A note on this handbook

This handbook applies to all students doing the M.Phil. in Speech and Language Processing. It provides a guide to what is expected of you on this programme, and the academic and personal support available to you. Please retain it for future reference.

The information provided in this handbook is accurate at the time of preparation. Any necessary revisions are notified to students via e-mail or by notices on the notice board outside the CLCS office. Please note that in the event of any conflict or inconsistency between the general regulations published in the Calendar of the University of Dublin and the information contained in the course handbook, the provisions contained in the Calendar will prevail.

Aims of the course

The course is designed with the intention that graduates will be able to:

• engage in the description and analysis of language
• understand central concepts in speech science
• understand central concepts in language processing, with particular regard to computational models of language
• proceed from this basis to the study of more advanced topics in speech science or language processing
• undertake research in a chosen field of speech science or language processing, having due regard to the ethical, empirical, and theoretical aspects of this research
• communicate the results of their research on topics in speech science and language processing through written papers, oral presentations, and other means where appropriate

Staff contributing to the course

Ailbhe Ní Chasaide – Associate Professor of Phonetics

Teaches the modules LI 7867 Laboratory Phonetics and Phonology and LI 7874 Speech Production, Hearing and Perception. Research interests: experimental investigation of linguistic contrasts, and implications for models of speech production and perception; prosody and voice quality; intonation of Irish and Hiberno-English; text-to-speech for Irish and Hiberno English.
Jeffrey Kallen – Senior Lecturer in Linguistics and Phonetics

Teaches the modules LI 7865 History and Globalisation of English and LI 7876 The English Sound System. Research interests: sociolinguistics; the English language in Ireland; linguistic theory and language variation; the linguistic landscape; bilingualism; discourse analysis; language acquisition.

John Harris – Senior Lecturer in Psycholinguistics

Teaches the modules LI 7866 Bilingualism and the Maintenance of Irish and LI 7879 Research Methodology. Research interests: psycholinguistics; bilingualism; second language acquisition and the maintenance of Irish.

Christer Gobl – Lecturer in Speech Science

Teaches the modules LI 7871 Speech Processing 1: spectral analysis; LI 7874 Speech Production, Hearing and Perception; and LI 7875 Speech Processing 2: acoustic modelling. Research interests: the acoustics of speech production; glottal source analysis and modelling; voice quality; auditory/speech perception; vocal expression of emotion; systems for speech analysis/synthesis/coding; signal processing.

Breffni O’Rourke – Lecturer in Applied Linguistics

Teaches the module LI 7860 Technology, Language, and Communication. Research interests: second language acquisition and pedagogy; computers in language learning; language and discourse in computer-mediated communication.

Elaine Uí Dhonnchadha - Lecturer in Computational Linguistics

Teaches the module LI 7864 Corpus Linguistics and LI 7873 Computational Theories of Grammar and Meaning (Labs). Research interests: Natural language processing applications (e.g. part-of-speech tagging, parsing, chunking etc.), corpus linguistics, and speech synthesis.

Denise O’Leary – Lecturer in Applied Linguistics

Teaches the module LI 7879 Research Methodology. Research interests: language education in Ireland; second/foreign language teaching and learning – programme evaluation (attitudinal/ motivational studies, studies of linguistic attainment and pupil performance, etc.).
Carl Vogel – Senior Lecturer in Computational Linguistics, Department of Computer Science

Teaches the modules LI 7872 Formal Foundations of Linguistic Theories; LI 7873 Computational Theories of Grammar and Meaning; and LI 7870 Advanced Syntactic Theory. Research interests: linguistic anomaly; formal language theory; constraint-based theories of syntax and semantics; metaphoricity and genericity in natural language; text classification and stylometry.

Admission

Applicants are normally required to possess a good primary degree or equivalent qualification in subjects such as engineering, computer science, physics, mathematics, linguistics, psychology, or a related discipline. Previous knowledge in the area of speech and language processing is not a requirement.

Students who are not native speakers of English are expected to attend the orientation course in English for Academic Purposes in the CLCS in the month preceding the start of the academic year.

Application for admission should be made on the PAC website <http://www.pac.ie>. The Trinity College Graduate Studies Office webpage <http://www.tcd.ie/Graduate_Studies/> can supply further information on general admission requirements, language requirements, fees, and other matters.

Duration

The course is taken full-time in one calendar year (September to September) or part-time in two calendar years. Only the part-time option is available to students who remain in employment while taking the course.

M.Phil. coordinator and support services

The coordinator of the M.Phil. in Linguistics is Breffni O'Rourke. General questions and problems to do with the course should in the first instance be addressed to him. Students are urged to familiarise themselves with the various student support services that are available to them in College. Details are provided on College websites, notably <http://www.tcd.ie/College_Health/> and <http://www.tcd.ie/disability/>.
Attendance / keeping in touch

Students are required to attend all components of the course and to comply with all course requirements. A student who is unable to attend because of illness or for any other reason should immediately inform the course coordinator and the relevant lecturer. Students who are persistently absent from their course without explanation may be excluded from the assessment process.

It is the responsibility of students to remain in touch with their supervisor and attend for supervision at mutually agreed times. They should immediately notify their supervisor and the course coordinator if they change their address.

