Course Name (English)	NATURAL LANGUAGE PROCESSING APPROVED
Course Code	CSC770

MQF Credit	3

Course Description	This course gives students the understanding of theory and practice of natural language processing (NLP) - the creation of computer programs that can understand, generate, and learn natural language. Natural language understanding as a vehicle to introduce the three major subfields of NLP: syntax (which concerns itself with determining the structure of a sentence), semantics (which concerns itself with determining the explicit meaning of a single sentence), and pragmatics (which concerns itself with deriving the implicit meaning of a sentence when it is used in a specific discourse context).

Transferable Skills	Demonstrateability to identify and articulate self skills, knowledge and understanding confidently and in a variety of contexts

Teaching Methodologies	Lectures, Blended Learning, Demonstrations, Presentation, Small Group Sessions , Directed Self-learning

CLO		
	CLO1	Explain the potentials and limitations of the use of ordinary language in computing systems.
	CLO2	Write grammars for syntactic processing and integrate semantic and pragmatic aspects.
	CLO3	Analyze basic issues in this area and present the main techniques needed to obtain successful performance in application areas such as database query answering, text generation, semi-formal specifications and front ends and others

Pre-Requisite Courses	No course recommendations

Topics

1. Introduction
1.1) Knowledge in Speech Language Processing (SLP)
1.2) Ambiquity
1.3) Models and Algorithm
1.4) Language, Thoughts and Understanding History

2. Regular Expressions & Automata
2.1) Regular Expressions
2.2) Finite-state methods
2.3) Regular Languages and FSAs

3. N-Grams
3.1) Counting
3.2) Simple N-Gram
3.3) Training and Test Sets
3.4) Evaluation
3.5) Smoothing
3.6) Interpolation
3.7) Backoff

4. Part-of-Speech Tagging
4.1) Parts of speech (POS)
4.2) Tagsets
4.3) POS Tagging
4.4) Rule-based tagging
4.5) HMMs and Viterbi algorithm

5. Formal Grammars
5.1) Context-free grammar
5.2) Grammars for English
5.3) Treebanks
5.4) Dependency grammars

6. Syntactic Parsing
6.1) Parsing with CFGs
6.2) Bottom-up, top-down
6.3) Ambiguity
6.4) CKY parsing

7. Statistical Parsing
7.1) Probabilistic Context Free grammars (PCFG)
7.2) Probabilistic CKY parsing

8. Lexical Semantics
8.1) Concepts about word meaning
8.2) Computational areas by enabling resource
8.3) Computational areas by enabling technology

9. Computational Lexical Semantics
9.1) Supervised Word-Sense Disambiguation (WSD)
9.2) Supervised Learning Algorithms
9.3) Evaluation of WSD
9.4) Similarity Metrics

10. Question Answering & Summarization
10.1) Web-based Question Answering
10.2) Information Retrieval

11. Machine Translation
11.1) Language Similarities and Divergences
11.2) Classic MT Approaches
11.3) Modern Statistical MT
11.4) Evaluation

Assessment Breakdown	%
Continuous Assessment	70.00%
Final Assessment	30.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment #1=5%, Assignment #2=10% Assignment #3=10%	25%	CLO1
	Quiz	Quiz and Participation in class	5%	CLO1 , CLO2 , CLO3
	Test	TEST 1= 20% TEST 2 =20%	40%	CLO1 , CLO2

Reading List	Recommended Text	**JURAFSKY D. ET. AL 2014,** *SPEECH AND LANGUAGE PROCESSING AN INTRODUCTION TO NATURAL LANGUAGE PROCESSING*, **2ND EDITION Ed., PEARSON EDUCATION [ISBN: 978-933251841]**
	Reference Book Resources	• **Richard M Reese 2015,** *Natural Language Processing with Java*, **Packt Publishing - ebooks Account ([ISBN: 978-178439179]** • **Grant S. Ingersoll, Thomas S. Morton, Andrew L. Farris 2013,** *Taming Text: How to Find, Organize, and Manipulate It*, **1st Edition Ed., Manning Publications** • **Alexander Clark, Chris Fox, Shalom Lappin 2012,** *The Handbook of Computational Linguistics and Natural Language Processing*, **1 edition Ed., Wiley-Blackwell [ISBN: 978-11183471]** • **Ela Kumar 2011,** *Natural Language Processing*, **I K International Publishing House [ISBN: 978-938057877]** • **Steven Bird, Ewan Klein, Edward Loper 2009,** *Natural Language Processing with Python*, **O'Reilly Media [ISBN: 978-059651649]** • **Jurafsky, D. & Martin, J.H. 2008,** *Speech and Language Processing*, **2 Ed., Prentice-Hall [ISBN: 978-01318732]**
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	