



DEPARTMENT OF PHYSICIAN ASSISTANT EDUCATION

MASTER OF SCIENCE IN MEDICINE

4 UNITS

MSM 6003 FOUNDATIONS IN MEDICAL SCIENCE

FALL 2023

Biochemistry	
Meeting days and times: Tuesdays, 8:00am-9:00am	Instructor title and name: Ariane Jansma, Ph.D. Office location and hours: please email to set-up
Dates: 9/3-12/18	Phone: 619 990 4539 Email: ajansma@pointloma.edu
Meeting location: Balboa Campus, Room 154	Final Exam: December 18, 8:00am
Microbiology	
Meeting days and times: Varies by week	Instructor title and name: Dr. Grace Gates, MD
Dates: 9/4/-12/16	Phone: Email: ggates@miracosta.edu Office location and hours: please email to set-up
Meeting location: Balboa Campus, Room 154	Final Exam: December 16, 3:00pm
Immunology	
Meeting days and times: Varies by week	Course Coordinator title and name: Dr. Toan Do, MD A&I Fellow UC San Diego
Dates: 9/4/-10/23	Phone: Email: ttd001@health.ucsd.edu Office location and hours: please email to set-up
Meeting location: Balboa Campus, Room 154	Final Exam:
Genetics	
Meeting days and times: Mondays, 5:30pm-7:30pm	Instructor title and name: Sara Turner-Cooper, Ph.D., PA-C

	Office location and hours: please email to set-up
Dates: 9/9-10/21	Phone: 765 490 0513 Email: scooper@pointloma.edu
Meeting location: Balboa Campus, Room 154	Final Exam: October 21, 5:30pm

PLNU Mission
To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

COURSE DESCRIPTION

The course will provide instruction in the basic sciences of medicine integral to understanding human disease. The course will cover topics in pathology, pathophysiology, biochemistry, immunology, microbiology, and genetics.

COURSE GOALS

The student will be provided with:

1. Lectures covering the relevant didactic content and the opportunity to connect this content to the application of the material to clinical case discussions.

PROGRAM LEARNING OUTCOMES

The content in this course will contribute to the student’s proficiency in this/these area(s):

3. Recommend and interpret common diagnostic and screening tests. (MK, IC, PC, PR, PB, SB)

COURSE LEARNING OUTCOMES

Successful completion of this course requires demonstration of the skills and knowledge outlined here at, minimally, the ADVANCED BEGINNER level:

1. Apply knowledge of molecular, biochemical, cellular, and systems-level mechanisms that maintain homeostasis, and of the dysregulation of these mechanisms, to the prevention, and diagnosis of disease. (MK2; MK3; MK4)
2. Apply the mechanisms of general and disease-specific pathological processes in health and disease to the understanding of common human disorders. (MK2; MK3; MK4)
3. Use the principles of genetic transmission, molecular biology of the human genome, and population genetics to obtain and interpret family history and ancestry data, to order genetic tests and to assess patient risk. (MK1; MK2; MK3; MK4)

4. Apply principles of the biology of microorganisms in normal physiology and disease to explain the etiology of disease, identify preventive measures, and predict response to therapies. (MK1; MK2; MK3; MK4; MK5)

Initials indicate PA core competency required to meet the PLO/CLO.

PA Core Competencies:

MK = Medical Knowledge

IC = Interpersonal Skills & Communication

PC = Patient Care

PR = Professionalism

PB = Practice-based Learning

SB = Systems-based Practice

INSTRUCTIONAL OBJECTIVES

Upon completion of the **BIOCHEMISTRY** section of this course, the student will be able to:

1. Identify the major macromolecules (proteins, nucleic acids, carbohydrates, and lipids) and explain the ways molecular structure determines their properties. Knowledge, B1.01c
2. Explain the principles of enzymatic reactions, including controls such as feedback, competitive, and noncompetitive inhibition, and allosteric effects. Comprehend, B1.01c
3. Explain how membrane gradients and electron transport act to generate and store energy. Comprehend, B1.01c
4. Apply knowledge of biological systems and their interactions to explain how the human body functions in health and disease. Application, B1.01c, B2.02c
5. Explain how the regulation of major biochemical pathways for energy production, coupled with the synthesis/degradation of macromolecules function to maintain health and identify major forms of dysregulation in disease. Comprehend, B1.01c, B2.02c