M.Phil. course committee

The course is managed by a coordinator and a CLCS M.Phil. course committee, which manages all M.Phil. degrees in CLCS. The committee meets at least once each term to review the running of the four courses. The committee comprises the following members:

Dr Breffni O'Rourke (Course Coordinator) [as Chair]
Professor David Singleton (Head of Discipline – CLCS)
Professor Ailbhe Ní Chasaide (Director of Research)
Dr Jeffrey Kallen (Director of Teaching and Learning Postgraduate)
Dr Lorna Carson
Four student representatives, one from each of the four M.Phil. programmes, elected early in Michaelmas term.

Research Ethics

Students are given guidelines with regard to research ethics. Students doing individual research, e.g. for the dissertation, must ensure that they have complied with School regulations on obtaining ethical approval for this research. Further information is available at <http://www.tcd.ie/slscs/research/research_ethics_review.php>

Programme of study

STRUCTURE OF COURSE

The taught content of the course is expressed in two bands, A and B. The integration of part-time with full-time students is achieved by timetabling one band in the morning and the other in the late
afternoon, and reversing the timetabling of the two bands from year to year. Part-time students take one band in their first year and the other in their second year. All students take a course in research methods in Hilary term and begin work on their dissertations at this time. Part-time students are expected to take the course in research methods during their first year.

DATES OF TERMS AND TIMETABLE FOR 2009–10

The English for Academic Purposes (EAP) induction for non-native speakers of English runs from 31 August to 18 September 2009.

The induction week for all incoming M.Phil. students in the CLCS runs during the week beginning 21 September 2009. Sessions will take place from 4 to 6 p.m. on Monday the 21st, Wednesday the 23rd, and Thursday the 24th of September.

Michaelmas teaching term 2009 will begin on Monday 28 September. Hilary term 2010 begins on Monday 18 January. Teaching lasts for 12 weeks in each of these terms, though week 12 may be used as a reading week.

In 2009–10 Band B will be taught on Monday and Thursday mornings. It will be taken by full-time students.

In 2009–10 Band A will be taught from 4 to 6 p.m. on Monday and Thursday evenings. It will be taken by full-time students and part-time students.

The Research Methodology course is taught on Wednesdays from 4 to 6 p.m. in Hilary term. All full-time students take this course; part-time students take this course in their first year.

Students should regularly consult the notice board outside Room 4091 in the Arts Building for any timetable changes.

COURSE CONTENT

The degree consists of four obligatory core courses and two electives selected from a list of options, as shown below:

Core Modules:

- LI 7871  Speech Processing 1: spectral analysis
- LI 7872  Formal foundations of linguistic theories
- LI 7867  Laboratory Phonetics and Phonology
- LI 7873  Computational theories of grammar and meaning
Areas in which dissertations may be written

COMPUTATIONAL LINGUISTICS
(Carl Vogel, Elaine Uí Dhonnchadha)
Computational linguistics is a cognitive science which attends to formal rigour in linguistic description and processing issues associated with the resulting models. Natural language processing addresses language technology and representational and efficiency concerns of software systems. Topics across subject areas of linguistics can be treated from the perspective of computational linguistics: e.g. morphology, syntax, semantics, pragmatics. Past dissertation titles in computational linguistics are available on the internet at <http://www.cs.tcd.ie/Carl.Vogel/postgraduatetheses>.

EXPERIMENTAL PHONETICS/PHONOLOGY
(Ailbhe Ní Chasaide)
This area of research involves the use of instrumental techniques to describe aspects of languages and of speech. The emphasis is descriptive, e.g. the analysis of features of the sound system of a language or a cross-language comparison. However, the descriptive work should also allow for inferences on the mental organization of language. The same instrumental techniques may also be applied to the description and remediation of speech disorders.

SPEECH SCIENCE
(Christer Gobl)
This area covers a range of topics concerning the description and modelling of speech production as well as the development of techniques that can be used for that end. Ongoing research in the phonetics and speech laboratory is focused particularly on speech
analysis methods, modelling of the human voice source/voice quality, and aspects of speech synthesis and perception.

Students may seek permission to write their dissertation in some other area provided that the board of examiners deems it relevant and appropriate.

**European Credit Transfer System (ECTS)**

The ECTS is an academic credit transfer and accumulation system representing the student workload required to achieve the specified objectives of a study programme. The ECTS weighting for a course module is a measure of student input or workload for that module, based on factors such as the number of contact hours, the number and length of written or oral presentations, class preparation and private study time, laboratory classes, and so on. In Trinity College, one ECTS unit is defined as 20-25 hours of student input. Thus, for example, a 10-credit module is designed to require a total of 200-250 hours of student input, including class time, reading, and work on assessments.

Each module in the M.Phil. programme is weighted at 10 ECTS; the research dissertation and the preparation that goes with it (including the Research Methodology course) is weighted at 30 ECTS. In keeping with College and international norms, the total ECTS weighting for the M.Phil. course is thus 90 ECTS credits.

ECTS credits are awarded to a student only upon successful completion of the course year. Students who fail a year of their course will not obtain credit for that year, even if they have passed certain course components.

