REPUBLIC OF YEMEN
SANA'A UNIVERSITY
Faculty Of Veterinary Medicine
Veterinary Medicine Program

Course Specification of Veterinary Immunology

I. Course Identification and General Information:							
1	**Course Title:**	Veterinary Immunology					
2	**Course Number & Code:**	MI351					
3	**Credit hours:**	**C.H**				**Total**	
		Theoretical	**Practical**	**Training**	**Seminar**		
		2	**1**	**0**	**0**	**3**	
4	**Study level/ semester at which this course is offered:**	Third Year – First Semester					
5	**Pre –requisite (if any):**	PH242 , PH243					
6	**Co –requisite (if any):**						
7	**Program (s) in which the course is offered:**	Bachelor Veterinary Medicine					
8	**Language of teaching the course:**	English					
9	**Location of teaching the course:**	Faculty of Veterinary Medicine - building and laboratories					
10	**Prepared by:**	Dr. Fateh Ali Yahya Badi					
11	**Date of approval:**						

II. Course description:

This course provides students with basic information to understand immunology in terms of the composition of the immune system, cellular and molecular components, functions of the immune system, various immune system mechanisms and the role of colostrum and maternal immunity in the animal health. The course will cover also the allergies and types, vaccines and their types, vaccination importance, selection and analysis of diagnostic immunological tests implemented in practice. This course is considered to be an important pre-technology course that enables the student to understand other related sciences and to explain many phenomena related to these sciences such as microbiology, pathology, pharmacy, infectious diseases, epidemiology, clinical pathology, and internal medicine.

Prepared by	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Fateh Badi	Dr. Abdulraqeb Alshami	Ass. Prof. Dr. Abdu Alraoof Al-Shawkany	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

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:**	
A1-	Demonstrate knowledge and understanding of concepts and principles of general culture, basic science, and supportive to veterinary medicine.	**a1-**	Demonstrates knowledge of the different organs and cells involved in the immune response and its mechanism of action
A3-	Identifies various causes of diseases and animal epidemics and how they can be diagnosed, including common diseases that life threatening of animals, poultry and fish.	**a2-**	Determines the types of vaccines and their importance in addition to the various applications of immunology in the diagnostic aspects

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:		-Lectures using board, data shows and multimedia aids. - brainstorm. - Discussion. -Self-learning by preparing essay and presentations (computer and faculty library) - theoretical lectures and presentation on the basic knowledge of Immunological	-Written exam -Practical written exam -Oral exam - Quizzes - Report assignments - Discussion
a1-	Demonstrates knowledge of the different organs and cells involved in the immune response and its mechanism of action		
a2-	Determines the types of vaccines and their importance in addition to the various applications of immunology in the diagnostic aspects		

		laboratories and test (laboratory demonstrations)	

(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:**	
B1-	Competently practices analytical and critical thinking skills in studying and assessing health problems and reading the results of animal medical examinations and in related sciences	**b1-**	explains how the immune response occurs and how the immune system can identify the strange antigens
B2-	Predicts an appropriate medical diagnosis for the most common disease states through analysis of clinical story data and the results of medical examinations of sick animal.	**b2-**	Assess various allergic states, symptoms of immune deficiency.

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) - Laboratory test troubleshooting. - Case studies Historical stories	-Written exam -Practical exam -Oral exam - Quizzes - Report assignments - Discussion
b1-	explains how the immune response occurs and how the immune system can identify the strange antigens		
b2-	Assess various allergic states, symptoms of immune deficiency.		

Prepared by	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Fateh Badi	Dr. Abdulraqeb Alshami	Ass. Prof. Dr. Abdu Alraoof Al-Shawkany	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

(C) Professional and Practical Skills:

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-**	Collect appropriate samples and perform suitable immunological diagnostic tests for clinical and infectious cases
C2	Practices practical, diagnostic, clinical and research skills, including the collection of samples in various fields of veterinary medicine and related sciences, in a safe and effective manner, considering the ethics of the profession.	**c2-**	Conducts vaccinations for different animals

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 (theoretical and practical laboratory tests demonstrations, practice of skills, and discussions). (a) Field visits (farms-dairy and poultry) (b)National animal laboratory visits (c) Quality standards authorities visits (c) -Case study	Written exam -Practical exam -Oral exam - Quizzes - Report assignments - Discussion
c1-	Collect appropriate samples and perform suitable immunological diagnostic tests for clinical and infectious cases		
c2-	Conducts vaccinations for different animals		

