



## American University of Ras Al Khaimah

### AURAK Syllabus

#### Course & Instructor Information

**Course Title:** Probability and Statistics for Engineers

**Course Code:** STAT 346

**Credit Hours:** 3.0

**Prerequisite course(s) and/or co-requisite courses, if applicable:**

MATH 114

**Faculty Name:** Suleyman Ulusoy

#### Contact Information and Office Hours:

• E-mail: [suleyman.ulusoy@aurak.ac.ae](mailto:suleyman.ulusoy@aurak.ac.ae) • Office: Building C 38 • Office Hours: Mon. and Wed. 11:00 am-11:50 am via MS Teams & by appointment. • When sending e-mail include your name, Student ID and Section and wait at least 12 hours for an answer and sending a follow up e-mail.

#### Course Description:

The course introduces principles of statistics and probability for undergraduate students in engineering. The course covers the basic concepts of probability, discrete and continuous random variables, probability distributions, expected values, joint probability distributions, and independence. The course also covers statistical methods and topics including data summary and description techniques, sampling distributions, hypothesis testing, and regression analysis.

#### Additional Information about the course:

This course is normally not an online course but due to the COVID 19 pandemic is currently being delivered through online instruction.

#### Course Textbooks and Materials:

- Statistics, Informed Decisions Using Data, M. Sullivan III, Pearson (Fourth Edition), ISBN-10: 1269425498, ISBN-13: 978-0321757272.

**Other Resources:**

Slides and some lecture notes will be provided in the blackboard. <https://bb.aurak.ac.ae>

**Web Resources:**

Some lecture videos will be provided in the blackboard. <https://bb.aurak.ac.ae>

**Course Learning Outcomes (CLOs)**

<b>Course Learning Outcomes</b> At the end of this course, students should be able to:	
CLO 1	Use probability rules and identify discrete and continuous random variables.
CLO 2	Use the properties of the probability distributions, mainly the normal distribution and apply them to solve general engineering problems.
CLO 3	Apply the concept of conditional and joint probability.
CLO 4	Organize and analyze a discrete data set using statistical parameters.
CLO 5	Perform parameter estimations and hypothesis testing and comparative analysis using linear regression.

**Program Learning Outcomes (PLOs) and Mapping Course to Program Outcomes**

Please see the APPENDIX for the Course to Program Learning Outcomes Mapping.

## Assessment Activities

The dates for quizzes, exams, and submission of assignments are specified in the schedule. You will be graded in this class based on the number of points you earn for quizzes, exams written assignments, or other activities, including your class participation. Keep track of your scores in Blackboard.

<b>Assessment Activities and Grading Weight</b>	<b>Assignments 35%</b>	<b>Midterm 30%</b>	<b>Final Exam 35%</b>
<b>CLO 1</b>	X	X	
<b>CLO 2</b>	X	X	
<b>CLO 3</b>	X	X	
<b>CLO 4</b>	X		X
<b>CLO 5</b>	X		X

## Grading Scale

The grading system and scale for AURAK, as established by the Board of Trustees, is as follows:

<b>AURAK Grading System and Scale</b>		
<b>Grade</b>	<b>Percentage Scores</b>	<b>Grade Points</b>
A	95-100	4.00
A-	90-94	3.70
B+	86-89	3.30
B	83-85	3.00
B-	80-82	2.70
C+	76-79	2.30

C	73-75	2.00
C-	70-72	1.70
D+	66-69	1.30
D	60-65	1.00
F	0-59	0.00

An "S" grade reflects satisfactory, or passing, work in a course (i.e., equivalent to grade of D or higher for undergraduate students). A "U" grade reflects unsatisfactory, or failing, work in a course. S/U will have no effect on the GPA.

## Weekly Course Information

<b>Schedule of Course Topics, Required Reading, and Assignments and Assessments</b> <b>(Including scheduling of laboratory, studio, external visit, and other non-classroom meeting sessions, as appropriate)</b>				
<b>Week</b>	<b>Topic</b>	<b>Required Readings (Textbook)</b>	<b>Assignment, Assessment (with grade weighting) &amp; Due Date</b>	<b>Mapping of CLOs to Assessments</b>
	Syllabus and Assessment Plan			
Week 1 Jan 10-14, 2021	Probability :  Probability Rules	Lecture Notes  On the Blackboard  Chapter 5 of the textbook		1, 3
Week 2 Jan 17-21, 2021	Independence	Lecture Notes  On the Blackboard  Chapter 5 of the textbook		1, 3
	Bayes' Rule	Lecture Notes  On the Blackboard  Chapter 5 of the textbook		1, 3
Week 3 Jan 24-28, 2021	Discrete Probability distributions:  Discrete Random Variables	Lecture Notes on Blackboard  Chapter 6 of the textbook		1, 2, 3
	Binomial, Poisson Probability Distributions	Lecture Notes on		1, 2, 3

