

## Module (Course Syllabus) Catalogue 2023-2024

College/ Institute	Erbil Technical Engineering College	
Department	Highway Engineering Department	
Module Name	Engineering Statistics	
Module Code	ENS405	
Degree	Technical Diploma <input type="checkbox"/>	Bachelor <input type="checkbox"/> / High Diploma <input type="checkbox"/> Master <input type="checkbox"/> PhD <input type="checkbox"/>
Semester	4 <sup>th</sup>	
Qualifications	MSc. Construction Management+ MSc. Structural Engineering	
Scientific Title	Asst. Lecturer	
ECTS (Credits)	5 / ( 135 ) Total hrs Workload	
Module type	Prerequisite <input type="checkbox"/>	Core <input type="checkbox"/> / Assist. <input type="checkbox"/>
Weekly hours	4	
Weekly hours (Theory)	( 2 )hr Class	
Weekly hours (Practical)	( 2 )hr Class	
Number of Weeks	12	
Lecturer (Theory)	Farah Subhi Hayder	
E-Mail & Mobile NO.	Farah.hayder@epu.edu.iq	
Lecturer (Practical)	Karzan Kamal Ahmed	
E-Mail & Mobile NO.	Karzan.ahmed@epu.edu.iq	
Websites	-	

# Course Book

<b>Course Description</b>	This module will apply statistics and probability distributions to modern day engineering problems. It will develop graphical visualisation methods, probability theory and distributions. The module will develop knowledge, skill and competence of sampling theory and hypothesis testing.			
<b>Course objectives</b>	<p>Statistic is a branch of mathematics with the collection, analysis, interpretation, and presentation of masses of numerical data for report and project study in the site.</p> <p>When information is sought, statistic idea suggests a typical collection process with four crucial steps.</p> <ol style="list-style-type: none"> <li>1. Set clearly defined goals for the investigation.</li> <li>2. Make a plan of what data to collect and how to collect it.</li> <li>3. Apply appropriate statistical methods to extract information from the data.</li> <li>4. Interpret the information and draw conclusions.</li> </ol>			
<b>Student's obligation</b>	Students must attend all lectures. They also do quick daily exams. Furthermore, they are required to do their homework and duties that will be assigned to them. Moreover, they must do seminars and projects. And finally, they must pass the final and midterm exam.			
<b>Required Learning Materials</b>	lectures are going to be presented in the class. with projector for presenting the lectures. Also, white board will be used for demonstrating materials that needs more highlights.			
<b>Evaluation</b>	<b>Task</b>	<b>Weight (Marks)</b>	<b>Due Week</b>	<b>Relevant Learning Outcome</b>
	Paper Review	-		
	Assignments	Homework	10	
		Class Activity	2	
		Report	-	
		Seminar	8	
		Essay	-	
		Project	8	

	Quiz	8		
	Lab.	-		
	Midterm Exam	24		
	Final Exam	40		
	Total	100		
<b>Specific learning outcome:</b>	One basic and very important objective of study Engineering Statistic is: The Engineering Statistic lectures will help students to learn and easily recognize of Engineering Statistic, which it is relate to all of the civil engineering and highway engineering special for report and project in more subject to get summary and discuss about result of data.			
<b>Course References:</b>	<p>-Jessica M. Utts, (2010), Mind on Statistics, University of California, Irvine, Fourth Edition.</p> <p>- Johnson R., (2005), Probability and Statistics for Engineers, University of Wisconsin-Madison, Seven Edition.</p> <p>- Garber N.J. and Holey A., (2003), Traffic and Highway Engineering, Four Edition.</p> <p>- Transportation and Traffic Engineering Hand Book, ITE, (1976).</p>			
<b>Course topics (Theory)</b>		<b>Week</b>	<b>Learning Outcome</b>	
<ul style="list-style-type: none"> <li>• Description and inferential statistic</li> <li>• Pictorial description of data</li> <li>• Sample size</li> </ul>		1		
<ul style="list-style-type: none"> <li>• Data classification</li> <li>• Frequency distribution</li> </ul>		2		
<ul style="list-style-type: none"> <li>• Cumulative frequency</li> <li>• Distribution</li> </ul>		3		
<ul style="list-style-type: none"> <li>• Histogram</li> <li>• Frequency polygon</li> </ul>		4		
<ul style="list-style-type: none"> <li>• Central measures</li> <li>• Measures of variation</li> </ul>		5		
<ul style="list-style-type: none"> <li>• Probabilities of simple and compound events</li> <li>• Permutations</li> </ul>		6		
<ul style="list-style-type: none"> <li>• Combination</li> <li>• Binomial distribution</li> </ul>		7		
<ul style="list-style-type: none"> <li>• Poisons distribution</li> <li>• Normal distribution</li> </ul>		8		

