



Course Specifications

Course Title:	Neural Networks
Course Code:	501582-3
Program:	Bachelor in Computer Science
Department:	Department of Computer Science
College:	College of Computers and Information Technology
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3 Credit Hours
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered: 15 th level
4. Pre-requisites for this course (if any): 501481-3 (Artificial Intelligence)
5. Co-requisites for this course (if any): None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4	80%
2	Blended		
3	E-learning	1	20%
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	50
2	Laboratory/Studio	
3	Tutorial	
4	Others (specify)	
	Total	50

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>This is an introductory course to artificial neural networks (ANNs). Topics cover network abilities to cluster, associate, and classify patterns. Investigating these abilities entails studying different network models such as Kohonen, Associative, and Back-Propagation. Different learning techniques such as supervised and unsupervised methods are concurrently introduced. The course concludes with practical considerations in applying neural networks in different Machine Learning applications.</p>
<p>2. Course Main Objective</p> <p>Students at the end of this course are able:</p> <ul style="list-style-type: none"> • Introduce the main fundamental concepts and techniques of artificial neural network models • Investigate the main artificial neural network models and their applications

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Describe the analogy between biological and artificial models	K1
1.2	Describe different learning techniques such as supervised and unsupervised methods	K1
2	Skills :	
2.1	Demonstrate network abilities to cluster, associate, and classify patterns	S1
2.2	Evaluate practical considerations in applying neural networks in different applications	S2
3	Values:	
3.1		
3.2		

C. Course Content

No	List of Topics	Contact Hours
1	The analogy between the biological and artificial models	3
2	The Perceptron	3
3	The Linear Separability Concept	3
4	Single- Layer and Multi-Layer Networks	6
5	Learning techniques (e.g., Supervised and unsupervised)	3
6	Pattern association using associative memory networks	3
7	Pattern Clustering (Kohonen SOM and learning Vector Quantization Networks)	5
8	Pattern classification using Back-Propagation Networks	6
9	Introduction to important components of Neural Networks: Loss function, Optimization, and Generalization.	3
10	Introduction to Deep Learning	3
11	Pattern Classification using Deep Learning	6
12	Pattern Classification using Convolutional Neural Networks (CNNs)	6
Total		50

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	Describe the analogy between biological and artificial models	Lectures	Direct Assessment Tool Homework/Project/Exams Indirect Assessment Tool Course Exit Survey

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.2	Describe different learning techniques such as supervised and unsupervised methods	Lectures	Direct Assessment Tool Homework/Project/Exams Indirect Assessment Tool Course Exit Survey
...			
2.0	Skills		
2.1	Demonstrate network abilities to cluster, associate, and classify patterns	Lectures Homework Project	Direct Assessment Tool Homework/Project/Exams Indirect Assessment Tool Course Exit Survey
2.2	Evaluate practical considerations in applying neural networks in different applications	Lectures Homework Project	Direct Assessment Tool Homework/Project/Exams Indirect Assessment Tool Course Exit Survey
3.0	Values		
3.1			
3.2			
...			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Projects/Assignments	Weeks 2 →9	40%
2	Midterm Exam	Week 5	20%
3	Final Exam	Week 11	40%
4			
5			
6			
7			
8			

*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 :

- Meeting in pre-determined office hours
- Consultation by appointment (as needed)
- Through emails
- Through Blackboard

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<i>Introduction to Artificial Neural Networks</i> , Sivanandam & Paulraj, VIKAS Publishing House, 2013
Essential References Materials	<i>Neural Networks and Learning Machine</i> , Simon Haykin, Pearson Education, 2009
Electronic Materials	<ul style="list-style-type: none"> TBA during the course
Other Learning Materials	<ul style="list-style-type: none"> TBA during the course

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> Classroom with 20-30 chairs
Technology Resources (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"> Video projector / data show White board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	TBA during the course

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students	Students surveys and Students course evaluation
Improvement of Teaching	Course Coordinator	Deficiencies based on the student Evaluation, faculty input, course file, and program assessment
Verifying Standards of Student Achievement	Curriculum Committee	<ul style="list-style-type: none"> Review CAF (Course assessment file) Alumni surveys. Periodic exchange and remarking of tests or a sample of assignments with staff at another

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	CS council
Reference No.	Meeting #12
Date	23-10-1443

