

**King Fahd University of Petroleum and Minerals**  
**Department of Mathematics and Statistics**  
**STAT501: Probability and Mathematical Statistics**  
**Term 221**

**Instructor:** Dr. Maher Boudabra

**Office:** 5 - 203

**Office Hours:** By appointment

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**Course Objectives:** To master the fundamental concepts of probability theory with an aim to apply it in real life problems.

**Course Description:**

**STAT 501: Probability and Mathematical Statistics**

**(3-0-3)**

Axioms and foundations of probability. Conditional probability and Bayes' theorem. Independence. Random variables and distribution functions and moments. Characteristic functions. Laplace transforms and moment generating functions. Function of random variables. Random vectors and their distributions. Convergence of sequences of random variables. Laws of large numbers and the central limit theorem. Random samples, sample moments and their distributions. Order statistics and their distributions.

**Pre-requisite:** Graduate standing. Cannot be taken for credit with MATH 561 and MATH 563.

**Textbook:** Rohatgi, V.K. and Saleh, A.K. (2015) An Introduction to Probability and Statistics, Wiley 3<sup>rd</sup> Edition.

**Further readings:** Albert N. Shiryaev, Probability, Springer 3<sup>rd</sup> Edition.

**Software:** R, Python.

**Assessment**

Activity	Weight
Class Evaluation (homework, attendance, etc.)	15%
Project	20%
Major Exam (to be discussed)	20%
Final Exam (Comprehensive)	45%

**Grade Assignment**

Relative Grading based on overall performance of the students registered in this course.

**Academic Integrity**

All KFUPM policies regarding **ethics** and **academic honesty** apply to this course.

## Syllabus (Tentative)

Week	Chapters	Topics
<b>1</b> Jan 15 – Jan 19	<b>CH 1</b>	<b>Probability</b>
<b>2</b> Jan 22 – Jan 26	<b>CH 1</b>	<b>Probability</b>
<b>3</b> Jan 29 – Feb 2	<b>CH 2</b>	<b>Random Variables and Their Probability Distributions</b>
<b>4</b> Feb 5 – Feb 9	<b>CH 2</b>	<b>Random Variables and Their Probability Distributions</b>
<b>5</b> Feb 12 – Feb 16	<b>CH 3</b>	<b>Moments and Generating Functions</b>
<b>6</b> Feb 19 – Feb 21	<b>CH 3</b>	<b>Moments and Generating Functions</b>
<b>7</b> Feb 26 – Mar 2	<b>CH 4</b>	<b>Multiple Random Variables</b>
<b>8</b> Mar 5 – Mar 9	<b>CH 4</b>	<b>Multiple Random Variables</b>
<b>9</b> Mar 12 – Mar 16	<b>CH 4</b>	<b>Multiple Random Variables</b>
<b>10</b> Mar 19 – Mar 23	<b>CH 5</b>	<b>Some Special Distributions</b>
<b>11</b> Mar 26 – Mar 30	<b>CH 5</b>	<b>Some Special Distributions</b>
<b>12</b> Apr 2 – Apr 6	<b>CH 6</b>	<b>Sample Statistics and Their Distributions</b>
<b>13</b> Apr 9 – Apr 13	<b>CH 6</b>	<b>Sample Statistics and Their Distributions</b>
<b>14</b> Apr 30 – May 4	<b>CH 7</b>	<b>Basic Asymptotic: Large Sample Theory</b>
<b>15</b> May 7 – May 11	<b>CH 7</b>	<b>Basic Asymptotic: Large Sample Theory</b>

May 14 – May 15		Catch-up
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**Holidays:**

- Saudi Foundation Day Holiday: February 22 – 23, 2023
- Eid Al-Fitr Holiday: April 14 – 29, 2023