



## Course Specification of Biostatistics

I. Course Identification and General Information:						
1	<b>Course Title:</b>	Biostatistics				
2	<b>Course Number &amp; Code:</b>	FR217				
3	<b>Credit hours:</b>	C.H				Total
		Theoretical	Practical	Training	Seminar	
		2	1	0	0	3
4	<b>Study level/ semester at which this course is offered:</b>	Second Year - Second Semester				
5	<b>Pre –requisite (if any):</b>	FR116				
6	<b>Co –requisite (if any):</b>	None				
7	<b>Program (s) in which the course is offered:</b>	Bachelor of Veterinary Medicine				
8	<b>Language of teaching the course:</b>	English Language				
9	<b>Location of teaching the course:</b>	Faculty of Veterinary Medicine Building				
10	<b>Prepared by:</b>	Dr. Abdu-Alraoof Al-Shawkany				
11	<b>Date of approval:</b>					

### II. Course description:

This course is designed to acquire veterinary medicine student with basic principle of statistics and Emphasis on application in of veterinary medicine problems. The course focuses on descriptive and inferential statistics as applied to veterinary medicine practice. The course starts with descriptive measures and probability concepts. Conditional probability and bayes theory are given due emphasis to compute validity indicators for clinical and laboratory test, i.e sensitivity, specificity and predictive values for single and multiple tests. The students are trained to draw statistical inference by two main methods these are: estimation and hypothesis testing. Z, T, Chi-square and F tests are discussed with relevant clinical examples. Students are trained to use computer software as Excel and SPSS in solving assigned exercises.

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**III. Intended learning outcomes (ILOs) of the course:**

**(A) Knowledge and Understanding:**

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Knowledge and Understanding.**

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		After completing this course, students will be able to:	
<b>A1-</b>	Demonstrate a sound knowledge and understanding of concepts and principles of general culture, basic science, and that support veterinary medicine.	<b>a1-</b>	Identify biostatistics and type of a variable and the difference between nominal, ordinal, discrete, continuous, ungrouped and grouped
<b>A3-</b>	Identifies various causes of animal diseases, animal epidemics and how they can be diagnosed; including common and life-threatening diseases of animals, poultry and fish.	<b>a2-</b>	Define sample, populations, random sample and randomization

**Teaching And Assessment Methods For Achieving Learning Outcomes:**

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:			
<b>a1-</b>	Identify biostatistics and type of a variable and the difference between nominal, ordinal, discrete, continuous, ungrouped and grouped	-Lectures using board, data shows and multimedia aids. - brainstorm. - discussion. -Self-learning by preparing essay and presentations (computer and faculty library) -Practical training	-Written exam -Practical exam -Oral exam - Quizzes - Report assignments - Discussion
<b>a2-</b>	Define sample, populations, random sample and randomization		

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**(B) Intellectual Skills:**

**Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills**

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
<b>B1-</b>	Competently practices analytical and critical thinking skills in studying and assessing health problems and reading the results of animal medical examinations that is related to sciences.	<b>b1-</b>	Calculate the mean, median, mode, range, variance, standard deviation and coefficient of variation.
<b>B2-</b>	Predicts an appropriate medical diagnosis for the most common disease states through analysis of clinical story data and the results of medical examinations of a sick animal.	<b>b2-</b>	Compute Pearson's correlation coefficient r, Spearman's correlation coefficient rs

**Teaching And Assessment Methods For Achieving Learning Outcomes:**

**Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:**

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		-Lectures using board, data shows and multimedia aids. - brainstorm. - discussion. -Self-learning by preparing essay and presentations (computer and faculty library) -Practical training	-Written exam -Practical exam -Oral exam - Quizzes - Report assignments - Discussion
<b>b1-</b>	Calculate the mean, median, mode, range, variance, standard deviation and coefficient of variation.		
<b>b2-</b>	Compute Pearson's correlation coefficient r, Spearman's correlation coefficient rs		

**(C) Professional and Practical Skills:**

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**Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills**

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills	
After completing this program, students will be able to:		After completing this course, students will be able to:	
C1-	Accurately records a comprehensive pathological story of a sick animal including information on healthy behavior and the necessary checks	c1-	Construct the frequency table relative, cumulative, percentage and grouped frequency from raw data.
C4-	Treat animal patients safely and effectively considering the evaluation of the results, the appropriate modification of the treatment plan and the accurate description of the appropriate medications.	c2-	Use SPSS program in data entry and analysis of data

