



Course Specifications

| | |
|----------------------|--|
| Course Title: | Natural Language Processing |
| Course Code: | CS464 |
| Program: | B.Sc Computer Science |
| Department: | Information Technology |
| College: | College of Computer and Information Sciences |
| Institution: | Majmaah University |



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A. Course Identification

| |
|--|
| 1. Credit hours: 3(3,1,0) |
| 2. Course type |
| a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input type="checkbox"/> Others <input checked="" type="checkbox"/> |
| b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/> |
| 3. Level/year at which this course is offered: Level 12/Year 4 |
| 4. Pre-requisites for this course (if any): CS461 |
| 5. Co-requisites for this course (if any): Nil |

6. Mode of Instruction (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|----|-----------------------|---------------|------------|
| 1 | Traditional classroom | 55 | 100% |
| 2 | Blended | | |
| 3 | E-learning | | |
| 4 | Distance learning | | |
| 5 | Other | | |

7. Contact Hours (based on academic semester)

| No | Activity | Contact Hours |
|----|-------------------|---------------|
| 1 | Lecture | 44 |
| 2 | Laboratory/Studio | |
| 3 | Tutorial | 11 |
| 4 | Others (specify) | |
| | Total | 55 |

B. Course Objectives and Learning Outcomes

1. Course Description

Natural Language Processing addresses fundamental questions at the intersection of human languages and computer science. How can computers acquire, comprehend and produce English? How can computational methods give us insight into observed human language phenomena? In this interdisciplinary introductory course, you will learn how computers can do useful things with human languages, such as translation between different languages, filter junk email, and find the main topics in the day's news. The intent of the course is to present a fairly broad graduate-level introduction to Natural Language Processing (NLP, a.k.a. computational linguistics), the study of computing systems that can process, understand, or communicate in human language. The primary focus of the course will be on understanding various NLP tasks as listed on the course syllabus, algorithms for effectively solving these problems, and methods for evaluating their performance.

2. Course Main Objective

1. To learn about Regular Expressions, Text Normalization and Edit Distance
2. To understand String Edit Distance and Alignment
3. To Compute Context Free Grammars



4. To learn to understand about Part of Speech Tagging using Hidden Markov Models, Language modeling and Naive Bayes, Probability Theory
5. To design probabilistic Context Free Grammars
6. To understand Maximum Entropy Classifiers and Machine Translation

3. Course Learning Outcomes

| CLOs | | Aligned PLOs |
|----------|---|--------------|
| 1 | Knowledge and Understanding | |
| 1.1 | To understand major NLP issues and solutions | K1 |
| 1.2 | | |
| 1.3 | | |
| 1... | | |
| 2 | Skills : | |
| 2.1 | To apply programming techniques to implement NLP algorithms | S4 |
| 2.2 | To asses NLP problems and find solutions | S5 |
| 2.3 | | |
| 2... | | |
| 3 | Values: | |
| 3.1 | | |
| 3.2 | | |
| 3.3 | | |
| 3... | | |

C. Course Content

| No | List of Topics | Contact Hours |
|--------------|--|---------------|
| 1 | Introduction and Overview | 4 |
| 2 | Regular Expressions, Text Normalization, Edit Distance | 4 |
| 3 | String Edit Distance and Alignment | 4 |
| 4 | Context Free Grammars | 4 |
| 5 | Probability Theory | 4 |
| 6 | Language modeling and Naive Bayes | 8 |
| 7 | Part of Speech Tagging and Hidden Markov Models | 8 |
| 8 | Probabilistic Context Free Grammars | 6 |
| 9 | Maximum Entropy Classifiers | 6 |
| 10 | Machine Translation | 7 |
| Total | | 55 |

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------------|--|---------------------|--|
| 1.0 | Knowledge and Understanding | | |
| 1.1 | CLO1- To understand major NLP issues and solutions | Classroom Teaching | Quiz, Assignment, Mid Exam, Final Exam |
| 1.2 | | | |



| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------------|--|---------------------|--|
| ... | | | |
| 2.0 | Skills | | |
| 2.1 | CLO2-To apply programming techniques to implement NLP algorithms | Classroom Teaching | Quiz, Assignment, Mid Exam, Final Exam |
| 2.2 | CLO3-To asses NLP problems and find solutions | Classroom Teaching | Quiz, Assignment, Mid Exam, Final Exam |
| ... | | | |
| 3.0 | Values | | |
| 3.1 | Nil | | |
| 3.2 | | | |
| ... | | | |

2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|------------------|---------------|--------------------------------------|
| 1 | Quizzes | Week 4, 10,13 | 10 % |
| 2 | Assignments | Week 7, 13 | 10% |
| 3 | Midterm Exam | Week 8 | 20 % |
| 4 | Exercise | Every Week | 20% |
| 5 | Final Exam | Week 16 | 40 % |

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Each student is allotted to an academic advisor for guidance and counseling

F. Learning Resources and Facilities

1.Learning Resources

| | |
|---------------------------------------|--|
| Required Textbooks | 1. Jurafsky and Martin, "SPEECH and LANGUAGE PROCESSING: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition", Second Edition, McGraw Hill, 2008. 2. Manning and Schutze, "Statistical Natural Language Processing", MIT Press; 1st edition (June 18, 1999), ISBN: 0262133601 |
| Essential References Materials | |



| | |
|---------------------------------|--|
| Electronic Materials | |
| Other Learning Materials | |

2. Facilities Required

| Item | Resources |
|--|--|
| Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) | Classroom |
| Technology Resources (AV, data show, Smart Board, software, etc.) | PC with Windows/Linux, LCD Projector, Smart Board |
| Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | Internet Connection |

G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|--|-------------------------|--------------------|
| Final Exam Answer Scripts Verification | Review Committee member | Review |
| Course Feedback | Students | Survey |
| | | |
| | | |
| | | |

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

| | |
|----------------------------|--|
| Council / Committee | |
| Reference No. | |
| Date | |