



## Course Specifications

<b>Course Title:</b>	Fault Tolerant Computing
<b>Course Code:</b>	503539-3
<b>Program:</b>	Bachelor in Computer Engineering
<b>Department:</b>	Department of Computer Engineering
<b>College:</b>	College of Computers and Information Technology
<b>Institution:</b>	Taif University

## **Table of Contents**

<b>A. Course Identification</b>	<b>3</b>	
6. Mode of Instruction (mark all that apply)		3
<b>B. Course Objectives and Learning Outcomes</b>	<b>3</b>	
1. Course Description		3
2. Course Main Objective		3
3. Course Learning Outcomes		3
<b>C. Course Content</b>	<b>4</b>	
<b>D. Teaching and Assessment</b>	<b>4</b>	
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods		4
2. Assessment Tasks for Students		4
<b>E. Student Academic Counseling and Support</b>	<b>5</b>	
<b>F. Learning Resources and Facilities</b>	<b>5</b>	
1. Learning Resources		5
2. Facilities Required		5
<b>G. Course Quality Evaluation</b>	<b>5</b>	
<b>H. Specification Approval Data</b>	<b>6</b>	



## A. Course Identification

<b>1. Credit hours:</b> 3
<b>2. Course type</b>
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"/>
<b>3. Level/year at which this course is offered:</b> 10/5
<b>4. Pre-requisites for this course (if any):</b> 503528-3
<b>5. Co-requisites for this course (if any):</b> None

## 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

## 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	45
2	Laboratory/Studio	
3	Tutorial	
4	Others (specify)	
	<b>Total</b>	45

## B. Course Objectives and Learning Outcomes

<p><b>1. Course Description</b></p> <p>This course covers basic concepts of dependable computing. Reliability of non-redundant and redundant systems. Dealing with circuit-level defects. Logic-level fault testing and tolerance. Error detection and correction. Diagnosis and reconfiguration for system-level malfunctions. Degradation management. Failure modeling and risk assessment.</p>
<p><b>2. Course Main Objective</b></p> <ol style="list-style-type: none"> <li>Understand Dependability measures and modeling.</li> <li>Discuss how to deal with low level impairments.</li> <li>Understand various hardware implementation schemes.</li> </ol>

## 3. Course Learning Outcomes

CLOs	Aligned PLOs

<b>1</b>	<b>Knowledge and Understanding</b>	
1.1	Recognise the basic concepts of dependable computing	K1
1.2	Describe the reliability of nonredundant and redundant systems	K1
1.3		
1...		
<b>2</b>	<b>Skills :</b>	
2.1	Identify and interpret the various circuit level defects	S1
2.2	Estimate and classify all logic level fault testing and tolerance.	S1
2.3	Discuss error detection and correction.	S3
2...		
<b>3</b>	<b>Values:</b>	
3.1		
3.2		
3.3		
3...		

### C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Fault Tolerant Computing	4
2	Dependability measures in fault tolerant	4
3	Fault tolerant combinational modeling	4
4	Fault tolerant State space modeling	4
5	Defect avoidance and circumvention	4
6	Fault testing and Fault masking	5
7	Error detection and Error correction	5
8	Malfunction diagnosis and tolerance	5
9	Degradation allowance and management	5
10	Failure confinement	5
11		
12		
13		
14		
<b>Total</b>		45

### D. Teaching and Assessment

#### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Recognise the basic concepts of dependable computing	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.2	Describe the reliability of nonredundant and redundant systems	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments



...			
<b>2.0</b>	<b>Skills</b>		
2.1	Identify and interpret the various circuit level defects	Lecture Discussion Projects	Written Exams Quizzes Assignments Oral Test Project Practical Test
2.2	Estimate and classify all logic level fault testing and tolerance.	Lecture Discussion Projects	Written Exams Quizzes Assignments Oral Test Project Practical Test
...	Discuss error detection and correction.	Lecture Discussion Projects	Written Exams Quizzes Assignments Oral Test Project Practical Test
<b>3.0</b>	<b>Values</b>		
3.1			
3.2			
...			

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments	Continues	5%
2	Midterm Exam	7	20%
3	Project	14	15%
4	Quizzes	Continues	10%
5	Final Exam	16	50%
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 :**

- Teaching staff provide at least 6 office hours for students to help them in the course as well as in any other academic issues.
- Consultation can also be done 24 hours/ 7days through university Edugate (Tawasol)

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	Pradhan, D.K, Fault-Tolerant Computer System Design, Prentice Hall, 11 <sup>th</sup> Ed, 1996.
<b>Essential References Materials</b>	Reliable Computer Systems: Design and Evaluation (second edition) by D. P. Siewiorek and R. S. Swarz, Digital Press.
<b>Electronic Materials</b>	<a href="http://class.ece.iastate.edu/arun/Cpre545/references.htm">http://class.ece.iastate.edu/arun/Cpre545/references.htm</a>
<b>Other Learning Materials</b>	Fault Tolerance in Distributed Systems, Pankaj Jalote, PTR Printice Hall, 1994.

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Traditional Classrooms, Laboratories
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	White Board. Datashow, software
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Extent of achievement of course learning outcomes	Students	Indirect (Survey)
Effectiveness of teaching and assessment	Students	Indirect (Survey)
Extent of achievement of course learning outcomes	Faculty	Course Report

**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	Computer Engineering Council / Curriculum Committee
Reference No.	16
Date	04/02/2019

