OFFICE OF ACADEMIC RESOURCES

Learning from College Quantitative Courses

- Students are taught how to problem solve in college much differently than in most high schools. Therefore college students need to adjust their approach and strategies to excel in quantitative college courses. In high school students learn from textbooks and work through each problem with an instructor taking them step-by-step. In college, lectures may only cover a fraction of the material the student is required to master and the student is still responsible for learning the remainder of the material independently before the exam. Exams in high school assess students' ability to problem-solve by reproducing familiar questions previously covered in class, whereas quantitative exams in college will often **assess students on their ability to apply their knowledge to solve novel or unfamiliar and difficult problems**; therefore, the student must synthesize and apply their knowledge in order to be successful on college-level exams. In high school simply "doing more problems" was the solution to studying in quantitative courses. However in college, students need to be cognizant of the varied types of problems and the process rather then repeating multiple similar problems in their study. Quantitative courses are constructed by scholars in their discipline, not a standardized curriculum, and **require students to adopt the mindset of a scholar.**

General Strategies

- **Take active notes.** Listen to understand what is being taught and create notes that will help you recall lecture, one hour after lecture. If necessary, rewrite your notes so that you can recall the information one day, one week or months down the road.
- **Integrate your notes.** Create a synthesized study sheet with important formulas, common mistakes or a table of types of problems.
- **Don't be afraid to ask questions:** during class; office hours; review centers; peer-to-peer tutoring; study groups. Don't leave any gaps in your knowledge before the exam.
- Tutoring and Question Centers are designed to **supplement the instruction in class**. Utilize the opportunity to work together. Save yourself unnecessary hours of solitary frustration. Also, if you want to know how much you understand, teach it; reinforce your learning by helping others.
- **Make your own problem-sets and exams**; test yourself under exam conditions.

Solving the Problem

- Most quantitative fields are inherently about visualizing, conceptualizing, and simplifying the world around us. Concepts, theorems, methods, and problems could be and should be visualized.
- Make sure you **understand the question** before you attempt to solve it
- **Simplify the problem.** Breaking down a question into components by removing unnecessary components and descriptions. Turn core components into conceptual subunits of the problem
- **Visualize the problem.** Creating visual representation of the conceptual subunits of the problem and clarifying your drawings to emphasize the question.
- **Contextualize your solution.** Ensure your solution makes sense (common, physical, and/or mathematical) Make sure you understand how you solved it and why you chose your methods. Check no "silly" mistakes were made

Cited and adapted materials from: The McGraw Center for Teaching & Learning, Princeton University