**Teaching And Assessment Methods For Achieving Learning Outcomes:**

**Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:**

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		-Practical training - Solving Examples and Some Exercise	-Written exam -Practical exam -Oral exam - Quizzes - Report assignments - Discussion
c1-	Construct the frequency table relative, cumulative, percentage and grouped frequency from raw data.		
c2-	Use SPSS program in data entry and analysis of data		

**(D) General / Transferable Skills:**

**Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills**

Program Intended Learning Outcomes (PILOs) in General / Transferable skills	Course Intended Learning Outcomes (CILOs) in General / Transferable skills
After completing this program, students will be able to:	After completing this course, students will be able to:

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D1-	Communicates effectively with other fellow professions and animal owners and expresses his ideas clearly and objectively.	d1-	Make survey about one medical problem to collected data from population
<b>Teaching And Assessment Methods For Achieving Learning Outcomes:</b>			
<b>Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes (CILOs) in General and Transferable Skills</b>		<b>Teaching strategies/methods to be used</b>	<b>Methods of assessment</b>
After completing this course, students will be able to:		-Self-learning by preparing essay and presentations (computer and faculty library) - Cooperative learning and working groups - Scientific visits - discussions - Assignments	- Achievement file - Evaluating student presentations. - Practical exam - Report assignments - Discussion - Note performance
d1-	Make survey about one veterinary medicine problem to collected data from population		

<b>IV. Course Content:</b>					
<b>1 – Course Topics/Items:</b>					
<b>a – Theoretical Aspect</b>					
Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	<b>Introduction</b>	a1, a2, b1, b2, c1, c2	Statistical and biostatistics Concepts Type of Data and Information Type of variable, difference between nominal and ordinal, difference between discrete and continuous	1	2

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2	<b>Describing data by table</b>	a1, a2, b1, b2, c1, c2	Relative, cumulative and percentage frequency for ungrouped data tables. Relative, cumulative and percentage frequency for grouped data tables	1	2
3	<b>Describing data by chart</b>	a1, a2, b1, b2, c1, c2	Charting ungrouped data by pie, simple clustered, stacked bar, step charts, time series charts. Charting grouped data histogram, curve and ogive	2	4
4	<b>Describing data by numeric value</b>	a1, a2, b1, b2, c1, c2	Measure of location and dispersion. Mod, median, mean, rang, variance, standard deviation, coefficient of variation	2	4
5	<b>Sampling</b>	a1, a2, b1, b2, c1, c2	Methods of Collecting Data random sample and randomization Sampling and Non sampling Errors Survey conditions	1	2
6	<b>Correlation</b>	a1, a2, b1, b2, c1, c2	linear relationship between two variables (rxy), Type of correlation coefficient, R <sup>2</sup>	1	2
7	<b>Regression</b>	a1, a2, b1, b2, c1, c2	Simple Linear Regression Model Equation Regression Using it in Diagnostics	1	2
8	<b>Introduction to Hypothesis Testing</b>	a1, a2, b1, b2, c1, c2	Test hypothesis, Null and alternative hypothesis, Significance level and P value. Testing the Population Mean When the Population Standard Deviation Is Known	2	4

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			Inference a Population Mean When the Standard Deviation Is Unknown (T and Z test).		
9	<b>Introduction to Hypothesis Testing</b>	a1, a2, b1, b2, c1, c2	Inference about the Difference between Two Means: Independent Samples Inference about the Difference between Two Means: Matched Pairs Experiment Chi-square test. F test Analysis of Variance.	1	2
10	<b>SPSS Program</b>	a1, a2, b1, b2, c1, c2	Use SPSS program for data entry of survey data, describing and analysis of data.	2	4
<b>Number of Weeks /and Units Per Semester</b>				<b>14</b>	<b>28</b>

<b>b- Training Aspect:</b>				
Order	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Data entry in SPSS program	a1, a2, b1, b2, c1, c2, d1	3	6
2	Descriptive statistic	a1, a2, b1, b2, c1, c2, d1	3	6
3	Correlation and Regression	a1, a2, b1, b2, c1, c2, d1	3	6
4	Test Hypothesis (Z, T and X2 testes)	a1, a2, b1, b2, c1, c2, d1	3	6
5	Test Hypothesis (F testes)	a1, a2, b1, b2, c1, c2, d1	2	4
<b>Number of Weeks /and Units Per Semester</b>			<b>14</b>	<b>28</b>

**V. Teaching strategies of the course:**

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- Lectures using board, data shows and multimedia aids.
- Self-learning by preparing essay and presentations (computer and faculty library)
- Brainstorm
- Discussion
- Cooperative learning
- Practical training
- Tutorial classes (small group teaching)

### 3-Assessment Methods:

- Written exam
- Practical exam
- Oral exam
- Quizzes
- Report assignments
- Discussion

Grading Scale:

Grades are awarded on a scale from A to F, where A is the best grade(90-100) and F is a fail (<50).

