

(Effective: Spring 2024)

PREREQUISITES:	BI 1000 Introduction to Biology I BI 1101 Introduction to Biology II
CATALOG DESCRIPTION:	An integrated exploration of the fundamentals of cell and molecular biology as a science, the nature of life, biological chemistry, cell biology, metabolism and genetics
RATIONALE:	<p>This course is a fundamental molecular cell biology course addressed to biology minor and nutrition students. It will expose students to key themes in molecular biology of the cell, illustrated by examples from a wide range of microbial and mammalian systems. It will cover basic cell structure, and organization of cells into specialized cell types and complex multicellular organisms. The principles of cell cycle and cell division will be outlined. The control of living processes by molecular mechanisms will be also explained.</p>
LEARNING OUTCOMES:	<p>As a result of taking this course, the student should be able to:</p> <ol style="list-style-type: none">1. Acquire knowledge of the molecular mechanisms of the fundamental cellular processes.2. Demonstrate understanding of the molecular organization of the genetic material, its expression and control of expression, in connection to health and disease.3. Understand the structure of the cell.4. Demonstrate knowledge of the protein trafficking and membrane transport.5. Develop and demonstrate skills for interpreting information.
METHOD OF TEACHING AND LEARNING:	<p>In congruence with the teaching and learning strategy of the college, the following tools are used:</p> <ul style="list-style-type: none">○ Class lectures, interactive learning (class discussions, group work) video presentations, tutorials and practical problems solved in class.○ Exercises and primary source documents are assigned as homework, the solutions of which are reviewed in class.○ Office hours: students are encouraged to make full use of the office hours of their instructor, where they can ask questions, see their exam paper, and/or go over lecture/lab material.○ Use of a blackboard site, where instructors post lecture notes, assignment instructions, timely announcements, as well as additional resources.

ASSESSMENT:	<p>Summative:</p> <table border="1" data-bbox="632 188 1437 515"> <tr> <td data-bbox="632 188 1246 353">1st assessment: In-class midterm examination (1-hour) (Multiple choice, short answers questions, problem solving)</td><td data-bbox="1246 188 1437 353">40%</td></tr> <tr> <td data-bbox="632 353 1246 515">Final assessment: In-class final examination (2-hour, comprehensive) (Multiple choice, essay questions, short answer questions, problem solving)</td><td data-bbox="1246 353 1437 515">60%</td></tr> </table> <p>Formative:</p> <table border="1" data-bbox="632 593 1437 680"> <tr> <td data-bbox="632 593 1246 680">Multiple "diagnostic on-line" tests, Multiple choice, short answers, essay questions</td><td data-bbox="1246 593 1437 680">0</td></tr> </table> <p>The formative assessments aim to prepare students for the examinations. Students are expected to submit feedback on their performance.</p> <p>The midterm examination tests Learning Outcomes 1, & 2</p> <p>The final examination tests all learning outcomes and it is comprehensive.</p> <p><i>The final grade for this module will be determined by averaging all summative assessment grades, based on the predetermined weights for each assessment. If students pass the comprehensive assessment that tests all Learning Outcomes for this module and the average grade for the module is 40 or higher, students are not required to resit any failed assessments.</i></p>	1 st assessment: In-class midterm examination (1-hour) (Multiple choice, short answers questions, problem solving)	40%	Final assessment: In-class final examination (2-hour, comprehensive) (Multiple choice, essay questions, short answer questions, problem solving)	60%	Multiple "diagnostic on-line" tests, Multiple choice, short answers, essay questions	0
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Multiple "diagnostic on-line" tests, Multiple choice, short answers, essay questions	0						
INDICATIVE READING:	<p>REQUIRED READING:</p> <p>Alberts, Molecular Biology of the Cell, 7th Edition, (2022), Publisher, W. W. Norton & Company.</p> <p>RECOMMENDED READING:</p> <p>Alberts B et al, Essential Cell Biology, 6th Edition, Norton & Company, Inc.</p> <p>Fragkos et al, DNA replication origin activation in space and time, Nat Rev Mol Cell Biol. 2015 Jun;16(6):360-74. doi: 10.1038/nrm4002.</p> <p>Other sources, including 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:	N/A
SOFTWARE REQUIREMENTS:	Microsoft Office & Blackboard CMS
WWW RESOURCES:	<p>Cell Biology: https://geneed.nlm.nih.gov/specialty.php?spageID=2#topic2 DNA, Genes, Chromosomes: https://geneed.nlm.nih.gov/specialty.php?spageID=2#topic16 http://www.dnalc.org/ http://www.cellsalive.com/ http://www.learner.org/courses/biology/archive/animations.html http://www.mcb.harvard.edu/BioLinks.html http://www.nature.com/index.html</p>
INDICATIVE CONTENT: LECTURE	<ul style="list-style-type: none"> • Organization of prokaryotic and eukaryotic cells, origin and evolution of organisms, microscopy, model organisms • Chemical components of cell - protein structure, function and control • Structure and function of the nucleus • Membrane lipid bilayer and membrane proteins • Transport across cell membranes • Energy generation in mitochondria and chloroplasts • Intracellular compartments and protein transport • Membrane enclosed organelles, vesicular transport, secretory and endocytic pathways • Cell signalling, receptors and cell behaviours • The cytoskeleton • The cell-division cycle • Cell communication, extracellular matrix and cell junctions • Stem cells and tissue regeneration • DNA replication, DNA repair and recombination. • Basic mechanisms of transcription, mRNA processing and translation. • Control of gene expression • Cell death mechanisms • Mutations and cancer