



SULTAN QABOOS UNIVERSITY

COURSE OUTLINE

PROGRAM: VETERINARY TECHNOLOGY

1. Course Code	ANVS3212	
2. Course Title	Clinical Chemistry, Cytology, & Urology	
3. Credits	3 CH, 12 CP, 6 ECTS	
4. Pre-requisite Course(s)	ANVS3211, BIOL2101	
5. Co-requisite Course(s)	BIOL2101	
6. Equivalent Course(s)		
7. Incompatible Course(s)		
8. Course Category	<input type="checkbox"/> University Requirement <input type="checkbox"/> College Requirement <input checked="" type="checkbox"/> Department Requirement <input type="checkbox"/> Specialization Requirement <input type="checkbox"/> Other (specify):	<input type="checkbox"/> University Elective <input type="checkbox"/> College Elective <input type="checkbox"/> Department Elective <input type="checkbox"/> Specialization Elective
9. Course Owner	College: AGRICULTURE	Department: AVS
10. Course Type	<input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lecture/Seminar <input type="checkbox"/> Lecture/Tutorial <input type="checkbox"/> Tutorial <input type="checkbox"/> Field or Work Placement <input type="checkbox"/> Seminar <input type="checkbox"/> Workshop	<input type="checkbox"/> Lecture/Lab <input type="checkbox"/> Lecture/Studio <input type="checkbox"/> Lecture/Lab/Tutorial or Seminar <input checked="" type="checkbox"/> Laboratory (Practical) <input type="checkbox"/> Studio <input type="checkbox"/> Internship <input type="checkbox"/> Project
11. Language of Instruction	ENGLISH	
12. Course Description	<p>This course is designed to provide fundamental knowledge of veterinary clinical chemistry to undergraduate veterinary technology students. This course deals with the examination of chemical components of the blood for diagnostic and prognostic purposes in veterinary practice. Students will be introduced to importance of clinical chemistry tests for diagnosis of various health problems and conditions in veterinary patients. Laboratory testing for electrolytes, acid-base balance, plasma proteins, kidney functions, liver functions, pancreatic functions, energy metabolism, and muscle injury evaluation will be included in this course. Students will be introduced to sample collection, processing and storage for clinical chemistry testing from various animal species. Introduction to various tubes used to collect and store blood samples, their uses and advantages and disadvantages will be discussed. Students will learn collecting blood samples in various animal species, labelling, and transport of these samples. This course also includes urinalysis and students will be introduced to composition of urine, and different tests used to evaluate kidney and body functions in healthy and sick animal patients. Students will be subjected to hands-on training in examination of urine samples to examine for casts, White Blood Cells (WBCs), bacteria and blood in urine. Students will also be introduced to importance of cytological techniques in veterinary diagnosis, collection of samples for cytological examination, and to perform cytology to differentiate inflammation and neoplasia. Students will also learn composition of feces and its analysis for diagnosis of different diseases.</p>	
13. Teaching/Learning Strategies	<p>Classroom activities will include lectures, with power point slides, audiovisual presentations and class discussions. Lectures will emphasize on the theoretical aspects of the course, test principles, and methodologies. Labs will provide training to enable students to conduct various clinical chemistry tests using appropriate instrumentation independently and in groups.</p>	
14. Assessment Components and Weight [%]	<input type="checkbox"/> Quizzes 5 <input checked="" type="checkbox"/> Practical 30 <input type="checkbox"/> Other (specify):	

<input type="checkbox"/> Homework assignments 5	<input type="checkbox"/> Project	
<input type="checkbox"/> In-term examination(s) 20	<input checked="" type="checkbox"/> Final examination 40	
15. Grading Method		
<input checked="" type="checkbox"/> A-F Scale <input type="checkbox"/> Pass/Not passed		
16. Textbook(s) and Supplemental Material		
Paul Pratt. Laboratory Procedures for Veterinary Technicians, 3 rd editions. Mosby, 1997. Mary Anna Thrall. Veterinary Hematology and Clinical Chemistry. 2 nd edition, Wiley-Blackwell, 2012. Margi Sirois. Laboratory Procedures for Veterinary Technicians, 6 th edition. Mosby, 2014.		

17. Matching Course Objectives with Program Outcomes and SQU Graduate Attributes		
SQU Graduate Attributes		
A. SQU graduates should be able to: 1. apply the knowledge and skills relevant to the specialization 2. communicate effectively and use information and communication technologies 3. critically analyze complex information and present it in simple clear manner	B. SQU graduates possess 1. interpersonal communication skills and alignment with culture of international labour market to assist them in practical life and in living successfully 2. skills and motivation for independent learning and engagement in lifelong learning and research 3. work ethics and positive values, and intellectual independence and autonomy 4. teamwork skills and display potential leadership qualities	C. SQU graduates should relish good citizenship qualities, be conscious of their national identity and be socially responsible, engage in community affairs and be mindful of contemporary issues.

