**BIOLOGY 110: PRINCIPLES OF HUMAN BODY**
**MIDDLESEX COMMUNITY COLLEGE**
**COURSE SYLLABUS**
**SPRING 2016, CRN#1021**

**INSTRUCTOR: Madhavi Shah, Ph.D.**

- **Email:** Mshah@mxcc.commnet.edu
- **Prefer communication through Blackboard messages OR office phone**
- **Office Phone:** 860-343-5782
- **Office Location:** 209 Wheaton Hall
- **Office Hours:** Tuesday and Thursday 1:00 – 2:00 pm
  Wednesday 11:00 am – 12:00 pm OR by appointment

**COURSE CREDIT: 3** **COURSE PLACE & TIME: ONLINE**

**TEXTBOOK REQUIRED:** Human Biology: Concepts and Current Issues 7th Edition –Michael D. Johnson (ISBN # 978-0-321-82165-2)

***Course Description***

This is an introductory course dealing with the structure and function of the human organism and the issues facing the human in today's world. It is intended for students with limited science background. Reading exempt and grade of "C" or better in MAT*075 or placement into MAT*095 or higher.

***General Objectives of the Course***

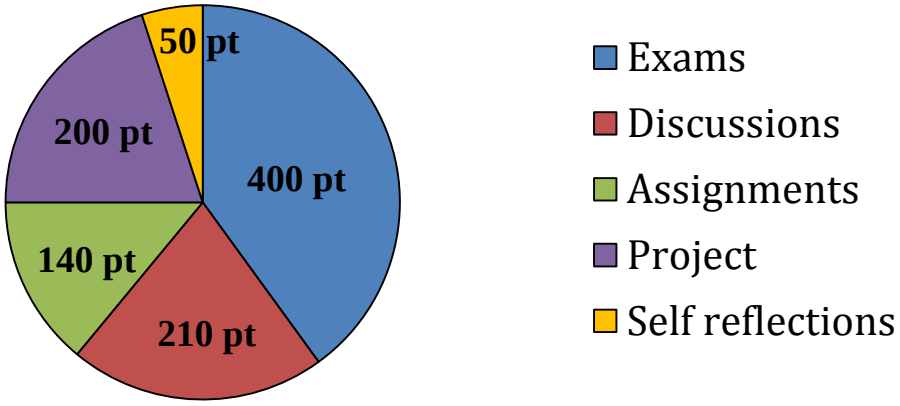
Upon successful completion of this course the student will be able to:

- Briefly describe the unifying themes that characterize the biological sciences.
- Explain the basic chemistry concepts important to biology.
- Explain the basic structure and function of cells as the basic units of all living things and as the building blocks of multicellular organisms.
- Define homeostasis and explain why this concept is central to physiology.
- Distinguish between discovery science and hypothesis-based science. Explain why both types of exploration contribute to our understanding of nature.
- Explain the relation between form and function in biology, as expressed in molecular, cellular, and whole-organism physiology.
- Recognize the anatomical structures and explain the physiological functions of the body systems.
- Develop scientific terminology to describe the parts and processes of the human body.

This Course Satisfies the TAP Framework requirements for the Competency Area in:
**Scientific Knowledge & Understanding** (D)

1. Communicate using appropriate scientific terminology.
2. Use representations and models to communicate scientific knowledge and solve scientific problems.
3. Plan and implement data collection strategies appropriate to a particular scientific question.
4. Articulate the reasons that scientific explanations and theories are refined or replaced.
5. Evaluate the quality of scientific information on the basis of its source and the methods used to generate it.

**GRADING POLICY:** Students in this course will be evaluated by ongoing assessment during the course.




**Grading Rubric (1000 point system)**

| Categories | | Total Points |
|---|---|---|
| **2 Exams** | **200 points each** | **400** |
| **14 Discussions** | **15 points each** | **210** |
| **14 Assignments** | **10 points each** | **140** |
| **Project** | | **200** |
| **2 Self-reflections** | **25 points each** | **50** |

**Final grade will be based on 1000 points:**

>920 points = A, 900 – 920 = A-, 880 – 899 = B+, 820 – 879 = B, 800 – 819 = B-, 780 – 799 = C+, 720 – 779 = C, 700 – 719 = C-, 680 – 699 = D+, 620 – 679 = D, 600 – 619 = D-, & <600 = F

- Grades will be routinely posted on Blackboard; however it is just for ADVISORY purpose. Your final grade will be calculated and entered on campus cruiser.
- Your privacy is mandated by federal regulation. Grades are discussed only with you in person, never by email or phone.
- (1) If a student is enrolled for a course but do not officially withdraw, fail to participate in course activities through the end of the term, and have insufficient gradable work during the course or (2) if a student is enrolled in a course, never attended (logged in in regards to online course), and never officially withdraw, that student will be given a final grade of "UF" – "unearned F." This "UF" grade will automatically be convert to an "F" on the student's transcript and will count in the student's GPA.
- Students are required to check the Academic Calendar and the College Catalog for specific dates and procedures regarding the withdrawal process. The last day to withdraw with Instructor's permission and a **'W' grade is April 13th** for spring 2016 semester.

