

One Year MA Computational Linguistics Semester I Course Descriptions

Course Title	Linguistic Phonetics
Category (Mention the appropriate category (a/b/c) in the course description	Existing course without changes
Course Code	MACLINGE 511
Semester	III
No. of Credits	4
Maximum intake	30
Day/ Time	Tuesday: 2.00 pm – 4.00 pm Thursday: 9.00 am – 11.00 am
Name of the teacher/s	Prof. S. Jayaraju (IPA) Dr. Neelam Singh (Articulatory and Acoustics)
Course Description:	A brief overview of the course The course ‘Linguistic Phonetics’ is an advanced level course which deals with the theoretical and practical aspects of three domains of Phonetics: articulation, IPA and acoustics. As part of the articulatory module, various speech mechanisms such as initiation, phonation, and articulation involved in the production of speech sounds, not just of English but also of other languages of the world are dealt with. IPA (International Phonetic Alphabet) is introduced and is backed by practice sessions in production, perception, and transcription of speech sounds. Similarly, theoretical inputs in acoustic phonetics are followed by hands on practical sessions in PRAAT (a speech analysis software), to enable learners get a grip on the acoustic analysis of speech. This skill is essential for students aiming to do research in the field of phonetics. Pre-requisite: MALINGC 511 - Phonetics and Spoken English References 1. Catford, J.C. (1977).Fundamental Problems in Phonetics. Edinburgh: Edinburgh University Press. 2. Denes, P. and Pinson,E.N.(1993). The Speech Chain, 2nd ed.Oxford: W. H. Freeman and Company. 3. Fry, D.B. (1979). The Physics of Speech. Cambridge: Cambridge University Press. 4. Ladefoged, P. (1996). Elements of Acoustic Phonetics, 2nd ed.Chicago: University of Chicago Press. 5. Ladefoged, P. and Johnson, K. (2001). A Course in Phonetics, 6th ed. Wadsworth: Cengage Learning. (i) Objectives of the course in terms of Programme Specific Outcomes (PSO of the Programme under which the course is being offered) On completion of the course, the students will

	<table><tr><td>CO1</td><td>Gain an in-depth understanding of the theoretical underpinnings of the three domains of phonetics: Articulation, IPA and Acoustics</td><td>PO1, PO2, PO3</td><td>Domain Specifics</td></tr><tr><td>CO2</td><td>Grasp the various articulatory mechanisms such as initiation, phonation and articulation involved in the production of speech</td><td>PO1, PO2, PO3</td><td>Domain Specific</td></tr><tr><td>CO3</td><td>Identify, produce, perceive and transcribe all the sounds of IPA</td><td>PO9, P10</td><td>Application of knowledge and skills</td></tr><tr><td>CO4</td><td>Comprehend the physics behind the transmission of speech sounds and acoustically analyse speech</td><td>PO1, PO2 PO9, P10</td><td>Domain Specific Application of knowledge and skills</td></tr><tr><td>CO5</td><td>Efficiently use speech analysis tools such as PRAAT, CSL, Mingogram, etc.</td><td>PO7, P10</td><td>Skill Enhancements Application of knowledge and skills</td></tr><tr><td>CO6</td><td>Apply the theoretical knowledge and analytical skills gained to describe and document Indian languages including lesser studied and endangered languages</td><td>PO13 PO14</td><td>Generic Learning</td></tr></table>	CO1	Gain an in-depth understanding of the theoretical underpinnings of the three domains of phonetics: Articulation, IPA and Acoustics	PO1, PO2, PO3	Domain Specifics	CO2	Grasp the various articulatory mechanisms such as initiation, phonation and articulation involved in the production of speech	PO1, PO2, PO3	Domain Specific	CO3	Identify, produce, perceive and transcribe all the sounds of IPA	PO9, P10	Application of knowledge and skills	CO4	Comprehend the physics behind the transmission of speech sounds and acoustically analyse speech	PO1, PO2 PO9, P10	Domain Specific Application of knowledge and skills	CO5	Efficiently use speech analysis tools such as PRAAT, CSL, Mingogram, etc.	PO7, P10	Skill Enhancements Application of knowledge and skills	CO6	Apply the theoretical knowledge and analytical skills gained to describe and document Indian languages including lesser studied and endangered languages	PO13 PO14	Generic Learning
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Course Delivery	Lecture																								
Evaluation Scheme	- Internal Assessment: 40 % (3 internal tests of 20 marks each) - Final Assessment: 60 %																								
Reading List	1. Catford, J.C. (1977). Fundamental Problems in Phonetics. Edinburgh: Edinburgh University Press. 2. Denes, P. and Pinson, E.N. (1993). The Speech Chain, 2nd ed.Oxford: W. H. Freeman and Company. 3. Fry, D.B. (1979). The Physics of Speech. Cambridge: Cambridge University Press. 4. Ladefoged, P. (1996). Elements of Acoustic Phonetics, 2nd ed.Chicago: University of Chicago Press. 5. Ladefoged, P. and Johnson, K. (2001). A Course in Phonetics, 6th ed. Wadsworth: Cengage Learning. 6. International Phonetic Association. (1999). Handbook of the International Phonetic Association: a guide to the use of the International Phonetic Alphabet. Cambridge: CUP. (Supplementary reading will be given as and when needed)																								

