

DEREE COLLEGE SYLLABUS FOR: BMS 3220 MICROBIOLOGY AND INFECTIOUS DISEASE		3/0/3								
(Updated: Fall 2024)		UK LEVEL: 5 UK CREDITS: 15								
PREREQUISITES:	BI 1000 Introduction to Biology I BI 1101 Introduction to Biology II									
CATALOG DESCRIPTION:	An analysis of essential microbiology and infectious disease. The course introduces the major classes of micro-organisms and, through their biological adaptations, relates them to human activity. Their beneficial and harmful roles on humans is discussed through case studies, disease profiles and epidemiological analysis.									
RATIONALE:	This course is a thorough analysis on the structure and function of microorganisms through the scope of microbiology and infectious disease. Students will be exposed to the classes of pathogenic and beneficial microbes, as well as to the obligatory parasitism of viruses. Theories of infectious disease, vector transmission, evolutionary and radiative adaptation will be discussed. Host-parasite interactions, immunity and epidemiology will be addressed and through case studies and practical engagement, students will gain understanding of the applications of microbiology.									
LEARNING OUTCOMES:	<i>As a result of taking this course, the student should be able to:</i> 1) Demonstrate an understanding of the biological classes of microorganisms and infectious agents (bacteria, viruses, fungi, protozoan and non-cellular agents). 2) Apply methods of scientific enquiry by demonstrating problem solving and critical thinking skills towards diagnostic or epidemiological evaluation of case studies. 3) Compare the beneficial and harmful roles and applications of microbiology as well as the interplay between the social, environmental and economic considerations of infectious disease. 4) Develop the necessary critical and analytical skills to understand the nature of disease, its impact and the means to combat it.									
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning strategy of the college, the following tools are used: <ul style="list-style-type: none">• Lectures and class discussions.• Homework assignments.• Office hours held by the instructor to provide further assistance to students.• Use of library facilities for further study and preparation for the exams• Use of the Blackboard course management platform to further support communication, by posting lecture notes, assignment instruction, timely announcements, formative quizzes and online submission of assignments.									
ASSESSMENT:	<table><tr><td colspan="2">Summative:</td></tr><tr><td>1st assessment: Case Study- Written project (2,000-2,300 words)</td><td>40%</td></tr><tr><td>2nd assessment: Portfolio (collection of worksheets, exercises and problems)</td><td>10%</td></tr><tr><td>Final assessment: Final examination (2-hour)</td><td>50%</td></tr></table>		Summative:		1 st assessment: Case Study- Written project (2,000-2,300 words)	40%	2 nd assessment: Portfolio (collection of worksheets, exercises and problems)	10%	Final assessment: Final examination (2-hour)	50%
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INDICATIVE READING:	<p>REQUIRED READING: Marjorie Kelly Cowan, Microbiology: A Systems Approach, Latest Edition, McGraw, Hill</p> <p>RECOMMENDED READING: Other sources, including case studies, journal articles, research papers etc. recommended by the instructor throughout the semester.</p>				
INDICATIVE MATERIAL: (e.g. audiovisual, digital material, etc.)	<p>REQUIRED MATERIAL: N/A</p> <p>RECOMMENDED MATERIAL: N/A</p>				
COMMUNICATION REQUIREMENTS:	Verbal and written skills using academic / professional English				
SOFTWARE REQUIREMENTS:	MS Office and Blackboard CMS				
WWW RESOURCES:	N/A				
INDICATIVE CONTENT:	<p>Cell Theory</p> <ul style="list-style-type: none">● History and development● Impact on biology <p>Classification and Structure of Prokaryotic Cells</p> <ul style="list-style-type: none">● Prokaryotic domains● Major classifications of bacteria by shape● Lack of nuclear membrane and mitotic apparatus● Lack of typical eukaryotic organelles● Presence of cell wall in bacteria● Flagellar propulsion, mechanism <p>Growth and Physiology of Prokaryotic Cells</p> <ul style="list-style-type: none">● Reproduction by fission● High degree of genetic adaptability, acquisition of antibiotic resistance● Exponential growth● Existence of anaerobic and aerobic variants● Parasitic and symbiotic● Chemotaxis <p>Genetics of Prokaryotic Cells</p>				

	<ul style="list-style-type: none"> ● Existence of plasmids, extragenomic DNA ● Transformation: incorporation into bacterial genome of DNA fragments from external medium ● Conjugation ● Transposons (also present in eukaryotic cells) <p>Eukaryotic cells and microorganisms</p> <ul style="list-style-type: none"> ● Form and function ● Fungi ● Protists ● Helminths <p>Virus Structure</p> <ul style="list-style-type: none"> ● General structural characteristics (nucleic acid and protein, enveloped and nonenveloped) ● Lack organelles and nucleus ● Genomic content — RNA or DNA <p>Viral Life Cycle</p> <ul style="list-style-type: none"> ● Self-replicating biological units that must reproduce within specific host cell ● Generalized phage and animal virus life cycles ● Transduction: transfer of genetic material by viruses ● Retrovirus life cycle: integration into host DNA, reverse transcriptase, HIV <p>Host defenses and microbial evasion</p> <ul style="list-style-type: none"> ● Systems involved in immune defenses <p>Epidemiology</p> <ul style="list-style-type: none"> ● Spread of disease ● Modelling of infections <p>The Art and Science of Disease Prevention</p> <ul style="list-style-type: none"> ● Vaccination ● Public health ● Sanitation <p>Themes in Evolution</p> <ul style="list-style-type: none"> ● The Red Queen Hypothesis
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