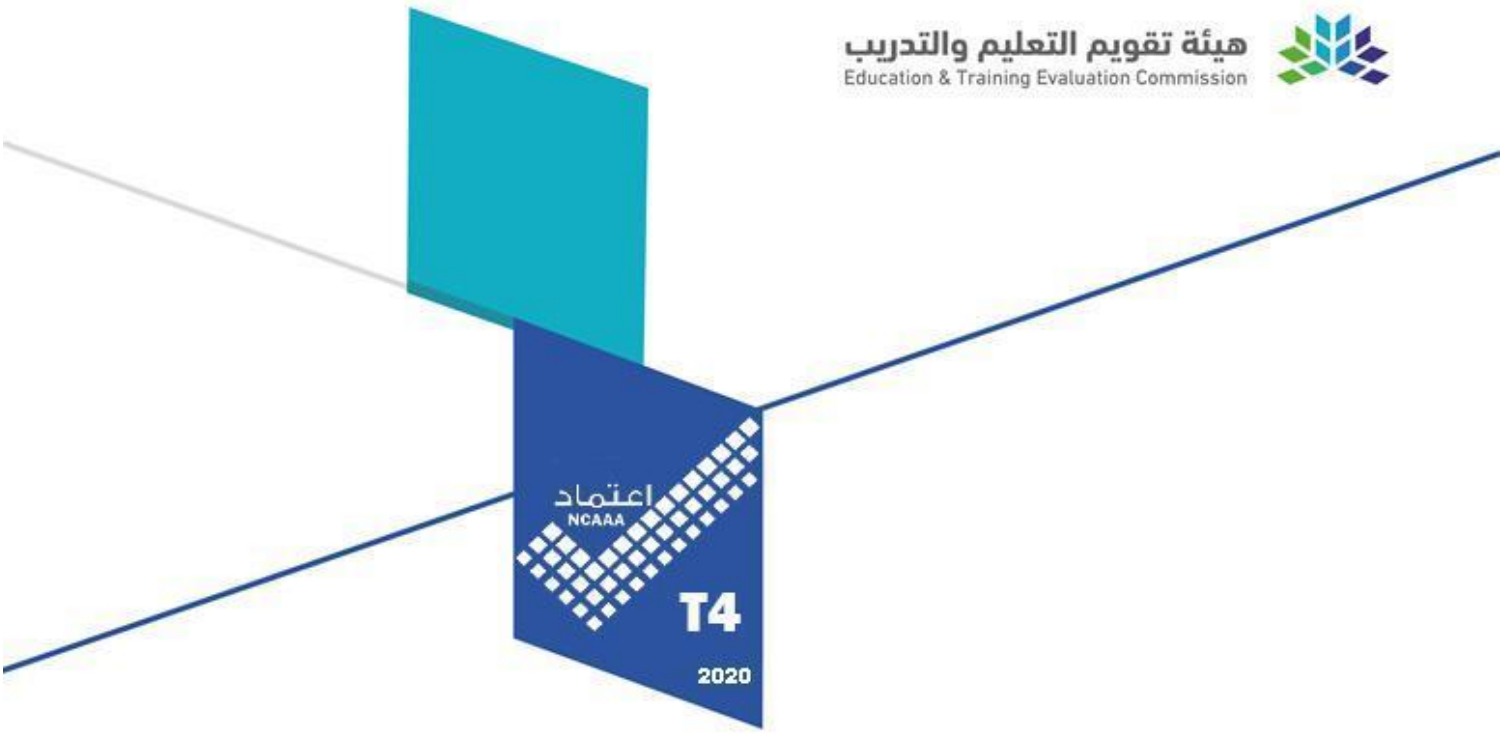
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Non-Traditional Database
Course Code:	**502575-3**
Program:	**Bachelor in Information Technology**
Department:	**Department of Information Technology**
College:	**College of Computers and Information Technology**
Institution:	**Taif University**

Table of Contents

A. Course Identification

1. Credit hours: 3
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☐ Elective ☑
3. Level/year at which this course is offered: 15/5
4. Pre-requisites for this course (if any)**: 502570-3 or 502571-3**
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	100 %
2	**Blended**	0	0
3	**E-learning**	0	0
4	**Distance learning**	0	0
5	**Other**	0	0

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	40
2	**Laboratory/Studio**	30
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	70

B. Course Objectives and Learning Outcomes

1. Course Description

This course aims to impart skills in alternative data storage mechanisms of handling ever growing data volumes of data. The concept of all non-traditional databases is to leverage the commodity hardware to support large volume of data and parallel processing. This course aims to build on the foundations of understanding various types of non-traditional databases that support large volume of data and parallel processing, these are in general categorized as: Row-based NoSQL database, column-based NoSQL database or volumnar database, document-based NoSQL database, graph database, time series database, in memory database, object-oriented, network, and triple stores.

