COURSE TITLE: Immunology  
COURSE NUMBER: PCB 3233

COURSE DESCRIPTION (with prerequisites):
This course provides an introduction to the basic principles of immune reactions, antigen and antibody interactions, cell mediated immunology, tumor immunology, immunosuppression, autoimmunity, and immunotherapy. Prerequisites: Biology (BSC 2010 & 2011), Chemistry (CHM 1045), and Cell and Molecular Biology (PCB 3023); or consent of the department. 3 semester hours credit.

NAME(S) OF INSTRUCTORS: Varies

EFFECTIVE SEMESTER: Not currently offered

REQUIRED TEXTBOOKS AND INSTRUCTIONAL SUPPLIES: TBD

GRADING POLICY:
The standing of a student in each course is expressed by one of the following letters and corresponding grading system:
A – 90 – 100
B – 80 – 89
C – 70 – 79
D – 60 – 69
F – 59 or less
The Chipola Catalog provides policies and procedures regarding the grading system. A student’s Grade Point Average is derived from the grading system/quality point scale.

ATTENDANCE AND WITHDRAWAL POLICIES:
Chipola College expects regular attendance of all students. Students who are absent from classes for any reason other than official college activities must satisfy the instructor concerned that the absence was due to illness or other clearly unavoidable reasons. Otherwise, the student may suffer grade loss at the discretion of the instructor. Chipola policy allows each instructor to specify in the Instructor First Day Handout whether or not an absence is excusable and what affect the absence or tardy may have on the grade.
A student is allowed to repeat a course a maximum of three (3) times. **On the third attempt a student (1) must bear the full cost of instruction (unless waived by Student Services), (2) cannot withdraw, and (3) must receive a grade.**

**MAKE-UP POLICY:**
Chipola allows each instructor to specify in the Instructor First Day Handout the makeup policy.

**ACADEMIC HONOR CODE POLICY:**
Students are expected to uphold the Academic Honor Code. Chipola College’s Honor Code is based on the premise that each student has the responsibility to (1) uphold the highest standards of academic honesty in his/her own work; (2) refuse to tolerate academic dishonesty in the college community; and (3) foster a high sense of honor and social responsibility on the part of students. Further information regarding the Academic Honor Code may be found in the Chipola Catalog, Student Governance section.

**STUDENTS WITH DISABILITIES POLICY:**
Chipola College is committed to making all programs and facilities accessible to anyone with a disability. Chipola’s goal is for students to obtain maximum benefit from their educational experience and to effectively transition into the college environment. Students with disabilities are requested to voluntarily contact the Office of Students with Disabilities to complete the intake process and determine their eligibility for reasonable accommodations.

**LIBRARY AND ON-LINE REFERENCE MATERIALS:**
The library is a comprehensive learning resource center providing information in print, electronic, and multimedia format to support the educational objectives of the College. On-line catalogs, e-books and electronic databases can be accessed by using the LINCCWeb icon on the Chipola Library website at www.chipola.edu/library. If you have questions about database usage consult the “How to Use the Chipola Databases” on the Library website or call the Library at 850/718-2274 during regular hours. Library hours are posted each semester at the building entrance and on the Library website. See your Instructor First Day Handout for individual instructor recommendations and resources.

**TECHNOLOGY RESOURCES:**
The Information Technology Center, located in the library, is equipped with computer workstations. Lab hours are posted each semester at the building entrance and on the Library website. The ACE Lab, located in Building L, is available for tutoring and is equipped with computer workstations. Lab hours are posted each semester at the room entrance. The college’s learning management system is Desire 2 Learn (d2l). Classes become available on d2l on the first day of the semester. It is the student’s responsibility to log onto the d2l system the first day of class to establish the first day of attendance and to check announcements. For further information, contact your instructor or the Director of Online Learning.
**ELECTRONIC DEVICE USAGE:**
All electronic devices such as cell phones, beepers, pagers, and related devices are to be silenced prior to entering classrooms and/or laboratories to avoid disruption. Should it become necessary for a student to leave his/her “device” on to send or receive an emergency call and/or text message, the student must inform the instructor prior to class. If the student finds it necessary to send and/or receive an emergency call and/or text message during class/lab time, he/she is instructed to take all books and belongings and step outside the classroom to deal with the situation. To minimize classroom disruption and the distraction to classmates, the student will not be permitted to reenter the classroom during that class period. Any time a test is being administered, all such devices must be turned off and put away. If a device is seen or heard during an exam, a score of zero will be given for that exam. Initial and repeated infractions may result in disciplinary action.

