# **University of Houston-Downtown**

Course Prefix, Number, and Title: MICRO 1305: Pre-nursing Microbiology

Credits/Lecture/Lab Hours: 3/3/0

Foundational Component Area: Life and Physical Sciences

**Prerequisites:** Credit or enrollment in MBIO 1105, CHEM 1305/1105 recommended **Co-requisites:** None

**Course Description:** The morphology, classification, growth, physiology and genetics of microorganisms are covered, with emphasis on bacteria. Control of bacterial growth with antibiotics, antiseptics and disinfectants are also considered. Pathogenesis of disease-causing bacteria and the role of the immune system in protection from disease are studied.

#### TCCNS Number: N/A

Assigned Core Objective	Learning Outcome Students will be able to:	Instructional strategy or content used to achieve the outcome	Method by which students' mastery of this outcome will be evaluated
Critical Thinking	Utilize scientific processes to identify questions pertaining to natural	A. Investigations (in co-requisite lab)	A. Investigations Students will complete a worksheet with their
Quantitative Reasoning	phenomena.	<b>Microbes in the Environment.</b> Students will question how microorganisms live in pond water, hay and peppercorn infusions.	observations for each of the activities described. Worksheets will be graded.
		<b>Bacterial Catabolism.</b> Students will question how bacteria breaks down carbohydrates and proteins.	
		<b>Bacterial Respiration.</b> Students will question how bacteria live in the presence or absence of oxygen.	
		<b>Control of Microbial Growth.</b> Students will question how bacteria survive exposures to	