Course Title	INTRODUCTION TO OPTIMALITY THEORY																																			
Category (Mention the appropriate category (a/b/c) in the course description	Existing course without changes																																			
Course Code	MACLINGE 521																																			
Semester	III																																			
No. of Credits	4																																			
Maximum intake	30																																			
Day/ Time	Tuesday & Wednesday: 11.00 am – 1.00 pm																																			
Name of the teacher/s	Prof. Hemalatha Nagarajan																																			
Course Description:	Students who complete this course will have the knowledge and skills to <table><tr><td></td><td>CO1</td><td>learn the basic premises and mechanisms of Optimality Theory</td></tr><tr><td></td><td>CO2</td><td>analyse key linguistic phenomena using the formal devices of the theory</td></tr><tr><td></td><td>CO3</td><td>understand major conceptual differences between OT and traditional approaches to linguistic analysis, and critically evaluate conceptual issues and empirical problems in OT</td></tr><tr><td></td><td>CO4</td><td>observe and identify phonological variations in new linguistic contexts and explain the differences using ranked constraints.</td></tr><tr><td></td><td>CO5</td><td>acquire cognitive and technical skills to analyse phonological aspects of languages</td></tr><tr><td></td><td>CO6</td><td>attain analytical skills to examine data, evaluate research findings, and conduct research in various languages</td></tr><tr><td></td><td>CO7</td><td>apply the principles of phonological variation to the structures of their languages.</td></tr><tr><td></td><td>CO8</td><td>plan fieldwork for collection of data pertaining to speech sounds- segmental and supra-segmental.</td></tr><tr><td></td><td>CO9</td><td>extend knowledge of phonology to other disciplines</td></tr><tr><td></td><td>CO10</td><td>document and study lesser-known languages and dialects</td></tr><tr><td></td><td>CO11</td><td>study phonological influences of languages in contact (contact phonology) and dialectal phonology</td></tr></table>				CO1	learn the basic premises and mechanisms of Optimality Theory		CO2	analyse key linguistic phenomena using the formal devices of the theory		CO3	understand major conceptual differences between OT and traditional approaches to linguistic analysis, and critically evaluate conceptual issues and empirical problems in OT		CO4	observe and identify phonological variations in new linguistic contexts and explain the differences using ranked constraints.		CO5	acquire cognitive and technical skills to analyse phonological aspects of languages		CO6	attain analytical skills to examine data, evaluate research findings, and conduct research in various languages		CO7	apply the principles of phonological variation to the structures of their languages.		CO8	plan fieldwork for collection of data pertaining to speech sounds- segmental and supra-segmental.		CO9	extend knowledge of phonology to other disciplines		CO10	document and study lesser-known languages and dialects		CO11	study phonological influences of languages in contact (contact phonology) and dialectal phonology
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Course Delivery	Offline-lectures, Seminars and Presentations																																			
Evaluation Scheme	Internal Assignment: 40 marks (quiz, assignments etc) Semester End: 60 marks (semester end examination)																																			