**Course Requirements**
A common misconception about on-line courses is that they are "self-paced" - that you can do the work any time during the semester. Keep in mind that this is **NOT** a self-paced course. This course is designed in one-week units, with various deadlines approximately every week to keep everyone working on the same material and better able to participate in discussions.

In an on-ground 3-credit course, we meet in the classroom for 3 hours per week. It is generally expected that you will study 2 to 3 hours for every hour in the classroom, for a total of 6 to 9 hours per week in addition to class time. The same math applies to online courses. For an online 3-credit course, you should expect to spend a total of 9 – 12 hours per week studying and completing assessment activities for that week.

Last minute glitches can occur with computer equipment, and the instructor will allow one extension (no later than 24 hours past deadline) per student for homework assignments and self-reflections ONLY with no penalty upon request. However, ongoing computer problems will not be an acceptable excuse for incomplete work; you are expected to have a backup plan that allows you to complete work on time throughout the semester.

Due to the nature of the course, discussion of sensitive or controversial topics may arise. The right of every student to learn in a safe, respectful environment is of primary importance and hence disruptive, threatening, or profane language or behavior will not be tolerated in this course. Please be aware of your writing and responses to your classmates.

**Reading Assignments**
As the course progresses students should become familiar with the topics in each chapter. Each topic includes important concepts and vocabulary with which the students will develop competencies. Readings from the text will provide the students with an introduction to these topics and a means for the student to continue their learning.

**Exams**
Two exams (mid-term and a final) will be administered during the semester.
Mid-term and Final exam each are worth 200 points and may include a combination of multiple choice questions, fill in the blank, match the following, or short essays. Makeup for an exam will ONLY be granted during a documented, extenuating circumstance. The make-up exam may be different than the original. Contact me within 24 hours to make arrangements. **Final exam will be conducted during final exam week: May 10-16, 2016.**

**Weekly Discussions**
In order to receive full credit for the discussion board, you must log on weekly and respond to the current questions as well as interact with your classmates. Please use correct grammar, punctuation, & full sentences. You must respond to at least two (2) other postings which offer insight to the classmates posting each week in order to receive full credit. Postings of just "good description" or "explained well" although they are encouraging to your classmates and welcome will not receive credit. There will be 2-3 Discussion Questions each week, which should be addressed in complete in your weekly post. Your discussion and responses to two other posts should be submitted on Blackboard by 11:59 pm of the due date. As discussion board posts involve participation and engagement among classmates, you cannot submit late work or request make-up.

**Homework Assignments**
Every week there will be one homework assignment that will involve analysis of the chapters that we have read. The homework assignment will be posted on Blackboard and must be submitted via assignment submission page by 11:59 pm of the due date. I will NOT accept late work. If serious circumstances prevent you from completing work within this time frame, you must notify the instructor prior to the due date. You will receive zeros for missed homework's unless prior approval was given. If prior approval is given for **valid documented reasons** you may make up the assignment within a certain time-frame.

**Project**
You will prepare a research poster on a topic related to a human disease or illness.
You are to use a minimum of four references, two of which should be peer-reviewed journal articles. Your sources cannot be older than 5 years. Please make sure you include in your poster a definition/explanation of what the disease is and what body system(s) are affected. Since this is a human body course, I would expect that the poster would include how the body system(s) are affected in detail. Then you may proceed to include signs and symptoms of the disease, how it is diagnosed, and then treatment options. Poster guidelines and templates will be provided on Blackboard. This poster must be posted two ways in order to receive credit: through the Assignment Drop Box as an attached document and on the Discussion Board so that everyone can share their information they found with their classmates. To submit your poster project, click on the tab labelled "Project" on the left hand menu of Blackboard page. Then click on the title named "Project", it will take you to the assignment submission page. At the assignment submission page, you have an option to attach your word or pdf document and then click submit. Submission of the project should be done by 11:59 pm of the due date. Late submission will not receive credit. There will be NO make-up opportunity for this project. PLAN AHEAD. DO NOT wait till the last day to figure out how to submit your project. If you have question or are not sure, ask beforehand.

