

## BISC 104 – *How the Body Works*. Spring 2020

**Course Description:** This GE (D, Life Science) course is designed to give non-science undergraduates an introduction to human physiology. BISC 104 introduces working knowledge of the human body at molecular, cellular, tissue, organ, and system levels. We will discuss the scientific methods, and highlight fundamental principles of biochemistry, molecular biology and cell biology, as well as focus on key functions of various organs and each of the 11 organ systems. In addition, we will discuss many diseases and the effect of both legitimate and illegal drugs, as well as explore health and social issues of many of the topics presented. Although there is no prerequisite, general knowledge of introductory biology and chemistry at the high school level is helpful. Please note that this course is not available for major credit.

**Learning Objectives:** (1). To inspire students with a sense of wonder and appreciation towards the intricacy of how myriads of molecules, cells, tissues, and various organ systems work together to make us alive. (2). To engage students in critical thinking and better understanding in biomedical literatures, which shall advance communications with scientists and health care providers for a better health. (3). To educate students in becoming well-informed citizens capable of dealing rationally with complex ethical, social, and legal issues related to human health and diseases.

### Instructors:

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**Laboratory Director:** Michael Moore, Ph.D. ZHS 371B. (213) 740-6084. [moore@usc.edu](mailto:moore@usc.edu)  
Office Hours: generally available during regular hours

**Teaching Assistant:** Caoqi Fan, 213-810-1051. [caoqifan@usc.edu](mailto:caoqifan@usc.edu)  
Office Hours: W 12-1:45 in RRI 4th floor lounge during office hours

### Textbook:

Biology of Humans: Concepts, Applications, and Issues by Judith Goodenough and Betty McGuire. Pearson, 6<sup>th</sup> Edition. [Recommended]

**Blackboard Website:** <https://blackboard.usc.edu/>

**Lecture:** MWF 2–2:50 PM, HNB 100

**Grading:** The possible numbers of points for the various evaluations are:

|                     |            |      |
|---------------------|------------|------|
| Exam I              | 75 points  | 15%  |
| Exam II             | 75 points  | 15%  |
| Exam III            | 75 points  | 15%  |
| Exam IV             | 75 points  | 15%  |
| Lab/Discussion      | 150 points | 30%  |
| Lecture Pop Quizzes | 50 points  | 10%  |
| -----               |            |      |
| Course Total        | 500 points | 100% |

**Exam Contents:** In a course such as this, in which the exact content of the lectures can vary, the student must realize that the examinations can and will cover anything that is discussed in class. Some of this material may not be in the textbook, and will be available only to those who were present in class. For this reason, it is very important that you attend class. Those who do not attend will surely not do as well on examinations.

**Exams Days:** If you arrive late for an exam; and another student has already finished their exam and left the exam room – you will NOT be permitted to take the exam and will receive a score of ZERO for that exam.

**Re-grading of exams:** If you wish to have exam questions re-graded, you must submit a request to your TA within one week of when your exam was returned to you. Your request must be thoroughly explained in writing. TAs will not consider oral requests. The entire answer will be re-graded, not just the part you think deserves more credit. Your score may go up or down as a result of a re-grade.

**Missed Exams:** Students who are unable to take an exam at the scheduled time must give written notification as soon as possible, preferably in advance. Students who miss an exam, assignment, quiz, etc. for a legitimate reason, must provide documentation of said reason within seven days of the exam date or due date. Documentation must be sent to Dr. Moore. If documentation is not received within seven days, the score for the missed assignment/exam will be zero. Making up an exam will only be allowed if the student can demonstrate with written documentation a compelling reason (such as family or medical emergency) for not taking the exam at the scheduled time. A make-up exam may include an oral component and will generally be more difficult than the in-class exam.

