



الجامعة الافتراضية السورية
SYRIAN VIRTUAL UNIVERSITY

Probability and Statistics

Course Definition

Information

Technology

Engineering



Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

1. Basic Information:

Course Name	Probability and Statistics
Course Code	BPS601
Number of Presentational Sessions*	7*2
Number of Synchronous Sessions**	7
Number of Shorter Tests***	2
Number of Exams***	1
Theoretical Sessions Work Load (hrs.)	42
Practical Sessions Work Load (hrs.)	21
Credit Hours	6

*Each presentational session comprises both recorded lecture (1.5 hrs.) and interactive learning content (1.5 hrs.).

**Each synchronous session comprises the interactive lecture carried out in real time in a virtual class (1.5 hrs.).

***Each shorter test is 0.5 hr. long. The final exam is 2 hrs. long.

N.B.

Generally, each chapter requires two presentational sessions: one for the recorded content and one for the interactive content (unless the chapter is too long, in which case it may require more sessions (. This note applies to synchronous sessions as well, where each chapter requires one synchronous session generally.

2. Prerequisites courses:

Course	Code
Discrete Math	BDM501
Mathematical Analysis II	BMA402

Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

3. Course Objectives:

This course is an introduction to Probability and Statistics. The students will be able to understand and to use the basic concepts in probability: sample space, events and their probabilities, fundamental principle of counting, the conditional probability and Bayes rule, the concept random variables, probability distributions (discrete, continuous and conditional distributions), mathematical expectation and variance, some famous discrete and continuous probability distributions focusing on the normal distribution. The students will be able to apply the concept of conditional probability while studying discrete Markov chains. The students will be then, introduced to the basic concepts in statistics and various methods of representation, displaying and describing data and some numerical measures. Finally, the students will be introduced to inference statistics by studying the Central limit theorem, sampling distributions and estimation of some population's parameters.

4. Learning Outcomes (LO):

After successfully completing the course, students should be able to:

- Apply the basic concepts of probability and counting methods to calculate probability of an event.
- Understand and use the random variables and probability distributions and be able to distinguish between discrete and continuous distributions.
- Understand and apply the notion of condition probabilities in studying discrete Markov chains.
- Organize and display the collected data and calculate the measures of central tendency and measures of variability.

Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

- Apply the central limit theorem, Identify sampling distributions and estimate the sample mean.

5. Assessment Results:

Chapter Number	Chapter Title	General Objectives	Assessment Type				
			Interactive Content & Recorded Sessions	Applied Activities (Synch. Sessions)	Final Exam*/ Shorter Tests* *	Presentations and Interviews***	Reports ***
CH1	Basic concepts in probability	Comprehension –Analytical Thinking – Tools And Application Hands– On	√	√	√	√	√
CH2	Random variables and probability distributions	Comprehension –Analytical Thinking – Tools And Application Hands– On	√	√	√	√	√
CH3	Discrete probability distributions	Comprehension –Analytical Thinking – Tools And Application Hands– On	√	√	√	√	√

Syrian Arab Republic	 SVU الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

CH4	Continuous probability distributions	Comprehension –Analytical Thinking – Tools And Application Hands– On	√	√	√	√	√
CH5	Discrete Markov Chains	Comprehension –Analytical Thinking – Tools And Application Hands– On	√	√	√	√	√
CH6	Basic concepts in statistics	Comprehension –Analytical Thinking – Tools And Application Hands– On	√	√	√	√	√
CH7	Sampling distributions and estimation theory	Comprehension –Analytical Thinking – Tools And Application Hands– On	√	√	√	√	√

***The final exam is two hours long and is given at the end of the course.**

****Shorter tests are about 30 minutes long and are given after three or four lectures throughout the semester during synchronous sessions.**

*****Presentations, interviews, and reports are submitted once after each three or four lectures throughout the semester during synchronous sessions.**

Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

6. Course Syllabus:

Chapter	Subject	Content	Number of Learning Objects	Number of synchronous Learning Objects
CH1	Basic concepts in probability	<ol style="list-style-type: none"> 1. Basic Definitions 2. Events 3. Counting Sample Points 4. Probability of an event 5. Conditional Probability 6. Bayes theorem 	6	3
CH2	Random variables and probability distributions	<ol style="list-style-type: none"> 1. Random Variables 2. discrete probability distributions 3. continuous probability distributions 4. joint probability distributions 5. mathematical expectation 6. variance of a random variable 	6	3
CH3	Discrete probability distributions	<ol style="list-style-type: none"> 1. Bernoulli's distribution 2. binomial distribution 3. geometric distribution 4. hypergeometric distribution 5. Poisson distribution 	5	2
CH4	Continuous probability distributions	<ol style="list-style-type: none"> 1. uniform distribution 2. normal distribution 3. gamma and exponential 	7	3

Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

		distribution 4. Chi-squared distribution 5. lognormal distribution 6. Weibull distribution 7. Rice distribution		
CH5	Discrete Markov Chains	1. Random Processes 2. Markov chains	2	1
CH6	Basic concepts in statistics	1. Introduction to Statistic 2. Data Logging, Organization and Presentation 3. Measures of Central Tendency 4. measures of variability	4	2
CH7	Sampling distributions and estimation theory	1. Introduction to Statistic 2. Data Logging, Organization and Presentation 3. Measures of Central Tendency 4. measures of variability	4	2

Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

7. Practical Activity:

- **Tools and Labs:**

Tool Name	Description
MS- Excel R	Using software can help students in their future work.

- **Practical Activities per Chapters:**

Chapter	Activities Type	Remarks
CH1	<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Experiments <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Others	Homework
CH2	<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Experiments <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Others	Homework

Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

CH3	<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Experiments <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Others	Homework
CH4	<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Experiments <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Others	Homework
CH5	<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Experiments <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Others	Homework
CH6	<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Experiments <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Others	Homework

Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

CH7	<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Experiments <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Others	Homework
------------	--	----------

8. References:

1. د. عمران قويا "مبادئ الاحتمالات"، منشورات جامعة دمشق 2000-2001.
2. د. عزات قاسم، " مبادئ الاحتمالات والاحصاء"، منشورات جامعة دمشق 2014-2015.
3. DOUGLAS C. MONTGOMERY, GEORGE C. RUNGER ,“Applied Statistics and Probability for Engineers”, 7th Edition, Wiley, 2018.
4. R. Walpole, R H. Myers, Sh L. Myers and, K. Ye, “Probability and Statistics for Engineers and scientists”, 9th Edition, Prentic Hall, 2012.
5. Dimitri P. Bertsekas and John N.Tsitsiklis , “Introduction to Probability”, Lecture Notes, M.I.T, 2000.
6. Norman Matloff, “Probability and Statistics for Data Science”, CHAPMAN & HALL BOOK, 2020.