

# Exploring Medicine

## Syllabus

### **Course Description:**

Exploring Medicine is an online course designed for students interested in the health professions, specifically students seeking a career as a medical doctor, doctor of osteopathy, physician assistant, and nurse practitioner. Students will study various systems of the body and learn the pathophysiology and treatment of a variety of human diseases and conditions. Further, students will explore the social and business side of medicine and compare the US to other countries, and will review their personal finances as they create a realistic future budget. The purpose of this course is to help students see the relevance of their basic sciences, be better prepared for the MCAT and medical school (or other health professions post-graduate program), and be a step ahead in a decision to pursue a career in medicine.

**Course Objectives:** By completing the modules of this course, the student will be able to

1. Apply basic science to clinical medicine
2. Describe how the body maintains homeostasis
3. Explain the concepts of diagnosis and treatment of disease
4. Articulate a renewed interest or lessened interest in a career in medicine

**Prerequisites:** None, but students of sophomore or higher level tend to master the material best

**Required Materials:** Exploring Medicine online modules are required for this course, specifically the Cardiovascular, Respiratory, Renal-Acid/Base, and Diabetic Ketoacidosis modules. These are available individually or for a package discount at, <https://exploringmedicine.net/>. Your instructor will get you a discount code to purchase these modules and get you registered into a class. Online quizzes, online lecture modules, and additional resources are also available with this purchase. A hard copy of the text is also available but is optional – it does not replace the online content. If you would like a copy of the online text, you can inquire about this purchase at [info@exploringmedicine.net](mailto:info@exploringmedicine.net).

**Grading Policy:** Students are graded in the following manner:

- Module Quizzes:
1. Cardiovascular: 20 points
  2. Respiratory: 20 points
  3. Renal Acid/Base: 20 points
  4. Diabetic Ketoacidosis: 20 points

Total for quizzes: 80 points

Renal Acid/Base 20 Q's: 20 points

Final Exam (Cumulative): 80 points

Business of Medicine Project: 80 points

Total points possible: 260 points

Final Grade will be determined based on percent of total points earned:

A	91 – 100%
B	82 – 91%
C	70 – 82%
D	60 – 70%
F	0 – 60%

**Upon completion of each of the modules, the student will receive a “Certificate of Completion” indicating the competencies and MCAT foundational concepts addressed in that module.**

**Academic Integrity:** It is anticipated that students will do all of their own work and complete their quizzes independently. Students will have unique login accounts. No one should login into another students account. The Business of Medicine project is a group project and all members of the group are expected to make significant contributions. Grades will be determined based on relative contributions to the project and the presentation of group material.

## **Course Overview:**

### **Module 1: Day 1, Introduction to Course**

1. Welcome
2. Introduction to Course Lectures
  - a. Apply basic science to clinical medicine
  - b. Exploring Medicine Mission statement
  - c. EM Goals
  - d. MCAT prep
  - e. Step ahead for medical school application
  - f. Homeostasis vs. Equilibrium
3. MCAT Foundational Concept 1, Category 1D
4. MCAT Foundational Concept 2, Category 2A
5. MCAT Scientific and Reasoning Skill 1

### **Module 2: Cardiovascular System: Shock**

1. Focused Anatomy and Physiology of CV system
  - a. Electrical and mechanical events of the heart
  - b. Dynamic nature of large vessels
  - c. Fluid movement across capillaries
  - d. Blood and its contents
2. Pathophysiology of Shock
  - a. Hypovolemic
  - b. Cardiogenic
  - c. Vasogenic
  - d. Mechanical
3. Shock Scenarios
4. MCAT Foundational Concept 1, Category 1D
5. MCAT Foundational Concept 2, Category 2A
6. MCAT Foundational Concept 3, Category 3B
7. MCAT Foundational Concept 4, Category 4B
8. MCAT Scientific and Reasoning Skill 1

### **Module 3: Respiratory System: Asthma**

1. Focused Anatomy and Physiology
  - a. Mechanics of breathing
  - b. Arterial blood gasses
  - c. Cellular physiology
2. Pathophysiology of Asthma
  - a. Obstructive vs. Restrictive lung disease
  - b. Spirometry
3. Treatment of Asthma
4. Asthma and other respiratory pathophysiologic scenarios
5. MCAT Foundational Concept 1, Category 1D
6. MCAT Foundational Concept 2, Category 2A
7. MCAT Foundational Concept 3, Category 3B
8. MCAT Foundational Concept 4, Category 4B
9. MCAT Scientific and Reasoning Skill 1

