CSC 582 – Computational Linguistics

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2. credit units  4       contact hours  6

3. Course Coordinator: Foaad Khosmood

4. Textbook (or other required material):
   Speech and Language Processing by Jurafsky and Martin. Natural Language
   Processing with Python by Bird, Klein and Loper.

5. a. Course Description:
   Research-based review of recent advancements in computational linguistics and natural
   language processing. Topics selected from: language morphology, natural language
   generation, feature extraction and unification, meaning representations, stylistics,
   discourse analysis and machine learning methods. 3 lectures, 1 laboratory.

   b. Prerequisite: CSC 482 and graduate standing. Recommended: CSC 580.

   c. Required/Elective/Selective Elective for CPE, CSC, EE, SE

      |               | CSC | CPE | SE |
      |---------------|-----|-----|----|
      | Required      |     |     |    |
      | Elective      | X   | X   | X  |
      | Selective Elective |   |     |    |

6. a. Course Learning Objectives
   The student will be able to:
   • Write programs to perform basic syntactic and semantic decomposition of digitized text
     in various forms using Python programming language.
   • Interface with online tools and references to enhance natural language understanding and
     analysis.
   • Discuss algorithms and programming techniques for contemporary Natural Language
     Processing.
   • Critically discuss current research in NLP and Computational Linguistics through reading
     peer-reviewed articles.
   • Produce a hypothesis-testing research paper, or a survey paper on an open problem in the
     field.
   • Present critical reviews of approaches to coordinated and/or cooperative problem solving
     systems through a taxonomy of evaluation criteria.

   b. Level at which Student Outcomes are addressed
      (“B” = Basic level, “I” = Intermediate level, “A” = Advanced level)

      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
      |---|---|---|---|---|---|---|
      | A | A | A | B | A | I | N/A |
7. **Major Topics Covered: (number of lecture hours per)**
   - NLP systems (1 hour)
   - Sentence/word tokenization and processing (1 hour)
   - Ngrams and statistical evaluation of text (1 hour)
   - Part of speech tagging (2 hours)
   - Parsing theory and methods (4 hours)
   - Statistical NLP models (3 hours)
   - Classification and Machine Learning in NLP (3 hours)
   - Word-sense-disambiguation (2 hours)
   - Processing large corpora (1 hour)
   - Speech processing (1 hour)
   - Vocalization (1 hour)
   - Natural Language Generation (1 hour)
   - Significance analysis for research results (1 hour)
   - Contemporary research in NLP (8 hours)