**Description of course components**

An outline description of each course module is given on pp. 9-23. Students should familiarise themselves with this material as they will be required to indicate their choice of course options at a specified time **before** the start of the academic year. Books marked as "*(textbook)*" are essential to the module in question and all students will need their own copy. Students are responsible for placing their own book orders with a bookseller of their choice.
MODULES BY BAND AND TERM

Band A

Michaelmas term:
Core: Formal Foundations of Linguistic Theories
Options: Technology, Language, and Communication; Speech Production, Hearing, and Perception

Hilary term:
Core: Computational Theories of Grammar and Meaning
Options: The English Sound System; Bilingualism and the Maintenance of Irish;

Band B

Michaelmas term:
Core: Speech Processing 1: spectral analysis
Option: History and Globalisation of English; Corpus Linguistics

Hilary term:
Core: Laboratory Phonetics and Phonology
Options: Advanced Syntactic Theory; Speech Processing 2: acoustic modelling

Band A

Michaelmas Term

LI 7872 Formal Foundations of Linguistic Theories (Carl Vogel)

Aims:
The course is designed to establish competence in foundational mathematical concepts used in contemporary cognitive science and computationally-oriented approaches to linguistic theory. Basic concepts of discrete mathematics are reviewed with attention to their relevance in linguistics: sets, operators, relations, trees, logic, formal language theory. Emphasis is placed on finite recursive specification of infinite formal languages as an idealization of grammar specification for natural languages (each of which is thought to be infinite but managed by finite brains). Natural languages are modelled as uninterpreted sets of grammatical sentences whose internal structural complexity has implications related to constraints on human syntactic processing. Human languages are also modelled via their translation into logical languages supplied with deductive mechanisms supplying representational and denotational semantic analysis. Logical languages within a range of expressivity classes are considered in terms of their syntax, semantics, and inference mechanisms as simulations of human recognition, interpretation, and reasoning with
natural language expressions. Thus, the aims of the course are to (i) establish competence with the core concepts and analytical tools, (ii) develop awareness of the range of applicability of the tools and concepts within linguistic theory and cognitive science, (iii) foster confident and fluent use of formal methods in analysing human language and reasoning.

*Working methods:*
The course is divided into 2/3 lecture and 1/3 hands-on practice with the formal tools. An automated theorem prover is introduced to facilitate specification of formal theories of natural language syntax and semantics within one of the logical languages addressed in the lectures in order to use the theorem prover to test the consequences of theories of language on natural language inputs. Thought-problems designed to test understanding of key concepts will be offered at the end of each session.

*Syllabus:*
- Sets, characteristic functions, operators, relations
- Languages as sets of sentences
- Propositional logic: syntax, semantics & valid inference
- Deductive inference and human reasoning
- Predicate logic: syntax, semantics & valid inference
- First order logic (FOL): syntax & semantics & valid inference
- Translating natural language utterances into FOL
- Axiomatizing theories in Prolog (Horn Logic).

*Assessment:*
Students complete a take-home assignment with a mixture of problems intended to elicit demonstration of mastery of core concepts and ability to reason with those concepts in representing relevant phenomena.

*Recommended Readings:*
Course handouts and sources in their bibliographies.

**LI 7860 Technology, Language, and Communication (Breffni O'Rourke)**

*Aims:*
Participants in this module will explore how language and communication are mediated by various technologies, including that of writing. Students will be encouraged to reflect on the relationship between language, communication and technologies on one hand and
individual language processing, communication processes, and the nature of discourse on the other. Lectures, readings and discussions will range over historical, socio-cultural and individual-cognitive levels of analysis as appropriate. There will be opportunities for individual students to focus on what these issues imply for the enterprise of language learning and language teaching.

**Working methods:**
The module will be taught through a combination of lectures, workshop activities based on sample authentic texts, and student-led discussion.

**Syllabus:**
Specific themes addressed in the module include:
- The historical development of writing; the properties of writing systems
- The effects of literacy on our perception of language
- The historical and cultural significance of the printing press
- Audio and video technologies
- Computer-mediated communication

**Assessment**
Students write an assignment of 3-4,000 words exploring one or more aspects of language and communication as mediated by technologies.

**Suggested Readings:**

**LI 7874 Speech production, hearing, and perception (Christer Gobl, Ailbhe Ní Chasaide)**

**Aims:**
This course aims to provide (i) an understanding of the whole process of speech communication, encompassing the speaker and the listener and (ii) an understanding of some of the major models of production, perception and hearing, and (iii) practical, hands-on, experience in conducting production and perception experiments. Central to the
course is an understanding of the acoustic theory of speech production, and of the acoustic characteristics of speech sounds. Speech materials are analysed to illustrate the acoustic properties of speech, provide insight into the underlying mechanisms of speech production, while also providing a basis for speech perception experimentation. The processes of hearing are dealt with along with the auditory transforms of the acoustic signal. Students are introduced to speech synthesis, and through synthesis based experimentation to the methods that may be used to explore the perceptual correlates of speech sounds.

**Syllabus:**
Specific themes addressed within the module include:
- Acoustic theory of speech production
- Resonance
- Hearing and the auditory system
- Synthesis and its applications in speech perception
- Perception of stops: locus theory
- Categorical perception
- Analysis and synthesis of the voice source
- Perception of voice quality

**Assessment:**
The assessment is based on the conducting and writing up of experimental work on a key topic of the course, equivalent to 3-4,000 words.

**Suggested readings:**

**Hilary Term**
**LI 7873 Computational Theories of Grammar and Meaning (Carl Vogel, Elaine Uí Dhonnchadha)**

**Aims:**
The course expands on an earlier module which provides mathematical foundations for linguistic theory, particularly computational linguistics: formal syntax, formal semantics, computational morphology. The course aims to (i) extend participants' abilities to describe natural language phenomena as computationally oriented grammars that model natural language parsing, generation, and construction of semantic representation in a deductive logical setting; (ii) apply the tools of formal language theory to analysing the syntactic complexity of human languages in its syntax and morphology with reference to ramifications for human language processing; (iii) develop skill in grammar development for extensive fragments of natural language encompassing important syntactic domains: complex noun phrase structure, relative clauses, arguments and adjuncts, embedding verbs, topic focus constructions and questions.

