

Course: IENG 431 – Expert Systems in IMSE – Spring 2013

Number of credit hours: 3

Catalog Data: Expert systems design and development for manufacturing and service applications; knowledge acquisition, representation, search techniques, inference engines, database interfaces, algorithmic interfaces.

Prerequisites: IMSE 331

Optional Textbook: Artificial Intelligence: A Guide to Intelligent Systems

Instructor: Michael Carr, Phone: 304-685-8700, Email: m.colin.carr@gmail.com,

Office hours: Before and after class and by appointment at place of work.

Course Goals:

1. To provide students with the basic concepts related to artificial intelligence and expert systems.
2. To provide students with knowledge to enable them to develop expert systems and artificial intelligence systems for industrial applications.

Student Learning Objectives:

Upon completing the course, the student will be able to:

- a. Understand the elements of an expert system and develop expert systems based on unstructured problem definition.
- b. Understand the various aspects of knowledge representation and inference engine so as to develop, verify, and validate expert systems for application in a variety of industrial domains.

Grading:

<u>Weight</u>	<u>Type</u>	<u>Specifics</u>
30%	Exam 1	
30%	Exam 2	
20%	Project 1	Programming project using an Expert System shell
20%	Project 2	Programming project using VBA and Excel

Course Topics and Schedule:

Week	Topic	Activity
1	Introduction to Artificial Intelligence	
2	Evolutionary Computing	
3	Evolutionary Computing	
4	Evolutionary Computing	
5	Evolutionary Computing	
6	Evolutionary Computing	
7	Exam 1	
8	Knowledge Acquisition and Representation	Project 1 due
9	Expert System Design and Development Techniques	
10	Expert System Design Continued	
11	Expert System Design Continued	
12	Expert System Design Continued	
13	Expert System Design Continued	
14	Expert System Design Continued	Project 2 due
15	Exam 2	

Course Contribution to Professional Component:

Engineering Science – 15 %, Engineering Design – 85 %, Engineering Topics – 100%

Course relationship to Program Educational Outcomes:

The course relates strongly to the following program educational outcomes.

1. The course enables the students to acquire the ability to use modern and classical industrial engineering methodologies pertaining to expert systems development. (Outcome 1). The key ability the students will acquire is as below.
 - a. Expert systems design
2. The course enables the students to acquire the ability to shape expert systems design recommendations so that results will be achieved and communicate findings effectively (Outcome 3). The key abilities the students will acquire are as below.
 - a. Conduct an analysis of different alternatives and make appropriate recommendations.
 - b. Communicate the results of the analysis in an engineering report.
 - c. Make oral presentation.
 - d. Gather information from a variety of sources including publications, the internet, and reference materials.
3. The course enables the students to acquire the ability to work individually and on teams to identify, formulate and solve problems in expert systems design (Outcome 4). The key abilities the students will acquire are as below.
 - a. Work as an individual to solve an engineering problem.
 - b. Work in a project team of industrial engineers to solve an engineering problem.
 - c. Formulate and solve problems to satisfy system criteria.
4. The course enables the students to acquire the ability to design integrated expert systems that include people and information (Outcome 5). The key ability the students will acquire is as below.
 - a. Develop an information system to support the on-going management of a system.

Statement on Attendance:

Student attendance is mandatory unless excused by the instructor. The basis for an excused absence will follow University and IMSE policy. Students who are absent from class for any reason are responsible for all missed work. Students who miss a quiz or an exam will not be allowed to make it up, except in the case of a family or other legitimate emergency. Any exception will be allowed at the discretion of the instructor.

Statement on Social Justice:

West Virginia University is committed to social justice. I concur with that commitment. I expect to foster a nurturing learning environment that is based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, you must make appropriate arrangements through Disability Services (293-6700). They will identify the nature of the accommodation your disability requires.