

**MARION TECHNICAL COLLEGE
COURSE SYLLABUS**

Course No.: SCI 1200

Course Title: Anatomy & Physiology I

Term: Fall Semester 2012

Department: Arts and Sciences

Credit Hours: 4

Lecture Hours: 3

Lab Hours: 1

Recommended Prerequisite(s): SCI 1050 or equivalent

Day/Time: M/W, 8:00 – 9:20 a.m. (Day Sections)

M/W, 5:00 – 6:20 p.m. (Evening Sections)

Labs scheduled at various days/times

Instructor: Luann Wilkinson (Day)

Building/Office: TEC 129

Telephone: 740-389-4636, ext. 264

e-mail: wilkinsonl@mtc.edu

Instructor: Sue Conklin (Evening)

Building/Office: TEC 169G

Telephone: 740-389-4636, ext. 287

e-mail: conklins@mtc.edu

In case of emergency: Dial 9-911 from any office or courtesy phone on campus.

Course Description: This is the first of a two semester sequence. This course has a laboratory component which relates chemistry to anatomy. The lab then focuses on the structures of tissues and the skeletal, muscular and nervous systems. The lecture component emphasizes the physiology of these systems.

Textbooks:

Required: Marieb. *Human Anatomy and Physiology*, 9th Ed., 2013.

Mastering A & P

Publisher: Pearson

Optional: Marieb. *Study Guide*, 9th Ed., 2013.

Publisher: Pearson

MAJOR COURSE LEARNING OBJECTIVES

A student successfully completing this class will be able to:

Objectives for the Chemical Level of Organization

1. Describe the physical and chemical characteristics of matter.
2. Identify the role of osmosis and osmotic pressure in the functioning of the cell.
3. Distinguish between diffusion, osmosis, and active transport.
4. Define the terms that describe the basic units of matter including elements, molecules and compounds.
5. Describe the different kinds of bonds that can occur between atoms and molecules.
6. Distinguish between structural and molecular formulas.
7. Identify isomers.

8. Distinguish between mixtures, solutions and colloids.
9. Identify the most abundant chemical elements found in living organisms.
10. Identify, the properties of the element carbon and its bonding characteristics within the human body.
11. Distinguish between saturated and unsaturated organic compound.
12. Describe hydrocarbons, alcohols, and acids.
13. Recognize a carbohydrate and identify the importance of carbohydrates in the body.
14. Distinguish between dehydration synthesis and hydrolysis as they relate to carbohydrates, lipids, and proteins.
15. Recognize a general definition of lipids, carbohydrates, and proteins.
16. Identify the principle role of nucleic acids.
17. Identify the three components of a DNA nucleotide, and recognize or state the base pairing rules for DNA.
18. List three features which distinguish RNA from DNA.
19. Explain the relationship of DNA and RNA in protein synthesis.

Objectives for the Cellular and Tissue Levels of Organization

1. Identify the basic structural components of the cell and the function of each.
2. Explain phases of mitosis.
3. Explain the differences between mitosis and meiosis.
4. Identify the four tissue types in the human body.
5. Describe the structure and function of different types of epithelial tissue.
6. Describe the structure and function of different types of connective tissue.
7. Describe the epithelial and connective tissue membranes.
8. Describe the structure of the skin.
9. Describe the accessory structures of the skin.
10. Explain the relationship of tissues to organs and systems.

Objectives for the Skeletal System

1. Describe the functions of the skeletal system.
2. Differentiate between compact and cancellous bone.
3. Describe the homeostatic mechanism responsible for the maintenance of bone.
4. Differentiate the functions and locations of the three types of bone cells: osteoblast, osteoclast, and osteocyte.
5. Differentiate between the different types of fractures.
6. Differentiate between the four classes of bone: long, short, flat, and irregular.
7. Describe, locate, and give the function of the two types of bone marrow.
8. Describe the microscopic structure of bone.
9. Describe and give approximate times of appearance of the four types of curves of the vertebral column.
10. Describe the pelvic girdle.
11. Differentiate between the male and female skeleton.