**Working methods:**
The course is divided into 2/3 lecture and 1/3 hands-on practice with the formal tools. Prolog is used as a theorem prover in which to develop definite clause grammars for recognizers, parsers, and constructors of semantic representations for natural language utterances. A grammar for a fragment is constructed iteratively and evaluated against test suites, with considerable focus on unbounded dependency constructions.

**Syllabus:**
- Basics of definite clause grammars applied to recognizing natural language
- DCGs with parsing and semantic construction
- DCGs and complement subcategorization frames
- Formal language theory and the complexity of natural language syntax
- Unbounded dependency constructions
- Parsing, interpreting and answering questions
- Formal language theory and natural language morphology
- Computational approaches to natural language morphology.

**Assessment:**
A fragment grammar will be evaluated with respect to its coverage of a test suite of sentences. Training test suites will be provided covering the essential constructs, and success of the suite will be measure by its coverage of an suite of unseen constructions drawn on the same terminal vocabulary. Computational morphology will be assessed in a way appropriate to the work in that module.

**Recommended Readings:**
LI 7866 Bilingualism and the Maintenance of Irish (John Harris)

Aims:
This module has four aims: (1) to introduce key concepts and theories in bilingualism and to relate them specifically to Irish-English bilingualism, (2) to examine bilingualism and language maintenance in Ireland in historical and comparative context, (3) to critically evaluate successes and failures in national efforts to revitalise Irish, and (4) to assess the contribution of the education system to the intergenerational transmission of the language. The course is intended as an introduction to psycholinguistic and sociolinguistic research for students who are considering research either on bilingualism or on the Irish language.

Working methods:
The topics are presented in lectures and explored in class discussions. Each student also presents a brief paper to the class on an aspect of bilingualism, on a particular bilingual situation or on a language planning/maintenance issue with which he or she is familiar.

Syllabus:
Specific themes addressed in the module include:
- General issues and concepts in individual and societal bilingualism
- Early bilingual acquisition; bilingualism and thought
- Minority and endangered languages, language loss and language attrition
- The nature and extent of Irish/English bilingualism
- Number of speakers; ability in and use of Irish
- National efforts to revitalise Irish since the foundation of the state; levels of support for various measures
- Successes and failures in learning Irish at primary level; Long-term trends in attainment
- Classroom learning of Irish; attitudes of teachers, children and parents
- Irish and English in Gaeltacht areas and in Northern Ireland
- Bilingual education and immersion
- Evaluating bilingual programmes

Assessment:
Students write an assignment of 3-4,000 words that addresses one of the topics discussed during the module or that arises in one of the recommended readings.

Suggested readings:

LI 7876 The English Sound System (Jeffrey Kallen)

Aims:
This module examines the phonological system of English from two distinct, yet inter-related, points of view: (i) the grammatical, where the rules and constraints which define what is and is not possible in English phonology are understood in a universal framework, and (ii) the descriptive, which relies on accounts of phonological variation in the English-speaking world. The aim of the course is thus to encourage an understanding of English phonology which incorporates both grammatical and descriptive perspectives. Students will be encouraged to make use of data from their own experience as teachers or learners of English.

Syllabus:
Specific themes addressed in the module include:
- Articulatory phonetics and the sound pattern of English
- English phonemic contrasts and distinctive feature systems
- Syllables in English
- English stress placement
- Relationships between English spelling and phonological patterns
- Comparing English world-wide: lexical sets and reference accents
- Irish English: a special case
- Major features of variation: looking backwards and forwards in history
English phonology and contact with other languages: systems and learners

Assessment:
Students write an assignment of 3,000 to 4,000 words that presents and analyses a problem in (a) variation within a national variety of English, (b) teaching and learning of English phonology for non-native speakers, or (c) the relationship between phonological theory and an aspect of English phonology.

Suggested readings:

Band B

Michaelmas Term

LI 7871 Speech processing 1: spectral analysis (Christer Gobl)

Aims:
The aim of this module is to provide students with an in-depth knowledge of the basic properties of continuous and discrete signals, and of linear time-invariant (LTI) systems, as the basis for spectral analysis of speech signals. Through the theoretical framework of LTI systems, the source-filter model of speech production is explored as well as different types of speech analysis techniques, including the speech spectrograph. A further aim is to introduce students to key digital signal processing techniques for spectral analysis of speech signals, including the Discrete Fourier Transform, Cepstral analysis and Linear Predictive Coding.

Syllabus:
Specific themes addressed within the module include:
- Continuous and discrete signals
- LTI systems
- The Source-filter model of speech production
- The Fourier Transform
• Digital Signal Processing: A/D, D/A, DFT, the Cepstrum, LPC
• Spectral analysis of speech signals

Assessment:
Assessment is typically based on a series of practical exercises, which students carry out during the course, equivalent to 3-4,000 words. Alternatively, an assignment involving a single, larger task is carried out on a key aspect of the course: in this case, assessment is based on the written report (3-4,000 words) of the assignment.