**Self-reflections**
There will be a total of 2 self-reflection opportunities during this course. Self-reflection journaling will involve looking back on all course material and assessment activities you would have completed in the course to that date. The self-reflection questions will be posted on Blackboard and must be submitted via assignment submission page by 11:59 pm of the due date. If serious circumstances prevent you from completing work within this time frame, you must notify the instructor prior to the due date.

**Problems**
If you are struggling with any aspect of the course, or unexpected situations arise,
You should always contact me immediately. You can reach me via Blackboard messages, office phone or just stop by my office during office hours. I very much want to see you succeed in the course and will make every effort to help you do so.

**Accommodations**
Students with physical or learning disability who may require accommodation are encouraged to contact the Disability Support Services office (Hilary Phelps, Disabilities Support Specialist at 860-343-5879 or hphelps@mxcc.edu; her office is in Founders Hall, Room 121). After disclosing the nature of the disability, students are urged to discuss their needs with individual instructors. This should be done at the beginning of each semester. Instructors, in conjunction with appropriate college officials, will provide assistance and/or accommodations only to those students who have completed this process.

**Plagiarism policy**

- Plagiarism is defined as the use of another's' idea(s), or phrase(s) and representing that/those idea(s) as your own either intentionally or unintentionally.
- Plagiarism includes (NOT limited to) cheating on examinations, unauthorized collaboration on assignments, unauthorized access to examinations or course materials, copying from another student, cutting/pasting from another source without referencing, falsifying an excuse for absence and other proscribed activities.
- Whether this is done intentionally or unintentionally, plagiarism will result in loss of credit for the work in question and a report will be filed to the Dean.
- Repeated cases of plagiarism will result in an "F" for the course and a report will be filed to the Dean.
- Always write using your own words when submitting a written assignment.
- When you get information from any source, make sure you provide a citation to protect yourself if there is a question about copying.
- College's policy on Plagiarism can be found by clicking on the following link: www.mxcc.edu/catalog/syllabus-policies/

**IMPORTANT COLLEGE POLICIES!! PLEASE READ CAREFULLY!**

For information about the college's policies and procedures regarding academic honesty, accessibility/disability services, attendance, audio-recording in the classroom, grade appeals, plagiarism, religious accommodations, weather and emergency closings, and more, please go to the following website: www.mxcc.edu/catalog/syllabus-policies/ or scan the QR code with your smart phone. Also, please become familiar with the policies regarding nondiscrimination, sexual misconduct, and general student conduct at the following website: www.mxcc.edu/nondiscrimination/.

**NON-DISCRIMINATION STATEMENT**

Middlesex Community College does not discriminate on the basis of race, color, religious creed, age, sex, national origin, marital status, ancestry, present or past history of mental disorder, learning disability or physical disability, sexual orientation, gender identity and expression or genetic information in its programs and activities. In addition, the College does not discriminate in employment on the additional basis of veteran status or criminal record.
The following people have been designated to handle inquiries or complaints regarding non-discrimination policies and practices:

- Primary Title IX Coordinator
  Dr. Adrienne Maslin
  Dean of Students/Title IX and Section 504/ADA Coordinator
  amaslin@mxcc.edu; 860-343-5759; Founders Hall Room 123

- Secondary Title IX Coordinator
  Ms. Queen Fordham
  Coordinator of the Meriden Center Welcome Desk
  qfordham@mxcc.edu; 203-608-3011

**Topics covered in this course**

| Unit # | Instructional Unit | Specific Objectives of Unit |
|---|---|---|
| 1. | Exploring Life and Science | 1. Explain the characteristics of life.<br>2. Diagram the hierarchy of structural levels in biological organization.<br>3. Distinguish between discovery science and hypothesis-based science.<br>4. Distinguish between quantitative and qualitative data.<br>5. Distinguish between inductive and deductive reasoning.<br>6. Explain what is meant by hypothesis, fact, law, and theory in science.<br>7. Distinguish between science and technology. Explain how science and technology are interdependent.<br>8. Define homeostasis and explain why this concept is central to physiology.<br>9. Define negative feedback and give an example of it.<br>10. Define positive feedback and give an example of it. |
| 2. | The chemistry of living things | 1. Sketch and explain the structure of an atom.<br>2. Explain electronegativity and predict the behavior of individual atoms.<br>3. Identify the types of chemical bonds that would occur between various atoms important to cellular biology.<br>4. Discuss the biologically important properties of water.<br>5. Describe the structure of the four main classes of biological molecules: proteins, nucleic acids, lipids, and carbohydrates.<br>6. Define acid and base and interpret the pH scale.<br>7. Describe the purpose and effects of a buffer. |
| 3. | Structure and function of Cells | 1. Distinguish between prokaryotic and eukaryotic cells.<br>2. Explain why there are both upper and lower limits to cell size.<br>3. Discuss the development and modern tenants of cell theory.<br>4. Explain the advantages of compartmentalization in eukaryotic cells.<br>5. Describe membrane structure and function and the mechanism for movement of materials across the cell membrane.<br>6. Identify parts of a cell and describe the structure and function of each organelle.<br>7. Describe the effects of hypotonic, isotonic, and hypertonic environments on cells. |