		Blackboard  Chapter 6 of the textbook		
Week 4 Jan 31- Feb 4, 2021	The Normal Probability Distribution:  Continuous Probability Distributions	Lecture notes on the blackboard  Chapter 7 of the textbook		1, 2, 3
	Properties of the Normal Distribution	Lecture notes on the blackboard  Chapter 7 of the textbook	Homework 1 (grade weight: 7%,  Due: Feb, 4, 2021)	1, 2, 3
Week 5 Feb 7- 11, 2021	Applications of the Normal Distribution	Lecture notes on the blackboard  Chapter 7 of the textbook		1, 2, 3
	Normal approximation to the Binomial Probability Distribution	Lecture notes on the blackboard  Chapter 7 of the textbook		1, 2, 3
Week 6 Feb 14- 18, 2021	Data Collection:  Introduction to the Practice of Statistics	Lecture notes on the blackboard Chapter 1 of the textbook		1,2,3,4
	Simple Random Sampling	Lecture notes on the blackboard Chapter 1 of the textbook		1,2,3,4
Week 7 Feb 21- 25, 2021	-Other Effective Sampling  -The Design of Experiments	Lecture notes on the blackboard  Chapter 1 of the textbook	<b>Midterm Exam</b>  <b>(Week 1-7 topics, Grade weight: 30%, Feb. 24 2021)</b>	4

	Continued: The Design of Experiments	Lecture notes on the blackboard Chapter 1 of the textbook		4
Week 8 Feb 28- Mar 4, 2021	Organizing and summarizing Data:  -Statistical Parameters (Mean, median, variance and standard deviation)  -Organizing Qualitative Data and popular displays  -Measures of Central Tendency  -Measure of Dispersion  -Measures of Position and Outliers	Lecture notes on the blackboard  Chapter 2 of the textbook	Homework 2 (grade weight: 7%,  Due: Mar, 4, 2021)	4
	-Measure of Dispersion  -Measures of Position and Outliers	Lecture notes on the blackboard Chapter 2 of the textbook		
Week 9 Mar 7- 11, 2021	Joint Probability Distributions  Describing Relation between two variables	Lecture notes on the blackboard		4
	Continued: Joint Probability Distributions  Describing Relation between two variables	Lecture notes on the blackboard		4
Week 10 Mar 14- 18, 2021	Scatter Diagrams and Correlation	Chapter 4 of the textbook		
	Least-Squares linear Regression	Chapter 4 of the textbook		
Week 11 Mar 21-	Sampling Distributions	Lecture notes on the blackboard	Homework 3 (grade weight: 7%,  Due: Mar, 24,	4

25, 2021			2021)	
	Distribution of the Sample	Chapter 8 of the textbook		1,2,3,4
Week 12	Distribution of the Sample Mean and Sample Proportion	Chapter 8 of the textbook		1, 2 3, 4
Apr 11-15, 2021	Continued: Mean and Sample Proportion	Chapter 8 of the textbook		1, 2 3, 4
Week 13	Estimating The Value of a Parameter	Lecture notes on the blackboard Chapter 9 of the textbook	Homework 4 (grade weight: 7%, Due: Apr, 14, 2021)	4, 5
Apr 18-22	Continued: Estimating The Value of a Parameter	Lecture notes on the blackboard Chapter 9 of the textbook		4, 5
Week 14	Estimating a Population Proportion, Mean and Standard Deviation.	Lecture notes on the blackboard Chapter 9 of the textbook		4, 5
Apr 25-29, 2021	Continued: Estimating a Population Proportion, Mean and Standard Deviation.	Lecture notes on the blackboard Chapter 9 of the textbook		4, 5
Week 15	Hypothesis Tests regarding a Parameter.	Lecture notes on the blackboard Chapter 10 of the textbook	Homework 5 (grade weight: 7%, Due: May, 4, 2021)	5
May 2-6, 2021	Hypothesis tests of a Population Proportion, Mean and Standard Deviation.			



	Continued: Hypothesis tests of a Population Proportion, Mean and Standard Deviation.	Lecture notes on the blackboard  Chapter 10 of the textbook		5
Week 16	Final Examination Period (May 10-19, 2020)		Final exam <b>(Week 8-15 topics, grade weight: 35%)</b>	1,2,3,4,5

### Attendance Policy

University policy is that students are to attend all classes and to arrive on time. Students are required to:

- Attend all learning and teaching sessions associated with their program of study.
- Notify their course instructors in advance (in person, by phone or e-mail) that they will be absent from time-tabled class sessions.
- Obtain prior permission from their instructor or course manager, for planned absences of two or more consecutive class sessions during the semester.
- Provide a medical certificate or other corroborating evidence to explain their absence, if required by the University.