Objectives for the Muscular System

1. Describe in detail the structure and composition of skeletal, smooth, and cardiac muscles.
2. Explain the physiological properties of excitability and contraction.
3. Describe the sequence of neural and muscular events leading to muscle contraction.
4. Explain the effects of fatigue on skeletal muscular contraction.
5. Differentiate between the following types of muscular contractions.
 - a) tonic
 - b) isotonic
 - c) isometric
 - d) simple twitch
 - e) tetanic
 - f) treppe
6. Explain the physiological basis for the following abnormal contractions:
 - a) spasm
 - b) fibrillation
 - c) rigor mortis
 - d) fasciculation

Objectives for the Nervous System

1. Describe the relationship of the nervous system to maintaining homeostasis.
2. Differentiate between the anatomic and physiologic divisions of the nervous system.
3. Describe the structure of the typical neuron.
4. Describe the different types of neurons and their special endings.
5. Explain the anatomy of a nerve.
6. Explain the mechanism of action potential and factors that influence its speed.
7. Explain how a whole nerve responds to different strengths of stimuli.
8. Differentiate between excitatory synapses and inhibitory synapses.
9. Describe neurotransmitters responsible for excitation and inhibition.
10. Describe the anatomy of a reflex arc.
11. Differentiate between the following reflex arcs:
 - a) 2-neuron ipsilateral
 - b) 3-neuron ipsilateral
 - c) 3-neuron contralateral
 - d) intersegmental
12. Visualize (name and draw) and explain major anatomical structures of the brain and spinal cord.
13. Describe the ventricles and their openings.
14. Explain the formation and circulation of cerebrospinal fluid.
15. Explain the structure and arrangement of the meninges.
16. Describe sensory neural pathways to and from the brain.
17. Identify the 12 pairs of cranial nerves their origins, distributions, and functions.
18. Describe the anatomy of a typical spinal nerve.
19. Explain the anatomy of the autonomic nervous system.
20. Explain the functional difference between parasympathetic and sympathetic systems.
21. Identify adrenergic and cholinergic fibers and their receptors.

COURSE OUTLINE

Tentative Lecture Schedule and Assignments

Week 1	<u>An Introduction to the Human Body</u> – Chapter 1 Homeostasis
Week 2	Monday, September 3 – Holiday – Labor Day <u>The Chemical Level of Organization</u> – Chapter 2 Matter and Energy Atoms and Elements Molecules and Mixtures
Week 3	<u>The Chemical Level of Organization</u> – Chapter 2 Chemical Bonds Chemical Reactions (oxidation-reduction reactions) Solutions
Week 4	<u>The Chemical Level of Organization</u> – Chapter 2 Movement of Atoms and Molecules Water and Its Properties Acid/Base EXAM I – September 19
Week 5	<u>The Chemical Level of Organization</u> – Chapter 2 Hydrocarbons Cyclic Compounds
Week 6	<u>The Chemical Level of Organization</u> – Chapter 2 Alcohols Acids Amino Acids
Week 7	<u>The Chemical Level of Organization</u> – Chapter 2 Carbohydrates Proteins
Week 8	<u>The Chemical Level of Organization</u> – Chapter 2 Lipids Nucleic Acids EXAM II – October 17
Week 9	<u>The Cellular Level of Organization</u> – Chapter 3 Plasma Membrane (structure and transport) Cytoplasm Nucleus Cell Growth and Reproduction <u>The Tissue Level of Organization</u> – Chapter 4 Epithelial, Connective, Muscular, and Nervous Tissue Membranes Tissue Repair

- Week 10 The Integumentary System – Chapter 5
Skin
Skin Derivatives
Burns

The Skeletal System – Chapter 6
Functions of the Skeletal System
Bone Structure
Bone Development
Bone Homeostasis
Fractures
- Week 11 Axial and Appendicular Skeletons – Chapter 7