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| | | 8. Define osmosis and predict the direction of water movement based on differences in solute concentrations.<br>9. Define energy. Distinguish potential energy from kinetic energy.<br>10. Describe the structure of ATP, production, and function of ATP.<br>11. Define metabolism, catabolism, and anabolism.<br>12. Explain the role of catabolic and anabolic pathways in cellular metabolism.<br>13. Distinguish between kinetic and potential energy.<br>14. Briefly describe the energy conversions carried out by mitochondria. |
| 4. | Organization and Regulation of Body Systems | 1. Define the term histology and contrast the general features of the four major classes of tissues.<br>2. Identify the organ systems, their functions, and the major organs in each system.<br>3. Demonstrate and describe the anatomical planes of section.<br>4. Apply directional terms to descriptions of anatomical parts.<br>5. Identify structures of the integumentary system.<br>6. Describe the general functions of skin and the subcutaneous layer.<br>7. Compare the structure and function of the epidermis and dermis.<br>8. Describe the three most common types of skin cancer. |
| 5. | The Skeletal System | 1. Describe the general functions of the skeletal system.<br>2. Identify the internal structural components of compact and spongy bone.<br>3. Identify parts of a long bone.<br>4. Describe two bone disorders.<br>5. Define the two major divisions of the skeletal system (axial and appendicular) and the general bones contained in each.<br>6. Explain the different types of movements permitted at synovial joints. |
| 6. | Cardiovascular System | 1. Describe the functions and major components of the cardiovascular system.<br>2. Identify the parts of the heart.<br>3. Define and distinguish between the pulmonary and systemic circuits.<br>4. Define systole and diastole.<br>5. Explain what keeps the heartbeat regular.<br>6. Compare and contrast the various types of blood |

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| | | vessels and their functions.<br>7. Describe the components and physical properties of blood and blood plasma.<br>8. Distinguish between the terms hemostasis and homeostasis.<br>9. Explain the structure and function of the various formed elements: RBCs, WBCs, and platelets.<br>10. Name and describe three disorders associated with RBCs.<br>11. Name and describe three disorders associated with WBCs.<br>12. Explain what determines a person's ABO and Rh blood types and how this relates to transfusion compatibility.<br>13. Explain what is meant by blood pressure and heart rate. |
| 7. | The Lymphatic system and Immunity | 1. Explain how lymph is formed and returned to the bloodstream.<br>2. Describe the major functions of the lymphatic system.<br>3. Compare and contrast the major concepts regarding humoral immunity and cellular immunity.<br>4. List the cardinal signs of inflammation and state the cusses of each.<br>5. Summarize the benefits of fever and the limits of these benefits. |
| 8. | The Muscular System | 1. List the functions of muscles.<br>2. Describe the connective tissues associated with muscle.<br>3. Describe the microscopic levels of structure in skeletal muscle.<br>4. Explain how a nerve fiber stimulates a skeletal muscle fiber.<br>5. Explain what is meant by origin, insertion, belly, action, and insertion.<br>6. Distinguish between isotonic and isometric contraction. |
| 9. | The Nervous System | 1. Describe the function of the nervous system.<br>2. Describe the major anatomical and functional subdivisions of the nervous system.<br>3. Explain the difference between a sensory neuron, motor neuron, and an interneuron.<br>4. Explain how messages are transmitted from one neuron to another.<br>5. Describe the function of the spinal cord.<br>6. Describe the gross anatomy of the spinal cord.<br>7. Define reflex and describe the general components |

