciences: Evidence-based practice. Plural Publishing; 2014 Aug 1.

Student assessment practices:

- Written Exam

Title of the Course: Research Methods

Code of the course: 09

Number of Credits: 02

Type of the course: Compulsory

Prerequisite: Statistical Techniques for researchers

Principal objective(s) of the course:

Introduction to various components of the health system and learning to design the research proposal.

Course description:

- 1) Introduction to Research
- 2) Ethics of research
- 3) Identifying and formulating research questions
- 4) Literature review
- 5) Measurement
- 6) Research designs
- 7) Research Participants and Sampling

8) Reporting and disseminating research

Main topic: 34 hours

Theoretical: 2 units

Practical: -

Principal reference(s):

1. Irwin DL, Pannbacker M, Lass NJ. Clinical research methods in speech-language pathology and audiology. Plural Publishing; 2013 Apr 15.
2. Nelson LK. Research in communication sciences and disorders: Methods for systematic inquiry. Plural Publishing; 2016.

Student assessment practices:

- Written Exam

The Title of the Course: Seminar in Neurolinguistics

Code of the course: 09

Number of Credits: 02

Type of the course: Compulsory

Prerequisite: None

Principal objective(s) of the course:

Introduction to scientific journals and the analysis of research articles in neurolinguistics.

Course description:

This course is designed to provide an opportunity to explore and discuss major topic areas in neurolinguistics research.

Also lecture by guest speakers and M.Sc. students who will share their experiences and knowledge of topics such as language structure and language processing from a neuroscience perspective in normal and impaired populations.

Main topic: 68 hours

Theoretical: -

Practical: 2 units

Principal reference(s):

International scientific database (Medline, Scopus, Science Direct, and etc.)

Student assessment practices:

- Oral exam

Title of the Course: Neurolinguistics Lab.

Code of the course: 10

Number of Credits: 04

Type of the course: Compulsory

Prerequisite:

Principal objective(s) of the course:

Clinical and experimental methods in neurolinguistics

Main topic: 68 hours

Theoretical: -

Practical: 2

Principal reference(s):

- 1) Stemmer B, Whitaker HA, editors. Handbook of the Neuroscience of Language. Academic Press; 2008 Apr 29.
- 2) Relative journals in the field

Student assessment practices:

- Written exam (Preparation of a study protocol of a project)
- Oral exam

Non-Core Credits

Title of the Course: Medical Information Technology

Code of the course: 01

Number of Credits: 01

Type of the course: Optional

Prerequisite: None

Principal objective(s) of the course:

Introduction to data extraction from medical databases.

Course description:

In this course students will be familiar with the basic concepts of computer-based information technology, operation systems such as windows and medical information data banks (Medline) and electronic searches in neurolinguistics and related domains.

Main topic: 26 hours

Theoretical: 0.5 units (9 hours)

Practical: 0.5 units (17 hours)

Principal reference(s):

- Finding information in science, technology and medicine, Jill Lambert, Taylor R. Francis, Latest edition
- Information technology solutions for healthcare, Krzysztof, Zielinski, et al. Latest edition

Student assessment practices:

- Written exam
- Oral exam

Title of the Course: English Language for Neurolinguistics

Code of the course: 02

Number of Credits: 02

Type of the course: Optional

Prerequisite: None

Principal objective(s) of the course:

Introduction to the principles of conversation, translation, writing and analysis of medical information, especially in the field of Neurolinguistics and proper and scientific application of research articles.

Course description:

Most of the reference books of **Neurolinguistics** have been written in English. Therefore, it is necessary for students of **Clinical and Experimental Neurolinguistics** to be familiar with this language and its application in **Neurolinguistics**. In addition, they must read and understand the methods of assessment, treatment, etc. in textbooks of **Neurolinguistics**.

Main topic: 34 hours

Theoretical: 02 units (34 hours)

Practical: 0 units

Principal reference(s):

- All related Neurolinguistics books
- All related Neurolinguistics journals

Student assessment practices:

- Written Exam
- Oral Exam

Title of the Course: Cultural Psychology of Language

Code of the course: 03

Number of Credits: 02

Type of the course: Optional

Prerequisite: None

Principal objective(s) of the course:

Introduction of the effects of a multicultural environment on communication

Course Description

1. Verbal and non-verbal interactions in cultural context
2. Understanding of cultural influences and cultural implications
3. The role of experimental psychology in analyzing our cultural experiences
4. Cultural implications in cognitive, emotional, motivational and behavioral realms
5. The role of culture in our thoughts, feelings, behaviors and decision making
6. Conscious and unconscious manifestations of cultural phenomenology in intrapersonal and interpersonal domains
7. Cultural psychology related to international disputes
8. The latest findings on neuroscience and their implications for understanding multicultural issues

Required Text Book:

Heine SJ. Cultural psychology: Third International Student Edition. WW Norton & Company; 2015 Aug 28.