• -t- distribution	9	
• -f- distribution	10	
• Correlation and regression	11	
• Curve fitting by least squares		
• Surveys and how to ask question • Discussion the result for end each subject	12	
<b>Practical Topics</b>	<b>Week</b>	<b>Learning Outcome</b>
SPSS		
<b>T-Test</b>		
<b>Z-Test</b>		
<b>Regressions</b>		

## Questions Example Design

### Questions Example Design

#### Q1//

Determining spot speed characteristics from a set of spot speed data mentioned, data collected on an urban (60-m Ring Road) in Erbil City during a spot speed study below: so determine all of them for input data:

- 1.The mean spot speed
- 2.The rang of spot speed
- 3.The variance of spot speed
- 4.The standard deviation of spot speed
- 5.The coefficient of variance of spot speed
- 6.The frequency of polygon if length (range) of class equal to 5 (normal or not normal distribution)

Input data 37 51 55 65 42 40 55 60 42 47 35 58 59 48 42 56 59 42 53 65 65

*(30 Marks)*

#### Q2//

**a-** Define qualitative data with giving examples.

*(5 Marks)*

**b-** What is the difference between Descriptive statistics and Inferential statistics according to their form

of final result?

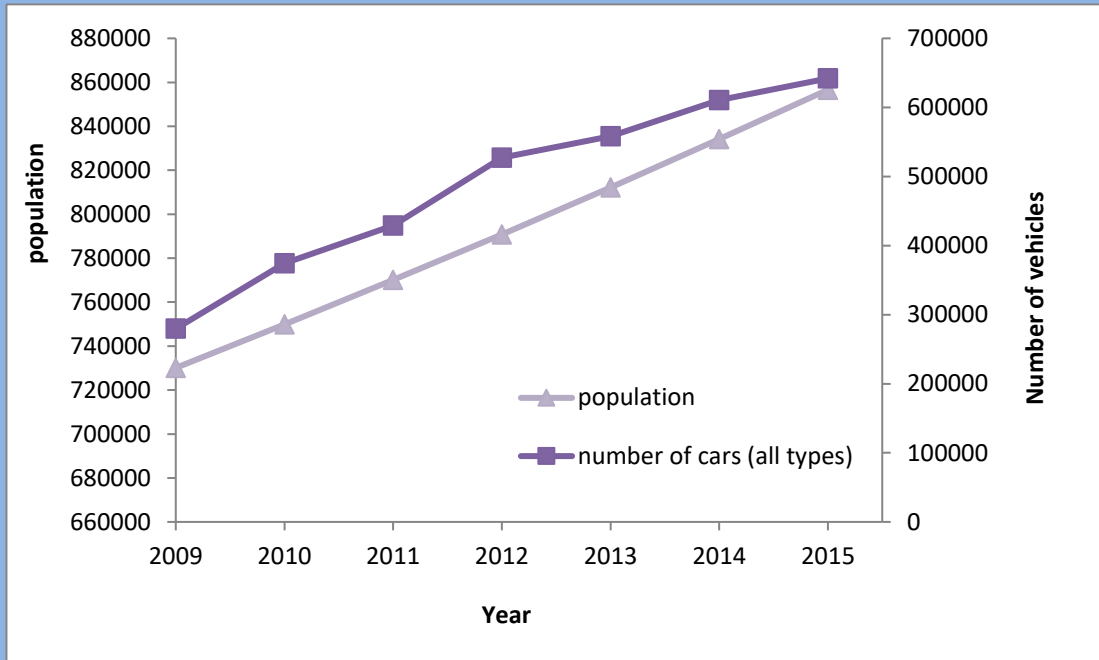
(10 Marks)

c- What are the common types of bias in survey?

(10 Marks)

**Q3//**

a- Describe the chart below:



(20 Marks)

b- Let the sample space  $S = \{0 < X < 1\}$  if  $A = \{0 < X < \frac{1}{2}\}$  and  $B = \{\frac{1}{2} < X < 1\}$ ,  $P(S) = 1$ , find  $P(B)$  if  $P(A) = \frac{1}{4}$ ?

(5 Marks)

**Q4//**

a- consider the set (3, 11, 12, 19, 22, 23, 24, 25, 27, 29, 35, 36, 37, 45, and 49) range of class equal to (10) determine the skwness?

(15 Marks)

b- If the sample space  $S = A \cup B$ ,  $P(A) = 0.8$ , and  $P(B) = 0.5$  find  $P(A \cap B)$ ?

(5 Marks)

**GOOD LUCK**

**Examiner**  
**Farah Subhi Hayder**  
*Farah S.*

## Extra notes:

### External Evaluator

I hereby confirm that all syllabuses given in the attached course modules is sufficient to cover required subjects, areas and titles needed for students regarding this study year.



**Ahmed Suad Ali**

Senior scientific committee member of Highway Engineering Department