### VI. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Participation quizzes and assignments	2-14	10	10%	a1, a2, b1, b2, c1, c2, d1
2	Mid-Term Exam	8	10	10%	a1, a2, b1, b2, c1, c2, d1
3	Mid-Term Practical Exam	8	10	10%	a1, a2, b1, b2, c1, c2, d1

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4	Final Practical Exam	15	10	10%	a1, a2, b1, b2, c1, c2, d1
5	Oral exam	16	5	5%	a1, a2, b1, b2, c1, c2, d1
6	Final Exam	16	55	55%	a1, a2, b1, b2, c1, c2, d1
<b>Total</b>			<b>100</b>	<b>100%</b>	

<b>VII. Students' Support:</b>	
Office Hours/week	Other Procedures (if any)
Saturday-Wednesday from 8:00 a.m.-2 p.m.	Student can contact me via email

<b>VIII. Learning Resource (MLA style or APA style)S:</b>	
<b>1- Required Textbook(s) ( maximum two )</b>	
1-	Daniel, Wayne and Cross. C. L. 2013. Biostatistics: A foundation for analysis in the health sciences, student solutions manual. 10 <sup>th</sup> edition, John Wiley, Canada.
2-	David Bowers. 2008. Medical Statistics from Scratch An Introduction for Health Professionals, JohnWiley and Sons, England.
<b>2- Recommended Readings and Reference Materials</b>	
<b>3- Essential References</b>	
	Kanishka Bhattacharya.2004. Introduction to Statistics for Medical Students, University of Oxford.
<b>4- Electronic Materials and Web Sites etc.</b>	
	<ul style="list-style-type: none"> <li><a href="http://www.MikeMiddleton.com">www.MikeMiddleton.com</a></li> </ul>
<b>5- Other Learning Material:</b>	

<b>X. Course Policies:</b>	
<b>1</b>	<b>Class Attendance:</b> <b>MANDATORY TO ATTEND ALL COURSE LECTURES</b>
<b>2</b>	<b>Tardiness:</b> Not allowed at all. Students must be in class or in the practical session 10 minutes prior to the

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	beginning of lectures or practical session
3	<b>Exam Attendance/Punctuality:</b> Attendance is mandatory; absence is accepted with valid excuse
4	<b>Assignments &amp; Projects:</b> All assignments and projects are to be submitted on their due date. Any assignment turned in after the due date will not be accepted without valid and reasonable excuse
5	<b>Cheating:</b> Not tolerated and may lead to <b>EXPELLING</b> the student from the program
6	<b>Plagiarism:</b> Not tolerated <b>AT ALL</b> and may lead to <b>EXPELLING</b> the student from the program
7	<b>Other policies:</b> <ol style="list-style-type: none"> <li>1. All devices must be on silent or at least on vibration during lectures/labs</li> <li>2. Before any exam (written, oral) we must check student's identity (student's card, ID, passport). Without any of these documents, the student will not be allowed in the exam room.</li> <li>3. Any of type/ form of cheating is not allowed no matter what.</li> <li>4. Maintain silence during lectures/exam and disturbance is not allowed. For any questions students should raise their hand and wait for permission to talk.</li> </ol>

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## Course Plan of Biostatistics

X. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Abdu-Alraoof Al-Shawkany	Office Hours					
Location & Telephone No.	Yemen-Sana`a, Thamr university, 771135616	SAT	SUN	MON	TUE	WED	THU
E-mail	<a href="mailto:abdualraufe@yahoo.com">abdualraufe@yahoo.com</a> <a href="mailto:abdualraufe@gmail.com">abdualraufe@gmail.com</a>	8am 2pm	8am 2pm	8am 2pm	8am 2pm	8am 2pm	

XI. Course Identification and General Information:						
1-	Course Title:	Biostatistics				
2-	Course Number & Code:	FR217				
3-	Credit hours:	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		2	0	1	0	3
4-	Study level/year at which this course is offered:	Second Year - Second Semester				
5-	Pre –requisite (if any):	FR116				
6-	Co –requisite (if any):	None				
7-	Program (s) in which the course is offered	Bachelor Veterinary Medicine				
8-	Language of teaching the course:	English language				
9-	System of Study:	Regular / Semesters				
10-	Mode of delivery:	Lectures and Practical				
11-	Location of teaching the course:	Faculty of Veterinary Medicine Building				