Main topic: 34 hours

Theoretical: 02 units (34 hours)

Practical: 0 units

Student assessment practices:

- Written Exam

The Title of the Course: Scientific writing and presenting

Code of the course: 04

Number of Credits: 02

Type of the course: Optional

Prerequisite: None

Principal objective(s) of the course:

The purpose of this course is to learn how to write a research paper in neurolinguistics.

Course description:

1. Writing rules
2. Evidence-based writing
3. Ethics of professional writing
4. Using resources
5. The structure of writing an article
6. Writing for oral presentation

Main topic: 51 hours

Theoretical: 1 unit (17)

Practical: 1 unit (34)

Principal reference(s):

1. Brookshire RH, Brundage SB. Writing Scientific Research in Communication Sciences and Disorder. Plural Publishing; 2015 Nov 2.
2. Goldfarb RM, Serpanos YC. Professional writing in speech-language pathology and audiology. Plural Pub.; 2009.

Student assessment practices:

- Written exam

Title of the Course: Introduction to Neuroscience

Code of the course: 05

Number of Credits: 02

Type of the course: Optional

Prerequisite: None

Principal objective(s) of the course:

The course intends to provide a systematic introduction to the mammalian nervous system, emphasizing the structural and functional organization of the human brain.

Course description:

This course begins with the study of nerve cells: their structure, the propagation of nerve impulses and transfer of information between nerve cells, the effect of drugs on this process, and the development of nerve cells into the brain and spinal cord. We then move to the sensory systems such as olfaction, hearing, and vision and discuss how physical energy such as light is converted into neural signals, where these signals travel in the brain, and how they are processed. Next we study the control of voluntary movement. Finally, we cover the neurochemical bases of brain diseases and those systems which control motivation, emotion, learning and memory.

Main topic: 34 hours

Theoretical: 02 units (34 hours)

Practical: 0 units

Principal reference(s):

- Mesulam MM. Principles of behavioral and cognitive neurology. Oxford University Press; 2000 Jan 27.
- Bear M. F., Connors B.W., Paradiso M.A. Neuroscience Exploring the Brain, Wolters Kluwer; 4th edition, 2015.

Student assessment practices:

- Written Exam

Title of the Course: Language and Thought

Code of the course: 06

Number of Credits: 02

Type of the course: Optional

Prerequisite: None

Principal objective(s) of the course:

The course intends to provide the nature of relationship between speaking and thinking.

Course description:

In this course the following questions will be answered:

Does what we think determine what we say? Or does our language restrict the thoughts we can have? What comes first, thinking or speaking? Does learning a new language shape the way we think? These are some of the questions that have sparked controversy. This course aims at introducing students to a range of issues in relation to language and thought and at providing them with a solid grounding for further participation in the debate. The course brings together

findings from linguistics, psychology, and philosophy. The course is an advanced course and advanced academic and self-directed learning skills as well as scholarly discourse are expected.

Main topic: 34 hours

Theoretical: 02 units (34 hours)

Practical: 0 units

Principal reference(s):

1. Malt B, Wolff P, editors. Words and the mind: How words capture human experience. Oxford University Press; 2010.

2. Behrmann M, Patterson K. Words and Things: Cognitive Neuropsychological Studies in Tribute to Eleanor M. Saffran. Psychology Press; 2004.

Student assessment practices:

- Written Exam

Title of the Course: Cognitive Linguistics

Code of the course: 07

Number of Credits: 02

Type of the course: Optional

Prerequisite: None

Principal objective(s) of the course:

The course intends to provide basic theoretical and methodological knowledge in the area of cognitive linguistics with a certain focus on vocabulary.

Course description:

The course gives an overview of the basic concerns of cognitive linguistics: the structural characteristics of natural language categorization (such as prototypicality, systematic polysemy, cognitive models, mental imagery and metaphor); the functional principles of linguistic organization (such as iconicity and naturalness); the conceptual interface between syntax and semantics (as explored by cognitive grammar and construction grammar); the experiential and pragmatic background of language-in-use; and the relationship between language and thought,

including questions about relativism and conceptual universals.

Main topic: 34 hours

Theoretical: 02 units (34 hours)

Practical: 0 units

Principal reference(s):

Ungerer F, Schmid HJ. An introduction to cognitive linguistics. Routledge; 2013 Nov 12.

Student assessment practices:

- Written Exam