(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:**	
D1-	Communicates effectively with Professional colleagues and animal owners and expresses his ideas clearly and objectively.	**d1-**	Communicate effectively with logistic & working teams and scientifically discuss in scientific manner in scientific discussions and meetings.
D2-	Develops his scientific, professional and research capabilities and follow what is emerging in his field of specialization and using computer applications and information and communication technology.	**d2-**	Develops scientific and professional performance in the field of veterinary immunology and related sciences, in particular borderline techniques related to laboratory immunoassays, vaccines, and monitors scientific developments in these fields through use electronic libraries & Internet

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		-Self-learning by preparing essay and presentations (computer and faculty library) - Scientific visits - discussions - Assignments	-Written exam -Practical exam -Oral exam - Report assignments - Discussion - Note performance
d1-	Communicate effectively with logistic and working teams and scientifically discuss in scientific manner in scientific discussions and meetings.		
d2-	Develops scientific and professional performance in the field of veterinary immunology and related sciences, in particular borderline techniques related to laboratory immunoassays and vaccines, and monitors scientific developments in these fields through the use electronic libraries and Internet		

IV. Course Content:

Prepared by	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Fateh Badi	Dr. Abdulraqeb Alshami	Ass. Prof. Dr. Abdu Alraoof Al-Shawkany	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction to immunology and its importance in veterinary medicine	a1, a2, b1, b2 c1, c2, d1	• Definition and terms • Historic prospective • Importance of Immunology in animal health and production	1	2
2	Immune system : components and responses types	a1, a2, b1, b2 c1, c2, d1	• Primary and secondary Immune Organs • Cells of immune system • molecules of immune system • Immune response types	3	6
3	Innate Immunity and complement system	a1, a2, b1, b2 c1, c2, d1	• Physical and mechanical barriers • Pathogen recognition • Innate immunity defense molecules • Complement systems	3	6
4	Acquired Immunity	a1, a2, b1, b2 c1, c2, d1	• Antigens • Humoral immunity • Cell mediated immunity	3	6
5	Hypersensitivity	a1, a2, b1, b2 c1, c2, d1	• Hypersensitivity I &II • Hypersensitivity III & IV	2	4
6	Vaccination and Vaccines	a1, a2, b1, b2 c1, c2, d1	• Vaccines important and quality control • Vaccines types	2	4
Number of Weeks /and Units Per Semester				**14**	**28**

b- Training Aspect:

Order	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	Introduction to Immunology Laboratory and quality control	a1, a2, b1, b2 c1, c2, d1	2	4

Prepared by
Dr. Fateh Badi

Quality Assurance Unit
Dr. Abdulraqeb Alshami

Dean of the Faculty
Ass. Prof. Dr. Abdu Alraoof Al-Shawkany

Academic Development Center & Quality Assurance
Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

2	Complement Fixation Test	a1, a2, b1, b2 c1, c2, d1	2	4
3	Agglutination and Precipitation	a1, a2, b1, b2 c1, c2, d1	3	6
4	Labeled Immunoassay	a1, a2, b1, b2 c1, c2, d1	2	4
5	Vaccination procedures and troubleshooting	a1, a2, b1, b2 c1, c2, d1	3	6
6	Scientific Visit	a1, a2, b1, b2 c1, c2, d1	2	4
Number of Weeks /and Units Per Semester			**14**	**28**

V. Teaching strategies of the course:

- Lectures using data shows and multimedia aids.
- Self-learning by preparing essay and presentations (computer and faculty library)
- Brainstorm
- Discussion
- Cooperative learning
- Practical training (Clinical demonstrations, practice of skills, and discussions).
  (a) Field visits (farms and villages)
  (b) General experimental animal teaching
  (c) Clinical and small group sessions
  (d) Outpatient clinic
- Tutorial classes (small group teaching)

3-Assessment Methods:

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

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
2	**Mid-Term Exam**	**8**	**10**	**10%**	a1, a2, b1, b2 c1, c2
3	**Mid-Term Practical Exam**	**8**	**10**	**10%**	a1, a2, b1, b2 c1, c2
4	**Final Practical Exam**	**15**	**10**	**10%**	a1, a2, b1, b2 c1, c2
5	**Oral Exam**	**16**	**5**	**5%**	a1, a2, b1, b2 c1, c2
6	**Final Exam**	**16**	**55**	**55%**	a1, a2, b1, b2 c1, c2
	Total		**100**	**100%**	

VII. Students' Support:

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

VIII. Learning Resource (MLA style or APA style)S:

1- Required Textbook(s) (maximum two)

- Day, M. J., Schultz, R. D. (2014). Veterinary Immunology: Principles and Practice, Second Edition. United Kingdom: CRC Press.
- Sirois, M. (2019). Laboratory Manual for Laboratory Procedures for Veterinary Technicians E-Book. United States: Elsevier Health Sciences.