#	Intended Student Learning Outcome /Course Learning Objective	Relevant Program Outcome(s)	Applicable Attribute(s)
1.	Demonstrate knowledge and importance of use of clinical chemistry testing in diagnosis of diseases/conditions in veterinary patients	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
2.	Understand the chemical composition of blood	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
3.	Identify commonly used laboratory instruments and equipment in clinical chemistry testing and learn their operation and maintenance	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
4.	Identify the techniques, procedures and sites used to collect blood samples in various animal species.	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
5.	Identify types of tubes and anticoagulants used to collect whole blood, serum and plasma samples	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
6.	Identify major electrolytes present in the blood, their importance and also identify various derangements associated with electrolytes	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
7.	Identify various liver enzymes, their importance, sample handling and methods used for laboratory evaluation of liver enzymes	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
8.	Identify various tests used for renal functions and pancreas evaluation in veterinary patients.	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
9.	Identify the importance of glucose, creatinine kinase and cholesterol in the body, their metabolism and methods to measure their blood levels and test interpretation	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
10.	Identify various types of plasma proteins and their importance and functions. Also, identify methods to measure the plasma proteins levels and various disorders associated with plasma proteins	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3

11.	Identify various methods to collect urine sample in veterinary patients and identify urine tests to evaluate renal and other body functions	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
12.	Identify various tests used for fecal testing, their interpretation to diagnose health problems in veterinary patients	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
13.	Identify importance and techniques of cytological examination of samples of animal origin and their interpretation	Demonstrate pertinent knowledge pertaining to preclinical veterinary sciences	A1,A2,A3
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16. Student Responsibilities

It is the student's responsibility to know and comply with all University Academic Regulations relevant to participation in this course. These regulations specifically include attendance requirement and students' academic code of conduct.

For attendance, it is the student's responsibility to be punctual and to attend all classes.

Students are expected to perform their work with honesty and avoid any academic misconduct, which is defined as the use of any dishonest or deceitful means to gain some academic advantage or benefit. This can take many forms, including but not limited to, the following: copying, plagiarism, collusion and forging documents. For full details, please refer to the Undergraduate Academic Regulations and to the Student Academic Misconduct Policy.

Additionally, this course requires that you:

Student must wear lab coats during laboratory work. Every student must follow the safety guidelines for laboratory work.

COURSE INFORMATION			
Course Code	ANVS3212	Course Title	Clinical Chemistry, Cytology & Urology
Semester/ Year	SP	Section(s)	
Day, Time, and Place			
Course Coordinator	Haytham Ali		
Office Location		Office Hours	
Office Tel. Ext.		Email	

Tentative Schedule			
Week	Lecture #	Topic/Material to be covered	Assessment
1	Introduction of veterinary clinical chemistry, a case demonstration.	Introduction to veterinary clinical chemistry. A case demonstration. Uses of clinical chemistry testing in diagnosis of various health problems in veterinary patients. Types of samples used for clinical chemistry tests, handling and storage of samples.	Exam
2	Introduction to electrolytes	Definition. Importance of electrolytes including sodium, potassium, chloride, bicarbonate. Derangements of electrolytes levels including acidosis and alkalosis in veterinary patients and tests used for electrolyte evaluation.	Exam
3	Liver function testing in veterinary patients	Importance and functions of liver in the body. Evaluation of liver function by using various tests in small and large animals.	Exam
4	Kidney function testing in veterinary patients	Importance and functions of kidneys in the body. Evaluation of kidney functions by using various tests including creatinine, blood urea nitrogen (BUN), and urinalysis	Exam
5	Glucose, CK and Cholesterol testing in veterinary patients	Importance of blood glucose, creatine Kinase (CK) and cholesterol in the body and laboratory testing of each of these by using appropriate tests and interpretation of each test.	Exam
6	Plasma proteins testing in veterinary patients	Definition, importance and functions of plasma proteins in veterinary animals. Laboratory indicators of plasma protein disorders and test interpretation. Case demonstration of a veterinary patient with plasma protein disorder.	Exam
7	Urinalysis in veterinary patients	Importance of urinary system in veterinary patients, various methods used to collect urine sample. Handling and storage of urine sample. Gross examination of urine sample. Specific gravity calculation using refractometer and reagent strips. Various tests used for urinalysis in veterinary patients.	Exam
8	Microscopic examination of urine sample	Microscopic examination of urine sample for various cells including RBC, WBC, epithelial cells, bacteria, yeasts and casts and crystals.	Exam
9	Urinalysis in birds. Fecal analysis in veterinary patients.	Collection of urine sample in birds for analysis. Testing bird urine sample for uric acid and biliverdin. Using commercial reagent strips for bird urine analysis. Collection and organoleptic testing of animal fecal samples. Fecal testing for occult blood, parasites, and bacteria.	Exam
10	Cytological testing in veterinary patients Part I.	Definition and importance of cytology in veterinary medicine. Collection of samples using imprints, scraping, swabs, and aspiration of mass for cytological examination. Smear preparation and staining using various stains.	Exam
11	Cytological testing in veterinary patients Part II.	Smear preparation and examination for cytological processing of samples of veterinary animals. Demonstration of various clinical cases using cytological techniques.	Exam
12			Exam
13			Exam
14			Exam

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APPENDIX B: ADDITIONAL INFORMATION