Discrete Structures: Should it be Required to Obtain a Degree in Computer Science?

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“Over all, employment of computer software engineers and computer programmers is projected to increase much faster than the average for all occupations. Job prospects should be best for those with a bachelor’s degree and relevant experience.” (Bureau of Labor Statistics)

There is no disputing that when it comes to finding a job, those who have a bachelor’s degree have an advantage over those who do not. As such, in addition to personal interests and mental aptitude many students pursue a Computer Science degree in hopes of obtaining more lucrative and rewarding career opportunities; but what exactly is computer science? Dictionary.com defines computer science as “The science that deals with the theory and methods of processing information in digital computers, the design of computer hardware and software, and the applications of computers.” Upon reflection, it would appear that this definition covers almost anything that has to do with computers. The field of computer science has such a broad range that it is hard to narrow down specifically which direction one wishes to pursue. The question is, how and in what context does Discrete Structures fit in this field of study and eventual career field?

The University of Central Florida currently has Discrete Structures as a required course for a Bachelor’s degree in Computer Science. The specific rational for including Structures in
the curriculum is frankly lost on many students but may be for one of the following reasons: harder classes translate to a better education or to help develop problem solving. The first of these is nebulous and perhaps a bit cynical on the part of students who believe that Discrete Structures exists solely as a device to “weed out” students who are more capable and studious from those who are less so and as such allow the university to create and sustain a highly credible body of study. The second reason is concrete and reflects a belief that Discrete Structures provides unique skills and disciplines necessary to successfully perform in the computer science career field. Whichever of these is the reason, it is this author’s position that the course content is not required to perform the average job that a software engineer would consider. Additionally, the course is not required as a part of a Computer Science curriculum at other top ranking universities. Given this, one could question the relevance of Discrete Structures as a required course for a Bachelors in Computer Science at the University of Central Florida.

The line of discrete classes are commonly known among computer science students as the “weed out” classes. Although most computer science degrees understandably require Discrete Mathematics, even the 2010’s top ranked universities for computer science such as Carnegie Mellon University and MIT (U.S. News) do not require their students to take the course equivalent to Discrete Structures (Carnegie Mellon, MIT). If the top ranked universities do not think that the class is required, then neither should the University of Central Florida.

Conversely, some claim that the knowledge gained in a Discrete Structures class helps computer programmers develop their skills at problem solving; however, by the time a student graduates with a computer science degree, they have already had to complete several other challenging classes which also require significant problem solving. Of course, any help improving such skills should always be welcomed, but the sets of problems presented in Structures are narrow in that they are more for the research side of computer science. When the professor openly admits that even he does not understand parts of the book, that is when you know that the material is pushing the borderline, and the class should be optional for the few who are interested in this type of study.

“Bachelor’s degree in a technical field or relevant experience” is just one line that appears on the countless job descriptions that come across while searching for a job in software engineering. On the other hand, requirements that do not seem to appear on any of these descriptions would be ones such as, “Must know how to create a diagram using a
Push Down Automata” or “Must be able to prove that a language is decidable” and certainly not “Must be able to solve P=NP.” This author has worked with several software engineers who have obtained a degree that fits the “technical field” category and are more than capable of performing the job duties, and most of them have never heard of a Turing Machine or know what a decidable language is. Clearly the course curriculum is not needed for the average job that a software engineer would seek.

Indubitably, Discrete Structures should not be a required class for a Bachelors in Computer Science. Simply put, the course material is more directed for those who wish to go into research or further education; many jobs out there do not require the knowledge learned in the course; and lastly, the highest ranked computer science schools do not require it. So what is the harm in University of Central Florida allowing its computer science students to pick which direction in the computer science field they want to head. After all, they are the ones paying the tuition, right?
References