**Laboratory Portion:** Each student must enroll in one section of Laboratory. Lab sections will start the week of January 20<sup>th</sup> (There will be no labs during the first week of classes). The lab section meets once each week for two hours. The labs will serve to further elucidate various lecture topics either through discussion and/or laboratory exercises and activities. The material covered in the labs is critical to understanding the overall course. As a result, the lab is an integral part of this course, and cannot be taken separately. For certain exercises and activities additional handouts will be provided in lab and/or on Blackboard. More information about the labs will be supplied to you at a later date. Be sure to attend the first offering of your lab section.

**Lecture Pop Quizzes (50 points):** A total of 12 pop quizzes will be given during lectures. Each correct answer will earn 5 points and incorrect 2 points. Missed quizzes will earn zero points. Only your top 10 quiz scores will be used for grading. Pop quizzes are relatively easy if you attend lectures as the quizzes are based on the preceding lecture materials.

**Final grades:** Grades will be assigned on a curve, based on the total number of points earned in the course. After each exam a curve will be given by the instructor/Lab director to indicate roughly what letter grade corresponds to the student's current number of points. Specifically, you will be provided with the current course average and a provisional letter grade scale. Please remember that the course mean on Blackboard is provisional as it is based on the number of points possible at that point in the course. Only the total number of points earned by the end of

the semester will determine course grades. Please note that this course involves conceptual ideas that are not easily grasped, as well as a significant amount of memorization. These are often challenging to students. BISC 104 is not a trivial course. The entire grade distribution will be used, including Ds and (when we are forced to) Fs.

**Pass/No Pass Status:** Should you choose the Pass/No Pass option, you must have a final score equivalent to “C minus” quality or better to receive a “Pass.” “No Pass” will be assigned if your final score is less than the equivalent of a “C minus.” No petitions for change from Pass/No Pass to graded status will be accepted after the deadline (January 31) to change status has passed.

## **Statement on Academic Conduct and Support Systems**

### **Academic Conduct**

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/student/scampus/part-b>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, intimate partner violence, stalking, and harassment are prohibited by the university. You are encouraged to report all incidents to the *Office of Equity and Diversity/Title IX Office* <http://equity.usc.edu> and/or to the *Department of Public Safety* <http://dps.usc.edu>. This is important for the health and safety of the whole USC community. Faculty and staff must report any information regarding an incident to the Title IX Coordinator who will provide outreach and information to the affected party. The sexual assault resource center webpage <http://sarc.usc.edu> fully describes reporting options. Relationship and Sexual Violence Services <https://engemannshc.usc.edu/rsvp> provides 24/7 confidential support.

### **Support Systems**

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://ali.usc.edu>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* <http://dsp.usc.edu> provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of Blackboard, teleconferencing, and other technology.

**Proposed lecture:**

It is anticipated that student involvement during class will be frequent. The content of lectures may change as a result of questions or interests of the students.

