



## **Course Handbook**

Ministry of Higher Education and Scientific research

Salahaddin University- Erbil

College of Education/ Shaqlawa

Biology Department

Fourth Year: Second Semester

Subject: **Virology**

Academic Year: 2023-2024

Lecturer's name:

**Lec. Sherko Muhammed Abdul-Rahman**

# Course Book

<b>1. Course name</b>	Virology
<b>2. Lecturer in charge</b>	Lec. Sherko Muhammed Abdul-Rahman
<b>3. Department/ College</b>	Biology Dept./ College of Education/Shaqlawa
<b>4. Contact</b>	E-mail: sherko.abdulrahman@su.edu.krd Tel: 00964 750 445 6357
<b>5. Time (in hours) per week</b>	Theory: 2 hrs
<b>6. Office hours</b>	2 Hours per week
<b>7. Course code</b>	EdB1405
<b>8. Teacher's academic profile</b>	<p><b><u>Education:</u></b></p> <ul style="list-style-type: none"> <li>• Graduated from Nursing Preparatory School-Erbil in 1991-1994.</li> <li>• Obtained Diploma from Nursing Dept., Medical Technical Institute-Erbil in 1994-1996</li> <li>• Obtained B.Sc. in Biology/Microbiology from college Science/ Salahaddin University-Erbil in 1996-2001.</li> <li>• Obtained Master in Management Business Administration (MBA)/Business Management University (BMU)/ Lebanon-French University in 2007-2010.</li> <li>• Obtained M.Sc. in Biology/ Microbiology from College Education/ Salahaddin University-Erbil in 2017-2019.</li> </ul> <p><b><u>Thesis Title:</u></b></p> <p>Neonatal Sepsis: Bacteriological Profile, Molecular Detection and Antimicrobial Susceptibility Test Among Preterm Pediatric in Erbil City.</p> <p><b><u>Qualifications and Teaching Experience</u></b></p> <ul style="list-style-type: none"> <li>• He worked as a teacher in college of nursing from 2004-2016 during these periods of time, he tried to work in collaboration with university and health sectors to improve nurse's role and participated in many education trainings courses. Also, he worked to introduce graduated nurses from the college of nursing as new models of career in Erbil city's hospitals.</li> <li>• 2006 until 2010, Head of Planning &amp; Follow up Department in College of Nursing.</li> <li>• 2004-2016 experience in Journalism field, writing many articles in newspapers and websites.</li> <li>• Excellent computer skills in the all Windows and Microsoft Office versions.</li> <li>• More than 20 years' experience in managing of Companies administration.</li> </ul>

- He has been assigned as laboratory demonstrator in the Laboratory department between 2004-2016 in Nursing College, Hawler Medical University. This included practical Biology (such as Zoology, and Pathogenic Bacteria, Physiology and Biochemistry) in the laboratories.
- He started to study M.Sc./Microbiology in 2019, at department of Biology/ College of Education/Shaqalawa, Salahaddin University- Erbil. Then, he started to work in the same department, as an assistant lecturer.
- Member of the examination committee for College of Nursing from 2010-2016 except 2012, and at College of Education/Shaqalawa, from 2019 till now.
- He worked as Registrar of college of Education /shaqlawa from 2019-2021.
- He was worked as Head of Biology Department, college of Education /shaqlawa from 7-01-2021 to 26-12-2023
- He has six published researches from International Journals around Microbiology specialist.

#### **Research and publications**

- He has five published researches and one acceptance letter from International Journals around Microbiology specialist as following:
- Neonatal sepsis: Bacteriological profile, molecular detection and antimicrobial susceptibility test among pre-term pediatrics in Erbil city, Iraq. (Zanco J. Med. Sci., Vol. 24, No. (2), August, 2020)
- Molecular detection of  $\beta$ -lactamase genes in Klebsiella pneumoniae and Escherichia coli isolated from different clinical sources. (Kamal Ismael Bakr et l. /  $\beta$ -lactamase genes in Gram negative bacteria from clinical specimens, 2021, 67(4): 1-9)
- Impact of Alcoholic and Aqueous Extracts of Annona Muricata on the Growth of Staphylococcus aureus and Escherichia coli Isolates. (SVU- International Journal of Veterinary Sciences, 5(4): 103-113, 2022)
- Serological Diagnosis and Epidemiological impact of Helicobacter pylori infection on human health in Diyala Governorate, Iraq. (Tikrit Journal of Pure Science Vol. 27 (3) 2022)
- Prevalence of Hepatitis B Virus Infection among General People and Hemophilia Patients in Erbil City, Iraq during 2020-2021. (SVU- International Journal of Veterinary Sciences, 5(4): 103-113, 2022).
- Application of Salmonella phages to reduce in-vitro and in-vivo colonization of Salmonella enteritidis and Salmonella typhi.( Zanco J. Med. Sci.) Acceptance