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| | | of a typical reflex arc.<br>8. Describe the gross anatomy of the brain.<br>9. Name the three meninges from superficial to deep.<br>10. Describe the function of the cerebrospinal fluid.<br>11. Identify the structures of the eye and explain their function.<br>12. Explain the sense of vision.<br>13. Identify the structures of the ear and explain their function.<br>14. Explain the sense of hearing and balance.<br>15. Explain the sense of taste and smell. |
| 10. | The Endocrine System | 1. Define hormone and the endocrine system.<br>2. List the major organs of the endocrine system.<br>3. Compare and contrast the nervous and the endocrine systems.<br>4. Describe how an endocrine gland differs from an exocrine gland.<br>5. Explain some general causes and examples of hormone hyposecretion and hypersecretion.<br>6. Explain the pathophysiology of and treatment for Diabetes. |
| 11. | The Respiratory System | 1. Identify the main structures of the respiratory system and state their functions.<br>2. Trace the flow of air from the nose to the pulmonary alveoli.<br>3. Describe the mechanisms of transporting $O_2$ and $CO_2$.<br>4. Describe the factors that govern gas exchange in the lungs and systemic capillaries.<br>5. Discuss two common pulmonary disorders. |
| 12. | The Digestion and Nutrition | 1. Identify the main structures of the digestive system and state their functions.<br>2. Describe the basic processes underlying digestion.<br>3. Describe some factors that regulate hunger and satiety.<br>4. Define nutrient and list the major classes of nutrients.<br>5. Name the major vitamins and mineral required by the body and the general functions they serve.<br>6. Discuss the recommended dietary guidelines outlined by the USDA. |
| 13. | The Urinary System | 1. Name and locate the main structures of the urinary system and state their functions.<br>2. Describe the major functions of the urinary system.<br>3. Explain the significance of urine formation.<br>4. Describe the composition and properties of urine<br>5. Define glycosuria and its relationship to diabetes mellitus. |

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| 14. | The Reproduction and Development | 1. Identify the fundamental biological distinction between male and female.<br>2. Define primary sex organs, secondary sex organs, and secondary sex characteristics.<br>3. Explain the role of sex chromosomes in determining sex.<br>4. Define gonad and gamete and describe the relationship between the terms.<br>5. Trace the male and female reproductive tracts and describe the gross anatomy and function of the organs.<br>6. Compare and contrast male and female sex response.<br>7. Compare oogenesis with spermatogenesis.<br>8. Explain the fundamental concepts processes involved in ovulation and menstruation.<br>9. Describe the process of fertilization, implantation and pregnancy. |

**BIO 110 Course Schedule:**

| **Week: date** | **Assignment/ Discussion deadline date** | **Chapter of Book** | **Topic** |
|---|---|---|---|
| Week 1: 1/21 | 1/30 | Chapter 1 | Exploring Life and Science |
| Week 2: 1/28 | 2/6 | Chapter 2 | Chemistry of Living Things |
| Week 3: 2/4 | 2/13 | Chapter 3 | Structure and Function of Cells |
| Week 4: 2/11 | 2/20 | Chapter 4 | From Cells to Organ Systems |
| Week 5: 2/18 | 2/27 | Chapter 5 | The Skeletal System |
| Week 6: 2/25 | 3/5 | Chapter 7 & Chapter 8 | Blood<br>Heart and Blood vessels |
| Week 7: 3/3 | 3/12 | Chapter 9 | The Immune System and Mechanisms of Defense |
| **Week 7: 3/3** | **3/12** | **Ch 1, 2, 3, 4, 5, 7, 8 & 9** | **Exam 1** |
| Week 8: 3/10 | 3/19 | Chapter 6 | The Muscular System |
| **Week 8: 3/10** | **3/19** | | **Self-reflection 1** |
| **3/21 – 3/27** | **SPRING** | **BREAK** | |
| Week 9: 3/17 | 4/2 | Chapter 11<br><br>Chapter 12 | The Nervous System: Integration and Control<br>Sensory Mechanisms |
| Week 10: 3/31 | 4/9 | Chapter 13 | The Endocrine System |
| **Week 10: 3/31** | **4/9** | | **Project Due** |
| Week 11: 4/7 | 4/16 | Chapter 10 | The Respiratory System: Exchange of Gases |
| Week 12: 4/14 | 4/23 | Chapter 14 | Digestive System and Nutrition |
| Week 13: 4/21 | 4/30 | Chapter 15 | The Urinary System |
| Week: 14 4/28 | 5/7 | Chapter 16 | Reproductive Systems |
| **Week 15: 5/7** | **5/16** | | **Self-reflection 2** |
| **Week 15: 5/10** | **5/16** | **Ch 6, 10, 11, 12, 13, 14, 15 & 16** | **Final Exam (Non-cumulative)** |

**Exam & Project Dates**

**Midterm Exam: Week 7** **Due date – 3/12** **Chapters 1, 2, 3, 4, 5, 7, 8 & 9**

**Project: Week 10** **Due date – 4/9**

**Final Exam: Week 15** **Due date – 5/16** **Chapters 6, 10, 11, 12, 13, 14, 15 & 16**