**Basic Course Information:** CS 5170

Course Title: Natural Language Processing

Units: 3

C/S Classification #: C-2

Component (select one): Lecture

Instructional Mode (select all appropriate choices): Face-to-Face and web-assisted

Grading Basis (select one): Graded only

Repeat Basis (select one): May be taken only once

Cross listed Course (if offered with another department): N/A

Dual-listed Course (if offered as lower/upper division or undergraduate/graduate): N/A

Major course/Service course/GE course (select all appropriate choices): Major course

Date Prepared: March 31, 2015

Prepared by: Sukanya Manna

**I Catalog Description**

Introduction to natural language processing. Use of statistical and logical techniques to study language processing at morphological, lexical, syntactic, and semantic levels; algorithms and procedures for sentence parsing and analysis. Applications of natural language processing techniques.

**II Required Coursework and Background**

Pre-requisite(s): CS 3310 or consent of instructor.

**III Expected Outcomes**

On successful completion of this course, students will be able to:

1. Appreciate the importance of natural language processing

2. Comprehend the models, methods, and algorithms of NLP for different tasks

3. Identify, analyze, and design NLP applications

4. Gain experience in implementing NLP algorithms and using different open source NLP packages

Outcomes of this course will build student capacity in each of the following areas as defined by programmatic objectives for the computer science major.

P-SLO 4. A breadth of advanced knowledge and skills in applied areas of computer science.

**IV Instructional Materials**

*Required text:*

Daniel Jurafsky and James H. Martin, Speech and Language Processing, 2nd Edition, ISBN-10: 0131873210, ISBN-13: 978-0131873216.

*Reference text:*

Christopher D. Manning and Hinrich Schütze, Foundations of Statistical Natural Language Processing, MIT Press. Cambridge, MA: May 1999, ISBN: 9780262133609.

**V Minimum Student Material**

Course textbooks and lecture handouts

**VI Minimum College Facilities**

A classroom with a projection system and whiteboard, a computer laboratory

**VII Course Outline**

1. Introduction

2. Regular Expressions

3. English morphology

4. N-gram Language Models

5. Parts of Speech tagging

6. Syntactic Parsing

7. Semantic Analysis

8. Information Extraction

9. Applications

**VIII Instructional Methods**

Lecture

Discussion

In-class exercises

Hands on practice

Demonstrations

Project-based learning

**IX Evaluation of Outcomes**

A. Student Assessment

i Programming projects (individual and groups)

ii midterm

iii final

iv quizzes

v homework

B. Meaningful Writing Assignment

* Students shall produce written solutions or proofs or programs to problems that are assigned as homework and/or programming projects and explain their reasoning.
* Short answer or essay questions on exams will require students to explain and justify their response in writing.
* Project reports will allow them to present their research topics they have comprehended.

C. A Matrix of Course Student Learning Outcomes vs Methods of Assessment

If the course is being evaluated for accreditation purposes, approved department accreditation assessment tools will additionally be utilized.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course Learning Outcomes | Methods of Assessment | | | | |
| Homework | Programming Projects | Quizzes | | Exams |
| Appreciate the importance of natural language processing | x | x | x | | x |
| Comprehend the models, methods, and algorithms of NLP for different tasks | x | x | x | |  |
| Identify, analyze, and design NLP applications | x | x |  |  | |
| Gain experience in implementing NLP algorithms and using different open source NLP packages | x | x |  |  | |