	<p>letter.</p> <p><b><u>Conferences and courses attended</u></b></p> <ul style="list-style-type: none"> <li>• June, 2000, Ishik Language Center, participant in WOW course (Window of the World).</li> <li>• June 2005, Participant in First Nursing conference of Salahaddin University- Erbil.</li> <li>• Dec. 2006, participant in E-Learning Courses in college of Nursing broadcasted from Greece supported by KLIMAKA NGO.</li> <li>• July, 2007 participant in Internet &amp; Computer Courses in Technical Institute by KPA Center.</li> <li>• 2016-2019, completed four levels in face2face English language learning (Starter, Elementary, Pre-intermediate and Intermediate) in CIS institute center.</li> <li>• Participated in Workshop titled (The Role of Technology in Higher Education Institutions during Coronavirus Pandemic), on 24 June, 2021 in Garmian University.</li> <li>• Participated in scientific webinar entitled (Introduction to Serverless), on 13/03/2022 in Baghdad University.</li> <li>• Participated in scientific webinar entitled (How to scientific journal to publish your scientific product and why is it important, in Scholars and Academics Platform and IFAD, on 7 April, 2022</li> <li>• Participated in scientific webinar entitled (Future studies in scientific research), in Scholars and Academics Platform and IFAD, on 15 April, 2022</li> <li>• Participated in “The First International Conference on Administrative and Legal Sciences and Prospects for Renewal and Innovation” organized by the Colleges of (Administrative and Financial Sciences and Law) at Knowledge University on (7-8/5/2022).</li> <li>• Participated in Fourth Conference on Student Research Projects and Academic Posters Salahaddin University- Erbil, on 16th May,2022.</li> <li>• Participated in Third Conference on Student Research Projects and Idea Grants Salahaddin University-Erbil, on 2nd February,2023.</li> <li>• Has attended the scientific lecture entitled: Copyright and Related Rights in the Digital Environment: Egypt as a Model Within the activities of the Scientific Research Week - building a culture of scientific research and publishing with an applied perspective, organized by IFAD platform, Bani Walid University, and Komar University of Science and Technology Held (remotely), on 3rd February, 2023.</li> <li>• Has attended the scientific lecture entitled: Copyright and Related Rights in the Digital Environment: Egypt as</li> </ul>
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	<p>a Model in The IFAD platform licensed with No. (4651291105) and approved by the government in the Republic of Turkey, On February 3, 2023.</p> <ul style="list-style-type: none"><li>• Has participated in scientific webinar entitled: Determinants the use of ChatGPT artificial intelligence in scientific research and academic and educational work, in IFAD - Scholars and Academics, On 8 February.</li><li>• Has participated in scientific webinar entitled: Scientific Explanations of Earthquakes, on 9 February, 2023, in IFAD - Scholars and Academics Platform.</li><li>• Funding and academic awards</li><li>• Completed the Course of pedagogical training for teacher professional development (30 ECTS) for the period of six months from 01.12.2019 - 01.06.2020 at the Salahaddin University – Erbil, Pedagogy Center.</li><li>• Completed an English Language proficiency course with advanced level from July 11,2023 to August 24, 2023 as a requirement for postgraduate studies and academic title at the Salahaddin University – Erbil, Language and Translation Center.</li><li>• Quality Assurance Certificate Final Result of Evaluating Academic Staff in Quality Assurance Process (Academic Year 2019-2020).</li><li>• Quality Assurance Certificate Final Result of Evaluating Academic Staff in Quality Assurance Process (Academic Year 2020-2021).