**Lecture Schedule, BISC 104, Spring 2020**

| <b>Lecture #</b> | <b>Date</b>   | <b>Topic</b>   | <b>Reading</b> | <b>Lecture</b> |
|------------------|---------------|--|----------------|----------------|
| Week 1           |               |  |                |                |
| 1                | Jan 13        | Introduction to Human Physiology   | 1              | Ko             |
| 2                | Jan 15        | Scientific Methods; Clinical Trials  | 1              | Ko             |
| 3                | Jan 17        | Chemistry Comes to Life I (Atoms, Molecules, Water)                          | 2              | Ko             |
| Week 2           |               |  |                |                |
|                  | <i>Jan 20</i> | <i>University Holiday (Martin Luther King Day)</i>                           |                |                |
| 4                | Jan 22        | Chemistry Comes to Life II (Major Molecules of Life)                         | 2              | Ko             |
| 5                | Jan 24        | The Cell I (Structure and Function of Organelles)                            | 3              | Ko             |
| Week 3           |               |  |                |                |
| 6                | Jan 27        | The Cell II (Cellular Metabolism and Membrane Transports)                    | 3              | Ko             |
| 7                | Jan 29        | Body Organization and Homeostasis (Tissue; Skin)                             | 4              | Ko             |
| 8                | Jan 31        | The Muscular System I (Muscle Structure & Contraction)                       | 6              | Ko             |
| Week 4           |               |  |                |                |
| 9                | Feb 3         | The Muscular System II (Contractile Properties; Exercise)                    | 6              | Ko             |
|                  | Feb 5         | <b>Review for Exam I</b>   |                | Ko             |
|                  | <b>Feb 7</b>  | <b>EXAM I, 75 Points (Covers 1/13/-2/3, Lectures 1-9)</b>                    |                | Ko             |
| Week 5           |               |  |                |                |
| 10               | Feb 10        | The Skeletal System (Bones, Joints, Bone Repair & Diseases)                  | 5              |                |
| 11               | Feb 12        | Neurons; Glia; Bioelectricity  | 7              | Ko             |
| 12               | Feb 14        | Synaptic Transmission  | 7              | Ko             |
| Week 6           |               |  |                |                |
|                  | <i>Feb 17</i> | <i>University Holiday (President's Day)</i>                                  |                |                |
| 13               | Feb 19        | The Nervous System I (CNS & Brain Imaging)                                   | 8              | Ko             |
| 14               | Feb 21        | The Nervous System II (PNS; Stress; Brain Disorders; Drugs and the Mind)     | 8 & 8a         | Ko             |
| Week 7           |               |  |                |                |
| 15               | Feb 24        | Sensory Systems I (The General Senses; Hearing & Balance)                    | 9              | Ko             |
| 16               | Feb 26        | Sensory Systems II (Vision)  | 9              | Ko             |
| 17               | Feb 28        | The Endocrine System I (Hormones; Endocrine Glands)                          | 10             | Ko             |
| Week 8           |               |  |                |                |
| 18               | Mar 2         | The Endocrine System II (Pancreas; Diabetes Mellitus)                        | 10 & 10a       | Ko             |
|                  | Mar 4         | <b>Review for Exam II</b>  |                | Ko             |
|                  | <b>Mar 6</b>  | <b>EXAM II, 75 Points (Covers 2/10-3/2, Lectures 10-18)</b>                  |                | Ko             |
| Week 9           |               |  |                |                |
| 19               | Mar 9         | The Cardiovascular & Lymphatic Systems I (Heart)                             | 12             | Yazejian       |
| 20               | Mar 11        | The Cardiovascular & Lymphatic Systems II (Blood Vessels and Blood Pressure) | 12             | Yazejian       |
| 21               | Mar 13        | Blood (Functions; Composition; Disorders)                                    | 11             | Yazejian       |

|         |               |   |     |          |
|---------|---------------|---|-----|----------|
|         | Mar 15-22     | Spring Recess   |     |          |
| Week 10 |               |   |     |          |
| 22      | Mar 23        | Body Defense Mechanisms (Innate & Acquired Defenses: Immunization)          | 13  | Yazejian |
| 23      | Mar 25        | Infectious Disease (Pathogens; Antibiotics; Spread and Threat)              | 13a | Yazejian |
| 24      | Mar 27        | The Respiratory System I (Structures; Breathing)                            | 14  | Yazejian |
| Week 11 |               |   |     |          |
| 25      | Mar 30        | The Respiratory System II (Gas Exchange; Regulation)                        | 14  | Yazejian |
| 26      | Apr 1         | Respiratory Disorders   | 14  | Yazejian |
| 27      | Apr 3         | Stem Cells  | 19a | Yazejian |
| Week 12 |               |   |     |          |
|         | Apr 6         | <b>Review for Exam III</b>  |     | Yazejian |
|         | Apr 8         | <b>EXAM III, 75 Points (Covers 3/9 – 4/3, Lectures 19-27)</b>               |     | Yazejian |
| 28      | Apr 10        | The Digestive System I (GI Tract; Digestion)                                | 15  |          |
| Week 13 |               |   |     |          |
| 29      | Apr 13        | The Digestive System II (Nutrition; Eating Disorders)                       | 15  | Yazejian |
| 30      | Apr 15        | The Urinary System I (Structures; Kidneys and Urine Formation)              | 16  | Yazejian |
| 31      | Apr 17        | The Urinary System II (Dialysis and Disorders)                              | 17  | Yazejian |
| Week 14 |               |   |     |          |
| 32      | Apr 20        | Reproductive Systems I (Male)   | 17  | Yazejian |
| 33      | Apr 22        | Reproductive Systems II (Female)  | 17  | Yazejian |
| 34      | Apr 24        | Reproductive Systems III (Disorders)  | 17  | Yazejian |
| Week 15 |               |   |     |          |
| 35      | Apr 27        | Birth control and STDs  | 17a | Yazejian |
| 36      | Apr 29        | Fertilization, Pregnancy and Development                                    | 18  | Yazejian |
|         | May 1         | <b>Review for Exam IV</b>   |     | Yazejian |
|         | May 2-5       | Study Days  |     |          |
|         | <b>May 11</b> | <b>EXAM IV, 75 points (Covers 4/10 – 4/29, Lectures 28-36) 2:00-4:00 PM</b> |     |          |