2- Recommended Readings and Reference Materials

1- Objective Type Questions and Answers in Veterinary Immunology. (2008). (n.p.): Scientific Publishers (India).
2- Gershwin, L. (2017). Case Studies in Veterinary Immunology. United States: CRC Press.

3- Essential References

- Tizard, I. R. (2017). Veterinary Immunology - E-Book. United States: Elsevier Health Sciences.

4- Electronic Materials and Web Sites *etc*.

Prepared by
Dr. Fateh Badi

Quality Assurance Unit
Dr. Abdulraqeb Alshami

Dean of the Faculty
Ass. Prof. Dr. Abdu Alraoof Al-Shawkany

Academic Development Center & Quality Assurance
Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

	https://www.journals.elsevier.com/veterinary-immunology-and-immunopathology
5- Other Learning Material:	
	- https://www.oie.int/scientific-expertise/veterinary-products/diagnostic-tests/

	Course Policies:
1	**Class Attendance:** **MANDATORY TO ATTEND ALL COURSE LECTURES**
2	**Tardiness:** Not allowed at all. Students must be in class or in the practical session 10 minutes prior to the beginning of lectures or practical session
3	**Exam Attendance/Punctuality:** Attendance is mandatory; absence is accepted with valid excuse
4	**Assignments & Projects:** 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	**Cheating:** Not tolerated and may lead to **EXPELLING** the student from the program
6	**Plagiarism:** Not tolerated **AT ALL** and may lead to **EXPELLING** the student from the program
7	**Other policies:** 1. All devices must be on silent or at least on vibration during lectures/labs 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. 3. Any of type/ form of cheating is not allowed no matter what. 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.

Prepared by	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Fateh Badi	Dr. Abdulraqeb Alshami	Ass. Prof. Dr. Abdu Alraoof Al-Shawkany	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

Course Plan of Veterinary Immunology

X. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Fateh Ali Yahya Badi	**Office Hours**					
Location & Telephone No.	Dhamar university	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail							

XI. Course Identification and General Information:						
1-	**Course Title:**	Veterinary Immunology				
2-	**Course Number & Code:**	MI351				
3-	**Credit hours:**	**C.H**				**Total**
		Th.	**Seminar**	**Pr.**	**F. Tr.**	
		2	-	1		3
4-	**Study level/year at which this course is offered:**	Third Year – First Semester				
5-	**Pre –requisite (if any):**	PH242 , PH243				
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				
9-	**System of Study:**	Regular / Semesters				
10-	**Mode of delivery:**	Lecturers, presentations, tutorials, practical laboratory works				
11-	**Location of teaching the course:**	Faculty of Veterinary Medicine building				

Prepared by	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Fateh Badi	Dr. Abdulraqeb Alshami	Ass. Prof. Dr. Abdu Alraoof Al-Shawkany	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

II. Course Description:

This course provides students with basic information to understand immunology in terms of the composition of the immune system, cellular and molecular components, functions of the immune system, various immune system mechanisms and the role of colostrum and maternal immunity in the animal health. The course will cover also the allergies and types, vaccines and their types, vaccination importance, selection and analysis of diagnostic immunological tests implemented in practice. This course is considered to be an important pre-technology course that enables the student to understand other related sciences and to explain many phenomena related to these sciences such as microbiology, pathology, pharmacy, infectious diseases, epidemiology, clinical pathology, and internal medicine.

