

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

Ses sion	Title	Behavio ral Objectiv es	Lear ning Dom ain	Teach ing Metho d	Dura tion	Teachi ng Aids	Evalu ation Metho d
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.	Cogni tive	Discus sion, Direct Observ ation	2 hours	PowerP oint, Whiteb oard	Work Report
2	Familiarization with Laboratory Tools	1. Name general laboratory tools. 2. Name specialized laboratory tools. 3. Describe storage	Cogni tive	Discus sion, Direct Observ ation	2 hours	PowerP oint, Whiteb oard	Work Report

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		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 various buffers.	Cognitive	Discussion, Direct Observation	2 hours	PowerPoint, Whiteboard, Practical Work	-

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4	Sterilizati on and Its Types	1. Explain the principles of dry sterilizati on and its applicatio ns. 2. Describe the method of moist sterilizati on and its applicatio ns. 3. Explain the filtration sterilizati on method.	Cogni tive	Discus sion, Direct Observ ation	2 hours	PowerP oint, Whiteb oard, Practic al Work	-
5	PCR Method	1. Explain the principles of PCR. 2. Name the compone nts of the reaction. 3. Describe troublesh ooting in PCR.	Cogni tive	Discus sion, Direct Observ ation	2 hours	Video, Whiteb oard	Work Report
6	Primer and Probe Design	1. Explain the principles of primer	Cogni tive	Discus sion, Direct	2 hours	Whiteb oard, PowerP oint	Work Report

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		design for viruses by gender and family. 2. Explain primer design for viruses by species. 3. Describe viral genetic banks. 4. Determine primer specificity .		Observation			
7	DNA and RNA Electrophoresis	1. Explain types of DNA electrophoresis. 2. Describe electrophoresis principles on agarose gels. 3. Explain DNA and RNA electrophoresis on	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard, PowerPoint	Work Report

Ses sion	Title	Behavio ral Objectiv es	Lear ning Dom ain	Teach ing Metho d	Dura tion	Teachi ng Aids	Evalu ation Metho d
		acrylamid e gels. 4. Explain RNA electroph oresis.					
8	Protein Electroph oresis	1. Define protein electroph oresis. 2. Explain buffers and principles of working with them. 3. Describe making acrylamid e gels of varying percenta ges. 4. Perform protein gel staining using various methods.	Cogni tive	Discus sion, Direct Observ ation	2 hours	Video, Whiteb oard, PowerP oint	Work Report
9	Sanger Sequenci ng	1. List applicatio ns of sequenci ng methods. 2.	Cogni tive	Discus sion, Direct Observ ation	2 hours	Video, Whiteb oard	Q&A

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		Interpret Sanger method peaks. 3. Explain the principles of Sanger sequencing.					
10	Next Generation Sequencing	1. Explain the principles of next-generation sequencing. 2. Describe its applications in identifying viruses under various conditions.	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard, PowerPoint	Q&A
11	ELISA	1. Explain the principles of ELISA and its applications in virology. 2. List types of reporters in ELISA.	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard, PowerPoint	Q&A

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		3. Describe ELISA design based on antigens and antibodies.					
12	Viral DNA and RNA Extraction	1. Explain manual extraction principles · 2. Explain kit-based extraction principles · 3. Discuss challenges of extraction in various tissue samples.	Cognitive	Discussion, Direct Observation	2 hours	Video, Whiteboard, PowerPoint	Work Report
13	Extraction of Recombinant Plasmids	1. Explain principles of plasmid extraction and its differences from DNA. 2. Describe applications of plasmids	Cognitive	Discussion, Direct Observation	2 hours	Whiteboard, PowerPoint	Work Report

Ses sion	Title	Behavio ral Objectiv es	Lear ning Dom ain	Teach ing Metho d	Dura tion	Teachi ng Aids	Evalu ation Metho d
		in viral biotechnology. 3. Demonstrate the extraction method practically.					
14	Protein Extraction	1. Explain the principles of protein extraction and extraction buffers. 2. Show the use of protease inhibitors in protein extraction. 3. Extract from tissue and cell culture sources.	Cognitive	Discussion, Direct Observation	2 hours	Whiteboard, PowerPoint	Work Report

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