Reading List	Kager, Rene (1999), Optimality Theory, Cambridge: Cambridge University Press Prince, Alan and Smolensky, Paul (2004) Optimality Theory: Constraint Interaction in Generative Grammar. Malden, Mass., and Oxford, UK: Blackwell. (Revision of 1993 technical report, Rutgers University Center for Cognitive Science. Available on Rutgers Optimality Archive, ROA-537) McCarthy (2007) Harmonic Serialism
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Course title	Research Methodology
Category (Mention the appropriate category (a/b/c) in the course description.)	Existing course without changes
Course code	MACLINGRMC 598
Semester	III
Number of credits	4 credits
Maximum intake	30
Day/Time	Monday: 2.00 pm – 4.00 pm Friday: 11.00 am – 1.00 pm
Name of the teacher/s	Prof. Roopa Suzana, Dr. Iram Ali Ahmad and Prof. S. Jayaraju
Course description	Introduction The Research Methodology course in linguistics aims to teach students the fundamental techniques and approaches used in linguistic research. It focuses on developing skills to design studies, collect and analyse data, and draw valid conclusions. Overall, the course aims to empower students with the tools and knowledge necessary to conduct rigorous and meaningful research in the field of linguistics. This course has three modules. Module1: Types of Research and Research Design This module is designed to enhance students’ ability to critically evaluate existing linguistic research, identify gaps in the literature and contribute to the ongoing discourse in the field. It further equipslearners with the skills to identify research problems, formulate research questions, build hypotheses, and state objectives clearly. In addition, it also developsskills to build an appropriate research design based on the nature of enquiry. Module 2: Data Collection Techniques This module on field methods in linguistics typically involves collecting and documenting linguistic data. It introduces learners to various methods of gathering linguistic data, such as designing questionnaires and tests, interviews, surveys, experiments, audio recordings, and corpus analysis. It also equips learners with the knowledgeof using appropriatetechniques and tools necessary to conduct effective and rigorous linguistic fieldwork. Emphasis is also laid on the importance of involving and collaborating with language speakers and communities throughout the research process. In addition, it also addresses the ethical issues related to linguistic research, such as consent, privacy, and cultural sensitivity. Module 3: Data Analysis and interpretation and Academic Writing This module focuses on training learners how to analyseand interpret linguistic data.It introduces students to the various instrumental techniques used in the analysis of linguistic/Phonetic data. Students will have hands-on experience in designing and conducting small-scale research projects, collecting linguistic data, analysing results, and drawing valid conclusions. Students will also learn about data analysis and experiments in syntax and semantics. This module also focuses on equipping learners with the required technical writing skills to present the literature review, description of the methodology used for the research experiment. It trains learners on how to paraphrase, use appropriate methods of in-text citation and referencing using APA style. It also draws their attention to the issue of plagiarism.
Course delivery	Lecture
Evaluation scheme	Internal: 40% (Assignments/ Presentations) External: 60% (Term Paper)
Reading list	Bowern, C. 2015. <i>Linguistic fieldwork: A practical guide</i> . Springer. Chelliah, S. L., & De Reuse, W. J. 2010. <i>Handbook of descriptive linguistic fieldwork</i> . Springer Science & Business Media.