#### Demonstration of Core Objectives within the Course:

heat, UV radiation, disinfectants and antibiotics.heat, UV radiation, disinfectants and antibiotics.heat, UV radiation, disinfectants and antibiotics.Effectiveness of Hand Washing. Students will question if microorganisms are present on their skin before and after hand- washing.B. Panel Discussion The teams will present their position the validity of the statistical methods used in the study that unleashed the controversy.B. Panel Discussion The teams will present their positions and discuss the events as the controversy unfolded, participation in the discussion will be assessed and discuss the assessed and assigned a grade using a rubric.Critical Thinking LeapingUtilize scientific processes to develop hypotheses, collect and analyze dat using qualitative measures.A. Student Investigations (cor- requisite lab) Bacterial Catabolism. Students well are catabolic capabilities of bacterial organism. They will te catabolic capabilities of bacterial organism into media control of bacterial agrowth avertal respiration. Students well recatabolism. Students well				
Effectiveness of Hand Washing. Students will question if microorganisms are present on their skin before and after hand- washing.B. Panel Discussion The Autism Vaccine Hoax. Students will question the validity of the statistical methods used in the statisti			heat, UV radiation, disinfectants and antibiotics.	
Panel Discussion: The Autism Vaccine Hoax. Students will question the validity of the statistical methods used in the study that unleashed the controversy.B. Panel Discussion The teams will present their positions and discuss the events as the controversy unfolded, participation in the discussion will be assessed and assigned a grade using a rubric.Critical Thinking Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.A. Student Investigations for bacterial catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will text the hypothesis inoculating several organisms. They will text the hypothesis inoculating several organisms. They will text the hypothesis or other natural compounds.A. Student Investigations for bacterial growth exercise, students will everties and complete gradel ab write-ups.Critical Thinking Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.A. Student Investigations for bacterial catabolism, bacterial catabolism, bacterial catabolism, bacterial respiration and containing carbohydrates, proteins, amino acids or other natural compounds.A. Student Investigation outpress everoices, students will record the media changes photographically, assemble a table with their observations and complete gradel lab write-ups.			<b>Effectiveness of Hand Washing.</b> Students will question if microorganisms are present on their skin before and after hand- washing.	
B. Panel Discussionassessed and assigned a grade using a rubric.Critical Thinking Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.B. Panel Discussion Emerging Diseases and Outbreaks. Students question how current emerging diseases or outbreaks develop by analyzing published reports.C. Special Report 			Panel Discussion: The Autism Vaccine Hoax. Students will question the validity of the statistical methods used in the study that unleashed the controversy.	<b>B. Panel Discussion</b> The teams will present their positions and discuss the events as the controversy unfolded, participation in the discussion will be
Outbreaks students, students, students, students, guestion how current emerging diseases or outbreaks develop by analyzing published reports.C. Special Report The students will write a Special Report that will be assessed and given a grade according to a rubric.Critical Thinking Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using qualitative measures.A. Student Investigations (co- requisite lab)A. Student Investigations science and analyze lab)Critical Thinking Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using quantitative measures.A. Student Investigations requisite lab)A. Student Investigations for bacterial catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will test the hypothesis inoculating several organisms ino media containing carbohydrates, proteins, amino acids or other natural compounds.A. Student Investigations for bacterial catabolism.Bacterial Respiration. Students 			B. Panel Discussion Emerging Diseases and	assessed and assigned a grade using a rubric.
C. Special Report Bacterial contamination in organic foods. Students will question the safety of organic vs. 			how current emerging diseases or outbreaks develop by analyzing published reports.	<b>C. Special Report</b> The students will write a Special Report that will be assessed and given a grade
Bacterial contamination in organic foods. Students will question the safety of organic vs. non-organic foods by analyzing published reports on food contamination outbreaks.A. Student Investigations For bacterial catabolism, bacterial catabolism, bacterial catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will record the media changes photographically, assemble a table with their observations and complete 			C. Special Report	according to a rubric.
organic foods. Students will question the safety of organic vs. non-organic foods by analyzing published reports on food contamination outbreaks.A. Student Investigations (co- requisite lab)Critical Thinking Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.A. Student Investigations (co- requisite lab)A. Student Investigations (co- requisite lab)Bacterial Catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will test the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.A. StudentsBacterial Respiration. StudentsSoservations and complete graded lab write-ups.			Bacterial contamination in	
Provide the safety of organic vs. non-organic foods by analyzing published reports on food contamination outbreaks.A. Student Investigations For bacterial catabolism, bacterial catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will test the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.A. Student Investigations For bacterial catabolism, bacterial catabolism, bacterial respiration and control of bacterial growth exercises, students will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.			organic foods. Students will	
Critical Thinking Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.A. Student Investigations (co- requisite lab) Bacterial Catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will rest the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.A. Student Investigations For bacterial catabolism, bacterial respiration and control of bacterial growth exercises, students will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.Bacterial Respiration. Students will form buschesensendingFor bacterial growth exercises, the hypothesis of bacterial organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.For bacterial growth exercises and complete graded lab write-ups.			question the safety of organic vs.	
Critical Thinking Empirical & Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.A. Student Investigations (co- requisite lab)A. Student Investigations (co- requisite lab)A. Student InvestigationsBacterial Catabolism. Students using quantitative measures.Bacterial Catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will test the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.A. Student Investigations For bacterial catabolism, bacterial respiration and control of bacterial growth exercises, students will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.			non-organic foods by analyzing	
Critical ThinkingUtilize scientific processes to develop hypotheses, collect and analyze data Quantitative ReasoningA. Student Investigations (co- requisite lab)A. Student Investigations (co- requisite lab)A. Student Investigations (co- requisite lab)Reasoningcollect and analyze data using quantitative and qualitative measures.Bacterial Catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will test the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.A. Student Investigations (co- For bacterial catabolism, bacterial catabolism, bacterial catabolism, bacterial respiration and control of bacterial growth exercises, students will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.			published reports on food	
Critical Thinking Empirical & Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.A. Student Investigations (co- requisite lab)A. Student Investigations For bacterial catabolism, bacterial respiration and control of bacterial growth exercises, students will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.Critical Thinking Empirical & Quantitative ReasoningUtilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.A. Student Investigations (co- requisite lab) Bacterial Catabolism. Students bacterial organisms. They will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.			contamination outbreaks.	
Empirical & Quantitative Reasoningto develop hypotheses, collect and analyze data using quantitative and qualitative measures.requisite lab) Bacterial Catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.For bacterial catabolism, bacterial growth exercises, students will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.Bacterial Respiration. Students will form hypotheses regarding test the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.For bacterial growth	Critical Thinking	Utilize scientific processes	A. Student Investigations (co-	A. Student Investigations
Empirical & Quantitative Reasoningcollect and analyze data using quantitative and qualitative measures.Bacterial Catabolism. Students will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.bacterial respiration and control of bacterial growth exercises, students will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.Bacterial Respiration. Students will form hypotheses regarding test the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.For bacterial growth		to develop hypotheses,	requisite lab)	For bacterial catabolism,
Quantitative Reasoningusing quantitative and qualitative measures.will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.Quantitative qualitative measures.will form hypotheses regarding the catabolic capabilities of bacterial organisms. They will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.Bacterial Respiration. Students will form hypotheses regarding test the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.For bacterial growth graded lab write-ups.	Empirical &	collect and analyze data	Bacterial Catabolism. Students	bacterial respiration and
Reasoningqualitative measures.the catabolic capabilities of bacterial organisms. They will test the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.exercises, students will record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.Bacterial Respiration. Students will form hypotheses recordingFor bacterial growth record the media changes	Quantitative	using quantitative and	will form hypotheses regarding	control of bacterial growth
bacterial organisms. They will test the hypothesis inoculating several organisms into media a table with their observations and complete graded lab write-ups.record the media changes photographically, assemble a table with their observations and complete graded lab write-ups.Bacterial Respiration. Students will form hypotheses recordingFor bacterial growth routing routing routing routing	Reasoning	qualitative measures.	the catabolic capabilities of	exercises, students will
test the hypothesis inoculating several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.photographically, assemble a table with their observations and complete graded lab write-ups.Bacterial Respiration.Students multifierer hypotheses recordingFor bacterial growth multifierer hypotheses recording			bacterial organisms. They will	record the media changes
several organisms into media containing carbohydrates, proteins, amino acids or other natural compounds.a table with their observations and complete graded lab write-ups.Bacterial Respiration. Students will form hypethogen proteinsFor bacterial growth the termine and the termine			test the hypothesis inoculating	photographically, assemble
containing carbohydrates, proteins, amino acids or other natural compounds.observations and complete graded lab write-ups.Bacterial Respiration.StudentsFor bacterial growth multiplete			several organisms into media	a table with their
proteins, amino acids or other       graded lab write-ups.         natural compounds.       Bacterial Respiration. Students         For bacterial growth         will form burget baces recording			containing carbohydrates,	observations and complete
natural compounds.       Bacterial Respiration.     Students       For bacterial growth			proteins, amino acids or other	graded lab write-ups.
Bacterial Respiration. Students For bacterial growth			natural compounds.	
			Bacterial Respiration. Students	For bacterial growth
will form hypotheses regarding   exercise, students will			will form hypotheses regarding	exercise, students will

