Course specification
(2203 Probability and Statistics)

Faculty:	*HICIT- **Higher Institute for Computers & Information Technology**-El Shorouk Academy*
Programme(s) on which the course is given:	Under graduate program in Computer Science
Major or minor element of programme:	Core
Department offering the programme	Department of Computer Science
Department offering the course:	Department of Computer Science
Year / Class	2nd Year – 2nd semester
Date of specification approval	**1/8/2022**

A- Basic Information

Title: Probability and Statistics	***Code:*** 2203		
Weekly Hours:			
Lecture : 3	**Exercise: - 3**	**Practical :**	**Total:** 6

B- Professional Information

1- Course Aims:

- Understand the principles and probability theories and basic of statistics.
- Understand methods of processing statistical data.
- Understand and application of statistical data.

2- Program ILOs Covered by Course

Program Intended Learning Outcomes			
Knowledge and understanding	**Intellectual Skills**	**Professional and practical skills**	**General and Transferable skills**
A1, A4	**B1, B5, B7, B8**	**C16**	**D11**

3- Intended learning outcomes of course (ILOs)

After completing this course, the student should be able to:

a- Knowledge and Understanding

a1. Identify the fundamental probability and statistics concepts, principles and theories necessary for computer science such as artificial intelligence, expert systems, vision, neural networks, …etc. [A1,A4]

b- Intellectual skills

b1. Solve a wide range of problems related to different courses.[B1,B5,B7,B8]

c- Professional and practical skills

c1. Practice statistical techniques to solve big problems dedicated for computer science. [C16]

d- General and transferable skills

d1. Communicate effectively by oral, written and visual means. [D11]

d2. Work effectively as an individual and as a member of a team. [D11]

d3. Develop Creativity and imagination skills, Self-assessment ability and Critical thinking and analytic ability. [D11]

3- Contents

Topic	Hours	Lec.	Exc/Lab
An introduction to Descriptive Statistics.	6	3	3
Mean, Median, and Variance in row data and grouped data.	12	6	6
Probability, Sampling, Sample space, Permutation and combinations.	12	6	6
Discrete and continuous probability functions.	12	6	6
Conditional Probabilities, Bayes theorem, Expectations.	12	6	6
Random variables, the probability density functions.	12	6	6
Special distributions such as Normal, uniform, Binomial, … distributions.	12	6	6
Correlation – Regression.	6	3	3
Hypothesis Testing, Analysis of Variance.	9	3	6
Selected Topics	3	3	-

4- Teaching and learning methods

Teaching and learning methods	Used
Active Learning	
Lectures(blending learning – online learning using virtual classroom)	√
Tutorial Exercises (hybrid learning – online learning)	√
Practical Lab(blending learning– online learning)	-
Exercises	-
Discussions.	√
Self – Learning strategy	
Reading material	√
Websites search	√
Research and reporting	√
Self-studies	-

Experimental strategy	
Group work	-
Presentation	-
Problem solving strategy	
Problem solving/problem solving learning based	√
Case study	-
Synchronous E-Learning	
Virtual lab	-
Virtual class	-
Chat Room	-
Video lectures	-
Asynchronous E-Learning	
E-Learning	√

5 -Student assessment methods

Methods	Assessment	Used
Electronic Midterm Exam	To assess the knowledge and understanding achieved by the student during the previous weeks. (online on e-learning hub)	√
Pencil-to-Paper Final Exam	To evaluate what the student gain at the end of the course, and to assess: the knowledge and understanding, general skills, and intellectual skills.	√
Electronic Course Work & Quizzes	To keep the student always in the course, and to evaluate knowledge, understanding, intellectual, and transferable skills.(online on e-learning hub)	√
Practical Exam	to measure the ability of students to design and implement a software program(FTF).	-
Partipation	To assess the knowledge and understanding achieved by the student during the previous weeks.	√

Assessment Schedule

Assessment	Week #
Participation	**3-14**
Mid Term Exam	**8**
Final Exam	**16**
Course Work &Quizzes	**2-14**

Assessment Weight

Assessment	Weight %
Participation	**10%**
Mid Term Exam	
Final Exam	**80%**

Course Work &Quizzes	**10%**
Total	**100**

Course Work &Quizzes: (Short Exams, Assignments, Researches, Reports, Presentations, Class/Project discussion)

6 -List of references

6.1 Text Books

- Hayter, Anthony J. *Probability and statistics for engineers and scientists*. Cengage Learning, 2012.
- Walpole, Ronald E., et al. *Probability and statistics for engineers and scientists*. Vol. 5. New York: Macmillan, 1993.
- Ross, Sheldon M. *Introduction to probability and statistics for engineers and scientists*. Academic press, 2020.
- Devore, Jay L. *Probability and Statistics for Engineering and the Sciences*. Cengage Learning, 2015.

7- Required Facilities

To assess professional and practical skills given the following facilities:

a. Tools & SW (Technologies facilities):
   - **Spss software**
   - **Microsoft TEAMS to create virtual classrooms for lectures, discussions for project**
   - **portal(MOODLE) to make electronic quizzes and electronic midterm exam**
   - **portal(MOODLE) to upload project deliverable and assignment**
   - **academy portal(MOODLE) to upload electronic material**

b. Teaching facilities:

	Lecture	*class*	*Lab*
Whiteboard	used	-	used
Pc/laptop	used	-	used
Data show	used	-	used
Webinars	MS TEAMS	-	MS TEAMS
SocialMedia	Facebook Page for 2nd year	-	Facebook Page for 2 year
ChatRoom	ChatTeams	-	ChatTeams
Videos	Stream-MOODLE	-	Stream-MOODLE
Website	MOODLE	-	MOODLE

8-Course Matrices

8.1-Course Content/ILO Matrix

Course Contents	Knowledge & understanding	Intellectual skills	Professional and practical skills	General		
	A1	B1	C1	D1	D2	D3
An introduction to Descriptive Statistics.	√	√	√			
Mean, Median, and Variance in row data and grouped data.	√	√	√			
Probability, Sampling, Sample space, Permutation and combinations.	√	√	√			
Discrete and continuous probability functions.	√	√	√			
Conditional Probabilities, Bayes theorem, Expectations.	√	√	√			
Random variables, the probability density functions.	√	√	√			
Special distributions such as Normal, uniform, Binomial, … distributions.	√	√	√			
Correlation – Regression.	√	√	√			
Hypothesis Testing, Analysis of Variance.	√	√	√			
Selected Topics	√	√				

8.2-Learning Method /ILO Matrix

Learning Methods	Knowledge & understanding	Intellectual skills	Professional and practical skills	General		
	A1	B1	C1	D1	D2	D3
Lectures	√	√	√			
Tutorial Exercises		√	√			
Discussions.	√	√	√	√	√	√
Reading material	√					
Websites search	√					
Research and reporting	√	√				
problem solving/problem solving learning based		√	√			

8.3-Assessment Methods /ILO Matrix

Assessment Methods	Knowledge & understanding	Intellectual skills	Professional and practical skills	General		
	a1	b1	c1	d1	d2	d3
Mid Term Exam	√	√	√			
Final Exam	√	√				
Course Work &Quizzes	√	√	√	√	√	√

9. Course ILOs Vs Program ILOs

Program ILOS / Course ILOS		K&U		Int.				P. &P.	General
		A1	A4	B1	B5	B7	B8	C16	D11
K&U	a1	√	√						
Int.	b1			√	√	√	√		
P. &P.	c1							√	
General	d1								√
	d2								√
	d3								√

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