POSC 619/FSTC 619/AGRO 619
MOLECULAR METHODS FOR MICROBIAL CHARACTERIZATION

Instructor Information
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Prerequisites
POSC 429 or FSTC 326 or AGRO 405 or Approval of Instructor. Microbiology or molecular biology coursework or laboratory experience desirable.

Course Objectives
To provide the students the theory and hands-on experience in the molecular detection and characterization of pathogens. The course will focus on the underlying principles of molecular methods for characterizing microbial populations in natural and man-made ecosystems. The course will emphasize method application and data interpretation and will cover pathogens and indicator organisms that are of relevance to food safety and environmental microbiology. The laboratory component will provide hands-on experience in select protocols.

Credit Hours
Three

Class Schedule: TBA

Course Topics
1. Why molecular methods?
2. Indicator organisms and pathogens
3. Sampling and sample processing
4. Nucleic acid probes and probe detection
5. Target amplification techniques
6. Quantitative 5’ Nuclease assays/TaqMan probes
7. Probe amplification techniques
8. DNA micro-arrays and biosensor-based approaches- strategies for use in food and environmental microbiology
9. Sensitivity and specificity threshold issues in molecular methods
10. Molecular typing methods and molecular ecology applications
11. Quality control and data analysis
12. Future advances in molecular methodologies for microbial detection and characterization
Laboratory Topics
1. Non-isotopic probe labeling and slot-blot hybridization protocol
2. End point and 5’ Nuclease-based PCR amplification of specific and conserved microbial sequences
3. Genetic fingerprinting of bacterial isolates using conserved sequences
4. Interpreting 5’Nuclease assay-based data sets

Grading
Mid-Term exam 25%
Problem sets 25%
Proposal/Manuscript submission/critique 25%
Final exam 25%

Suggested Readings
Emphasis will be placed on discussing the current literature in peer-reviewed journals such as Journal of Food Protection, Applied and Environmental Microbiology, Molecular and Cellular Probes, and Journal of Microbiological Methods

The American with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life for Students with Disabilities in Room 126 of the Koldus Building, or call 845-1637.