Suggested readings:

LI 7865 History and globalization of English (Jeffrey Kallen)

Aims:
This module has four principal aims: (i) to give an overview of the linguistic history of English, covering the major developments in syntax, phonology, the lexicon, and aspects of the writing system, (ii) to show the relationship between variation within English and the historical development of the language, (iii) to survey the spread of English as a world language, and (iv) to examine world Englishes within the context of social, historical, and linguistic theory. Throughout the course, students are encouraged to provide relevant examples of variation in English from their experience of English as a world language.

Syllabus:
Specific themes addressed in the module include:
• The ancestries of English from early times to the present
• Periods of English: what are 'Old', 'Middle', and 'Modern' English?
• Development and variation in English phonology and spelling
• The lexicon, word-formation, and lexical expansion in English
• The development of English morphology and syntax
• Regional variation in English dialects
• Is there – or was there ever – a Standard English?
• The spread of English: Scotland and Ireland
• The growth of national Englishes: social and linguistic aspects
• English and other languages: outcomes of language contact
• Beyond colonization: English as a global language

Assessment:
Students write an assignment of 3,000 to 4,000 words that presents and analyses a problem in (a) the historical development of English, (b) the role of contact between English and other languages, or (c) the social and political status of English in a newly-independent nation state.

Suggested Readings:

LI 7864 Corpus Linguistics (Elaine Uí Dhonnchadha)

Aims:
A corpus consists of a large body of text, speech, or video material, held on computer. Corpora are used in a wide range of areas including linguistic research (e.g. morphology, syntax), language pedagogy, and speech and language processing. This course will introduce students to principles of corpus creation (i.e. design, collection, linguistic annotation, and evaluation), and students will gain experience of using various types of corpus query tools and corpus annotation tools which are currently available.

Syllabus:
The module will cover:
• corpus design, and collection and preparation of corpus materials
• various levels of linguistic annotation, e.g. part-of-speech, phrase structure, phonetic, prosodic, gesture etc.
• manual and automatic annotation, and methods of evaluation/verification of same
• use of various types of corpora and corpus query tools

Learning Outcomes:
• An appreciation of the benefits and limitations of using corpora in various linguistic domains
• Practical experience of creating and using corpora.

Assessment:
Assessment for this module, amounting to approximately 3-4,000 words will include:
• A written assignment on an aspect of corpus development or use
• A small-scale linguistic annotation project

Suggested readings:

Hilary Term
LI 7867 Laboratory Phonetics and Phonology (Ailbhe Ní Chasaide)

Aims:
This course introduces empirical methods that are used for the analysis of the sounds and sound systems of languages. In the first instance it aims to provide a practical training in the use of aerodynamic, articulatory, and acoustic techniques that are used for linguistic analysis. By focusing on a series of experimental tasks associated with key aspects of linguistic structure, the course aims
further to provide an understanding of (i) primary phonetic dimensions of speech generation, (ii) how these phonetic dimensions are exploited in the sound systems of different languages, and (iii) the interactions of phonetic and phonological factors in language. In addition to formal lectures there are supervised laboratory sessions, during which students are trained and helped with the practical analytic tasks.

Syllabus:
The course is delivered in terms of a number of topics, each of which explores some aspect of the human speech production capacity. With each topic the student is required to carry out and write up a practical analytic task, which serves to focus on how different languages exploit this dimension in their sound systems. Analysis techniques include airflow transduction (oral and nasal), electropalatography, and spectrography. The topics examined are likely to include:

- Voice production: how the voice is used in spoken communication, and a cross-language perspective on phonological voicing contrasts
- Nasality: phonetic and phonological aspects
- Lingual articulation: secondary articulation and gestural overlap
- Coarticulation
  - cross-language differences as pertaining to (i) nasality and (ii) lingual articulation
  - phonological structure constraints on the operation of coarticulation
- Vowel systems
- Prosody: phonetic dimensions and their use in linguistic systems

Assessment:
Assessment is based on a written assignment of 3-4,000 words which expands on one of the experimental tasks undertaken during the course.

Suggested Readings:


LI 7870 Advanced Syntactic Theory (Carl Vogel)

Aims:
The course should provide students with practice in addressing recent literature in syntax and the syntax-semantics interface, leading to the possibility of contributing to that literature. The focus in 2009-10 will be on categorization. Many semantic categories have graded structure; for example, in terms of membership, a piano is less clearly a piece of furniture than a desk is. In contrast, the primitive categories of syntactic theories are generally discussed as if the membership criteria offer clear binary distinctions. Linguistic categories will be examined with respect to their underlying structure. The relationships among graded categories, degrees of grammaticality, and linguistic innovation will be explored. The analysis will be conducted with respect to the background linguistic frameworks like Head-driven Phrase Structure Grammar and Lexical Functional Grammar, with reference to the Minimalist paradigm, and will be informed by recent work in cognitive science and corpus linguistics.

Working Methods:
Participants will digest and present articles, and in doing so will hone abilities in extracting the theoretical relevance of published articles and sharpen competence in providing constructive critique of the claims, methods and argumentation adopted. Readings will draw upon chapters from the readings list, a number of related articles to be announced, partly determined by the prior background of each participant.

Syllabus:
Atomic categories in linguistic theories; gradience in cognition; gradience in linguistic categories; argument structure and the syntax/semantics interface; ’quirky case’; degrees of grammaticality and eliciting grammaticality judgements; linguistic innovation vs. error; corpus-driven and computational methods of detecting category change.

Assessment:
The course will be based on the evaluation of a 3-4,000 word essay connected to the theme addressed within the course, the literature addressed specifically in the seminar, and secondary literature on the topic, synthesizing the material addressed.

