Model No.12

Course Specifications: Engineering Thinking

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: GEN391 **Course Title:** Engineering thinking
Specialization: Mechanical Production Engineering **Course Type:** Elective **Study Year:** Third Year
Teaching Hours: Lecture: 2 Tutorial: 0 Practical: 0 Total: 2

2- Course Aim

For students undertaking this course, the aims are to:

1. Appreciate the different forms of intelligence and aware of thinking and learning processes.

3- Intended Learning Outcomes of Course (ILOS)

a- Knowledge and Understanding

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

a- 1 –Adventurous and playful. (A7)
a- 2 – A set of skills that allows them to use both sides of their brains to discuss topics, generate ideas, and devise solutions. (A11)
a- 3 – Design teaching and research in technology education.(A20)

b- Intellectual Skills

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

b.1 - Combine, exchange, and assess different ideas, views, and knowledge from a range of sources (B4)
b. 2 - Examine connections between design and creativity (B7)

c- Professional Skills

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

c.1 – Apply engineering thinking to solve engineering problems. (C7)
c.2-and have an interest in developing their potential for creativity are encouraged to register (C.11)

d- General Skills

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

d- 1 - Effectively manage tasks, time, and resources .(D6)
d- 2 - Acquire entrepreneurial skills .(D8)

4- Course Contents

Week no.	Topics
1	Introduction: Goals and expectations
2	Introduction: Getting to know each other
3	Curiosity: Asking questions
4	Curiosity: Observing
5	Curiosity: Challenging assumptions
6	Curiosity: Contemplating
7	Learning: Own beliefs
9	Learning: Own sources
10	Learning: Points of view. Six thinking hats
11	Learning: Anti-models
12	Ambiguity and Uncertainty: Drawing uncertainty
13	Logic and Imagination: Mind-mapping 1
14	Interconnections: Connections

5- Teaching and Learning Methods

5.1 Lectures
5.2 Tutorial
5.3 Class activity
5.4 Case study
5.5 Seminar / workshop

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	Quizzes	4, 9
3	Midterm exam	8
4	Oral exam	-
5	Final exam	15

c- Weighting of Assessments

Assessment	Weight (%)
Midterm Examination	10
Final Term Examination	80
Oral Examination	-
Semester Work	10
Assessments and Quizzes	-
Total	**100**

8- List of References

a- Course Notes: Course notes prepared by instructor.

b- Recommended Books

- Engineering a Safer World: Systems Thinking Applied to Safety by By Nancy Leveson 2011
- Advanced Systems Thinking, Engineering, and Managemen by t Derek K. Hitchins - 2003

Course Coordinator: Dr. Mamdouh Soliman

Head of Department: Prof. Dr. Osama Ezzat Abdelatif

Model No.11A

Course Specifications: Engineering thinking

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 no.	Knowledge and Understanding Skills	Intellectual Skills	Practical and Professional Skills	General and Transferable Skills
1	Introduction: Goals and expectations	1	a1		c2	
2	Introduction: Getting to know each other	2		b1		d1
3	Curiosity: Asking questions	3	a1		c2	
4	Curiosity: Observing	4		b1		d2
5	Curiosity: Challenging assumptions	5		b1		
6	Curiosity: Contemplating	6	a3		c1, c2	
7	Learning: Own beliefs	7		b1		d3
8	Midterm Exam	8				
9	Learning: Own sources	9	a2			
10	Learning: Points of view. Six thinking hats	10		b2	c1	
11	Learning: Anti-models	11	a2		c2	d2
12	Ambiguity and Uncertainty: Drawing uncertainty	12		b1		
13	Logic and Imagination: Mind-mapping 1	13	a1	b1, b2	c1, c2	
14	Interconnections: Connections	14	a3	b2		d1
15	Final Exam	15				

Course Coordinator: Dr. Mamdouh Soliman

Head of Department: Prof. Dr. Osama Ezzat Abdelatif

Matrix of course aims and ILO's

Course Title: Engineering Thinking

Course Code: GEN391

Teaching Hours: Lecture: 2 Tutorial: 0 Total: 2

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: 2014

Course aims	Basic Knowledge	Intellectual Skills	Professional Skills	General Skills
Appreciate the different forms of intelligence and aware of thinking and learning processes.	a1, a2, a3	b1,b2	c1,c2	d2,d2

Course Coordinator: Dr. Mamdouh Soliman

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