the ability of bacteria to live in	compile their data to
the presence or absence of	determine the necessary
oxygen.	time/concentration of agent
	needed to kill the bacterial
Control of bacterial Growth.	organisms. Students record
Students will form hypotheses	their data and write a report
regarding methods of bacterial	with all their observations
control. Then, they will expose	and this will be graded with
bacterial cultures to increasing	a rubric.
lengths of heat, UV radiation,	
disinfectants and antibiotics.	
	B. Unknown Reports
B. Unknown Reports (co-	For unknown reports
requisite lab)	students record data
Bacterial Unknown Report 1.	photographically, in data
Students will form hypotheses	tables and flow charts; their
regarding methods of bacterial	complied observations
newided with a bacterial culture	which will be graded for
and they perform tochniques to	auality of both scientific
morphologically identify the	information and written
	communication
Bacterial Unknown Report 2.	
Students will form hypotheses	
regarding methods of bacterial	
identification. Students are	
provided with a bacterial culture	
and they perform morphological	
and catabolic assays to identify	
the unknown organism.	C. Special Report
	The students will write a
C. Special Report	Special Report that will be
Bacterial contamination in	assessed and given a grade
organic foods. Students will form	using a rubric.
hypotheses regarding safety of	
foods; read and analyze	
published reports related to	
current outbreaks. Quantitative	D. Panel Discussion
and qualitative information will	The teams will present their
be gathered from sources such as	positions and discuss the
the CDC or the FDA.	events, participation in the
D. Danal Discussion	alscussion will be assessed
D. Parlel Discussion	and assigned a grade using a
i në Autism vaccine Hoax.	rupric.