Recommended Readings:

LI 7875  Speech processing 2: acoustic modelling (Christer Gobl)

Aims:
The aim of this module is to provide students with an understanding of the acoustics of speech production and with knowledge about the signal analysis and processing techniques required to model the speech production process for the purpose of generating synthetic speech. To achieve these goals, a theoretical framework is developed whereby students are introduced to the Laplace transform and the s-plane, the z transform and the z-plane, as well as techniques for the design of digital filters. A further aim is to introduce students to different speech synthesis methodologies which may be used in text-to-speech systems, including parametric, concatenative, and articulatory approaches.

Syllabus:
Specific themes addressed within the module include:
- Speech acoustics
- The Source-Filter model of speech production
- The Laplace transform/The z-transform/Impulse invariant transformation
- First and second order filters
- Parametric, concatenative and articulatory methods for speech synthesis and methods for text-to-speech conversion
- Cascade and parallel formant synthesis

Assessment:
Students carry out an assignment involving the design and implementation of acoustic models of speech production. Students are assessed on their implementations and written report of the assignment.

Suggested readings:
Research Methodology Module (LI 7879)

(John Harris and Denise O'Leary)

Aims:
The module is an obligatory part of the preparation for the dissertation and has three principal aims: (i) to equip students with the knowledge and skills necessary to critically evaluate published research and to explore different ways of translating research questions in quantitative or qualitative studies, (ii) to introduce the basic concepts, experimental designs, and statistical procedures needed to execute research, and (iii) to provide hands-on experience in using the statistical package SPSS to carry out data analysis in linguistic and applied linguistic studies. Training in SPSS will include data entry, dataset checking, presentation of results in tabular and chart form, and the use of the package to conduct statistical tests. Among the statistical tests introduced are Chi-square, Pearson correlation, t-tests and analysis of variance.

Working methods:
The topics in the first half of the module are presented in lectures and explored and discussed in class. In the second half of the module, each two-hour session will be composed of a lecture followed by a lab session in which there will be an opportunity for students to implement in practice what they have learned about statistical analysis and SPSS procedures.

Syllabus:
Specific themes addressed in the module include:
- qualitative versus quantitative approaches
- descriptive and exploratory research
- design and analysis of surveys
- the null hypothesis
- independent and dependent variables
- levels of measurement
- descriptive and inferential statistics
- measures of central tendency and dispersion
- the normal distribution
- power, sample size and error types
- Confidence intervals/statistical significance
- Parametric and non-parametric tests to check for (a) relationships and (b) differences between groups/variables
Assessment
General

METHOD
Students are assessed on the basis of their performance in
- six assignments related to four core and two optional modules of
  the course
- a dissertation.

ATTRIBUTION AND PLAGIARISM
All quotations from published and unpublished sources must begin
and end with quotation marks and be accompanied by a full reference
(see below). The following practices are unacceptable and will be
trusted as plagiarism:
- copying without acknowledgement;
- selective copying (which omits words, phrases or sentences
  from the original) without acknowledgement;
- close summary without acknowledgement.

No student found guilty of plagiarism will be (i) awarded a degree or
diploma or (ii) supported in applications for admission to other courses
of study either at Trinity College or elsewhere.

Plagiarism is a serious disciplinary offence: see also the College
regulations on plagiarism printed at the end of this handbook.

REFERENCES
Students should ensure that they follow good academic practice in the
presentation of essays and other written work. In assignments and
dissertations references should be given in the main body of the text,
giving the author and year of publication of the material being cited.
Specific page references must be given for quotations. Using the
'author/date' system yields references such as:

Bialystok (2001) [for reference to a work as a whole]
Coleman (2002, p. 115) [for reference to one page in a work]
Tonhauser (2007, pp. 838-841) [for reference to several pages]

A complete alphabetical list of references must be included at the end
of each piece of work. Each type of work cited (book, article in a book,
article in a journal, etc.) has a particular format which should be
followed carefully. Detailed information on references, essay format,
and the use of linguistic examples is given to students during
orientation week: the following forms should be remembered as a
guide to the most-commonly used published sources.

Bialystok, Ellen. 2001. *Bilingualism in Development: Language,
Coleman, J. 2002. Phonetic representations in the mental lexicon, in
J. Duran and B. Laks (eds.), *Phonetics, Phonology, and
Tonhauser, Judith. 2007. Nominal tense? The meaning of Guaraní

**AWARD OF DIPLOMA**
Students may decide for personal reasons not to write a dissertation,
or they may be debarred from doing so by the court of examiners (see
p. 28 below). Provided that they satisfy the examiners in respect of
their course work, such students will be awarded a Postgraduate
Diploma in Speech and Language Processing.

**COMPENSATION**
Students are allowed to compensate for one fail mark among their six
assignments, provided that their average mark for all six assignments
is at least 40%. As provided for by College regulations, a student who
receives a fail mark may be allowed to resubmit an assignment if there
are mitigating circumstances; the course co-ordinator should be
consulted in the first instance.

**Assignments**

**PRESENTATION**

*Language*. The discursive component of assignments must be written
in English. Illustrative materials and examples may be in any
appropriate language.