**DISCIPLINE SPECIFIC COMPETENCIES / LEARNING OUTCOMES:**
PCB 3233 is not a general education course.

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<tr>
<th>STUDENT LEARNING OUTCOMES FOR PCB 3233</th>
<th>NGSSS/ NSES Standards</th>
<th>FEAPs (Discipline Outcomes)</th>
<th>FL Competencies and Skills: Science 6-12</th>
<th>Prof. Ed.</th>
<th>Assessment Activities</th>
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<td>The student will:</td>
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<td><strong>1. Students will demonstrate an understanding that life begins with cells, and that the commonality or diversity of cells relates to the specific function of the cell—reliant on the immunologic determination of self versus non-self. The cell theory will be applied to describe hematopoiesis of the blood and the generation of other cells of the immune system—including organ and tissue specificity in terms of the major histocompatibility complexes.</strong></td>
<td>1.2, 1.17, 1.18, 2.2, 2.4, 3.1, 3.12, 4.7, 8.1, 8.4, 8.5, 8.6, 8.9, 8.10</td>
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<td>2. Students will demonstrate an understanding of protein structure and function as it relates to antibody structure, antigenic determinants, enzymatic activity, and methods of protein purification in vaccine production.</td>
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<td><strong>1.5, 1.6, 1.9, 1.12, 1.13, 1.16, 2.2, 3.1, 3.2, 3.3, 3.10, 3.11, 3.12, 3.14, 3.16, 4.2,</strong></td>
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<td>3. Students will demonstrate an understanding of the chemical foundations of biomolecular interactions as they relate to the complement cascade, antibody-antigen interactions, and cytokine and chemokine signaling.</td>
<td>4.7</td>
<td>1.7, 3.1, 3.10, 3.11, 3.12, 3.14, 3.16, 6.3, 8.11</td>
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<td>4. Students will demonstrate an understanding of the molecular genetics of antibody diversity including genetic recombination and adaptive immunity. The generation of diversity in the T-cell receptor will be discussed. There will be a review of the structure of nucleic acids, transcription of protein-coding genes, formation of mRNA, the role of mRNA in translation, the stepwise synthesis of proteins on ribosomes, and the role of post translational modifications. Current topics in molecular biotechnology will be considered—including gene splicing, plasmid construction in recombinant DNA, transformation of bacteria, the polymerase chain reaction, protein expression, and applications of DNA technology.</td>
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<td>1.5, 1.9, 1.13, 1.14, 2.1, 2.2, 2.4, 3.10, 3.11, 3.12, 3.14, 3.16, 4.3, 4.7, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 6.3, 6.5</td>
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<td>5. Students will demonstrate an understanding of eukaryotic cell signaling through cell-surface receptors, signal transduction pathways, and the integration of these signals as they affect cell fate. Immunologic control, endocrine-related hormonal control by insulin and glucagon, as well as environmental factors will be considered.</td>
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<td>1.3, 3.1, 3.3, 3.10, 3.11, 3.12, 3.13, 3.16, 4.7, 8.4, 8.6, 8.9, 8.10, 8.11</td>
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<td>6. Students will demonstrate an understanding of immunologic effector systems and immunity to infection. This will include an</td>
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<td>2.5, 3.10, 3.11, 3.12, 3.14,</td>
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<td>Understanding of cell-mediated immunity, mucosal immunity, and immunity to bacterial, viral and parasitic infections.</td>
<td>3.16, 4.2, 4.6, 4.7, 6.1, 6.3, 6.5, 8.10</td>
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<td>Students will demonstrate an understanding of immune system dysfunction in HIV-1 infection, immunodeficiency disorders, hypersensitivity, and autoimmunity. Biomembrane rafts and molecular flip-flops in cell membrane architecture in both normal and disease states will be discussed. The structure and function of organelles, including cellular energetics associated with the oxidation of glucose and fatty acids to carbon dioxide as it applies to apparent cellular glucose deprivation and gluconeogenesis, ketoacidosis, and advanced glycation end-products in autoimmunity associated with diabetes mellitus, will be discussed.</td>
<td>2.2, 2.5, 3.2, 3.3, 3.4, 3.10, 3.11, 3.12, 3.14, 3.16, 4.3, 4.7, 4.8, 5.7, 6.2</td>
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<td>Students will demonstrate an understanding of immune system dysfunction in cancer. There will be a review of the eukaryotic cell cycle including mitosis, meiosis, factors that regulate the cell cycle, cell fate, differentiation, cell regulated death through apoptosis, and the genetic basis of cancer. The structure and function of organelles, including cellular energetics associated with the harnessing of electron transport and the generation of a proton motive force, will be covered as it pertains to ATP-dependent programmed cell death in apoptosis versus cell death by necrobiosis. Normal and suggested DNA sequences that</td>
<td>1.9, 2.2, 2.4, 3.10, 3.11, 3.12, 3.14, 3.16, 4.3, 4.4, 4.5, 4.7, 5.7, 5.8, 5.12, 5.13, 6.2, 9.5, 10.7</td>
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genetically predispose to disease will be compared using the NCBI GENE BANK available on-line. The selective advantage of the sickle-cell trait in malaria-endemic regions will be discussed.

**Assessment Codes**

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**MEANS OF ACCOMPLISHING STUDENT LEARNING OUTCOMES:**

Lecture and practical application of skills are the primary methods of instruction. Students are expected to be attentive and are encouraged to ask questions. Lectures may be primarily from the textbook, and may be enhanced by the board illustrations, concept maps, power point presentations and overhead transparencies. Other teaching strategies may include: use of inquiry, science activities, demonstrations, problem solving, critical thinking, cooperative groups, process skills (describing relationships between variables, acquiring and processing your own data, analyzing investigations, constructing hypotheses, defining variables operationally, designing investigations, experimenting), class discussions, large and/or small group projects, service projects, oral presentations, read and report on subject matter articles from referred journals, reflective papers.

**ASSIGNMENT AND/OR COURSE OUTLINE**

See your Instructor First Day Handout for individual instructor assignment schedule.