In the name of God

Hamadan University of Medical Sciences and Health Services

Educational Deputy of the University

Center for Studies and Development of Medical Sciences Education

Theory/Practical Lesson Plan Form

Dear Colleagues,

As the teaching-learning process is one that requires careful planning to achieve its objectives, it is essential to develop a lesson plan at the beginning of the educational process. This plan serves as a map and guide for both instructors and students, making it one of the primary tools for educational activities.

Therefore, we kindly ask all instructors to exercise utmost care in completing the lesson plan.

Course Details

- **Course Title:** Practical Virology 1
- **Instructors:**
  - Dr. Ali Timouri
  - Dr. Farid Azizi Jalilian
  - Dr. Nasrin Ansari
  - Dr. Shahab Mahmoudvand
- **Course Coordinator:** Dr. Timouri

- **Department Head:** Dr. Farid Azizi Jalilian
- **Credit Hours:**
  - **Theory:** 0 units
  - **Practical:** 2 units
- **Student Program and Level:** Master's Degree
- **Semester:** First Semester

Session	Title	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
1	Study of Laboratory Cases	1. Identify powdered materials by application. 2. Identify chemical solvents by application. 3. Explain acids and bases and their practical applications.	Cognitive	Discussion, Direct Observation	2 hours	PowerPoint, Whiteboard	Work Report
2	Familiarization with Laboratory Tools	1. Name general laboratory tools. 2. Name specialized laboratory tools.	Cognitive	Discussion, Direct Observation	2 hours	PowerPoint, Whiteboard	Work Report

Session	Title	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		3. Describe storage and cleaning conditions of tools. 4. Perform quality control of tools.					
3	Principles of Dilution and Buffer Preparation	1. Understand molarity and normality. 2. Estimate dilutions of stock and working solutions. 3. Estimate dilutions of acids by percentage and molarity. 4. Prepare cell culture media. 5. Prepare	Cognitive	Discussion, Direct Observation	2 hours	PowerPoint, Whiteboard, Practical Work	-

Session	Title	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		various buffers.					
4	Sterilization and Its Types	1. Explain the principles of dry sterilization and its applications. 2. Describe the method of moist sterilization and its applications. 3. Explain the filtration sterilization method.	Cognitive	Discussion, Direct Observation	2 hours	PowerPoint, Whiteboard, Practical Work	-
5	PCR Method	1. Explain the principles of PCR. 2. Name the components of the reaction. 3.	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard	Work Report

Session	Title	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		Describe troubleshooting in PCR.					
6	Primer and Probe Design	1. Explain the principles of primer design for viruses by gender and family. 2. Explain primer design for viruses by species. 3. Describe viral genetic banks. 4. Determine primer specificity.	Cognitive	Discussion, Direct Observation	2 hours	Whiteboard, PowerPoint	Work Report
7	DNA and RNA Electrophoresis	1. Explain types of DNA electrophoresis. 2.	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard, PowerPoint	Work Report

Session	Title	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		Describe electrophoresis principles on agarose gels. 3. Explain DNA and RNA electrophoresis on acrylamide gels. 4. Explain RNA electrophoresis.					
8	Protein Electrophoresis	1. Define protein electrophoresis. 2. Explain buffers and principles of working with them. 3. Describe making acrylamide gels of varying percentages. 4.	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard, PowerPoint	Work Report

Session	Title	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		Perform protein gel staining using various methods.					
9	Sanger Sequencing	1. List applications of sequencing methods. 2. Interpret Sanger method peaks. 3. Explain the principles of Sanger sequencing.	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard	Q&A
10	Next Generation Sequencing	1. Explain the principles of next-generation sequencing. 2. Describe its applications in identifyin	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard, PowerPoint	Q&A

Session	Title	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		g viruses under various conditions.					
11	ELISA	1. Explain the principles of ELISA and its applications in virology. 2. List types of reporters in ELISA. 3. Describe ELISA design based on antigens and antibodies.	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard, PowerPoint	Q&A
12	Viral DNA and RNA Extraction	1. Explain manual extraction principles. 2. Explain kit-based extraction principles.	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard, PowerPoint	Work Report

Session	Title	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		3. Discuss challenges of extraction in various tissue samples.					
13	Extraction of Recombinant Plasmids	1. Explain principles of plasmid extraction and its differences from DNA. 2. Describe applications of plasmids in viral biotechnology. 3. Demonstrate the extraction method practically.	Cognitive	Discussion, Direct Observation	2 hours	Whiteboard, PowerPoint	Work Report
14	Protein Extraction	1. Explain the principles of protein extractio	Cognitive	Discussion, Direct Observation	2 hours	Whiteboard, PowerPoint	Work Report

Session	Title	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		n and extraction buffers. 2. Show the use of protease inhibitors in protein extraction. 3. Extract from tissue and cell culture sources.					

Grading Method

Type of Evaluation	Evaluation Tool	Points (Out of Total)
Quiz		
Project Presentation	Review of Work Reports	8
Midterm Exam		
Final Exam	Descriptive Exam	7
Other	Instructor's Personal Opinion on Class Activity	5
Total		**20**

منابع:

1. Virology method manual