XIII. Intended learning outcomes (ILOs) of the course:

After completing this course, students will be able to:

a1- Demonstrates knowledge of the different organs and cells involved in the immune response and its mechanism of action

a2- Determines the types of vaccines and their importance in addition to the various applications of immunology in the diagnostic aspects.

b1- explains how the immune response occurs and how the immune system can identify the strange antigens

b2- Assess various allergic states, symptoms of immune deficiency.

c1- Collect appropriate samples and perform suitable immunological diagnostic tests for clinical and infectious cases

c2- Conducts vaccinations for different animals

d1- Communicate effectively with logistic & working teams and scientifically discuss in scientific

manner in scientific discussions and meetings.

d2- Develops scientific and professional performance in the field of veterinary immunology and related sciences, in particular borderline techniques related to laboratory immunoassays, vaccines, and monitors scientific developments in these fields through use electronic libraries & Internet

XIV. Course Content:

A – Theoretical Aspect:

Order	Topics List	Week Due	Contact Hours
1	**Introduction to immunology and its importance in veterinary medicine** • Definition and terms • Historic prospective • Importance of Immunology in animal health and production	1	2
2	**Immune system : components and responses types** - Primary and secondary - Immune Organs •Cells of immune system • molecules of immune system • Immune response types	2,3,4	6
3	**Innate Immunity and complement system** • Physical and mechanical barriers • Pathogen recognition • Innate immunity defense molecules • Complement systems	5,6,7	6
4	**Mid-Term Exam**	8	2
5	**Acquired Immunity** • Antigens • Humoral immunity • Cell mediated immunity	9,10,11	6

6	**Hypersensitivity** • Hypersensitivity I &II • Hypersensitivity III & IV	12,13	4
7	**Vaccination and Vaccines** • Vaccines importance and quality control • Vaccines types	14,15	2
8	**Final Exam**	16	2
Number of Weeks /and Units Per Semester		**16**	**32**

b- Training Aspect:

Order	Training Tasks	Week Due	Contact hours
1	Introduction to Immunology Laboratory and quality control	1,2	4
2	Complement Fixation Test	3,4	4
3	Agglutination and Precipitation	5,6,7	6
4	**Mid-Term Exam**	8	2
5	Labeled Immunoassay	9,10	4
6	Vaccination procedures and troubleshooting	11,12,13	6
7	Scientific Visit	14,15	4
8	**Final Exam**	16	2
Number of Weeks /and Units Per Semester		**16**	32

XV. 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 (Clinical demonstrations, practice of skills, and discussions).

(a) Field visits (farms and villages)

(b) General experimental animal teaching

(c) Clinical and small group sessions

(d) Outpatient clinic

- Tutorial classes (small group teaching)

XVI. 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).

N.B.:
1. Any student who pass the 25% of the class attendance will not be allowed for the final exam.
2. Students are advised to study hard in the class during the semester.
3. Retaking an exam is not allowed without valid excuse.

Prepared by	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
Dr. Fateh Badi	Dr. Abdulraqeb Alshami	Ass. Prof. Dr. Abdu Alraoof Al-Shawkany	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

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%
	Total		100	100%

VIII. Learning Resources:

•

1- Required Textbook(s) (maximum two).

- Day, M. J., Schultz, R. D. (2014). Veterinary Immunology: Principles and Practice, Second Edition. United Kingdom: CRC Press.
- Sirois, M. (2019). Laboratory Manual for Laboratory Procedures for Veterinary Technicians E-Book. United States: Elsevier Health Sciences.

2- Essential References.

- Tizard, I. R. (2017). Veterinary Immunology - E-Book. United States: Elsevier Health Sciences.

3- Electronic Materials and Web Sites *etc*.

https://www.journals.elsevier.com/veterinary-immunology-and-immunopathology
https://www.oie.int/scientific-expertise/veterinary-products/diagnostic-tests/

IX. Course Policies:

1	**Class Attendance:** ▪ **MANDATORY TO ATTEND ALL COURSE LECTURES**
2	**Tardy:** Not allowed at all. Students must be in class or in the practical session 10 minutes prior to the beginning of lectures or practical session

Prepared by
Dr. Fateh Badi

Quality Assurance Unit
Dr. Abdulraqeb Alshami

Dean of the Faculty
Ass. Prof. Dr. Abdu Alraoof Al-Shawkany

Academic Development Center & Quality Assurance
Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

3	**Exam Attendance/Punctuality:** ▪ Attendance is mandatory; absence is accepted with valid excuse
4	**Assignments & Projects**: ▪ **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	**Cheating**: ▪ Not tolerated and may lead to **EXPELLING** the student from the program
6	**Plagiarism**: ▪ Not tolerated AT ALL and may lead to EXPELLING the student from the program
7	**Other policies**: 1. All devices must be on silent or at least on vibration during lectures/labs 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. 3. Any of type/ form of cheating is not allowed no matter what. Maintain silence during lectures/exam and disturbance is not allowed. For any questions students should raise their hand and wait for permission to talk.