Topics in Bioscience: Biodefense and Emerging/Re-emerging Infectious Diseases

Catalogue Description (1:1:0): Prerequisite: Admission to the MS or PhD Bioscience program, or instructor’s permission. PhD students must register for the BIOS 704 section, and MS students for the BIOL 695 section. The focus of this course is to provide a broad overview of some of the current research topics in biodefense and emerging/re-emerging infectious diseases. New therapeutics and vaccines are urgently needed to combat a number of emerging and reemerging infectious diseases, especially in light of the appearance of drug resistant strains. In addition, concerns over the use of highly infectious pathogens (agents) for bioterrorism have risen dramatically over the past few years, especially given the limitations in efficacy of many current vaccines and therapeutics. The danger posed by the biodefense agents, combined with the natural emergence/re-emergence of infectious diseases including those caused by some biodefense pathogens, have made this area of study a current topic of great interest. This course will involve a review of some of the current molecular research and technologies used in this area of investigation.

Course Objectives: The objective of this course is to provide a broad overview of some of the current research topics in biodefense and emerging/re-emerging infectious diseases. In addition, this course aims to provide hands-on training and experience in understanding and analyzing primary literature and also the ability to communicate research findings in a coherent and effective manner.

Course Requirements: Grades in this seminar course are based on your presentation (70%), participation in class discussions (15%), and attendance (15%). Presentations will be graded by the participants using the attached rubric.

There will not be any exams or make-up sessions. Students will be organized into groups of two. Each week one group will be assigned one of the topics outlined below. The group will then choose an original research article directly related to that topic by searching through the literature and present the research article for the class the following week. The selected article must be sent to me as a PDF (NOT the “full text” format) no later than Thursday afternoon before the presentation date. Once I receive the article, I will post it on Blackboard so that all the students in the class have access to it and have a chance to read it before the
presentation date. It is very important that you choose an original research article that directly relates to your assigned topic; I will take this into account for your grade. If you have any doubts as to whether you have selected the right type of article for your topic, please consult me and I would be more than happy to provide guidance. Please make sure to avoid choosing “Review” articles as they provide a review of the work that has been done in a specific research topic/area but are not themselves original research papers. Each class will consist of two presentations separated by a short (10 min) break. Each presentation should last not more than 45 min (typically, this means about 45 slides). We will have a 10 min discussion period after each presentation.

Topics for Selection:

• Molecular Basis of Bacterial Adherence to Cell Surfaces and Cellular Uptake
• Molecular Basis of Viral Adherence to Cell Surfaces and Cellular Uptake
• Modulation of Specific Host Signaling Pathways during Bacterial Infection
• Modulation of Specific Host Signaling Pathways during Viral Infection
• Role of Chemokines during Viral Infection
• New Technologies for High Throughput Protein Analysis
• Current Novel Antimicrobials for Combating Pathogenic Bacteria
• New Vaccine Technologies
• Combating Multiresistant Pathogens
• Novel Technologies for Pathogen Detection
• Aerosol Models of Infectious Diseases
• Role of Exosomes and other Extracellular Membrane Vesicles in Bacterial Infections
• Animal Models of Infection
• Naturally Occurring Antimicrobial Peptides
• Novel Drug Design Strategies

ACADEMIC INTEGRITY

GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else’s work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.
GMU EMAIL ACCOUNTS
Students must activate their GMU email accounts to receive important University information, including messages related to this class.

OFFICE OF DISABILITY SERVICES
If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS. http://ods.gmu.edu

OTHER USEFUL CAMPUS RESOURCES:
WRITING CENTER: A114 Robinson Hall; (703) 993-1200; http://writingcenter.gmu.edu
UNIVERSITY LIBRARIES “Ask a Librarian”
http://library.gmu.edu/mudge/IM/IMRef.html
COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): (703) 993-2380;
http://caps.gmu.edu

UNIVERSITY POLICIES
The University Catalog, http://catalog.gmu.edu, is the central resource for university policies affecting student, faculty, and staff conduct in university affairs.