	De Laine, M. 2000. “Fieldwork, participation and practice: Ethics and dilemmas in qualitative research”. <i>Fieldwork, Participation and Practice</i>, 1-240. Lee-Treweek, G., &Linkogle, S. (Eds.). 2000. <i>Danger in the field: Risk and ethics in social research</i>. Psychology Press. Newman, P., & Ratliff, M. (Eds.). 2001. <i>Linguistic fieldwork</i>. Cambridge University Press. Butcher, A. 2013. <i>Research Methods in Phonetic Fieldwork</i>. Bloomsbury Publishing. Staley, Kent W. 2014. <i>An Introduction to the Philosophy of Science</i>. Cambridge University Press. Sprouse, Jon. 2023. <i>The Oxford Handbook of Experimental Syntax</i>. Oxford University Press. Goodall, Grant. 2021. <i>The Cambridge Handbook of Experimental Syntax</i>. Cambridge University Press. Ball, Derek and Brian Rabern. 2018. <i>The Science of Meaning</i>. Oxford University Press.
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Course Title	Advanced Topics in Semantics
Category (Mention the appropriate category (a/b/c) in the course description	Existing course without changes
Course Code	MACLINGE - 551
Semester	III
No. of Credits	4
Maximum intake	30
Day/ Time	Monday & Wednesday: 4.00 pm – 6.00 pm
Name of the teacher/s	Dr. Utpal Lahiri
Course Description:	This course is a continuation of Semantics I and is intended to give a basic introduction to advanced topics. Topics include: Logical Form and Quantifiers Generalized Quantifier Theory Lambda Calculus Adverbial Modification and Event Semantics; tense, aspect Anaphora and Indexicals.
Course Delivery	Lecture
Evaluation Scheme	Internals: 40 marks External: 60 marks
Reading List	Required text: Altshuler, D., T. Parsons and R. Schwarzschild (2018). <i>A Course in Semantics</i>. MIT Press. Recommended texts: Chierchia, G. and S. McConnell-Ginet (2000). <i>Meaning and Grammar</i>. MIT Press (2nd Edition) Heim, I. and von Stechow (2007). <i>Notes on Intensional Semantics</i>. Ms., MIT (downloadable)

Course Title	Introduction to Psycholinguistics
Category (Mention the appropriate category (a/b/c) in the course description	Existing course without changes
Course Code	MACLINGE 565
Semester	III
No. of Credits	4
Maximum intake	30
Day/ Time	Monday: 11.00 am – 1.00 pm Thursday: 2.00 pm – 4.00 pm
Name of the teacher/s	Prof. Shruti Sircar
Course Description:	This course is an introduction to psycholinguistics, the study of how individuals comprehend, produce, and acquire language. As part of the larger field of cognitive science, psycholinguistics is an interdisciplinary field shaped by research in psychology, linguistics, artificial intelligence, neuroscience, and philosophy. We will primarily be concerned with questions such as: what does it mean to know a language? What are the cognitive processes involved in language use? What social rules are associated with language use? What brain mechanisms are active in language use? i. Learning outcomes— By the end of the programme, the students will have: PO1: obtained a sound knowledge of various branches of language sciences: theoretical and applied PO2: acquired skills to analyse various aspects of a language/ languages PO3: applied theories to analyse data from Indian and other languages PO4: understood how theories are built with evidence/data from languages PO5: obtained theoretical and functional understanding of phonetics with special reference to English PO6: carried out empirical studies in languages PO7: learnt to apply knowledge of linguistics to other disciplines such as Artificial Intelligence, Cognitive Psychology, Forensic and Clinical Sciences PO8: learnt to address language-related societal needs and issues: language planning, language maintenance, language standardization, language variation and language and gender PO9: learned to describe and document lesser studied and endangered languages PO10: learned to use relevant tools to analyse phonetic and linguistic data a) domain-specific outcomes: Upon successful completion, students will have the knowledge and skills to CO1:understand the relationship between theoretical linguistics and psychology CO2: learn how acoustic stimuli are mapped to phonetic and phonological representations CO3: learn how are words stored and organized in memory CO4: learn how syntactic structure is computed in real time CO5:understand how syntactic dependencies (movement, anaphora, agreement) are processed CO6: learn about the difference between producing linguistic expressions versus perceiving them b) value addition: Most psycholinguists work in academia, but a psycholinguistics degree with special reference to language disorders can also set you up for a career in speech-language pathology, education, and research. Training in psycholinguistics can equip you to work in the fast-growing field of artificial intelligence and machine learning,

	c) skill-enhancement Student-centric methods, such as experiential learning, participative learning and problem-solving methodologies are used for enhancing learning experiences. d) employability quotient During the last 3 years, inputs from latest research and industry are fed into curriculum renewal and revision.
Course Delivery	Lecture and Experiential learning for all modules
Evaluation Scheme	Three quizzes (MCQ, short/long answers) – 40% of the internal assessment (closed book) 60% external examination: sit down closed book examination
Reading List	Essential reading: Carroll, David W. 2008. Psychology of Language. 5th ed. Thomson Wadsworth. Harley, Trevor A. 2001. The psychology of language: from data to theory. 2nd ed. Oxford: Taylor and Francis. Field, John. 2003. Psycholinguistics: a resource book for students. London: Routledge. Scovel, Thomas. 1998. Psycholinguistics. Oxford: Oxford University Press.

