Model No.12

Course Specifications: Reliability and Engineering Statistics

University: Benha University
Faculty: Faculty of Engineering at Shoubra
Department offering the program: Mechanical Engineering Department
Department offering the course: Mechanical Engineering Department

1- Course Data

Course Code: MDP365 **Course Title:** Reliability and Engineering Statistics
Specialization: Mechanical Production Engineering **Course Type:** Elective **Study Year:** Third Year
Teaching Hours: Lecture: 4 Tutorial:2 Practical: 0 Total: 6

2- Course Aim

For students undertaking this course, the aims are to:

1 -design simulation models, analyze simulation output, collect and analyze input data, incorporate knowledge from other disciplines in simulation studies

Outcomes of Course (ILOS)

a- Knowledge and Understanding 3- Intended Learning

On completing this course, students will be able to demonstrate the knowledge and understanding of :

a.1 Characteristics of engineering materials related to reliability. (A.3)
a.2 Methodologies of solving engineering reliability problems. (A.5)
a.3 The key concepts of quality engineering and reliability and their importance in the production of goods and services.(A.17)

b- Intellectual Skills

At the end of this course, the students will be able to:

b.1 Choose suitable solutions for engineering problems based on analytical thinking. (B.2)
b.2 Assess different ideas and knowledge from a range of sources. (B.4)
b.3 Analyze and solve the problems presented by industrial entities.(B.15)

c- Professional Skills

On completing this course, the students are expected to be able to:

c.1 Use reliability engineering to improve design or product. (C.2)
c.2 Use reliability techniques or software packages. (C.6)
c.3 Apply the acquired skills in a commercial or industrial environment.(C.15)

d- General Skills

At the end of this course, the students will be able to:

d.1 Effectively manage tasks, time, and resources.(D.6)
d.2 Search for information and engage in life-long self-learning reliability. (D.7)
d.3 Refer to relevant literatures.(D.9)

4- Course Contents

No.	Topics
1	Introduction to Reliability Engineering
2	Probability and Component Reliability Theory
3	Reliability Block Diagrams
4	Hazard and Operability (HAZOP) Studies
5	Failure Modes and Effects Analysis (FMEA)
6	Reliability Centered Maintenance
7	Rapid Ranking
8	Fault Tree Analysis
9	Markov Analysis
10	Event Tree Analysis
11	Monte Carlo Simulation
12	Applications and Case Studies

5- Teaching and Learning Methods

5.1 Lectures
5.2 Tutorial
5.3 Class activity
5.4 Case study

6- Teaching and Learning Methods of Disables

- Nothing.

7- Student Assessment

a- Student Assessment Methods

1. Five Assignments to assess knowledge and intellectual skills.
2. Two quizzes to assess knowledge, intellectual and professional skills.
3. Midterm exam to assess knowledge, intellectual, professional and general skills.
4. Final exam to assess knowledge, intellectual, professional and general skills.

b- Assessment Schedule

NO.	Assessment	Week
1	Assignments	3, 5 , 7 ,10, 11
2	Quiz	4, 9
3	Midterm exam	8
4	Oral exam	-
5	Final exam	15

c- Weighting of Assessments

Assessment	Weight (%)
Midterm Examination	20
Final Term Examination	67
Oral Examination	-
Semester Work	13
Other Types of Assessment	-
Total	**100**

8- List of References

a- Course Notes: Course notes prepared by instructor.

b- Recommended Books

1. Ebeling, Charles E., (1997), An Introduction to Reliability and Maintainability Engineering, McGraw-Hill Companies, Inc., Boston.
2. Denney, Richard (2005) Succeeding with Use Cases: Working Smart to Deliver Quality. Addison-Wesley Professional Publishing. ISBN
3. Gano, Dean L. (2007), "Apollo Root Cause Analysis" (Third Edition), Apollonian Publications, LLC., Richland, Washington

Course Coordinator: Dr. Sayed Zyaan

Head of Department: Prof. Dr. Osama Ezzat Abdelatif

Model No.11A

Course Specifications: Reliability and Engineering Statistics

University: Benha University
Faculty: Faculty of Engineering at Shoubra
Department offering the program: Mechanical Engineering Department
Department offering the course: Mechanical Engineering Department

Matrix of Knowledge and Skills of the course

No.	Topics		week	Basic Knowledge	Intellectual Skills	Professional Skills	General Skills
1	Introduction to Reliability Engineering	1	a1	b1			
2	Probability and Component Reliability Theory	2	a1	b2	c1		
3	Reliability Block Diagrams	3	a2	b2	c1		
4	Hazard and Operability (HAZOP) Studies	4	a2	b2		d1	
5	Failure Modes and Effects Analysis (FMEA)	5	a1	b2		d2	
6	Reliability Centered Maintenance	6		b1	c3		
7	Rapid Ranking	7	a3	b1	c2		
8	Fault Tree Analysis	9	a2	b3		d3	
9	Markov Analysis	10	a3	b2	c1		
10	Event Tree Analysis	11	a2	b3	c3		
11	Monte Carlo Simulation	12		b2		d2	
12	Applications and Case Studies	13	a3	b3		d2	

Course Coordinator: Dr. Sayed Zyaan

Head of Department: Prof. Dr. Osama Ezzat Abdelatif

Matrix of Course Aims and ILO's

Course Title: Reliability and Engineering Statistics

Course Code: MDP365

Teaching Hours: Lecture: 4 Tutorial: 2 Total: 6

Major or minor element of program: Major

Program on which the course is given: B.Sc. Mechanical Production Engineering

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

Academic year / level: 2014-2015 Third Year / Second semester

Date of specifications approval: 16/3/2010

Course aims	Basic Knowledge	Intellectual Skills	Professional Skills	General Skills
Design simulation models, analyze simulation output, collect and analyze input data, incorporate knowledge from other disciplines in simulation studies	a1, a3	b2, b3	c1, c2	d1, d2

Course Coordinator: Dr. Sayed Zyaan

Head of Department: Prof. Dr. Osama Ezzat Abdelatif