*Length*. The discursive component of assignments, including
quotations from secondary sources, must not exceed 4,000 words.
Word limits for smaller pieces of assessment may be set by
individual lecturers. *Students are required to note the word count on
the front of each assignment. They will be penalized for exceeding
the stated word limit.*

*Printing requirements*. Assignments should be word-processed and
printed on one side of the paper only, using double or 1.5 spacing,
with a margin of at least one inch (2.5 cm) at the top, bottom, left,
Examiners will pay particular attention to the presentation of assignments, and candidates whose work is deficient in this regard will be penalized.

Title page. Each assignment must begin with a title page that contains the following information (in this order): the full name of its author; the student number of the author; the title of the assignment or the task that it fulfils; the degree for which it is submitted (M.Phil. in Speech and Language Processing); the part of the course to which it is attached (where applicable); the term and year in which it is submitted.

Pagination. All pages must be clearly and sequentially numbered.

Binding. Assignments need not be bound in any formal sense, but all pages must be firmly fixed together, e.g. by a strong staple.

References. Every assignment must include an alphabetical list of references, presented according to the conventions set out above.

Doubtful cases. Candidates who are uncertain how to apply the above conventions to any of their assignments should consult with the member(s) of staff responsible for the part(s) of the course in question.

SUBMISSION
Assignments must be handed in at Room 4091, Arts Building. Michaelmas term assignments are due on Monday, 18 January 2010, and Hilary term assignments are due on Monday, 3 May 2010. Unless they present a medical certificate to the course coordinator, students are automatically penalized for late submission of an assignment — 5% if the assignment is up to one week late and 10% if the assignment is between one and two weeks late. Without a medical certificate, no assignment will be accepted later than two weeks after the submission date.

GRADES
Students should receive feedback on their Michaelmas term assignments by 15 February 2010 and on their Hilary term assignments by 31 May 2010. Feedback is given on a standard form, using the following headings:

- Content
- Coherence of argument
- Technical Accuracy (where applicable)
Although the final degree result is not classified, assignments are graded according to the scale in general use in the university:

- **I**  70+
- **II.1**  60-69
- **II.2**  50-59
- **III**  40-49

In general the four classes are to be interpreted as follows:

**I** – demonstrates a full understanding of key issues, an ability to construct a detailed argument on the basis of that understanding, and a capacity for developing innovative lines of thought

**II.1** – demonstrates a full understanding of key issues and an ability not only to construct a detailed argument on the basis of that understanding, but to generate additional insights

**II.2** – demonstrates a full understanding of key issues and an ability to construct a detailed argument on the basis of that understanding

**III** – demonstrates an adequate understanding of key issues and an ability to construct a basic argument.

Grades received as part of student feedback are provisional; final grades are decided at the Court of Examiners meeting in late June. Students are notified of their results after the meeting of the Court of Examiners.

### Dissertations

As well as following the programme of study summarized above and described in detail on pp. 9–23, students write a dissertation of not more than 15,000 words in one of the areas of research described on pp. 7-8.

Students select the general area in which they will write their dissertation by the end of Week 5 in Hilary term (in their first year if they are taking their course part-time). They may begin to receive supervision later in Hilary term (in their first year if they are taking their course part-time), and are expected to have drawn up a detailed plan
and work schedule for their dissertation by the 10th of May (in their first year if they are taking their course part-time).

The court of examiners may debar students from writing and submitting a dissertation (i) if they fail to submit a detailed plan and work schedule for their dissertation by the 10th of May (in their first year if they are taking their course part-time), or (ii) if they fail to achieve at least a II.2 grade in each of their assignments. Provided that they satisfy the examiners in respect of their course work, such students may be awarded a Postgraduate Diploma in Speech and Language Processing (see also p. 25 above).

The final date for submission of dissertations is 30 September of the year in which the course is completed. Supervision will not be given after this date except in cases where an extension has been granted on medical grounds.

Students whose dissertation receives a fail mark can be entitled to a viva voce examination on the dissertation in keeping with applicable College regulations; the course co-ordinator should be consulted in the first instance. Students whose dissertation fails to satisfy the examiners may, on the recommendation of the court of examiners and on payment of the prescribed fee, be allowed to register for a further year and revise and resubmit their dissertation.

**PRESENTATION**

**Language.** The discursive component of dissertations must be written in English. Illustrative materials and examples may be in any appropriate language.

**Length.** The discursive component of dissertations must not exceed 15,000 words. *Students are required to attach to their dissertation a note of the total word count. They will be penalized for exceeding the word limit.*

**Printing requirements.** Dissertations must be word-processed and printed as follows: A4 format, *on one side of the paper only*, with double or 1.5 spacing and margins of at least one inch (2.5 cm) at the top, bottom, left, and right of the page.

**Title page.** Every dissertation must begin with a title page that contains the following information (in this order): the title; the full name of its author; the degree for which it is submitted (M.Phil. in Speech and Language Processing); the year in which it is submitted.
Declaration. Immediately following the title page, every dissertation must contain the following declaration, signed and dated:

**Declaration**

I declare that this dissertation has not been submitted as an exercise for a degree at this or any other university and that it is entirely my own work.
I agree that the Library may lend or copy this dissertation on request.
Signed:     Date:

Abstract. Immediately following the declaration, every dissertation must contain an abstract which summarizes the methods used and the conclusions reached. The abstract must be headed with the title of the dissertation and the author’s full name (in that order), and must not exceed one page of single-spaced typescript.

Table of contents. Immediately following the abstract, every dissertation must contain a table of contents listing the main divisions (parts, chapters, sections, sub-sections, etc., as appropriate) and the pages on which they begin.