Unsatisfactory student attendance includes failure to regularly attend learning and teaching sessions without providing a satisfactory reason to instructors for absence and/or persistent late arrival at, or early departure from, learning and teaching sessions. Where a student fails to attend classes for **four or more weeks cumulatively**, or where a recurring pattern of non-attendance is observed over the course of the semester, the instructor has the option of deeming that the student has failed the course, in which case that student may receive an "F (Fail)" or "U (Unsatisfactory)" grade, as appropriate. At this point, and at the instructor's recommendation, the dean also has the authority to instruct the registrar to remove or withdraw the student from the course.

### Disability Accommodations

Students with disabilities may find they require additional support, services, or considerations. AURAK will endeavor to support students with disabilities or special needs where resources are available. Accommodations will be provided, for students with verified needs, allowing equal access to educational facilities, programs, services, and activities at AURAK. Disability Accommodations are never applied retroactively – only students who have previously requested and have been approved for supporting accommodations can have them apply to a given

academic semester/course. Students needing support must make the request from the Department of Counseling, Testing, and Disability Services located in Building H.

## **Other Relevant Policies**

### **A. Academic Integrity**

#### The Honor Code

The American University of Ras Al Khaimah strongly supports the concept of academic integrity and expects students and all other members of the AURAK community to be honest in all academic endeavors. The AURAK Honor Code can be found in the AURAK Student Handbook.

The role of the Honor Code and associated Academic Integrity Policy is to protect the academic integrity of the university, encourage consistent ethical behavior among students, and foster a climate of honorable academic achievement. The Honor Code is an integral part of university life and students are responsible, therefore, for understanding and abiding by the code's provisions. While a student's commitment to honesty and personal integrity is assumed and expected, this Code and associated policy and procedures provides clarity of expectations.

#### Expectations

Cheating, plagiarism, and all other forms of academic fraud are unacceptable; they are serious violations of university policy. AURAK expects all students to be familiar with university policies on academic integrity. The university will not accept a claim of ignorance – either of the policy itself or of what constitutes academic fraud – as a valid defense against such a charge.

#### Violations of Academic Integrity

Violations of academic integrity constitute academic fraud. Academic fraud consists of any actions that serves to undermine the integrity of the academic process or that gives the student an unfair advantage, including:

- Inspecting, duplicating or distributing test materials without authorization.
- Cheating, attempting to cheat, or assisting others to cheat – relevant here is the prohibition on being in possession of a mobile telephone or similar electronic device during a test or examination. In case such devices are found with a student, the student will be deemed to have attempted to cheat and will be subject to disciplinary action under the Student Academic Integrity Policy.

- Altering work after it has been submitted for a grade.
- Plagiarizing.
- Using or attempting to use anything that constitutes unauthorized assistance.
- Fabricating, falsifying, distorting, or inventing any information, documentation, or citation.

### Plagiarism

One of the most common violations of academic integrity is plagiarism. Plagiarism can be intentional or unintentional. However, since each student is responsible for knowing what constitutes plagiarism, unintentional plagiarism is as unacceptable as intentional plagiarism and thus will bring the same penalties.

Plagiarism – submitting the work of others as one’s own - is a serious offense. In the academic world, plagiarism is theft. Information from sources – whether quoted, paraphrased, or summarized – must be given credit through specific citations. When a student paraphrases a work, it is still necessary to cite the original source. Merely rearranging a sentence or changing a few words is not sufficient. The citation style should be appropriate for the discipline and should clearly indicate the beginning and ending of the referenced material. All sources used in the preparation of an academic paper must also be listed with full bibliographic details at the end of the paper, as appropriate in the discipline.

### Faculty and Student Expectations

- Every student, faculty member, and administrator is responsible for upholding the highest standards of academic integrity. Every member of the AURAK community shall honor the spirit of this policy by refusing to tolerate academic fraud.
- It is the responsibility of the instructor to provide students with additional guidelines for what constitutes “authorized” and “unauthorized” assistance.
- It is the responsibility of every student to see clarification if in doubt about what constitutes ‘authorized” and “unauthorized” assistance. In cases involving collaborative work, all students within the collaborative group may be help responsible for violating the code if any member of the group receives, accepts, or utilizes "unauthorized" assistance.
- Students are required to obtain permission prior to submitting work, any part of which was previously or will be submitted in another course. The instructor has the option of accepting, rejecting, or requiring modification of the content of previously or simultaneously submitted work.