2. Course Main Objective

On completing the course students will:

- Get a good insight into differences and similarities between Row-based NoSQL database and Column-based NoSQL database or Columnar database
- Appreciate the need for Document-based NoSQL database
- Understand the main principles of Network and Triple stores
- Gain working knowledge of Time Series Database, In Memory Database and Object-oriented

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Describe basic characteristics of querying and modeling in non-traditional DB	K1
2	**Skills :**	
2.1	Calculate XML Basics, SQL/XML, XML-relational mapping, XML Query languages, XML storage	S1
2.2	Analyze Graph databases and NoSQL storage types	S1
2.3	Design Map-reduce and document databases	S2
2.4	Review NoSQL Infrastructures	S2
3	**Values:**	
3.1	Demonstrate working in a group to build a data nontraditional data base to support an organization task	V2

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to No SQL, Characteristics of NoSQL databases. weaknesses of RDBMS, Object-relational mapping.	6
2	Object models, object-relational databases, ORM tools and Object databases	6
3	Graph theory and Graph databases.	7
4	XML Basics, SQL/XML, XML-relational mapping, XML Query languages, XML storage.	7
5	NoSQL storage types, advantages and drawback. Comparative study of NoSQL Products. Key-value stores, Map-reduce,	7
6	Map-reduce, document databases, Column stores, Colum compression, null suppression.	7
7	Extensible record stores, replication and fragmentation, Multi-version concurrency control and Paxos.	10
8	NoSQL Infrastructures. CAP theorem. Security issues in NoSQL Databases.	10
9	Introduction to MongoDB, creating, updating and deleting documents, querying, indexing, special index and collection types. Aggregation, Application Design.	10
Total		70

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 basic characteristics of querying and modeling in non-traditional DB	Lecture Discussion	Mid, Final, quizzes
2.0	**Skills**		
2.1	Calculate XML Basics, SQL/XML, XML-relational mapping, XML Query languages, XML storage	Lectures, lab work and exercises	Mid, Final, quizzes

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Analyze Graph databases and NoSQL storage types	Lectures, lab work and exercises	Mid, Final, quizzes
2.3	Design Map-reduce and document databases	Lectures, lab work and exercises	Mid, Final, quizzes
2.4	Review NoSQL Infrastructures	Lectures, lab work and exercises	Mid, Final, quizzes
3.0	**Values**		
3.1	Demonstrate working in a group to build a data nontraditional data base to support an organization task	Discussion Work group	Mini-Project

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes	4: 10	10%
2	Mid Exam	6	20%
3	Minor project	10	15%
4	Lab Exam	11	15%
5	Final Exam	12	40%

***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 :

Academic advising and counseling of students is an important component of teaching; student academic advising is a mandatory requirement of College of Computers and Information Technology (CCIT). Appropriate student advising provides support needed for the student during times of difficulty. In addition, it helps the student to build a close relationship with his/her advisor and to provide student motivation and involvement with the institution.

In addition, since faculty are usually the first to recognize that a student is having difficulty, faculty members play a key role in developing solutions for the students or referring them to appropriate services. Faculty members also participate in the formal student-mentoring program. Additional counseling is provided by course directors, who provide students with academic reinforcement and assistance and refer “at risk” students to the Vice Dean for Academic Affairs and the Vice Dean for female section.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	T1: Gaurav Vaish. Getting started with NoSQL. PACKT publishing house. Latest version. T2: Shashank Tiwari. Professional NoSQL. Wrox Publication. John Wiley & Sons. Inc. Latest version. T3: Christof Strauch, Lecture Notes, Selected Topics on Software Technology- Ultra-Large Scale Sites. Computer Science and Media, Hochschule der Median, Stuttgart, Stuttgart Media University. T4: Ian Robinson, Jim Webber, and Emil Eifrém. Graph databases. O’Reilly Media Latest version.

	T5: Elisa Bertino, Lorenzo Martino. Object-Oriented database systems: Concepts and Architectures. International Computer Science Series. Addison-Wesley Pub(Sd), Latest version.
Essential References Materials	None
Electronic Materials	All the course materials, lecture slides, practical workbook and other materials relating to Non-traditional databases are posted on Blackboard (lms.tu.edu.sa) where in each student can access the material with his studentID.
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• A Lecture room appropriate for maximum 25 students with a personal computer, a data show and a smart board. • A Lab room appropriate for maximum 15 students with a personal computer, a data show and a smart board.
Technology Resources (AV, data show, Smart Board, software, etc.)	• Data show / White Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

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	• 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	IT Department Council/ Executive program committee
Reference No.	11
Date	23/10/21443