Session Topics

- Proteins, Enzymes
- Glycolysis, Krebs Cycle
- Oxidative Phosphorylation, ATP Synthesis
- Carbs I: Gluconeogenesis & Glucose homeostasis
- Carbs II: Glycogen, Pentoses, Other Sugars
- Lipids I: Fatty Acid Synthesis & Oxidation
- Lipids II: Complex Lipids, Lipoproteins
- Amino Acids, Nitrogen Metabolism
- Porphyrins and Hemoglobin

Upon completion of the **GENETICS** section of this course, the student will be able to:

1. Explain how variation at the gene level affects the chemical and physical properties of biological systems, and how this, in turn, influences health. Comprehend, B1.01c, B2.02e
2. Describe the major forms and frequencies of genetic variation and their consequences on health in different human populations. Comprehend, B1.01c, B2.02e
3. Describe the various patterns of genetic transmission within families and implications for the health of family members. Comprehend, B1.01c, B2.02e

Session Topics

- Nucleotides, DNA
- RNA. Protein Synthesis
- Human Genetics and Inheritance
- Microbial Genetics

Upon completion of the **MICROBIOLOGY** section of this course, the student will be able to:

1. Explain the structure, function, metabolism, and virulence factors of pathogens and how they contribute to the infectious disease process. Knowledge, Comprehension, B1.01c, B2.02c
2. Apply the principles of host-pathogen interactions and knowledge of pathogen structure, genomics, life-cycle, transmission, and pathogenesis to the prevention, diagnosis, and treatment of infectious disease. Application, B1.01c, B2.02c
3. Evaluate probable explanations for pathogen behavior in an infected patient. Evaluation, B1.01c, B2.02c

Session Topics

- Pathogenic eukaryotes, prokaryotes, and viruses
- The human microbiome
- Infection and transmission
- Antibiotics and resistance

Upon completion of the **IMMUNOLOGY** section of this course, the student will be able to:

1. Apply knowledge of the mechanisms for distinction between self and non-self (tolerance and immune surveillance) to the maintenance of health, autoimmunity, and transplant rejection. Application, B1.01c, B2.02c
2. Apply knowledge of the molecular basis for immune cell development to diagnose and treat immune deficiencies. Application, B1.01c, B2.02c
3. Apply knowledge of the mechanisms utilized to defend against intracellular or extracellular microbes to the development of immunological prevention or treatment. Application, B1.01c, B2.02c

Session Topics

- Basic Immune System Function
- Autoimmunity, Immune Deficiency
- Hypersensitivity, Vaccines

Note: Superscripts identify the Bloom's Taxonomy level for each objective.

UNIT INSTRUCTION

UNIT	HOURS	LECTURES
Unit I	15	ORIENTATION
		BIOCHEMISTRY
UNIT I EXAM		
Unit II	15	GENETICS
UNIT II EXAM		
Unit III	15	MICROBIOLOGY

UNIT III EXAM		
Unit IV	15	IMMUNOLOGY
UNIT IV EXAM		

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

Note: Texts prefaced with double asterisks are provided in Access Medicine.

Biochemistry and Genetics:

Lippincott Illustrated Reviews: Biochemistry, 7e (2017) by Denise Ferrier PhD
 ISBN: 978-1496344496

Microbiology and Immunology:

Mims Medical Microbiology and Immunology, 6e (2018) by Richard Goering MSc PhD
 Paperback ISBN: 978-0702071546
 eBook ISBN: 9780702072024

Case Studies in Immunology: A Clinical Companion, 7e (2016) by Raif Geha and Luigi
 Notarangelo

ISBN-13: 978-0815345121

ISBN-10: 9780815345121

****Harrison's Principles of Internal Medicine 20/E (Vol.1 & Vol.2) 20th Edition by
 Dennis L. Kasper, Anthony S. Fauci, Stephen Hauser, Dan Longo, J. Larry Jameson,
 Joseph Loscalzo**

ISBN-13: 978-1259644030

ISBN-10: 0071802150

LEARNING MODALITIES

Modalities include lectures, on-line pre-lecture activities, and reading assignments. The class schedule and assignments can be found in Canvas.

ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. However, we recognize that as adults you have other life responsibilities and challenges that may interfere. Ultimately you are responsible for your education and your ability to demonstrate mastery of the course and program objectives.

1. You MUST attend:
 1. PE and clinical skills labs appropriately dressed and with all necessary equipment
 2. examinations on the date and time for which they are schedule
 3. community learning groups
2. We expect

4. active participation in all class activities.
 5. completion of all class preparatory assignments prior to commencement of class.
 6. respect for the class, peers and faculty.
 7. on-time arrival for all classes, laboratories, learning groups or any scheduled activities.
- Routine tardiness demonstrates a lack of professionalism and will not be tolerated

INCOMPLETE AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned under extremely unusual circumstances. Students failing an examination or practicum must complete the designated remediation (See REMEDIATION below) within the assigned time.

FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examinations (written and practical) **on their respective scheduled days**. No requests for early examinations or alternative days will be approved.

ASSESSMENT AND GRADING

Written examinations – MSM 6003 will include (4) unit exams, one for each of the four units.

The final course grade will be calculated based on the following distribution:

Unit written examinations:

1. Biochemistry	25%
2. Genetics	25%
3. Microbiology	25%
4. Immunology	25%

TOTAL	100%
-------	------

In order to pass this course, students must achieve a cumulative average of C (70%) or greater on the written exams. At the end of this course, the student will be expected to perform at the “advanced beginner” level.

All assignments and evaluations must be completed in the timeframe determined by the course director. Students receiving less than 70% on an examination must meet with the course instructor and faculty advisor. Students receiving less than 70% on any two written examinations will be referred to Student Progress and Promotions Committee. For additional information on this policy, refer to the PA Program Student Handbook.

Grading will be in keeping with Point Loma Nazarene University policy for graduate programs and will be as follows:

A = 93-100	C = 73-76
A- = 92-90	C- = 70-72
B+ = 87-89	D+ = 67-69
B = 83-86	D = 63-66
B- = 80-82	D- = 60-62
C+ = 77-79	F = 0-59

REMEDICATION

Remediation is the process by which both the student and the program are assured that performance indicating a deficiency in knowledge or skills is subsequently demonstrated to be satisfactory. This may include a re-test over missed material, a skills demonstration or a review of missed material with completion of corrected answers. It is important to note that this is content remediation, not grade remediation and no grade will be changed based on these activities.

Within 48 hours of the posting of a grade of <70%, the student **MUST** contact the course director to discuss the student's performance and create a remediation plan. Unless otherwise directed by the course director, remediation activities must be completed within 5 days.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law

PLNU RECORDING NOTIFICATION

In order to enhance the learning experience, please be advised that this course may be recorded by the professor for educational purposes, and access to these recordings will be limited to enrolled students and authorize personnel.

Note that all recordings are subject to copyright protection. Any unauthorized distribution or publication of these recordings without written approval from the University (refer to the Dean) is strictly prohibited.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See the [Academic Honesty Policy](#) in the Graduate and

Professional Studies Catalog for definitions of kinds of academic dishonesty and for further policy information.

Use of Artificial Intelligence (AI) tools (e.g, ChatGPT, iA Writer, Marmot, Botowski) is not permitted, and use of these tools will be treated as plagiarism.

SEXUAL MISCONDUCT AND DISCRIMINATION

Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. If you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that help and support are available through the Title IX Office at pointloma.edu/Title-IX. Please be aware that under Title IX of the Education Amendments of 1972, it is required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at counselingservices@pointloma.edu or find a list of campus pastors at pointloma.edu/title-ix

PLNU ACADEMIC ACCOMMODATIONS POLICY

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

This syllabus is subject to change. Students are encouraged to check course messages and emails in order to remain current.

ARC-PA standards (5th edition) addressed in this course: B1.01(c), B2.02(c), B2.02(e)