		Students will form hypothesis	
		regarding the origin of autism;	
		analyze the validity of the	
		statistical methods used in the	
		study that unleashed the	
		controversy.	
Critical Thinking	Utilize scientific processes	A. Panel Discussion	A. Panel Discussion
_	to effectively communicate	The Autism Vaccine Hoax.	The teams will present their
Empirical &	the analysis and results	Students will identify the issues	positions and discuss the
Quantitative	using written, oral and	that define scientific misconduct	events, participation in the
Reasoning	visual communication.	and ethics violations in this case.	discussion will be assessed
_		B. Special Report	and assigned a grade using a
Communication		Bacterial contamination in	rubric.
		organic foods. The economic and	
		social impact of the outbreaks	B. Special Report
		and food recalls will be identified	The students will write a
		in published reports.	Special Report that will be
			assessed and given a grade
		C. Staining techniques (co-	using a rubric .
		requisite lab)	
		Students will hypothesize which	
		organisms will stain positively or	C. Staining Techniques
		negatively, experimentally test	Students will complete lab-
		their hypotheses and report their	write-ups and lab reports
		findings.	where they will have to
			convey in writing what they
		D. Unknown Reports	did and how they did it. Lab
		Bacterial Unknown Report 1.	reports will be graded (see
		Students will hypothesize the	above).
		identity of their assigned	
		organism, test their hypothesis	D. Unknown Reports
		and report their results in a	Students will complete a lab
		written report including	report that summarizes in
		photographic proof of the	writing the results of the
		morphology of the organism.	unknown investigations.
			Lab results will be graded as
		Bacterial Unknown Report 2.	described above.
		Students will hypothesize the	
		identity of their assigned	
		organism, test their hypothesis	
		and report their results in a	
		written report including	
		photographic proof of the	
		morphology and catabolic	
		characteristics of the organism.	