A student who suspects that a violation of academic integrity has occurred should report the violation to the dean or to the Office of the Provost. In this report, the student should describe any action taken, such as talking with the person involved or with a faculty or staff member. Every effort will be made to preserve the anonymity of the student reporting the incident;

Possible penalties for academic fraud include: Formal warning, Reduction in grade for the assignment, Reduction in the grade for the course, A failing grade for the assignment, A failing grade (F) in the course, and/or Dismissal or Expulsion from the University.

Please refer to the relevant section in the *Student Handbook* and ensure a clear understanding of the provisions of the University Honor Code and the Student Academic Integrity Policy.

### **B. Concerns about grades or other course matters.**

Students are responsible for their learning experiences. If you are concerned about a class matter, first discuss it with the instructor. If the matter is not resolved, the next step is to meet with the Chair of the department in which the course is taught. If you still have a concern, meet with the Dean of the school in which the course is taught. The matter is likely to be resolved before it reaches that point, but if it is not, then visit the Associate Provost for Academic and Student Affairs. Students who decide to “jump to the top” will be referred “back” to the appropriate next step.

### **C. Assignments**

University policy is that assignments are due on the date assigned. Instructors may refuse to accept late assignments or lower the grade that would be otherwise given.

### **D. Mobile Phones**

All mobile phones, pagers and/or other communication devices should be turned off before entering the classroom. Students may NOT have mobile telephone or other electronic devices in their possession while completing examinations. Any violation will be deemed as having attempted to cheat.

### **E. Diversity and the Use of English**

English is the common language of the AURAK campus for everyone. It is the only language to be used in the classroom. AURAK brings together students and faculty from diverse cultural and linguistic backgrounds, which is one of the strengths of the university. This diversity provides an opportunity to share our different experiences and enlarge our understanding of the world.

## APPENDIX

### Program Learning Outcomes (PLOs) : BS In Chemical Engineering

<b>Program Learning Outcomes</b> <b>At the completion of the program, students should be able to:</b>	
PLO 1	1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
PLO 2	2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
PLO 3	3. An ability to communicate effectively with a range of audiences.
PLO 4	4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
PLO 5	5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
PLO 6	6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
PLO 7	7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

### Mapping Course to Program Learning Outcomes : BS In Chemical Engineering

<b>The learning outcomes of this course contribute to meeting one or more of the program learning outcomes as shown below, with the contribution designated as “high”, “medium”, or “low”:</b>							
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
<b>CLO 1</b>	<i>high</i>						
<b>CLO 2</b>	<i>high</i>						
<b>CLO 3</b>	<i>high</i>						
<b>CLO 4</b>	<i>high</i>						
<b>CLO 5</b>	<i>high</i>						

### Program Learning Outcomes (PLOs) : BS In Civil And Infrastructure Engineering

<b>Program Learning Outcomes</b> At the completion of the program, students should be able to:	
PLO 1	1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
PLO 2	2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
PLO 3	3. An ability to communicate effectively with a range of audiences.
PLO 4	4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
PLO 5	5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
PLO 6	6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
PLO 7	7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**Mapping Course to Program Learning Outcomes : BS In Civil And Infrastructure Engineering**

<b>The learning outcomes of this course contribute to meeting one or more of the program learning outcomes as shown below, with the contribution designated as “high”, “medium”, or “low”:</b>							
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
<b>CLO 1</b>	<i>high</i>						
<b>CLO 2</b>	<i>high</i>						
<b>CLO 3</b>	<i>high</i>						
<b>CLO 4</b>	<i>high</i>						
<b>CLO 5</b>	<i>high</i>						

**Program Learning Outcomes (PLOs) : BS In Computer Engineering**

<b>Program Learning Outcomes</b> At the completion of the program, students should be able to:	
PLO 1	1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

PLO 2	2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
PLO 3	3. An ability to communicate effectively with a range of audiences.
PLO 4	4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
PLO 5	5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
PLO 6	6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
PLO 7	7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

### Mapping Course to Program Learning Outcomes : BS In Computer Engineering

<b>The learning outcomes of this course contribute to meeting one or more of the program learning outcomes as shown below, with the contribution designated as “high”, “medium”, or “low”:</b>							
	<b>PLO 1</b>	<b>PLO 2</b>	<b>PLO 3</b>	<b>PLO 4</b>	<b>PLO 5</b>	<b>PLO 6</b>	<b>PLO 7</b>
<b>CLO 1</b>	<i>high</i>						
<b>CLO 2</b>	<i>high</i>						
<b>CLO 3</b>	<i>high</i>						
<b>CLO 4</b>	<i>high</i>						
<b>CLO 5</b>	<i>high</i>						