The Muscular System – Chapters 9 and 10
Types of Muscle Tissue
Muscle Functions
Gross and Microscopic Anatomy of Skeletal Muscles
Membrane Potentials and Muscle Contraction
- Week 12 **Monday, November 12 – Holiday – Veterans' Day**
EXAM III – November 14
- Week 13 The Nervous System – Chapter 11
Functions and Divisions of the Nervous System
Histology of Nervous Tissue
Membrane Potentials
The Synapse
Neurotransmitters
November 22 – Holiday – Thanksgiving
- Week 14 The Central Nervous System – Chapter 12
The Brain
The Spinal Cord
Protection of the Brain/Spinal Cord
- Week 15 The Peripheral Nervous System – Chapter 13
Sensory Receptors and Sensation
Cranial and Spinal Nerves
Motor Activity
Reflexes

The Autonomic Nervous System – Chapter 14
Somatic and Autonomic Nervous System
Autonomic Nervous System Anatomy and Physiology
- Week 16 **FINAL EXAM – December 12**



NOTE: This is a tentative schedule and subject to change at the discretion of the instructor.

If there is a need for reasonable accommodation or assistance because of mental, physical or learning disability, the student is requested to contact the instructor or if preferred, the Student Services counselor within the first two weeks of class.

ADDITIONAL INFORMATION: Eating and drinking is not permitted in any computer classroom or lab.
All copyright laws will be observed.
It is illegal to copy software.

EVALUATION PROCEDURES

ATTENDANCE AND PARTICIPATION: Consistent with class attendance Policy #721, the student is responsible for attending every class and for the material presented. If a student will not be attending a class, he or she is responsible to contact the instructor and to make sure all assignments are completed.

GRADING PROCEDURES:

1. Exams (3)	15.0% each	<u>Grading Scale</u>
2. Lab Quizzes	15.0%	900 - 1000 = A
3. Lab Practical	15.0%	800 - 899 = B
4. Final Exam	20.0%	700 - 799 = C
5. Relevance Writing	2.5%	600 - 699 = D
6. Participation	2.5%	Below 600 = F

MAKE-UP AND LATE POLICY:

Make-up exams will be given only for excused absences as determined by the instructor. The instructor must be notified of the prospective absence prior to the time scheduled for the examination. The make-up exam may be a different exam than the exam given during the scheduled exam time.

COLLEGE GRADUATE COMPETENCIES

Assessment begins with a clear understanding of what students are expected to learn. College Graduate Competencies (CGC's) are common to all areas of study and apply to all students. The individual sub-skills defined in each CGC are taught, reinforced, and/or periodically measured in various courses throughout the curriculum. The six CGC areas and statements are:

1. **Communications:** Communicate effectively both written and orally.
2. **Mathematics:** Solve problems using mathematics.
3. **Problem-Solving:** Solve problems through analysis, creativity, and synthesis to make informed decisions.
4. **Professionalism:** Demonstrate good work habits, effective interpersonal and teamwork skills, and a high level of professionalism.
5. **Technology:** Use technology tools efficiently and effectively to perform personal and professional tasks.
6. **Diversity:** Exhibit respect and sensitivity for individual and institutional differences.

Core Competencies:

1. Describe the sequence of events in human physiological systems (nerve impulse—action potential).
2. Describe the relationship between functional systems (muscular).

Course Goals:

1. Describe the physical and chemical characteristics of matter.
2. Identify the basic structural components of the cell and the function of each.
3. Describe body tissues.
4. Describe the structure and function of the skeletal system.
5. Describe the structure and function of the muscular system.
6. Describe the structure and function of the nervous system.

COMMUNICATIONS DEVICE USAGE

All personal communication devices, including cell phones, must be set to vibrate or off while in classrooms, labs and participating in other class-related activities, unless the use of such a device is specified in the official course syllabus. Infractions will result in warnings and, eventually, grade-related penalties. Exceptions must be approved in writing by the instructor.

