



ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

STAT-324

PROBABILITY AND STATISTICS FOR ENGINEERS AND SCIENTISTS

**Course Specifications
(CS)**



Course Specifications

Institution	Date of Report
College/Department: Department of Statistics and Operations Research	

A. Course Identification and General Information

1. Course title and code: Probability and Statistics for Engineers STAT 324		
2. Credit hours: 3 (2 + 1)		
3. Program(s) in which the course is offered. Bachelor of Engineering.		
4. Name of faculty member responsible for the course: Dr. Mamdouh Abdul Wakeel Mohamed Montaser		
5. Level/year at which this course is offered: Fourth level (2nd year)		
6. Pre-requisites for this course (if any) : None		
7. Co-requisites for this course (if any) : None		
8. Location if not on main campus: Not applicable.		
9. Mode of Instruction (mark all that apply)		
a. Traditional classroom	<input checked="" type="checkbox"/> What percentage?	<input type="text" value="70%"/>
b. Blended (traditional and online)	<input checked="" type="checkbox"/> What percentage?	<input type="text" value="30%"/>
c. e-learning	<input type="checkbox"/> What percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> What percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	<input type="text"/>
Comments:		



B Objectives

1. What is the main purpose for this course?

Learn : what is statistics concepts and its applications.

: what is Probability concepts and its applications.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field):

* Using the latest edition of the book for this course:

- Probability and Statistics for Engineers and Scientists, by
R. E. Walpole and R. H. Myers

* Using several references

Encouraging students to search for the information related to the subjects of the course through the Internet

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Summary of the main learning outcomes for students enrolled in the course.

- Introduction to Sample space, Random events, Probability rules, Conditional probability, Baye's rule.
- Definition of Random variables, Discrete and Continuous distributions.
- Definition of the mean (mathematical expectation) and the variance of a random variable. Mean and variance of a linear combination of independent random variables.
- Definition of Discrete distributions (Uniform, Binomial, Hyper geometric, Poisson).
- Definition of Continuous distributions (Uniform, Exponential, Normal).
- Sampling distributions of some sample statistics, the t-distribution.
- Emphasizing the concept of Estimation methods: Point estimation, Confidence interval estimation.
- Introducing the concepts involved in Testing Hypotheses. Hypotheses testing of a single Population parameter (mean, proportion, difference between two means and difference between two proportions of independent



populations.		
<ul style="list-style-type: none"> Introducing the concept of simple linear correlation and linear regression. 		
List of Topics	No. of Weeks	Contact Hours
* Introduction to Sample space, Random events, Probability rules, Conditional probability, Baye's rule.	2	4
*Definition of Random variables, Discrete and Continuous distributions.	2	4
*Definition of the mean (mathematical expectation) and the variance of a random variable. Mean and variance of a linear combination of independent random variables.	2	4
* Definition of Discrete distributions (Uniform, Binomial, Hyper geometric, Poisson.	2	4
* Some of the common Continuous Distributions: Uniform, Exponential, Normal distributions.	2	4
* Sampling distributions of some sample statistics, the t-distribution.	2	4
* Emphasizing the concept of Estimation methods: Point estimation, Confidence interval estimation.	2	4
* Introducing the concepts involved in Testing Hypotheses. Hypotheses testing of a single Population parameter (mean, proportion, difference between two means and difference between two proportions of independent	2	4



2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	32	48				80
Credit	32	16				48

3. Additional private study/learning hours expected for students per week.	<input type="text"/>
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy
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Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The *National Qualification Framework* provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.



	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge *A brief summary of the knowledge or skill the course is intended to develop; *A description of the teaching strategies to be used in the course to develop that knowledge or skill.		
1.1	The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.		
1.2			
2.0	Cognitive Skills: *A description of the teaching strategies to be used in the course to develop that knowledge or skill.		
2.1			
2.2			
3.0	Interpersonal Skills & Responsibility: The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.		
3.1			
3.2			
4.0	Communication, Information Technology, Numerical: The reference book.		
4.1			
4.2			
5.0	Psychomotor		
5.1			
5.2			

Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

NQF Learning Domains	Suggested Verbs
Knowledge	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write.
Cognitive Skills	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise.
Interpersonal Skills & Responsibility	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
Communication, Information Technology, Numerical	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize.
Psychomotor	demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct



Suggested **verbs not to use** when writing measurable and assessable learning outcomes are as follows:

Consider	Maximize	Continue	Review	Ensure	Enlarge	Understand
Maintain	Reflect	Examine	Strengthen	Explore	Encourage	Deepen

Some of these verbs can be used if tied to specific actions or quantification.

Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Knowledge of probability rules, independent random events.		
2	Knowledge of random variables and their probability distribution		
3	Knowledge of the most common discrete probability distributions and their relationships		
4	Knowledge of the most common continuous probability distributions and their applications		
5	Knowledge of sampling distribution of the some important sample statistics		
6	Knowledge of principals of estimation, estimation of some important population parameters		
7	Knowledge of principals of estimation of the simple linear regression		
8			



D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)
-Assessment task (eg. essay, test, group project, examination etc.)
-The first med term exam
-The second med term exam
-Home work
-Final exam.

E. Learning Resources

1. List Required Textbooks:

- Probability and Statistics for Engineers and Scientists. By: R.E. Walpole and R.H. Myers
- Introduction to Theory of Statistics by A. Mood, F. Graybill & B. Boes

2. List Essential References Materials (Journals, Reports, etc.)

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- Mathematical Statistics by Steven Arnold
- Mathematical Statistics by Hogg & Craig.

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

Any web Site for any of the Staff teaching the course,

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)



2. Computing resources (AV, data show, Smart Board, software, etc.) -Home work -First med term exam -Second med term exam -Final exam (Copy for the previous exams)
2. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Obtaining Student Feedback on Effectiveness of Teaching Questionnaires completed by students
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor -Home works - Exams..... Questionnaires completed by students
3 Processes for Improvement of Teaching -New textbook and references -Using newly computational techniques. -Using newly teaching methods and techniques.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) - Not applicable



5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Updating and reviewing the contents of the course.
- Comparing and evaluating the progress of students in different years.
- Reviewing the process of Evaluation of students

Faculty or Teaching Staff: Dr. Mamdouh Abdul Wakeel Mohamed Montaser

Signature: _____ **Date Report Completed:** _____

Received by: _____ **Dean/Department Head**

Signature: _____ **Date:** _____