</li><li>• Quality Assurance Certificate Final Result of Evaluating Academic Staff in Quality Assurance Process (Academic Year 2021-2022).</li><li>• Quality Assurance Certificate Final Result of Evaluating Academic Staff in Quality Assurance Process (Academic Year 2022-2023).</li></ul> <p><b><u>Professional memberships</u></b></p> <ul style="list-style-type: none"><li>• Erbil Chamber of Commerce and Industry/Iraq</li><li>• Importers &amp; Exporters Union Kurdistan Region of Iraq.</li><li>• Kurdistan Biology Syndicate</li><li>• Kurdistan Teachers Union</li></ul> <p><b><u>Professional Social Network Accounts:</u></b></p> <ul style="list-style-type: none"><li>• <a href="https://www.facebook.com/sherko.muhammed?ref=bookmarks">https://www.facebook.com/sherko.muhammed?ref=bookmarks</a></li><li>• <a href="https://scholar.google.com/citations?user=jq6RBs4AAA&amp;hl=en">https://scholar.google.com/citations?user=jq6RBs4AAA&amp;hl=en</a></li><li>• <a href="https://www.researchgate.net/profile/Sherko-Abdul-Rahman">https://www.researchgate.net/profile/Sherko-Abdul-Rahman</a></li></ul> <p><b><u>References:</u></b></p> <ul style="list-style-type: none"><li>• Prof. Dr. Badia Mohammed Najeeb, College of Nursing,</li></ul>
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	<p>Hawler Medical University, Erbil, Iraq. Mob.: 0750 488 80 59.</p> <ul style="list-style-type: none"> <li>• Prof. Dr. Adel Kamal Khedir, Department of Biology, College of Education, Salahaddin University- Erbil, Iraq. Mob.: 0750 447 29 08.</li> <li>• Assist. Prof. Dr. Farhad Ali Mustafa, Dean of College of Education/Shaqława, Salahaddin University- Erbil, Iraq. Mob.: 0750 455 39 19.</li> </ul>
<b>9. Keywords</b>	General Virology, academic profile, course book
<p><b>10. Course overview:</b></p> <p>Virology is a fascinating and rapidly developing subject, and is worthy of study purely because viruses are interesting! Furthermore, virology is a branch of science that is of immense relevance to mankind for a host of reasons, not least of which the threats to human health are caused by viruses, such as HIV, hepatitis B virus, papillomaviruses, measles and influenza viruses, to mention just a few. Evidence for the existence of very small infectious agents was first provided in the late 19th century by two scientists working independently: Martinus Beijerinck in Holland and Dimitri Ivanovski in Russia. Beijerinck called the agent a ‘virus’ and the term has been in use ever since. Viruses are the smallest infectious agents (ranging from about 20 nm to about 300 nm in diameter) and contain only one kind of nucleic acid (RNA or DNA) as their genome.</p> <p>This course provides an introduction to the field of virology. The course emphasizes the intrinsic properties of viruses that cause human disease and their interaction with cells, their structure, classification and evolution, their ways to infect and exploit host cells for virus reproduction, their interaction with host organism physiology and immunity, the diseases they cause, the techniques to isolate and culture them, and their use in research and therapy. Virology is considered to be a subfield of microbiology.</p>	
<p><b>11. Course objective:</b></p> <p>This course is designed for undergraduate students who are learning about virology for the first time. The purpose of this course is to provide a foundation for the understanding of viruses that cause human disease. The objective of the Science of Virology course is to describe at the molecular level the replication strategies of representative DNA and RNA viruses and the effects of virus infection on cell growth control and survival. Emphasis is placed on developing an understanding of the experimental systems used to elucidate individual steps in virus life cycles and their interactions with host cells. Host cell-virus</p>	