Additionally, all personal communication devices, including cell phones, must be deactivated (turned completely off) during exams, quizzes or other evaluations. Any student found to be using a communication device during an exam will be given a grade of zero for the exam.

ACADEMIC MISCONDUCT

Examples of dishonest or unacceptable scholarly practice at Marion Technical College include but are not limited to:

- A. Work copied verbatim from an original author; work copied practically verbatim with some words altered from the original without proper credit, i.e., reference citations, being given; a copyright explanation and more information is available at www.copyright.com.
- B. Copying answers [and/or electronic data] from another's test paper, quizzes, notes, book, etc.
- C. Evidence of a deliberate and calculated plan to engage in a dishonest academic practice, such as gaining access to examinations prior to the time the exam was to be given or the extraction of information regarding an examination from other students.
- D. Falsification of clinical, practicum, or laboratory records.
- E. Plagiarism – using someone else's ideas or words as your own. In an educational setting you can avoid plagiarism by providing appropriate source documentation. For more information on plagiarism, visit www.plagiarism.org.

FINANCIAL AID ATTENDANCE REPORTING

Marion Technical College is required by federal law to verify the enrollment of students who participate in Federal Title IV student aid programs (Federal grants and student loans) and/or who receive educational benefits through the Department of Veterans Affairs. It is the responsibility of the College to identify students who do not commence attendance or who stop attendance in any course for which they are registered and paid. Non-attendance is reported by each instructor, and can result in a student being administratively withdrawn from the class section. Please contact the Financial Aid Office for information regarding the impact of course withdrawals on financial aid eligibility.

ADDENDUM(s)

MTC Syllabus Addendum – 2012/2013 School Year

The following information is provided to help make you more aware of resources which may aid in your academic success. For additional information on these topics, please refer to the Catalog, the Student Handbook, and/or an MTC staff or faculty member.

Tutoring: Free one-on-one and group tutoring services are available for many of the classes you take at MTC. If you are having difficulties in a course, it is very important to immediately seek out solutions for your academic concerns. Falling behind will create additional problems quickly. For more information about Tutorial Services, please contact Kathy Rice in the Student Resource Center, room 183.

Your instructors want to see you succeed and are available to answer questions before, during and after class. Your study skills may also be enhanced by forming a study group, becoming friends with a classmate, preparing assignments early, managing your time using a weekly planner, and prioritizing "to do" lists.

Students with Disabilities: If you believe yourself to have a physical, learning or mental disability preventing you from being successful in your class, contact Mike Stuckey in the Student Resource Center. Students with certain disabilities may qualify for specific academic accommodations. Academic accommodations are considered and approved through the **Office of Students with Disabilities**.

You should inform your instructor the first week of classes of any medical or learning conditions that might impact the classroom or your ability to learn.

Drug/Alcohol & Mental Health Concerns: The SRC has a licensed mental health counselor on staff to guide you on getting help with personal matters that may distract you from performing well in your studies. Contact the SRC if you believe a counselor can be of assistance regarding topics such as persistent sadness, feeling overwhelmed, difficulty making a decision, anxiety, or substance abuse.

Semester Conversion: MTC has moved from the quarter system to 16-week semester terms. The college is devoted to making this transition as smooth as possible. Information about the semester conversion is available on MTC's home page. Working closely with your academic advisor and MAPS (My Advising Plan for Semesters) is the best way to assure you're making steady academic progress.

Academic Advising: It is in your very best interest to get to know your academic advisor. Not only is your advisor available to guide you in course selection, registration, and career planning, he/she can be helpful in discussing academic difficulties and personal goals. Communicate with your advisor on a regular basis. Your advisor needs to be considered a **significant** part of your life for the years ahead. If you are not sure of your advisor's name or office location, check with your academic department's dean or secretary.

