Expert Systems COSC 5348
School of Science and Engineering
Fall 2015

A. COURSE INFORMATION
Course number/section: COSC-5348.001
Class meeting time: MWF 8.00 – 8.50
Class location: OCNR-222
Course Website: http://sci.tamucc.edu/~garciam

B. INSTRUCTOR INFORMATION
Instructor: Mario A Garcia
Office location: CI331
Office hours: MWF 11.00 – 12.30
Telephone: 361 825 3478
e-mail: Mario.garcia@tamucc.edu
Appointments: By email

C. COURSE DESCRIPTION
This course will introduce students to the fundamentals of expert systems including the concepts of knowledge acquisition, knowledge representation, inference engine, backward chaining, forward chaining, and expert systems shells.

D. PREREQUISITES AND COREQUISITES
Data Structures
Corequisites
none

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
Instructor notes
Optional Textbook(s) or Other References
none
Supplies
none

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors.
A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:

1. Demonstrate an understanding of the knowledge acquisition techniques;
2. Demonstrate a working knowledge of knowledge representation techniques.
3. Apply the principles of inference engine using forward chaining and backward chaining.
4. Apply the expert system methodology implementing a prototype expert system

G. INSTRUCTIONAL METHODS AND ACTIVITIES

This class is a hybrid class: it has a face-to-face and online component. The class is composed of lectures, quizzes, hands-on labs, and homework. There will be an online quiz for each chapter. Formative assessment will consist of feedback provided by students after each lecture (summarizing the most important concepts learned in each class and stating what concepts were not understood or were difficult). Summative evaluation will consist of a midterm and final exam.

H. MAJOR COURSE REQUIREMENTS AND GRADING

The class will have formative and summative assessment.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exams</td>
<td>50</td>
</tr>
<tr>
<td>Quizzes</td>
<td>0</td>
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<tr>
<td>Homework</td>
<td>10</td>
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<td>Presentations</td>
<td>0</td>
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<td>Lab Reports</td>
<td>0</td>
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<tr>
<td>Papers</td>
<td>10</td>
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<tr>
<td>Expert system implementation</td>
<td>30</td>
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I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introduction to expert systems</td>
<td>1</td>
<td>History of expert systems</td>
</tr>
<tr>
<td>Week</td>
<td>Topic</td>
<td>Activity</td>
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<tr>
<td>Week 2</td>
<td>Knowledge acquisition</td>
<td>Write a 2 pages summary of knowledge acquisition</td>
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<tr>
<td>Week 3</td>
<td>Knowledge representation</td>
<td>Write a 2 pages summary of knowledge representation techniques</td>
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<td>Week 4</td>
<td>Inference Engines search techniques: Forward chaining</td>
<td>Forward chaining homework</td>
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<td>Week 5</td>
<td>Inference Engines search techniques: Backward chaining</td>
<td>Backward chaining homework</td>
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<td>Week 6</td>
<td>Expert system shells</td>
<td>Investigation of open source and commercial ESBT</td>
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<td>Week 7</td>
<td>Midterm Exam</td>
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<td>Week 8</td>
<td>Expert system implementation phase 1 – Acquire knowledge</td>
<td>Select expert system domain: Find a human expert and start knowledge acquisition</td>
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<td>Week 10</td>
<td>Expert system implementation phase 1 – Acquire knowledge</td>
<td>Continue knowledge acquisition</td>
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<td>Week 11</td>
<td>Expert system implementation phase 2 – knowledge representation</td>
<td>Transfer knowledge into Ishikawa diagrams</td>
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<tr>
<td>Week 12</td>
<td>Expert system implementation phase 2 – knowledge representation</td>
<td>Transfer knowledge into Ishikawa diagrams</td>
<td></td>
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<tr>
<td>Week 13</td>
<td>Expert system implementation phase 3 – Rule writing</td>
<td>Write first 50 rules and test them Research paper due date</td>
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<td>Week 14</td>
<td>Expert system implementation phase 3 – Rule writing</td>
<td>Write from 51 to 100 rules and test</td>
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</table>
Week 15 | Expert system implementation phase 4 – Testing
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Week 16 | Final exam: Expert system presentation
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them | Write from 101 to 150 rules and test them
\[\text{Individual expert system demonstration}\]

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

**Attendance/Tardiness**
Class attendance is important to success in this course.

**Late Work and Make-up Exams**
Assigned readings are assumed to be completed as scheduled. Homework and Labs will be submitted using Blackboard. Once the deadline is reached, the submission link will close. Submissions by email to the instructor will not be graded.

**Extra Credit**
None

**Cell Phone Use**
Must turn them off.

**Laptop Use**
Not allowed

**Food in Class**
Not allowed

**Missed Exam**
Makeup exams will be considered if the instructor is informed ahead of time or in cases of extreme circumstances.

**Participation**
Class participation is essential in this course. Collaborative learning needs the participation of everybody in the class.

**Others**
Courtesy Expectations. Mutual respect is expected. The instructor expects full attention
from the students when he is lecturing.

K. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that must submitted. No student is eligible to receive a W without completing the official drop process by this deadline. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

GENERAL DISCLAIMER

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.