



كلية الحاسبات و المعلومات



جامعة بنها
وحدة الضمان والجودة

Neural Networks Course Specifications

Course Specifications

Program(s) on which the course is given	: Bachelor in Computer and Information Sciences
Major or Minor element of program	: Computer Science
Department offering the program	: Computer Science
Department offering the course	: Computer Science
Academic year / Level	: 4th Year/BSc
Date of specification approval	:

A. Basic Information

Title: Neural Networks	Code: CSC 445	
Lecture: 4 hrs/week	Practical: 2 hrs/week	Tutorial: ---
Credit Hours: ---	Total: 6 hrs/week	

B. Professional Information

1. Overall Aims of Course:

Neural networks are a computational and engineering methodology based on emulating how nature has implemented biological brain (in particular, the brain's massively parallel and learning aspects). As such, it holds promise for significant impact on how important classes of scientific and engineering problems are solved. The aim of course is to have



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the students obtain a working knowledge of this forefront technology. This course presents the theory and practice of neural networks the lectures cover the different kinds of neural networks and the types of problems for which neural networks are used. Basic theoretical concepts, illustrated with graphs, figures, and examples, are covered to support practical neural network training.

2. Intended Learning Outcomes of Course (ILOs):

4.1- Knowledge and Understanding:

- a1. Know and understand the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, databases and computer graphics.
- a2. Show a critical understanding of the principles of AI, image, and pattern recognition.
- a3. Have a good understanding of how several fundamental algorithms work.

4.2- Intellectual Skills:

- b1. Perform comparisons between (algorithms, methods, techniques...etc).
- b2. Create and/or justify designs to satisfy given requirements (synthesis, evaluation, application).
- b3. Distinguish the different types of algorithm paradigms and evaluate when an algorithmic design situation calls for it.
- b4. Criticize performance of standard protocols and analyze suitable usage cases.



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4.3- Professional and Practical Skills:

- c1- Communicate effectively by oral, written and visual means.
- c2- Perform independent information acquisition and management, using the scientific literature and Web sources.
- c3- Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.

4.4- General and Transferable Skills:

- 1. Work in stressful environment and within constraints.
- 2. Demonstrate efficient IT capabilities.
- 3. Manage tasks and resources.
- 4. Write and present effective computer programs that employ efficient algorithms.

4.5- Attitude:

- e1- Work in stressful environment and within constraints.
- e2- Relationship Emphasis a successful with other students.
- e3- Explain the nature of privacy and how it is protected by the Data Protection.
- e4- Know the culture of other peoples.
- e5- Discuss the legal background of copyright in national and international law.
- e6- A knowledge and respect of ethics and ethical standards in relation to a major area of study.



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3. Contents:

Topic	No. of hours	Lecture	Tutorial/ Practical
Introduction	6	4	2
Learning Processes	6	4	2
Single Layer Perceptrons (I)	6	4	2
Single Layer Perceptrons (II)	6	4	2
Multilayer Perceptrons	6	4	2
Multilayer Perceptrons (II)	6	4	2
Radial-Basis Function Networks	6	4	2
Radial-Basis Function Networks (II)	6	4	2
Principal Component Analysis	6	4	2
Principal Component Analysis (II)	6	4	2
Self-Organizing Maps	6	4	2
Self-Organizing Maps (II)	6	4	2
Rules Extraction	6	4	2
Hardware Implementation of Neural Networks	6	4	2