II. Course Description:	
This course is designed to acquire veterinary medicine student with basic principle of statistics and	

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Emphasis on application in of veterinary medicine problems. The course focuses on descriptive and inferential statistics as applied to veterinary medicine practice. The course starts with descriptive measures and probability concepts. Conditional probability and bayes theory are given due emphasis to compute validity indicators for clinical and laboratory test, i.e sensitivity, specificity and predictive values for single and multiple tests. The students are trained to draw statistical inference by two main methods these are: estimation and hypothesis testing. Z, T, Chi-square and F tests are discussed with relevant clinical examples. Students are trained to use computer software as Excel and SPSS in solving assigned exercises.

**II. Intended learning outcomes (ILOs) of the course:**

**After completing this course, students will be able to:**

- a1- Identify biostatistics and type of a variable and the difference between nominal, ordinal, discrete, continuous, ungrouped and grouped
- a2- Define sample, populations, random sample and randomization
- b1- Calculate the mean, median, mode, range, variance, standard deviation and coefficient of variation.
- b2- Compute Pearson's correlation coefficient r, Spearman's correlation coefficient rs
- c1- Construct the frequency table relative, cumulative, percentage and grouped frequency from raw data.
- c2- Use SPSS program in data entry and analysis of data
- d1- Make survey about one medical problem to collected data from population.

**V. Course Content:**

**A – Theoretical Aspect:**

Order	Topics List	Week Due	Contact Hours
1	Introduction	1	2

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2	Describing data by table	2	2
3	Describing data by chart	3,4	4
4	Describing data by numeric value	5,6	4
5	Sampling	7	2
6	Mid-Term Exam	8	2
7	Correlation	9	2
8	Regression	10	2
9	Introduction to Hypothesis Testing	11,12	4
10	Introduction to Hypothesis Testing	13	2
11	SPSS Program	14,15	4
12	Final exam	16	2
<b>Number of Weeks /and Units Per Semester</b>		<b>16</b>	<b>32</b>

<b>b- Training Aspect:</b>			
Order	Training Tasks	Week Due	Contact hours
1	Data entry in SPSS program	1,2,3	6
2	Descriptive statistic	4,5,6	6
3	Correlation and Regression	7,8,9	6
4	Mid-Term Exam	10	2
5	Test Hypothesis (Z, T and X2 testes)	11,12,13	6
6	Test Hypothesis (F testes)	14,15	6
7	Final exam	16	2
<b>Number of Weeks /and Units Per Semester</b>		<b>16</b>	<b>32</b>

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**V. Teaching strategies of the course:**

- Lectures using board, data shows and multimedia aids.
- Self-learning by preparing essay and presentations (computer and faculty library)
- Brainstorm
- Discussion
- Cooperative learning
- Practical training
- Tutorial classes (small group teaching)

**VI. Assessment Methods:**

- Written exam
- Practical exam
- Oral exam
- Quizzes
- Report assignments
- Discussion

Grading Scale:

Grades are awarded on a scale from A to F, where A is the best grade (90-100) and F is a fail (<50)

No.	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Participation quizzes and assignments	2-14	10	10%
2	Mid-Term Exam	8	10	10%
3	Mid-Term Practical Exam	8	10	10%
4	Final Practical Exam	15	10	10%
5	Oral exam	16	5	5%
6	Final Exam	16	55	55%
<b>Total</b>			<b>100</b>	<b>100%</b>

**II. Learning Resources:**

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1- Required Textbook(s) ( maximum two ).	
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2- Essential References.	
	Kanishka Bhattacharya.2004. Introduction to Statistics for Medical Students, University of Oxford.
3- Electronic Materials and Web Sites etc.	
	<ul style="list-style-type: none"> <li><a href="http://www.MikeMiddleton.com">www.MikeMiddleton.com</a></li> </ul>
3. Course Policies:	
1	<b>Class Attendance:</b> <b>MANDATORY TO ATTEND ALL COURSE LECTURES</b>
2	<b>Tardy:</b> Not allowed at all. Students must be in class 10 minutes prior to the beginning of lectures
3	<b>Exam Attendance/Punctuality:</b> Attendance is mandatory; absence is accepted with valid excuse
4	<b>Assignments &amp; Projects:</b> All assignments and projects are to be submitted on their due date. Any assignment turned in after the due date will not be accepted without valid and reasonable excuse.
5	<b>Cheating:</b> Not tolerated and may lead to <b>EXPELLING</b> the student from the program
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