### Laboratory Portion

There is no lab manual. Lab exercises will be handed out prior to laboratory meetings. Grading of the lab portion will consist of eleven lab quizzes (8 points each), four lab assignments (10 points each), and performance on an oral presentation (30 points). See below for the schedule of these. Presentations will consist of a ten to fifteen minute oral report on a topic of students' choosing. Presentation topics must be related to physiology and must be approved by the TA at least three weeks before the beginning of the three weeks of presentations (see below). The use of visual aids is expected (*e.g.* PowerPoint slides) in the presentation. Grades will be assigned on the basis organization, subject knowledge and clarity of the presentation. A grading rubric for the presentation will be made available on Blackboard. Lab quizzes will be given in the first ten minutes of lab (and ONLY the first 10 minutes of lab) and will be based on the lab exercise or the presentations from the previous week.

The Laboratory portion of the course totals 150 points.

| <b>Week of</b>       | <b>Laboratory Exercise</b>        | <b>Lab Quiz?</b>   |                     |
|----------------------|-----------------------------------|--|---------------------|
| Jan 13 <sup>th</sup> | No Labs                           | No   |                     |
| Jan 20 <sup>th</sup> | Scientific Method 1               | No   |                     |
| Jan 27 <sup>th</sup> | Scientific Method 2               | No   |                     |
| Feb 3 <sup>rd</sup>  | No Labs                           | No   |                     |
| Feb 10 <sup>th</sup> | Skeletal Muscle Physiology        | No   |                     |
| Feb 17 <sup>th</sup> | EMG-Grip Strength                 | Yes  |                     |
| Feb 24 <sup>th</sup> | The Brain                         | Yes  |                     |
| Mar 2 <sup>nd</sup>  | Neurophysiology of Nerve Impulses | Yes  |                     |
| Mar 9 <sup>th</sup>  | The Senses                        | Yes (Presentation topics need to be approved by this week) |                     |
| Mar 16 <sup>th</sup> | Spring Recess                     | No   |                     |
| Mar 23 <sup>rd</sup> | Endocrine System Physiology       | Yes  |                     |
| Mar 30 <sup>th</sup> | Presentations                     | Yes  |                     |
| Apr 6 <sup>th</sup>  | Presentations                     | Yes  |                     |
| Apr 13 <sup>th</sup> | Cardiovascular Physiology         | Yes  |                     |
| Apr 20 <sup>th</sup> | ECG-Heart Sounds                  | Yes  |                     |
| Apr 27 <sup>th</sup> | Breathing-Rest-Exercise           | Yes  |                     |
| <b>Number</b>        | <b>Points</b>                     | <b>Exercise</b>  | <b>Total Points</b> |
| 10                   | 8                                 | Pre-Lab Quiz   | 80                  |
| 4                    | 10                                | Lab Assignment   | 40                  |
| 1                    | 30                                | Presentation   | 30                  |