### Program Learning Outcomes (PLOs) : BS In Computer Science

<b>Program Learning Outcomes</b> <b>At the completion of the program, students should be able to:</b>	
PLO 1	1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
PLO 2	2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline.
PLO 3	3. Communicate effectively in a variety of professional contexts.
PLO 4	4. Recognize professional responsibilities and make informed judgments in computing practice

	based on legal and ethical principles.
PLO 5	5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
PLO 6	6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

**Mapping Course to Program Learning Outcomes : BS In Computer Science**

<b>The learning outcomes of this course contribute to meeting one or more of the program learning outcomes as shown below, with the contribution designated as “high”, “medium”, or “low”:</b>						
	<b>PLO 1</b>	<b>PLO 2</b>	<b>PLO 3</b>	<b>PLO 4</b>	<b>PLO 5</b>	<b>PLO 6</b>
<b>CLO 1</b>	<i>high</i>					
<b>CLO 2</b>	<i>high</i>					
<b>CLO 3</b>	<i>high</i>					
<b>CLO 4</b>	<i>high</i>					
<b>CLO 5</b>	<i>high</i>					

**Program Learning Outcomes (PLOs) : BS In Electrical Engineering**

<b>Program Learning Outcomes</b> <b>At the completion of the program, students should be able to:</b>	
PLO 1	1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
PLO 2	2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
PLO 3	3. An ability to communicate effectively with a range of audiences.
PLO 4	4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
PLO 5	5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
PLO 6	6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.



PLO 7	7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
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**Mapping Course to Program Learning Outcomes : BS In Electrical Engineering**

<b>The learning outcomes of this course contribute to meeting one or more of the program learning outcomes as shown below, with the contribution designated as “high”, “medium”, or “low”:</b>							
	<b>PLO 1</b>	<b>PLO 2</b>	<b>PLO 3</b>	<b>PLO 4</b>	<b>PLO 5</b>	<b>PLO 6</b>	<b>PLO 7</b>
<b>CLO 1</b>	<i>high</i>						
<b>CLO 2</b>	<i>high</i>						
<b>CLO 3</b>	<i>high</i>						
<b>CLO 4</b>	<i>high</i>						
<b>CLO 5</b>	<i>high</i>						

**Program Learning Outcomes (PLOs) : BS In Electronics And Communication Engineering**

<b>Program Learning Outcomes</b> <b>At the completion of the program, students should be able to:</b>	
PLO 1	1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
PLO 2	2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
PLO 3	3. An ability to communicate effectively with a range of audiences.
PLO 4	4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
PLO 5	5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
PLO 6	6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
PLO 7	7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**Mapping Course to Program Learning Outcomes : BS In Electronics And Communication Engineering**

<b>The learning outcomes of this course contribute to meeting one or more of the program learning outcomes as shown below, with the contribution designated as “high”, “medium”, or “low”:</b>							
	<b>PLO 1</b>	<b>PLO 2</b>	<b>PLO 3</b>	<b>PLO 4</b>	<b>PLO 5</b>	<b>PLO 6</b>	<b>PLO 7</b>
<b>CLO 1</b>	<i>high</i>						
<b>CLO 2</b>	<i>high</i>						
<b>CLO 3</b>	<i>high</i>						
<b>CLO 4</b>	<i>high</i>						
<b>CLO 5</b>	<i>high</i>						

**Program Learning Outcomes (PLOs) : BS In Petroleum Engineering**

<b>Program Learning Outcomes</b> <b>At the completion of the program, students should be able to:</b>	
PLO 1	1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
PLO 2	2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
PLO 3	3. An ability to communicate effectively with a range of audiences.
PLO 4	4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
PLO 5	5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
PLO 6	6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
PLO 7	7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**Mapping Course to Program Learning Outcomes : BS In Petroleum Engineering**

<b>The learning outcomes of this course contribute to meeting one or more of the program learning outcomes as shown below, with the contribution designated as “high”, “medium”, or “low”:</b>							
	<b>PLO 1</b>	<b>PLO 2</b>	<b>PLO 3</b>	<b>PLO 4</b>	<b>PLO 5</b>	<b>PLO 6</b>	<b>PLO 7</b>

<b>CLO 1</b>	<i>high</i>						
<b>CLO 2</b>	<i>high</i>						
<b>CLO 3</b>	<i>high</i>						
<b>CLO 4</b>	<i>high</i>						
<b>CLO 5</b>	<i>high</i>						