Course Title	Introduction To Tagging And Parsing
Category (Mention the appropriate category (a/b/c) in the course description	c)
Course Code	MACLINGC 577
Semester	III
No. of Credits	4
Maximum intake	30
Day/ Time	Wednesday & Friday: : 2.00 pm – 4.00 pm
Name of the teacher/s	Dr. Atreyee Sharma
Course Description:	In the first part students are exposed to the first layer of Tagging and Parsing namely, Morphological Analyzer, Parts of Speech Tagging, Named Entity and Named Entity Recognition. Students read and research on different tag sets, models, challenges and issues regarding Morphological Analyzer, POS Tagging and NER wrt Indian languages. In this course, they will be exposed to Local Word Grouping, Chunking, Parsing and Tree Banks. Shallow parsing or chunking or light parsing) will be taught in terms of analysis of a sentence which first identifies constituent parts of sentences (nouns, verbs, adjectives, etc.) and then links them to higher order units that have discrete grammatical meanings (noun groups or phrases, verb groups, etc.). The term Parsing has slightly different meanings in different branches of linguistics and computer science. Traditional sentence parsing is often a method of understanding the exact meaning of a sentence or word, sometimes with the aid of devices such as sentence diagrams. Students will be introduced to the concepts of LWG, Chunking and Parsing and work out real world data to understand the terms and their significance in the world of NLP. CO1 To understand and analyze the grammatical structure of a sentence and to disambiguate words that have multiple meanings. CO2 To understand the design and nature of various tag sets available for PoS Tagging. CO3 To analyze and understand automatic text processing tools to consider which part of speech each word is. CO4 To have hands on experience in manual tagging and map it to statistical tagging methods. CO5 To make students understand the structure of sentences of their mother tongue and have them apply the PoS tagging methods in texts from their MT.
Course Delivery	Lectures
Evaluation Scheme	Mid-term evaluation: 40% (Assignments, quizzes, presentations and tests) End term examination: 60% (Assignments and Written examination)
Reading List	Readings will be suggested and changed as according to the topic. ESSENTIAL READING: Akshar Bharathi and Prashanth R. Mannem (2007), “Introduction to the Shallow Parsing Contest for South Asian Languages”, Language Technologies Research Center, International Institute of Information Technology, Hyderabad, India 500032. A. Ratnaparakhi. 1996. A Maximum Entropy Part Of-Speech Tagger. EMNLP 1996 A. Bharati, V. Chaitanya, R. Sangal 1995. Natural Language Processing : A Paninian Perspective . Prentice Hall India.