### **Module 4: Renal System - Acid/Base: Acid/Base disorders**

1. Focused Anatomy and Physiology
2. Pathophysiology of Acid/Base disorders
3. Acid/Base “20 questions” and scenarios
4. MCAT Foundational Concept 2, Category 2A
5. MCAT Foundational Concept 3, Category 3B
6. MCAT Foundational Concept 4, Category 4B
7. MCAT Foundational Concept 5, Category 5A
8. MCAT Scientific and Reasoning Skill 1

### **Module 5: Diabetic Ketoacidosis (DKA)**

1. Focused discussion about diabetes
2. Pathophysiology of DKA
3. Applications of basic science to DKA
  1. Facilitated transport across cell membranes
  2. Acid/Base physiology and buffers
  3. Henderson-Hasselbalch equation
4. MCAT Foundational Concept 1 Category 1D
5. MCAT Foundational Concept 3, Category 3B
6. MCAT Foundational Concept 4, Category 4B

7. MCAT Foundational Concept 5, Category 5A

## **Business of Medicine Project – General Rubric:**

Group Project: 3 - 4 per group.

80 points toward final grade

- 30-minute presentation
- 20 minutes presenting, 10 min Q/A
- Graded on knowledge and delivery
  - o Inclusion of all required data/aspects detailed
  - o Knowledge of topic
  - o Delivery of content
  - o Ability to field questions
  - o Individual grades at discretion of instructor
- Turn presentation (slide deck) and notes into instructor
- Do not use video works of others in this presentation

## **Country Health System Presentation**

This is a group project, and your group will be assigned to research the health system of one of the countries below. You will then present in class, as part of your group, aspects of the health system of that country. Inform the class of the following:

1. Describe the health system for that country
  - a. Public and/or Private health system?
  - b. Single or Two Tier?
2. Are people happy with it?
3. How is access to care?
4. How is it funded?
5. How much is spent on healthcare and what percent of GDP does that represent?
6. What care is covered?
  - a. Comprehensive? (e.g. dental, medications, clinic visits, etc.)
  - b. Are only certain aspects of care covered?
  - c. What are average “out of pocket” expenses for citizens for healthcare?
  - d. Any unique healthcare coverage features that this country has?
7. Benefits of this health system
8. Pitfalls or “bad” aspects of this health system
9. What ideas can the US take from this system to improve our health system

### **Countries to choose from:**

Canada, United Kingdom, New Zealand, Singapore, Guatemala

## Personal Finance Presentation

In this project, your group is tasked with creating a realistic budget based on current and anticipated federal, state, local, and personal economics, and given the scenario laid out for the group. In the end, tell the class what car you are going to buy once you start your new job and the justification for what you are spending on that car (entertain personal desires and deal with the reality of your financial situation). Will you need 2 cars if you are not single?

**Group 1:** You are single and have graduated from medical school and have specialized in general internal medicine. You would like to work as a hospitalist and have found a job in Minneapolis, MN that will pay you \$225,000/year along with health and dental benefits, and a minor contribution to a retirement plan (401k). What will be your monthly disposable income if you have the following scenario (create a budget)?

- i. Income: \$225,000/yr (no other supplemental income)
- ii. Expenses (include the following and all other imagined expenses)
  1. Tax burden
    - a. Federal
      - i. Income
      - ii. Social Security
      - iii. Medicare
    - b. State
    - c. 2% MN Provider tax
  2. Student Loan Debt: \$290,000 at 6% interest
  3. Purchased home for \$250,000, 4.5% interest for 15 years
  4. Assume average fixed expenses for food, clothing, home expenses, car insurance, medical/dental expenses, gas, etc.
  5. You are contributing \$7,000/yr to your 401k, standard retirement plan, so you receive matching dollars from your employer.
  6. You want \$500,000 in life insurance (parents co-signed your student loans)
  7. You want to buy a new car – determine what you can afford
  8. What is left over for incidentals, investment, and entertainment?  
Calculate your monthly disposable income.

**Group 2:** You are married with one income, and your partner stays home to care for your one and three-year-old children. You have graduated from medical school and have specialized in general internal medicine. You would like to work as a hospitalist and have found a job in Minneapolis, MN that will pay you \$225,000/year along with health and dental benefits, and a minor contribution to a retirement plan (401k). What will be your monthly disposable income if you have the following scenario (create a budget)?

- i. Income: \$225,000/yr (no other supplemental income)
- ii. Expenses (include the following and all other imagined expenses)
  1. Tax burden
    - a. Federal
      - i. Income
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  6. You want \$500,000 in life insurance (parents co-signed your student loans)
  7. You want to buy a new car – determine what you can afford
  8. What is left over for incidentals, investment, and entertainment?  
Calculate your monthly disposable income.

**Final Exam and Student Survey:** Via secure site, at end of class.