An oral presentation describing the studied organism will be given.An oral presentation describing the studied organism will be given.TeamworkCollaborate in the evaluation of the quality of scientific evidence from multiple perspectives toward the goal of reaching a shared objective.A. Panel Discussion The Autism Vaccine Hoax Students will work in small teams to read and analyze several wedia articles related to the vaccine-autism controversy. The original publication that triggered the controversy will also be critically analyzed.A. Panel Discussion The teams will present their positions and discuss the events as the controversy unfolded. Participation will be assessed and assigned a grade using a rubricB. Collection of Group Data Bacterial Metabolism. The student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the data collected by each student will be compiled into a large database available to the whole class through Blackboard.B. Collection of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion The teams will present their positions and discuss the evaluation of all microbes.				
TeamworkCollaborate in the evaluation of the quality of scientific evidence from scientific evidence from a shared objective.A. Panel Discussion The Autism Vaccine HoaxA. Panel Discussion The teams will present their opsitions and discuss the undided. Participation will be assessed and assigned a grade using a rubricNorman House scientific evidence for scientific evidence for toward the goal of reaching a shared objective.B. Collection of Group Data Bacterial Metabolism. The scientific and charay science or controversy will also be critically analyzed.B. Collection of Group Data Bacterial Metabolism. The scienci and science for participation in this process collection of microorganism the semester, and after each teach scienci and the accollected by each scienci and the accollected by each student class will be performed along the semester, and after each teach the data collected by each student will be compiled into a student will be compiled into a individence the whole class through Blackboard student will be compiled into a student will be compiled into a individence the whole class through Blackboard student will be compiled into a individence the whole class through Blackboard student will be compiled into a individence the whole class through Blackboard student will be compiled into a individence the science of individence the whole class through Blackboard student will be compiled into a rubric three accessful final evaluation of all microbes whole class through Blackboard individence the polytion will be event as the controvers event as the con			An oral presentation describing the studied organism will be given.	
evaluation of the quality of scientific evidence from multiple perspectives toward the goal of reaching a shared objective.The Autism Vaccine Hoax Students will work in small teams to read and analyze several media articles related to the vaccine-autism controversy. The original publication that triggered the controversy will also be critically analyzed.The teams will present their positions and discuss the events as the controversy. unfolded. Participation will be assessed and assigned a grade using a rubricB. Collection of Group Data Bacterial Metabolism. The student class will work as a team, collecting the results from eseveral assays to characterize a collection of microorganisms. The assays will be performed along the samester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.B. Collection of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion Emerging Diseases and outbreak unfolded. Participation will be assessed and assigned a	Teamwork	Collaborate in the	A. Panel Discussion	A. Panel Discussion
scientific evidence from multiple perspectives toward the goal of reaching a shared objective. Students will work in small teams to read and analyze several media articles related to the vaccine-autism controversy. The original publication that triggered the controversy will also be critically analyzed. B. Collection of Group Data Bacterial Metabolism. The student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard. C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering current		evaluation of the quality of	The Autism Vaccine Hoax	The teams will present their
<ul> <li>Builtiple perspectives</li> <li>broad and analyze several media articles related to the vaccine-autism controversy. The original publication that triggered the controversy will also be critically analyzed.</li> <li>B. Collection of Group Data Bacterial Metabolism. The student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.</li> <li>C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering current</li> </ul>		scientific evidence from	Students will work in small teams	nositions and discuss the
<ul> <li>toward the goal of reaching a shared objective.</li> <li>a shared objective.</li> <li>b collection of with ordinating spectral sp</li></ul>		multiple perspectives	to read and analyze several	events as the controversy
a shared objective.Incluia anticles relation the vaccine-autism controversy. The original publication that triggered the controversy will also be critically analyzed.Be assessed and assigned a grade using a rubricB. Collection of Group Data Bacterial Metabolism. The student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the samester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.B. Collection of Group Data Participation in this process will be assessed throughout the samester. Group participation will be required for the class to create a complete data table used by all students to identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion The teams will present their positions and discuss the events as the outbreak unfolded. Participation will be assessed and assigned a		toward the goal of reaching	modia articles related to the	unfolded Darticipation will
<ul> <li>a shaled objective.</li> <li>b a sessed and assigned a original publication that triggered the controversy will also be critically analyzed.</li> <li>b. Collection of Group Data Bacterial Metabolism. The student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.</li> <li>C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering current</li> </ul>		a shared objective	vassing auticm controversy. The	be assessed and assigned a
Original publication that triggered the controversy will also be critically analyzed.grade dising a rubricB. Collection of Group Data Bacterial Metabolism. The student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.B. Collection of Group Data Participation in this process will be assessed throughout the semester. Group participation will be required for the class to create a complete data table used by all students to will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion The teams will present their positions and discuss the events as the outbreak unfolded. Participation will be assessed and assigned a		a shared objective.	original publication that triggorid	grade using a rubric
<ul> <li>B. Collection of Group Data</li> <li>B. Collection of Group Data</li> <li>Bacterial Metabolism. The</li> <li>student class will work as a team,</li> <li>collecting the results from</li> <li>several assays to characterize a</li> <li>collection of microorganisms. The</li> <li>assays will be performed along</li> <li>the semester, and after each test,</li> <li>the data collected by each</li> <li>student will be compiled into a</li> <li>large database available to the</li> <li>whole class through Blackboard.</li> <li>C. Panel Discussion</li> <li>C. Panel Discussion</li> <li>C. Panel Discussion</li> <li>The teams will present their</li> <li>positions and discuss the</li> <li>events as the outbreak</li> <li>unfolded. Participation will</li> </ul>			the controversy will also be	
