

<p>Kingdom of Saudi Arabia Ministry of Higher Education <b>Qassim University</b> College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
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## CE 635 Probability and Statistics in Hydrology

**College:** Engineering

**Department:** Civil

### First: Course Definition

**1- Course Code:** CE 635

**2- Units:** 3

**3- Semester:**

**4- Prerequisite:**

**5- Co-requisite:**

**6- Location** (if not on main Campus):

### Second: Course Objectives

- 1- Develop an understanding of *random variables and their distributions*.
- 2- Develop an understanding of *correlation and regression methods*
- 3- Perform *multivariate analysis related to hydrology*.

### Third: Course Specifications

1- Topics to be covered		
Subject	No of Weeks	Units
<i>Random phenomena and their distributions</i>	2	6
<i>probability topics applied to hydrology</i>	2	6
<i>Distributions of hydrologic variables</i>	2	6
<i>Probability distribution functions</i>	2	6
<i>Estimation methods</i>	2	6
<i>Correlation and regression</i>	2	6
<i>Multivariate analysis related to hydrology</i>	2	6

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## 2- Course components (Total hrs in the Semester): 42

Lecture	Exercise	Other
42	-	0

## 3- Intended Learning Outcomes of the Course (ILO's)

### **a. Knowledge**

#### **i) Description of the knowledge to be acquired:**

- Random phenomena and their distributions
- Probability topics applied to hydrology
- Distributions of hydrologic variables
- Probability distribution functions
- Correlation and regression
- Multivariate analysis.

#### **ii) Teaching strategies to be used to develop that knowledge**

- Class lectures.
- Term projects.
- Students' presentations.
- Group discussion.

#### **iii) Methods of assessment of knowledge acquired**

- Exams.
- Quizzes.
- Homework assignments.
- Term projects.

### **b- Cognitive (Intellectual) Skills**

#### **i) Cognitive skills to be developed**

- Develop an understanding of the *random phenomena and their distributions*.
- Develop an understanding of *probability topics applied to hydrology*.
- Develop an understanding of *correlation and regression*.

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- ii) Teaching strategies to be used to develop these cognitive skills**
- Class lectures.
  - Case studies analysis.
  - Term projects.

- iii) Methods of assessment of students' cognitive skills**
- Students' seminars and presentations.
  - Term projects.
  - Written reports.

**c. Interpersonal Skills and Responsibility**

- i) Description of the interpersonal skills and capacity to carry responsibility to be developed**
- Decision making based on engineering analysis.
  - Communication skills.
  - Team work.

- ii) Teaching strategies to be used to develop these skills**
- Class lectures.
  - Term projects.
  - Case studies analysis.

- iii) Methods of assessment of students' interpersonal skills and capacity to carry responsibility**
- Term project.
  - Written reports.
  - Students' seminars and presentations.

**d. Communication, Information Technology and Numerical Skills**

- i) Description of the skills to be developed in this domain**
- Literature research.
  - Problems modeling.
  - Utilization of computer applications in analysis and design.

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<p><b>ii) Teaching strategies to be used to develop these skills</b></p> <ul style="list-style-type: none"> <li>- Class lectures.</li> <li>- Case studies analysis.</li> <li>- Computer lab sessions.</li> <li>- Term projects.</li> </ul> <p><b>iii) Methods of assessment of students numerical and communication skills</b></p> <ul style="list-style-type: none"> <li>- Term projects.</li> <li>- Written reports.</li> <li>- Students' seminars and presentations.</li> </ul>
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**e. Psychomotor (if applicable) & Other Non-cognitive Skills**

<p><b>i) Description of the psychomotor or other skills to be developed and the level of performance required</b></p> <ul style="list-style-type: none"> <li>- NA</li> <li>-</li> </ul>
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<p><b>ii) Teaching strategies to be used to develop these skills-</b></p> <ul style="list-style-type: none"> <li>- NA</li> <li>-</li> </ul>
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<p><b>iii) Methods of assessment of student's psychomotor skills</b></p> <ul style="list-style-type: none"> <li>- NA</li> <li>-</li> </ul>
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**4- Student Assessment Schedule**

Serial	Assessment tool (test, group project, examination etc.)	Week due	Weight
1	Term Project – 1	3 <sup>rd</sup>	15 %
2	Mid Term Exam -1	7 <sup>th</sup>	15 %
3	Term Project – 2	10 <sup>th</sup>	15 %
4	Term Project – 3	13 <sup>th</sup>	15 %
5	Final Exam	16 <sup>th</sup>	40 %

**5- Student Support**

<ul style="list-style-type: none"> <li>- Providing electronic library of textbooks and scientific periodicals.</li> <li>- Providing the necessary computer applications for the course.</li> </ul>
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<b>6- Learning Resources</b>
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<p><b>i) Essential Books (References)</b></p> <ul style="list-style-type: none"> <li>- Yevievich V. " <i>Probability and Statistics in Hydrology,</i>" Resources Pubns. USA; 2<sup>nd</sup> edition, 2010.</li> <li>- Haan, C.T. " <i>Statistical Methods in Hydrology,</i>" 2/e, John Wiley and Sons, Inc, 2005.</li> <li>- Walpole, R., R. Myers, S. Myers, and K. Ye. "Probability and statistics for engineers and Scientists," Prentice Hall, USA, 2011, ISBN-10: 0321748239, ISBN-13: 9780321748232.</li> </ul>
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<p><b>ii) Course Notes</b></p> <ul style="list-style-type: none"> <li>- NA</li> <li>-</li> </ul>
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<p><b>iii) Recommended Books</b></p> <ul style="list-style-type: none"> <li>- Johnson, R., I. Miller, and J. Freund. "Probability and Statistics for Engineers," Prentice Hall, USA, 2010, ISBN-10: 0321694988, ISBN-13: 9780321694980.</li> <li>- Clarke, R.T. " <i>Statistical Modeling in Hydrology,</i>" 1/e, John Wiley and Sons, Inc, 1994.</li> </ul>
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<p><b>iv) Electronic Books &amp; Web Sites:</b></p> <ul style="list-style-type: none"> <li>- Scientific journals and forums.</li> <li>- Instructor's instruction.</li> </ul>
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<p><b>v) Periodicals</b></p> <ul style="list-style-type: none"> <li>- Journal of Probability and Statistics.</li> <li>- Journal of Applied Probability and Statistics..</li> <li>- Brazilian Journal of Probability and Statistics.</li> <li>- Latin American Journal of Probability and Mathematical Statistics.</li> <li>- The Open Statistics and Probability Journal.</li> <li>- Journal of Probability and Statistical Science.</li> </ul>
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## 7- Course Evaluation and Improvement Processes

### ***i) Strategies for Obtaining Student Feedback on Effectiveness of Teaching***

- Students' questioners.
- Students' evaluation of course and instructor.

### ***ii) Other Strategies for Evaluation of Teaching by the Instructor or by the Department***

- Public faculty seminars.
- Assessment by external evaluators of students achievements.
- Instructor (Course) Report

### ***iii) Processes for Improvement of Teaching***

- Assessment of students' work by external examiners.
- Analysis of students' evaluation of course and instructor.
- Seminars by industry professionals.

### ***iv) Processes for verifying standards of student achievement***

- Check marking by an independent faculty member of a sample of student work.
- Periodic exchange and remarking of a sample of assignments/exams with a external evaluator.

### ***v) Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.***

- Assessment and evaluation of the level of achieving the course outcomes through a continuous improvement process (part of a quality assurance system established by the university),
- Consequently, actions are to be taken to improve the course delivery when necessary.
- Review of the course objectives, outcomes and curriculum every 2 years.