MCB4503 Virology

Course Description: This course will cover general virology, including virus structure, replication cycles, infection and mode of transmission of human diseases. Student will learn the major families of the bacterial (bacteriophages), plant and animal viruses and how they influence infection. Special fee. (3 hr. lecture)
Prerequisite: MCB3023, MCB3023L

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<tr>
<th>Course Competency</th>
<th>Learning Outcomes</th>
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| **Competency 1:** The student will demonstrate knowledge of the nature of viruses and different methods of viral study by: | 1. Communication  
2. Numbers / Data  
3. Critical thinking  
8. Computer / Technology Usage  
10. Environmental Responsibility |
| 1. Explaining the biological and physical properties of viruses. Describing the differences between viruses vs. virion. Summarizing the different methods of viral study. Explaining tissue and cell culture. Discussing cloning genes and genomes, DNA sequencing and PCR. Listing analysis of components SDS treatment & electrophoresis for nucleic acids. | |
| **Competency 2:** The student will demonstrate knowledge of viral structure by: | 1. Communication  
2. Numbers / Data  
3. Critical thinking  
8. Computer / Technology Usage  
10. Environmental Responsibility |
| 1. Discussing the characteristics of the DNA and RNA genome. Listing the characteristics and the structure of the capsid. Explaining the characteristics of envelope membrane from host cell. | |
| **Competency 3:** The student will demonstrate knowledge of viral classification by: | 1. Communication  
2. Numbers / Data  
3. Critical thinking  
8. Computer / Technology Usage  
10. Environmental Responsibility |
| 1. Explaining the Baltimore’s classification for viruses that infect eukaryotic cells. Summarizing the classification by host components and morphology. Listing the most important characteristics of DNA Viruses. Describing the most important characteristics of RNA viruses. Explaining the classification by producing mRNA | |
| **Competency 4:** The student will demonstrate knowledge of the Leviridae, Microviridae, Podoviridae, and Myoviridae by: | 1. Communication  
2. Numbers / Data  
3. Critical thinking  
8. Computer / Technology Usage |
### Competency 5: The student will demonstrate understanding of distinct structural and physiological characteristics of the Siphoviridae by:


### Competency 6: The student will demonstrate knowledge of RNA and DNA plant viruses by:

1. Classifying plants viruses as: single strained RNA (SS RNA), double strained RNA(DS RNA); single strained DNA (SS DNA) and double strained DNA (DS DNA). Demonstrating knowledge about the genetic composition of plant viruses. Demonstrating knowledge of different viruses shape (rods, polyhedral and bullets)

### Competency 7: The student will demonstrate knowledge of the epidemiology of selected plant viruses by:

1. Discussing the plant viruses methods of transmissions. Listing selected plant viruses and demonstrating knowledge of current methods of detection.

### Competency 8: The student will demonstrate knowledge of RNA animal viruses by:

1. Describing the structure, replication and diseases caused by viruses in the families, Picornaviridae, Togaviridae, Flaviviridae, Caliciviridae, Astroviridae, Coronaviridae, and Arteriviridae. Explaining the structure, replication and diseases caused by viruses in the families, Rhabdoviridae, Paramyxoviridae, Filoviridae, Orthomyxoviridae, and Bunyaviridae

### Competency 9: The student will demonstrate knowledge of viruses with Reverse Transcriptases by:

1. Listing distinguishing characteristics of these viruses. Explaining the structure (size, envelope, nucleocapsid, physical genetic map and capsid) of these viruses. Summarizing classification and characteristic members. Analyzing viral multiplication.

### 10. Environmental Responsibility

- Communication
- Numbers / Data
- Critical thinking
- Computer / Technology Usage
- Environmental Responsibility
1. Describing the structure, replication, and diseases caused by viruses in the family, Retroviridae
   Describing the structure, replication, and diseases caused by viruses in the family, Hepadnaviridae

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<tr>
<th>Competency 10: The student will demonstrate knowledge of DNA animal viruses by:</th>
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<tbody>
<tr>
<td>1. Describing the structure, replication and diseases caused by viruses in the families, Poxviridae, Herpesviridae, Adenoviridae, Polioviridae, Papillomaviridae, and Parvoviridae Listing prions, viroids, satellites, satellite viruses, and comparing them to other viruses and bacteria.</td>
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<th>Competency 11: The student will demonstrate knowledge of prions by:</th>
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<tbody>
<tr>
<td>1. Comparing prions to viruses, viroids, and bacteria Describing infections caused by prions Describing the occurrence, transmission, and the epidemiology of diseases caused by prions</td>
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<th>Competency 12: The student will demonstrate knowledge of bacteriophages by:</th>
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<tr>
<td>1. Describing the structure, replication and diseases caused by bacteriophages Listing selected bacteriophages, and demonstrating current methods of detection.</td>
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