<ul> <li>B. Collection of Group Data</li> <li>B. Collection of Group Data</li> <li>B. Collection of Group Data</li> <li>Bacterial Metabolism. The</li> <li>student class will work as a team,</li> <li>collecting the results from</li> <li>several assays to characterize a</li> <li>collection of microorganisms. The</li> <li>assays will be performed along</li> <li>the semester, and after each test,</li> <li>the data collected by each</li> <li>student will be compiled into a</li> <li>large database available to the</li> <li>whole class through Blackboard.</li> <li>C. Panel Discussion</li> <li>Emerging Diseases and</li> <li>Outbreaks. Students will work in</li> <li>teams to analyze published</li> <li>reports covering current</li> </ul>			critically analyzed	
B. Collection of Group Data Bacterial Metabolism. The student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard. C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering current based to the successful assigned a			critically analyzed.	
B. Collection of Group Data Bacterial Metabolism. The student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.Participation in this process will be assessed throughout the semester. Group participation will be required for the class to create a complete data table used by all students to identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion the eassest and assigned a				B. Collection of Group Data
Bacterial Metabolism. The student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.will be assessed throughout the semester. Group participation will be required for the class to create a complete data table used by all students to identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion the evants as the outbreak unfolded. Participation will be assessed and assigned a			B. Collection of Group Data	Participation in this process
student class will work as a team, collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.the semester. Group participation will be required for the class to create a complete data table used by all students to identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion The teams will present their positions and discuss the events as the outbreak unfolded. Participation will be assessed and assigned a			Bacterial Metabolism. The	will be assessed throughout
collecting the results from several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.participation will be required for the class to create a complete data table used by all students to identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion will work in teasses and assigned a			student class will work as a team,	the semester. Group
several assays to characterize a collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.required for the class to create a complete data table used by all students to identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion the teams signed a			collecting the results from	participation will be
collection of microorganisms. The assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.create a complete data table used by all students to identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentCreate a complete data table used by all students to identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.			several assays to characterize a	required for the class to
assays will be performed along the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.used by all students to identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion unfolded. Participation will be assessed and assigned a			collection of microorganisms. The	create a complete data table
the semester, and after each test, the data collected by each student will be compiled into a large database available to the whole class through Blackboard.identify their unknowns and will indirectly be evaluated on the successful final evaluation of all microbes.C. Panel Discussion Emerging Diseases and Outbreaks. Students will work in teams to analyze published reports covering currentC. Panel Discussion unfolded. Participation will be assessed and assigned a			assays will be performed along	used by all students to
the data collected by eachwill indirectly be evaluatedstudent will be compiled into aon the successful finallarge database available to theevaluation of all microbes.whole class through Blackboard.C. Panel DiscussionC. Panel DiscussionThe teams will present theirEmerging Diseases andpositions and discuss theOutbreaks. Students will work inevents as the outbreakteams to analyze publishedunfolded. Participation willreports covering currentbe assessed and assigned a			the semester, and after each test,	identify their unknowns and
student will be compiled into a large database available to the whole class through Blackboard.on the successful final evaluation of all microbes.C. Panel DiscussionC. Panel DiscussionEmerging Diseases and Outbreaks. Students will work in teams to analyze publishedoutbreak unfolded. Participation will be assessed and assigned a			the data collected by each	will indirectly be evaluated
Iarge database available to the whole class through Blackboard.evaluation of all microbes.C. Panel DiscussionC. Panel DiscussionEmerging Diseases and Outbreaks. Students will work in teams to analyze publishedpositions and discuss the events as the outbreak unfolded. Participation will be assessed and assigned a			student will be compiled into a	on the successful final
whole class through Blackboard.C. Panel DiscussionC. Panel DiscussionThe teams will present theirEmerging Diseases andpositions and discuss theOutbreaks. Students will work inevents as the outbreakteams to analyze publishedunfolded. Participation willreports covering currentbe assessed and assigned a			large database available to the	evaluation of all microbes.
C. Panel DiscussionC. Panel DiscussionC. Panel DiscussionThe teams will present theirEmerging Diseases andpositions and discuss theOutbreaks. Students will work inevents as the outbreakteams to analyze publishedunfolded. Participation willreports covering currentbe assessed and assigned a			whole class through Blackboard.	
C. Panel DiscussionThe teams will present theirEmerging Diseases andpositions and discuss theOutbreaks. Students will work inevents as the outbreakteams to analyze publishedunfolded. Participation willreports covering currentbe assessed and assigned a				C. Panel Discussion
Emerging Diseases andpositions and discuss theOutbreaks. Students will work inevents as the outbreakteams to analyze publishedunfolded. Participation willreports covering currentbe assessed and assigned a			C. Panel Discussion	The teams will present their
Outbreaks.Students will work in teams to analyze published reports covering currentevents as the outbreak unfolded. Participation will be assessed and assigned a			Emerging Diseases and	positions and discuss the
teams to analyze publishedunfolded. Participation willreports covering currentbe assessed and assigned a			Outbreaks. Students will work in	events as the outbreak
reports covering current be assessed and assigned a			teams to analyze published	unfolded. Participation will
			reports covering current	be assessed and assigned a
emerging diseases or outbreaks. grade using a rubric.			emerging diseases or outbreaks.	grade using a rubric.
Information will be gathered			Information will be gathered	
from sources such as the CDC or			from sources such as the CDC or	
the FDA. The economic and social			the FDA. The economic and social	
impact of the outbreaks and food			impact of the outbreaks and food	
recalls will be discussed, along			recalls will be discussed, along	
with the role of individuals and			with the role of individuals and	
the government in the whole			the government in the whole	
process.			process.	