Financial Aid: Regularly attending class is critical in achieving academic success. If you receive some form of financial aid, such as the Pell Grant and/or the Federal Direct Student Loan, ***federal regulations require you to attend classes***. In part, this is why your instructor records attendance. Maintaining ***satisfactory academic progress*** (SAP) is important in preserving your future eligibility for financial resources. If you ever have questions or concerns, please contact the Office of Financial Aid.

MARION TECHNICAL COLLEGE

**ANATOMY AND PHYSIOLOGY I
LABORATORY OBJECTIVES**



Fall Semester

ANATOMICAL TERMINOLOGY

After completing this lab, the student should be able to:

1. identify the body cavities and their subdivisions.
2. use proper anatomical terminology to describe directions, planes, regions.
3. state the anatomical position.
4. list the important organs of each body cavity.
5. name the body systems.
6. define the structural unit of body at different levels of organization (cells, tissues, organs, systems).

BASIC CHEMISTRY

After completing this lab, the student should be able to:

1. learn the symbols for important elements in the body.
2. define anion and cation.
3. contrast electrolytes/non-electrolytes.
4. distinguish ionic and covalent chemical bonds.
5. compare properties of acids, bases, salts, and buffers.
6. determine pH of solutions using indicators.

CHEMICAL AND PHYSICAL PROCESSES

After completing this lab, the student should be able to:

1. distinguish between the processes of diffusion, osmosis, and filtration.
2. distinguish true solutions, colloidal dispersions, and suspensions.
3. define isotonic, hypertonic and hypotonic solutions.
4. discuss hemolysis and crenation of red blood cells.

STRUCTURE OF THE MICROSCOPE, CELLS, TISSUES, AND MEMBRANES

After completing this lab, the student should be able to:

1. identify the parts of a scope and explain the function of each.
2. demonstrate the proper use of the microscope.
3. calculate the total magnification of the lenses.
4. prepare a stained slide for examination of a cell.
5. identify the basic structures of the cell.
6. identify tissues through microscopic inspection.
7. state location and function of major tissue types.
8. identify the structures of the skin.
9. identify the phases of mitosis.

SKELETAL SYSTEM

After completing this lab, the student should be able to:

1. describe the structures of compact and spongy bone.
2. state the functions of the skeletal system.
3. differentiate between axial and appendicular skeleton.
4. recognize significant markings of each bone.

ARTICULATIONS

After completing this lab, the student should be able to:

1. define an articulation and identify the factors that determine the type and degree of movement.
2. classify joints according to structure and type of movement.

MUSCULAR SYSTEM

After completing this lab, the student should be able to:

1. describe and identify the microscopic structure of three types of muscle tissue.
2. identify the arrangements of muscle fibers.
3. define ligament, tendon, and aponeurosis.
4. cite the criteria used in naming muscles.
5. name, locate, state muscle origins and insertions.
6. explain action of selected muscles of head, neck, back, shoulder, chest, arms, abdomen, gluteal region, thigh, and lower leg.

NERVOUS SYSTEM

After completing this lab, the student should be able to:

1. name and define the divisions of the nervous system and components of each.
2. identify the characteristics of a neuron.
3. classify neurons according to structure and function.
4. describe the covering of nerves.
5. locate the principle structures of the human brain.
6. identify the principle structures of the spinal cord.
7. name the three coverings of the brain and spinal cord.
8. identify the four major nerve plexuses, name the important nerves of each, and their distribution -- cervical, brachial, lumbar, sacral.
9. demonstrate the stretch, plantar, and Achilles reflex.
10. demonstrate the pharyngeal and salivary reflex.
11. dissect an animal brain specimen.

