



University of Puerto Rico
Mayagüez Campus
College of Agricultural Sciences
Food Science and Technology Program



OFFICIAL SYLLABUS

**MICROBIAL ADAPTATION AND FOOD SAFETY
6XXX**

Credit Hours: 3	Contact Hours: Forty-five (45) hours of conference	
Prerequisites: NONE		Co-requisites: NONE
Course Description (English): Basic science, mechanisms, assessment and control of stress adaptation and antimicrobial resistance in the food industry		
Course Description (Spanish): Ciencia básica, mecanismos, avalúo y control de la adaptación al estrés y la resistencia antimicrobiana en la industria alimentaria.		
Learning Objectives: At the end of the course the students will be able to: <ul style="list-style-type: none"> a. To develop an understanding of stress adaptation phenomenon and antimicrobial resistance and its implications for the safety of food processed foods b. To understand the responses of pathogens to physical and chemical stresses encountered during food processing the diversity of operations in Food Science and Technology c. To understand the implications of antimicrobial resistance and stress adaptation in the processing environment and how relates to pathogen's ability to cause disease. d. To examine strategies to overcome stress adaptation and antimicrobial resistance in foodborne pathogens. 		

Content Outline and Time Distribution:

<i>Topics to be covered</i>		<i>Contact hours</i>
I.	Basic of stress adaptation and antimicrobial resistance in foodborne pathogens	5
II.	Adaptation and antimicrobial resistance of foodborne pathogens from exposure to physical intervention strategies and food preservatives	4
III.	Antimicrobial resistance and stress adaptation of Shiga Toxin-Producing <i>Escherichia coli</i> , <i>Salmonella</i> , <i>Campylobacter jejuni</i> , <i>Yersinia enterocolitica</i> , <i>Vibrio</i> and <i>Shigella</i> species, <i>Listeria</i> spp.	8
IV.	Stress adaptation on Low Water Activity Foods and Spices	3
V.	Adaptation and antimicrobial resistance of microorganism to stresses in the food processing environment	4
VI.	Relationship between stress adaptation and antimicrobial resistance with virulence in foodborne pathogenic bacteria	5
VII.	Methods for the detection and risk assessment for antimicrobial resistance	4
VIII.	Novel antimicrobials in food and food processing	5
IX.	Strategies to control stress-adapted pathogens	5
X.	Monitoring and surveillance: The National Antimicrobial Resistance Monitoring System	1
XI.	Database resources	1
XII.		
XIII.		
<i>Total hours: (equivalent to course contact period)</i>		45.0

<i>Laboratories</i>		<i>Contact hours</i>
1.		
2.		
3.		
4.		
5.		
<i>Total hours: (equivalent to laboratory contact period)</i>		0.0

Instructional Techniques:			
<input checked="" type="checkbox"/> conference	<input checked="" type="checkbox"/> discussion	<input type="checkbox"/> computation	<input type="checkbox"/> laboratory
<input type="checkbox"/> seminar with formal presentation	<input checked="" type="checkbox"/> seminar without formal presentation	<input type="checkbox"/> workshop	
<input type="checkbox"/> art workshop	<input type="checkbox"/> practice	<input type="checkbox"/> trip	<input type="checkbox"/> thesis
<input type="checkbox"/> tutoring	<input type="checkbox"/> research	<input type="checkbox"/> special problems	
<input type="checkbox"/> others, please specify:			

Learning Resources and Minimum Facilities Available or Required:

Classroom, projector, computer, blackboard

Evaluation Techniques and Relative Weight:

	Percent
<input checked="" type="checkbox"/> Exams (<u>25</u> % each)	75%
<input type="checkbox"/> Final exam	
<input type="checkbox"/> Short quizzes	
<input type="checkbox"/> Laboratory	
<input checked="" type="checkbox"/> Oral reports	15%
<input type="checkbox"/> Monographies	
<input type="checkbox"/> Portfolio	
<input checked="" type="checkbox"/> Journals	10%
<input type="checkbox"/> Projects	
<input type="checkbox"/> Others, specify:	
TOTAL: 100%	100%

Reasonable Accommodation:

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Department of Counseling and Psychological Services at the Dean of Students Office (DE-21) at (787) 265 - 3864 or (787) 832 - 4040 extensions 3772, 2040 or 3864. Email: pura.vicenty@upr.edu.

Academic Integrity:

The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Students General Bylaws (Board of Trustees Certification 13, 2009-2010) states that academic dishonesty includes, but is not limited to: fraudulent actions; obtaining grades or academic degrees by false or fraudulent simulations; copying the whole or part of the academic work of another person; plagiarizing totally or partially the work of another person; copying all or part of another person answers to the questions of an oral or written exam by taking or getting someone else to take the exam on his/her behalf; as well as enabling and facilitating another person to perform the aforementioned behavior. Any of these behaviors will be subject to disciplinary action in accordance with the disciplinary procedure laid down in the UPR Students General Bylaws.

Grading System:

Quantifiable (letters) Not Quantifiable

Standard Curve

100-90 A; 89-80 B; 79-70 C; 69-60 D; 59-0 F

Bibliography:

Chen, C-Y., Yan, X., Jackson, C.R. (2015). Antimicrobial resistance and food safety. Methods and Techniques. Academci Press, Elsevier. ISBN: 978-0-12-801214-7

Yousef, A.E., Juneja, V.K. (2003). Microbial Stress Adaptation and Food Safety. CRC Press LLC. ISBN: 1-56676-912-4

Bhunia, A.K. (2008). Foodborne Microbial Pathogens. Springer. ISBN: 978-0-387-74536-7

Gurtler, J.B., Doyle, M.P., Kornacki, J.L. (2014). The Microbiological Safety of Low Water Activity Foods and Spices. Springer. ISBN: 978-104939-2061-7

Barbosa-Cánovas, G., Fontana, A.J., Schmidt, S.J., Labuza, T.P. (2007). Water Activity in Foods. Fundamentals and Applications. IFT Press Blackwell Publishing. ISBN: 978-0-8138-2408-6

Begley, M., Hill, C. (2015). Stress Adaptation in Foodborne Pathogens. Available at: <http://www.annualreviews.org/doi/full/10.1146/annurev-food-030713-092350>. Accessed: March 1, 2017

White, D., Zhao, S., Simjee, S., Wagner, D., McDermott, P. (2002). Antimicrobial resistance of foodborne pathogens. Microbes and Infection Volume 4(4): 405412. Availbale at: <http://www.sciencedirect.com/science/article/pii/S128645790201554X>. Accessed: March 1, 2017

Includes attachments:

Yes

No