

## Teaching Philosophy and Expectations in Calculus

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This course will most likely be much different from most other math courses you have taken before in terms of teaching method. This document explains some of the reasons behind this methodology. I hope you will understand that there is a reason and wisdom behind it even if you may not immediately see it or agree with it. I ask you to be open-minded and do your best to benefit from this teaching methodology. This teaching method is based on research based pedagogical principles. Here are some of these principles:

- **Expend Effort:** Knowledge cannot be transferred from one mind to another. Rather, it is *constructed by the learner which requires serious effort and active engagement*. The role of the teacher is to help the learner construct new knowledge. The teacher cannot simply insert the knowledge to the minds of the students. If this was the case the business of education would have been much easier! This idea is expressed in the saying *the one who does the work does the learning*. There is no short-cut!
- **Active engagement:** It is not possible to achieve deep learning without *active engagement* and regular study. Native ability and talent matters to some extent but working regularly is the most important factor in learning something deep. Therefore, I expect you to work on this course everyday. We know for ages that *the best of deeds is that which is done consistently even if it is small amount*.
- **Study Regularly:** Research in neuroscience has shown that trying to learn a lot of material in a short period of time before an exam is not a healthy way of learning. Rather, *to learn something well, practice over an extended period of time is needed*. So, please study regularly and do not plan on learning the material by cramming before the exams.
- *Learning must be a life-long process*. It should NOT stop after receiving your degree or diploma. You want to acquire valuable skills that will be useful to you in the rest of your life such as critical thinking, self-discipline, problem solving, critical examination of a proposed solution, not giving up easily when faced with challenging problems, communication and presentation skills. This course will be an excellent opportunity to help you develop or fortify these skills.
- **Learning from multiple sources.** Professors are not the only source of knowledge. You should be able to learn from books, articles, your fellow students and colleagues as well. The best way to learn something is by teaching it. Therefore, you will be required to present solutions to problems in class. Discussing the material with your classmates will help you prepare for presentations. Research shows students who work in groups do better. Therefore, I highly recommend that you form small study groups and be part of such a group. In real life, you will most likely be required to work in a team.
- **Learning not confined to the classroom.** Most of what one learns happens outside of a formal classroom. Activities outside the class that help you learn include: reading the textbook, doing homework problems, preparing for in-class presentations, discussing problems/material with your classmates, discussing problems/material with your professor in his office. Ask questions in and outside the class.
- *Visiting me during office hours will be an essential part of learning in this course*. I encourage each one you to come see me regularly. I am here to help you but I cannot help you if you do not make an effort.
- *Attitude is everything!* Be positive, active, pro-active, responsible and motivated.
- The real goal of education is not making good grades and earning a diploma. These are lesser goals compared to the higher goals of developing critical thinking and communication skills and other mind-strengthening abilities. Hope this course will be life changing experience for you!
- Some books I highly recommend (that discuss these ideas and more)
  - The new science of learning, by T. Doyle and T. Zakrajsek, Stylus Publishing 2013.
  - The 5 elements of effective thinking, by E. B. Burger and M. Starbird, Princeton U Press, 2012.
  - How Learning Works, 7 Research-Based Principles, Ambrose et al, Jossey-Bass, 2010