	A Part of Speech Tagger for Indian Languages (POS tagger), Tag set developed at IIIT - Hyderabad after consultations with several institutions through two workshops, 2007. shiva.iiit.ac.in/SPSAL2007/iiit_tagset_guidelines.pdf Kulkarni, A., Shukla, D.: Sanskrit morphological analyzer: some issues. In: Festschrift, B.K. (ed.) Volume by LSI (2009) Antony, P.J., Soman, K.P.: Computational morphology and natural language parsing for Indian languages: a literature survey. <i>Int. J. Comput. Sci. Eng. Technol.</i> 136–146 (2012) ADDITIONAL READING: Sparck Jones, K. and Galliers, J. R. (1995). <i>Evaluating Natural Language Processing Systems</i>. Springer Verlag, Heidelberg, Germany. Abney, S. P., Schapire, R. E., and Singer, Y. (1999). Boosting applied to tagging and PP attachment. In <i>EMNLP/VLC-99</i>, 38–45 Kupiec, J. (1992). Robust part-of-speech tagging using a hidden Markov model. <i>Computer Speech and Language</i>, 6, 225–242. Nivre, J., de Marneffe, M.-C., Ginter, F., Goldberg, Y., Hajic, J., Manning, C. D., McDonald, R., Petrov, S., Pyysalo, S., Silveira, N., Tsarfaty, R., and Zeman, D. (2016). <i>Universal Dependencies v1: A multilingual treebank collection</i>. In <i>LREC</i>. G. Leech, R. Garside and M. Bryant. 1992. Automatic POS-Tagging of the corpus. <i>BNC2 POS tagging Manual</i>. P. R. Ray , V. Harish, A. Basu and S. Sarkar 2003. Part of Speech Tagging and Local Word Grouping Techniques for Natural Language Parsing in Hindi. In <i>Proceedings of ICON 2003</i>
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Course title	Introduction to Machine Learning
Category (Mention the appropriate category (a/b/c) in the course description.)	Existing course without changes
Course code	MACLINGC 583
Semester	III
Number of credits	4
Maximum intake	30
Day/Time	Tuesday & Thursday: 4.00 pm – 6.00 pm
Name of the teacher/s	Dr. Iram Ali Ahmad
Course description	This course offers a foundational and practical exploration of machine learning by emphasizing the interplay between core algorithms, implementation tools and real-world systems. Students will study key machine learning paradigms including supervised, unsupervised and reinforcement learning. The students will also engage with the mathematical principles that underlie model design and evaluation. Hands-on lab sessions and assignments will provide experience with widely used frameworks such as Scikit-learn and Tensor Flow. The course also introduces modern machine learning infrastructures, including data pipelines, model deployment and MLOps (Machine Learning Operations).
Course delivery	Theoretical and Hands-on Practice
Evaluation scheme	Written Tests, Quizzes, Submissions
Reading list	Core Textbooks: 1. Géron, A. (2022). <i>Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow: Concepts, tools, and techniques to build intelligent systems</i> (3rd ed.). O’Reilly Media. 2. Bishop, C. M. (2006). <i>Pattern recognition and machine learning</i>. Springer. 3. Murphy, K. P. (2012). <i>Machine learning: A probabilistic perspective</i>. MIT Press. 4. Goodfellow, I., Bengio, Y., & Courville, A. (2016). <i>Deep learning</i>. MIT Press. Supplementary Papers and Articles: 8. Huyen, C. (2022). <i>Designing machine learning systems: An iterative process for production-ready applications</i>. O’Reilly Media. 9. Hastie, T., Tibshirani, R., & Friedman, J. (2009). <i>The elements of statistical learning: Data mining, inference, and prediction</i> (2nd ed.). Springer. 10. Ng, A. (2018). <i>Machine learning yearning: Technical strategy for AI engineers, in the era of deep learning</i>. deeplearning.ai. [Available online: https://www.deeplearning.ai/machine-learning-yearning/] 11. Google Cloud. (2020). <i>MLOps: Continuous delivery and automation pipelines in machine learning</i> (Whitepaper).

Course title	SPEECH PROCESSING
Category (Mention the appropriate category (a/b/c) in the course description.)	Existing Course
Course code	MACLINGE 586
Semester	III
Number of credits	4
Maximum intake	30
Day/Time	Tuesday: 11.00 am – 1.00 pm and Friday:9.00 am –11.00 am
Name of the teacher/s	Prof. M. Hari Prasad
Course description	After completing this course the students should be able to: • Understand the speech production and perception process. • Analyze speech signals in time and frequency domain. • Design and implement algorithms for processing speech signals. • Build a simple speech recognition/TTS system Main areas that will be covered are: Speech fundamentals, Speech analysis, Speech compression and Speech modelling
Course delivery	Lecture cum Seminar
Evaluation scheme	Internal Assignment/test – 40 % End-semester (mode of evaluation): Term paper 60%
Reading list	Daniel Jurafsky and James Martin. 2001. Speech and Language Processing. Prentice-Hall Xuedong Huang, Alex Acerd, Hsiao-Wuen Hon. 2001. Spoken Language Processing. Prentice-Hall Lawrence. R. Rabiner and Ronald W. Schafer. 2001. Introduction to Digital Speech Processing. NOW