#### Additional Course Outcomes:

Lecture: At the end of the course, the student should be able to

- Identify the scientific process used to classify microorganisms into prokaryotic, eukaryotic cellular organisms or viruses.
- Apply scientific reasoning to explain natural microbial growth and the molecular mechanisms of microbial control and antisepsis.
- Analyze the balance between disease-causing bacteria and the defense response of the human immune system during disease and health.
- Evaluate epidemiological data and report in written and oral form information showing the impact of human, animal and crop diseases in human societies throughout history and in our modern world.

Lab: At the end of this course, the student should be able to

- Understand the scientific process used to classify microorganisms into prokaryotic or eukaryotic cellular organisms and viruses.
- Apply scientific reasoning to explain natural microbial growth and the molecular mechanisms of microbial control and antisepsis.
- Utilize the scientific method to identify bacterial unknown organisms, testing their morphological and biochemical characteristics.
- Collaborate with peers to experimentally asses the effectiveness of physical and chemical methods to control bacterial growth.
- Develop hypotheses, collect and analyze experimentally obtained data; use quantitative and qualitative measures to create written, visual and oral reports.

## **Course Outline:**

Lecture Topics:

- The Microbial World and You
- Chemical Properties
- Microorganisms and Microscopes
- Anatomy of cells
- Microbial Metabolism
- Microbial Growth
- Control of microbial growth
- Microbial Genetics
- Classification of Microorganisms
- Eukaryotes
- Viruses, Viroids, and Prions
- Disease, Epidemiology, & Pathogenicity
- Nonspecific Host Defenses
- Adaptive Immune System
- Immunology Applications
- Immune System disorders
- Antimicrobial Drugs
- Microbial Diseases

Lab Topics:

- Use of Microscope
- Transfer of Bacteria
- Examination of Living Organisms
- Smears, Simple stains
- Gram Stain
- Acid Fast Stain
- Spores & Capsules
- Microbes in the Environment/Isolation
- Isolation of Bacteria (Media)
- Isolation results/Review
- Carbohydrate Catabolism
- Protein Catabolism
- Respiration
- Microbial Growth Oxygen
- Unknown Identification, IMViC
- Microbial Growth Control
- Disinfectants and Antiseptics
- Antimicrobial Drugs
- Fungi, Phototrophs, Protozoa
- Epidemiology

## Lecture-Grading/Course Content which Demonstrates Student Achievement of Core Objectives: *Course Grade* A: 90-100 B: 80-89 C: 70-79 D: 60-69 F: 0-59

irse Grade	A: 90-100	B: 80-89	C: 70	)-79	D: 60-69	F: 0-5
	Summary of Cou	rse Exams, Qui	zzes, Act	ivities, a	and Final	
	3 Exar	ns			50%	
	Best 5 Qı	uizzes			15%	
	Written Assignm	ients			5%	
	Panel Disc	ussion			5%	
	Fina	I			25%	
			Total		100%	

# Lab-Grading/Course Content which Demonstrates Student Achievement of Core Objectives:

Course Grade	A: 90-100	B: 80-89	C: 70	-79	D: 60-69	F: 0-59
	Summary of Cou	ırse Exams, Qui	zzes, Acti	vities, a	and Final	
	Two Lab Pr	actical's			40%	
	Practical Final				30%	
	2 Unknowns Re	oorts			20%	
	5 Homework	Exercises			10%	
		-	Total		100%	