

FIVE MATH COURSES TO INCREASE CAREER OPTIONS

by Ed Chang

The math requirements for college computing curricula vary[1] and some reading this may already have substantial credits, but for the rest, a few more courses could offer worthwhile career options. Specifically, I'm referring to two or three calculus courses (through multivariate calculus), differential equations, linear algebra and probability/statistics. All of these are offered through community colleges.

I entered the Massachusetts Institute of Technology (MIT) intending to major in electrical engineering or computer science, but chose political science after dropping two "weed-out" courses during my second semester. It would be impossible to overstate how lucky I was to have taken enough undergraduate math courses to obtain secondary school math teaching credentials in two states[2] and gain admittance to a graduate engineering program at UC Berkeley (UCB)[3].

After graduating from MIT, I first attended UCB's Graduate School of Public Policy for two quarters, but left to teach high school math (including "computer math" which involved writing programs in BASIC) and earn an MA from the School of Education. I then worked with the inventors of portfolio insurance (initially as an APL programmer) and a chess tutorial database start up. I'm a US Chess Federation Expert.

Eventually, I decided to earn a second master's from UCB's Industrial Engineering and Operations Research (IEOR) department. [Operations research](#) analyzes real-world problems using mathematical modeling. My previous MIT courses **just** met the program's math prerequisites. Some of the IEOR courses involved creating models using mathematical optimization software and one required writing APL programs. After a short period teaching high school math again, I changed careers and created optimization models for complex domestic and cross-border tax-advantaged leases for nearly a decade before semi-retiring in 1998.

As a chess player, I was used to thinking ahead, but did not plan my career path very well. I hope this essay convinces some to rely less on luck.

See <http://changsite.com> for more on Ed Chang, educator, analyst, chess player, MIT grad, operations researcher, and math enthusiast.

Notes

1. The Joint Task Force for Computing Curricula 2005, a cooperative project of the Association for Computing Machinery (ACM), the Association for Information Systems (AIS) and the Computer Society (IEEE-CS), [Computing Curricula: 2005 Overview Report](#), Table 3.2, page 25.
2. The requirements to [demonstrate subject matter competency](#) under the federal No Child Left Behind (NCLB) law vary by state. California's NCLB-compliant [Introductory Subject Matter Authorization for Mathematics](#) requires 32 semester credits covering specific areas. This authorizes teaching content matter typically found in grades 9 and below, which currently includes courses through Algebra II (California Department of Education, [2005 Mathematics Framework](#), pp. 78-79). Subject matter competency can also be demonstrated by taking the appropriate CSET ([California Subject Examinations for Teachers](#)) exams.
3. The expectations for entering students now include one semester each of upper division probability and statistics, besides calculus and linear algebra (University of California at Berkeley, Department of Industrial Engineering and Operations Research, [Degree Requirements for the Master of Science Degree, November 2000](#)).

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