Binding. Every dissertation must be securely bound in dark blue cloth. The spine must bear the candidate’s name in full, the degree for which the dissertation is submitted (M.Phil. in Speech and Language Processing), and the year. The front cover must bear the candidate’s full name and the title of the dissertation (or an abbreviated title approved by the supervisor).

Pagination. All pages must be clearly and sequentially numbered.

References. Every dissertation must include a full alphabetical list of references, presented according to the conventions set out above.

Doubtful cases. Candidates who are uncertain how to apply the above conventions to their dissertation should consult with their supervisor.

**SUBMISSION**

Dissertations must be submitted in two copies, neither of which will be returned to the candidate, at Room 4091, Arts Building, not later than 30 September in the year in which the course is completed. On submitting the dissertation, students will also be required to fill out an end-of-course survey. Extensions require the approval of the Dean of Graduate Studies and entail the payment of additional fees.
1.24 Plagiarism

1. Plagiarism is interpreted by the University as the act of presenting the work of others as one’s own work, without acknowledgement.

Plagiarism is considered as academically fraudulent, and an offence against University discipline. The University considers plagiarism to be a major offence, and subject to the disciplinary procedures of the University.

2. Plagiarism can arise from deliberate actions and also through careless thinking and/or methodology. The offence lies not in the attitude or intention of the perpetrator, but in the action and in its consequences.

Plagiarism can arise from actions such as:

a) copying another student’s work
b) enlisting another person or persons to complete an assignment on the student’s behalf

c) quoting directly, without acknowledgement, from books, articles or other sources, either in printed, recorded or electronic format

d) paraphrasing, without acknowledgement, the writings of other authors

Examples c) and d) in particular can arise through careless thinking and/or methodology where students:

(i) fail to distinguish between their own ideas and those of others
(ii) fail to take proper notes during preliminary research and therefore lose track of the sources from which the notes were drawn
(iii) fail to distinguish between information which needs no acknowledgement because it is firmly in the public domain, and information which might be widely known, but which nevertheless requires some sort of acknowledgement
(iv) come across a distinctive methodology or idea and fail to record its source.

All the above serve only as examples and are not exhaustive.

Students should submit work done in co-operation with other students only when it is done with the full knowledge and permission of the lecturer concerned. Without this, work submitted which is the product of collusion with other students may be considered to be plagiarism.

When work is submitted as the result of a Group Project, it is the responsibility of all students in the Group to ensure, in so far as possible, that no work submitted by the Group is plagiarised.

3. It is clearly understood that all members of the academic community use and build on the work of others. It is commonly accepted also, however, that we build on the work of others in an open and explicit manner, and with due acknowledgement. Many cases of plagiarism that arise could be avoided by following some simple guidelines:

a) any material used in a piece of work, of any form, that is not the original thought of author should be fully referenced in the work and attributed to its source. The material should either be quoted directly or paraphrased. Either way, an explicit citation of the work referred to should be provided, in the text, in a footnote, or both. Not to do so is to commit plagiarism

b) when taking notes from any source it is very important to record the precise words or ideas that are being used and their precise sources
c) while the Internet often offers a wider range of possibilities for researching particular themes, it also requires particular attention to be paid to the distinction between one’s own work and the work of others. Particular care should be taken to keep track of the source of the electronic information obtained from the Internet or other electronic sources and ensure that it is explicitly and correctly acknowledged.

4. It is the responsibility of the author of any work to ensure that he/she does not commit plagiarism.

5. Students should ensure the integrity of their work by seeking advice from their Lecturers, Course Co-ordinator, Director or Supervisor on avoiding plagiarism. All schools should include, in their handbooks or other literature given to students, advice on the appropriate methodology for the kind of work that students will be expected to undertake.

6. If plagiarism as referred to in Paragraph (2) above is suspected, the Director of Teaching and Learning (Postgraduate) or Head of Discipline as appropriate will arrange an informal meeting with the student, the student’s Supervisor, and the academic staff member concerned, to put their suspicions to the student and give the student the opportunity to respond.

7. If the Head of School or Discipline forms the view that plagiarism has taken place, he/she must decide if the offence can be dealt with under the summary procedure set out below. In order for this summary procedure to be followed, all parties noted above must be in agreement. If the facts of the case are in dispute, or if the Head of School/Discipline feels that the penalties provided for under the summary procedure below are inappropriate given the circumstances of the case, he/she will refer the case directly to the Junior Dean, who will interview the student and may implement the procedures set out in Section 5 (Other General Regulations).

8. If the offence can be dealt with under the summary procedure, the Head of School/Discipline will recommend to the Dean of Graduate Studies one of the following penalties:

a) that the piece of work in question receives a reduced mark, or a mark of zero;

or

b) if satisfactory completion of the piece of work is deemed essential for the student to rise with his/her year or to proceed to the award of a degree, the student may be required to re-submit the work. However, the student may not receive more than the minimum pass mark applicable to the piece of work on satisfactory re-submission.

9. Provided that the appropriate procedure has been followed and all parties above are in agreement with the proposed penalty, the Dean of Graduate Studies may approve the penalty and notify the Junior Dean accordingly. The Junior Dean may nevertheless implement the procedures set out in Section 5 (Other General Regulations).

---

10 This will be done by the Head of School. The Director of Teaching and Learning (Postgraduate) may also attend the meeting as appropriate.

11 As an alternative, students may nominate a representative from the Graduate Students’ Union to accompany them to the meeting.