

(Previously: BMS 4440 TOPICS IN PATHOPHYSIOLOGY)
(Updated: Fall 2024)

UK LEVEL: 6
UK CREDITS: 15

PREREQUISITES:

BI 1000 Introduction to Biology I
BI 1101 Introduction to Biology II
BI 2222 Cell Biology **or** BI 3233 Molecular Biology of the Cell
BI 3336 Molecular Biology **or** BI 3233 Molecular Biology of the Cell
BI 3240 Human Anatomy and Physiology

CATALOG DESCRIPTION:

An integrated exploration of human pathophysiology that provides the students with a comprehensive understanding of the underlying mechanisms and processes involved in the development of diseases. Focuses on molecular and cellular processes contributing to diseases, inflammation, immune system disorders, and organ-specific diseases. Specific cases, research and bioethics questions are explored using critical and analytical approaches including existing and experimental treatment strategies.

RATIONALE:

The study of pathophysiology is crucial in biomedical science education as it forms the foundation for understanding human disease processes, accurate diagnosis and prognosis, developing effective treatment strategies, advancing research and innovation, and facilitating interdisciplinary collaboration. Concept questions prompt recall of basic facts, while cases, research questions, and bioethics questions challenge the student to apply key concepts to very real situations. It helps students integrate molecular, cellular, physiologic and pathologic processes contributing to diseases. Furthermore, students will be helped to develop a critical and analytical approach to explaining specific case histories, explain the interaction of environmental and stress factors on the pathogenesis of human diseases but also develop a critical and analytical approach to explaining specific case histories. Biomedical sciences students will be in the position to discuss existing and experimental treatment strategies.

LEARNING OUTCOMES:

As a result of taking this course, the student should be able to:

1. Discuss the mechanisms and life implications associated with a range of diseases.
2. Critically evaluate the use of clinical findings, imaging techniques, tests of physiological function and laboratory data in the identification, etiology, diagnosis and pathogenesis of disease.
3. Demonstrate a critical and analytical approach to specific case histories of human disease and discuss diagnostics approaches and laboratory tests, including techniques in hematology.
4. Discuss treatment and consequences (risk-benefit ratio) of selected disease states.
5. Conduct appropriate literature-based research/evaluation of relevant topics.

METHOD OF TEACHING AND LEARNING:

In congruence with the teaching and learning strategy of the college, the following tools are used:

- Class lectures, interactive learning (class discussions, group work) video presentations, and practical problems solved in class.
- Exercises and primary source documents are assigned as homework, the solutions of which are reviewed in class.
- Master lectures by esteemed professors and other experts in the field.

	<ul style="list-style-type: none"> • Lectures on the principles and understanding of the subject matter, including original data from primary research papers and other sources. • Tutorials of an interactive format to establish understanding of topic areas primarily through case studies and experimentally derived data. • 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 material. • Use of library facilities for further study and preparation for the exams. • Use of the Blackboard course management platform to further support communication, by posting lecture notes, assignment instruction, timely announcements, formative quizzes and online submission of assignments.
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ASSESSMENT:	Summative:	
	1 st assessment: In-class midterm examination (2-hour) Multiple choice, problems, essays	40%
	2nd assessment: Portfolio (throughout semester) Essay questions aiming to prepare students for their first and second assessments in terms of content, context and time management; in-class presentations and participation	10%
	Final assessment: Final examination, multiple-choice, concept questions, case study questions (2-hour), comprehensive	50%
	Formative:	
	Multiple "diagnostic on-line" tests Multiple choice, short answers, essays	0%
	<p>The formative multiple-choice tests and written essays aim to prepare students for the examinations. Students are expected to submit feedback on their performance.</p> <p>The 1st summative assessment tests Learning Outcomes 1, 2. The 2nd assessment tests Learning Outcomes 1-6. The final examination tests all Learning Outcomes (1-6) 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>	

INDICATIVE READING:	<p>REQUIRED READING:</p> <ol style="list-style-type: none"> 1. Jacquelyn L. Banasik, PhD, ARNP, Pathophysiology, latest edition, Elsevier, ISBN: 9780323510455 2. Instructor’s lecture notes on blackboard. <p>RECOMMENDED READING:</p> <p>Other sources, including journal and newspapers’ articles, research papers etc. recommended by the instructor throughout the semester.</p>
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INDICATIVE MATERIAL: <i>(e.g. audiovisual, digital material, etc.)</i>	REQUIRED MATERIAL: N/A RECOMMENDED MATERIAL: N/A
COMMUNICATION REQUIREMENTS:	Verbal and written skills using academic / professional English
SOFTWARE REQUIREMENTS:	MS Office and Blackboard CMS
WWW RESOURCES:	http://www.dnalc.org https://www.jove.com/visualize https://biologicalproceduresonline.biomedcentral.com/ https://www.bitnos.com/biomedical-protocols https://www.ncbi.nlm.nih.gov/pubmed/ https://www.informaticseducation.org/ http://imia-medinfo.org/wp/welcome-to-imia-2/ http://genomicsandhealth.org https://www.humanbrainproject.eu/en/ http://www.braininitiative.org/ https://www.alleninstitute.org/ http://www.brain-map.org/
INDICATIVE CONTENT:	<ul style="list-style-type: none"> • Overview of the major physiological systems • Cellular adaptation, injury and death • Homeostasis, allostasis & stress • Genetic and Developmental Disorders • Inflammation and Immune System Disorders • Correlation of histopathology to diseases pathogenesis • Effect of environmental triggers on disease processes (e.g. water supply, sanitation, food & air quality, environmental toxins) • Hypersensitivities • Pain • Etiology, pathogenesis, and clinical manifestations of diseases <ul style="list-style-type: none"> ○ Obesity ○ Cardiovascular disorders ○ Neoplasia ○ Respiratory disorders ○ Hematological disorders (e.g. anemias, coagulation disorders) ○ Endocrine disorders (e.g. Cushing’s syndrome, diabetes, obesity) ○ Neurological disorders, neurodegenerative diseases ○ Neuromuscular diseases ○ Neuropsychiatric diseases ○ Gastrointestinal disorders ○ Reproductive disorders (e.g. polycystic ovarian syndrome) ○ Renal & urinary disorders ○ Autoimmune diseases • Interaction between the brain and the rest of the body • Poorly defined and hard to treat diseases (e.g. chronic inflammatory response syndrome, fibromyalgia) • Myalgic encephalomyelitis/chronic fatigue syndrome • Microbiota-gut-brain interactions

	<ul style="list-style-type: none">• Diagnostic approaches and laboratory tests, including haematology (e.g. total cholesterol levels, HDL, LDL, glucose levels, HbA1c levels, etc.)• Current and experimental therapies• Use of natural molecules, supplements and vitamins
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