MARION TECHNICAL COLLEGE
ANATOMY & PHYSIOLOGY I LAB
FALL SEMESTER - 2012

LABORATORY SCHEDULE

Aug. 27/28 Lab I	Organization of the Body Marieb: Chapter 1	Anatomical Terminology Handouts, Models, Charts
Aug. 29/30 Lab II	Organization of the Body Marieb: Chapter 1 Chemical Level of Organization Chemical and Physical Processes Marieb: Chapter 2	Handouts, Models, Charts Chemical Symbols Cellular Fluids
Sept. 3/4	LABOR DAY - NO CLASSES	
Sept. 5/6 Lab III	Chemical Level--Continued Marieb: Chapter 3	Electrolytes Acid/Base Balance, pH Filtration, Diffusion
Sept. 10/11 Lab IV	Chemical Level--Continued Marieb: Chapter 26	Osmosis Solutions: Isotonic, Hypotonic, Hypertonic
Sept. 12/13 Lab V	Microscope, Cells Marieb: Chapter 3	Staining of Cells Slides and Models Film: Usage of Scopes
Sept. 17/18 Lab VI	Mitosis Marieb: Chapter 3	Slides, Models
Sept. 19/20 Lab VII	Mitosis Marieb: Chapter 3	Slides, Models
Sept. 24/25 Lab VIII	Tissues Marieb: Chapter 4	Slides Identification of Cells
Sept. 26/27 Lab IX	Tissues Marieb: Chapter 4	Slides Identification of Cells
Oct. 1/2 Lab X	Tissues Marieb: Chapter 4	Slides Identification of Cells
Oct. 3/4 Lab XI	Tissues/Membranes Marieb: Chapter 4	Slides Identification of Cells
Oct. 8/9 Lab XII	Skin Marieb: Chapter 5	Identification of Cells Slides and Models Film: Skin

Oct. 10/11 Lab XIII	Skeletal System - Tissues Marieb: Chapter 6	Models Slides
Oct. 15/16 Lab XIV	Skeletal System - Axial Skeleton Marieb: Chapter 7	Skeleton Skulls
Oct. 17/18 Lab XV	Skeletal System – Appendicular Marieb: Chapter 7	Skeleton Disarticulated Bones
Oct. 22/23 Lab XVI	Skeletal System Marieb: Chapter 7	Skeleton Disarticulated Bones
Oct. 24/25 Lab XVII	Articulations Marieb: Chapter 8	Handout, Models Film: Bones and Joints
Oct. 29/30 Lab XVIII	Muscular System - Tissues Marieb: Chapter 9	Types of Tissues Naming of Muscles Handout
Oct. 31/Nov. 1 Lab XIX	Muscular System – Identification Marieb: Chapter 10	Naming of Muscles Handout
Nov. 5/6 Lab XX	Muscle Identification Marieb: Chap. 10	Charts, Models Handouts
Nov. 7/8 Lab XXI	Muscle Identification Marieb: Chap. 10	Charts, Models Handouts Film: Muscles
Nov. 12/13	VETERANS' DAY – NO CLASSES	
Nov. 14/15 Lab XXII	Anatomy of Nerves Marieb: Chapter 11	Charts, Models
Nov. 19/20 Lab XXIII	Anatomy of Nerves Marieb: Chapter 11	Charts, Models
Nov. 21/22	<i>Thanksgiving – No Classes</i>	

Nov. 26/27 Lab XXIV	Structures of the Brain and Spinal Cord Marieb: Chapter 12	Charts, Models Film: Cadaver Specimen
Nov. 28/29 Lab XXV	Peripheral Nervous System Marieb: Chapter 13	Charts, Models Dissection of Brain Specimen Film: The Brain
Dec. 3/4 Lab XXVI	Review for Lab Practical	
Dec. 5	PRACTICAL EXAMINATION	

¹ Approved TAG and OTM courses carry the guarantee that the courses and their credits will transfer and apply toward the major at any of Ohio's public institutions of higher education, provided they were taken when the courses were equivalent. Additional Ohio transfer information may be obtained at <http://regents.ohio.gov/transfer/>