GOVERNORS STATE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES
DIVISION OF SCIENCE

COURSE SYLLABUS

COURSE TITLE: Natural Language Processing
COURSE NUMBER: CPSC 815
CREDIT HOURS: 3
PROFESSOR: Winfried Karl RUDLOFF, Ph. D., Dr. h.c.
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OFFICE: Room F2637
OFFICE HOURS: by appointment

TRIMESTER: Spring 2011

RATIONALE AND COURSE DESCRIPTION:

Language is the basis of communication. Indeed, communication would be impossible without
some form of language which can range from primitive body language of animals (a dog wagging its tail
tries to convey to us a message), to sign language (if we don't understand another persons language), to
verbalization of facts and ideas, to symbolization through pictographs of the ancient Egyptians or Chi-
nese, and the alphabets of the Western and Arabic cultures.

Since computers are essentially designed to manipulate symbols, they can easily be used to
process numbers as well as alpha-numeric symbols which is reflected in many automated data processing
and man-machine or machine-machine communication tasks. Digital computers, by their very construc-
tion, can only understand the binary code as it symbolizes the on and off switches of their electronic de-
sign. In the course of their development, however, artificial languages such as Basic, Pascal, or Fortran
were designed which are closer to human understanding yet further removed from the original machine
language. Thus, intermediary programs (called compilers or interpreters), were written that could translate
these higher-level languages into the binary language of computers.

One of the fundamental drawbacks of artificial computer languages is that they are rather restric-
tive in communicating facts and logical concepts: Their syntax has to be precisely applied unless errors
will occur. As a consequence, procedural computer languages are not well suited to true human-like
communication between man and machine or between machines.

Although attempts at natural language processing by machines have been a part of artificial intel-
ligence since its early beginnings, we are still far removed from having intelligent machines understand
natural languages such as English. This, of course, is related to the inherent complexities and 'fuzziness'
in any language spoken and written on earth. Certainly, there are by now word processors, voice mail
systems and related language processing devices. However, intelligent machines which truly can under-
stand are still in their infancy.

This course develops concepts that can be used to eventually manipulate natural language beyond
word processing or voice mail systems.
LEARNING OBJECTIVE:

The main objective of this course is to provide the students with an understanding of the principles of natural language processing and the design and development of a natural language interface.

PREREQUISITES:

CPSC 390 Software Engineering and/or
CPSC 820 Planning and Management of Software
and/or CPSC 660 Introduction to Artificial Intelligence

INTENDED AUDIENCE:

Computer Science and Language Majors and Advanced Computer Programmers

MATERIAL:

Required: Lecture material developed during this course

Optional: Mary Dee Harris, "Introduction to Natural Language Processing", Reston Publishing Comp., Reston, VA, 1985

ACTIVITIES:

The lectures are primarily oriented around the required text and pertinent handouts. The lectures are presented in the Hypertext, Hypermedia, and Multimedia environment of GUIDE™ and will be made available on my website, http://www3.govst.edu/wrudloff/wkr.htm and/or on CD as they are developed. In addition, we will experiment with the interactive environment of Elluminate that permit long-distance lecturing and simultaneous recording of the lectures.

However, STUDENTS WILL BE RESPONSIBLE FOR ALL MATERIAL COVERED IN CLASS REGARDLESS WHETHER IT IS IN THE TEXTBOOK OR NOT. Students are expected to develop an independent attitude towards the study of the material and the development of the term project. The result of the project is envisioned as a system that can manipulate natural language reflecting the principles discussed during the course. PROLOG is the language of choice for the development of the project.

COURSE EVALUATION:

Homework and Class Participation 10%
Midterm Exam 30%
Final Exam 30%
Project 30%

Letter grades will be given based on a statistical evaluation of the overall number grades.
TENTATIVE CLASS SCHEDULE

**NOTE:** Numbers in parenthesis refer to the chapters in our hypertext/hypermedia notes, "Natural Language Processing: An Adventure in Communication", [http://www3.govst.edu/wrudloff/wkr.htm](http://www3.govst.edu/wrudloff/wkr.htm) (WKR). *The scheduled material may be subject to change.*

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<td>31 Jan</td>
<td>Text Processing (WKR: 2)</td>
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<td>07 Feb</td>
<td>Requirements of Natural Language Processing (WKR: 3)</td>
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<td>Transformational Grammars for Natural Languages (WKR: 4)</td>
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<td>26 May</td>
<td>Methinks, I know it all: <strong>Midterm Exam</strong></td>
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**Note:** This Syllabus may be downloaded in pdf-form from our website: [http://www3.govst.edu/wrudloff/wkr.htm](http://www3.govst.edu/wrudloff/wkr.htm)

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