interactions leading to production of progeny virus and interactions involved in establishing and maintaining long term interactions, such as latency and oncogenesis. Also present the historical perspectives of virology, to introduce the idea that viruses whether pathogenic or benign are important members of the biosphere and have an important impact on our daily and future activities

## 12. Student's obligation

Students are expected to attend all classes. The official college attendance policy is followed. Attendance in each class is counted from the first day the student is eligible to attend the class as given on the student's assessment sheet registration card or student change notice. Student may obtain an excuse for the emergency absence from the dean of students upon presentation of satisfactory documentation.

## 13. Forms of teaching

1- Different forms of teaching will be used to reach the objectives of the course: power point presentations, definitions and description images, summary of conclusions, classification of materials and any other illustrations, besides worksheet will be designed to let the chance for practicing on several aspects of the course in the classroom.

2-Using white board

3-Classroom discussions about the lecture subjects and students' questions.

## 14. Assessment scheme:

No.	Exam (Evaluation)	Marks
1	Student presence	5%
4	Theory Activities	10%
5	Mid-term Exam	25%
6	Total Scores (Average)	40%
7	Final Exam	60%

## 15. Student learning outcome:

This course will provide a comparative overview of virus life cycles and strategies viruses use to infect and replicate in hosts. We will discuss virus structure and classification and the molecular basis of viral reproduction, evolution, assembly, and virus-host interactions.

In the end of the course, it expects the students will be able to:

1- Define common terms used in virology and the history of virology.

2- Identify all the possible methods for diagnosis of virus, the special techniques by which

we can replicate viruses, laboratory diagnosis of viruses using different techniques (such as: Molecular, immunological etc...)

3-Identify International classification of viruses; know the taxonomy of human viruses that cause disease

4-Understanding the main and new emerging threats of viral diseases e.g., HIV, influenza

5- How to combat viral infections.

6- Understanding the relationships between virus and the other Kingdoms.

7- Compare different virus replication strategies and genome coding strategies

8- Have good knowledge of the prevention, control and eradication of viral diseases

9- Think critically in terms of their learning and research.

### **16. Course Reading List and References**

1. Fundamentals of Molecular Virology, 2nd Edition by Nicholas H. Acheson, John Wiley & Sons, Inc. 2011

2- “Principles of Virology” Flint S.J., Enquist L.W., Racaniello V.R., Skalka A.M. 2008, 3rd edition, ASM Press.

3- “Fields Virology” David M. Knipe, PhD, Peter M. Howley, MD, Diane E Griffin MD, PhD, Robert A Lamb, PhD, ScD, Malcolm A Martin MD, Bernard Roizman ScD, and Stephen E Straus, MD. 2007, 5th edition, Lippincott Williams & Wilkins.

4-“Basic Virology” Edward K. Wagner, Martínez J. Hewlett, David C. Bloom, David Camerini. 2007, 3rd edition, Wiley-Blackwell.

5-“Introduction to Modern Virology” N.J. Dimmock, A.J. Easton, K.N. Leppard. 2007, 6th edition, Wiley-Blackwell.

6- “Understanding viruses” Teri Shors. 2nd ed. Burlington: Jones & Bartlett Learning, cop. 2013.

### **17. The Topics**

**Week 1:** -Introduction and General characters of viruses

(History, definition, and importance of study)

-Viral structure

Virus structure and morphology

composition and function of viral structure

**Week 2:** Virus Architecture and Nomenclature

Viral shape (Symmetry) and different figure of virus

Classification of Animal Viruses (ICV and Baltimore scheme)

**Week 3:** Virus replication Strategies

Principal events involved in replication: Adsorption, penetration, uncoating nucleic acid



and protein synthesis, assembly, maturation and release.

**Week 4:** Chemical and physical agent reaction

To discuss the effect of pH, temperature, Heat, cold and salts upon

Viral activities.

-Viral Immunopathology-Viral Immune response and viral evasion Mechanisms

**Week 5:** Laboratory Diagnosis of Virus Infections (Method of Diagnosis)

-Direct method

-In Direct method

-Serological and molecular method

**Week 6 :** Double stranded DNA Virus (Adenoviruses, Herpesviruses, Poxviruses

**Week 7:** Single strand DNA viruses (+ sense) DNA (e.g., Parvoviruses

**Week 8:** Positive single strand (+)ssRNA viruses (+ sense) RNA (e.g. Picornaviruses, Togaviruses)

**Week 9:** Double strand RNA viruses (e.g., Reoviruses)

**Week 10:** Negative single strand (-)ssRNA viruses (- antisense) RNA (e.g. Orthomyxoviruses, Rhabdoviruses)

**Week 11:** Single strand RNA-RT viruses (+ sense) RNA with DNA intermediate in life-cycle (e.g., Retroviruses)

**Week 12:** Double strand DNA-RT viruses (e.g., Hepadnaviruses)

**Week 13:** Viral Persistence: Chronic & Latent Virus Infections, Effect of Host Age.

**Week 14:** Antiviral Chemotherapy, Viral Vaccines.

**19. External Evaluator**

I do approve the content of this course-book. It does cover the general concepts of general virology. The topics are broad and are aimed to equip students with required knowledge to enable them to understand the viruses concept equipment in latter stages.

**Lec. Sherko Muhammed Abdul-Rahman**

- **PhD. Student**
- **MSc. in Microbiology**