The Strawman Core Proposal in a Nutshell

By Tina Ding and Sarah Marzen

Introduction from The Editor:

These pieces continue the Tech’s series on the Core Curriculum Task Force (CCTF) proposal to revise core. The December issue examined the philosophy behind the new core; this issue considers the strawman proposal.

We understand that the proposal is just that, a strawman, but Core is not going to be changed by a proclamation of a new philosophy alone. Ultimately, courses will have to be striken, changed, and replaced. Thus, the devil is in these details concerning implementation. Well-worded educational philosophies can win the hearts and minds of students, but even the best-laid philosophies will go to waste without effective implementations.

Additionally, feedback on this draft proposal, we hope, will help CCTF formulate a better second draft.

**Physics**

“The current core physics strawman requirements consist of one term of classical mechanics, one half term of electricity and magnetism, and a one half term of survey of modern physics (i.e., twentieth century physics). The survey of modern physics will include brief introductions to quantum mechanics, special relativity, nuclear physics, and selected other aspects of twentieth century physics.” – preliminary report

Caltech’s physics core requirements are currently the most stringent in the nation. Even Caltech humanities majors must take five terms of physics. The strawman proposal for this new Core cuts physics requirements down to three terms, part of the broader proposal of “renormalizing Core requirements.” Explicitly, Ph2ab (waves, quantum mechanics, and statistical mechanics) is cut from physics Core and an introduction to “mind-bending” concepts of twentieth century physics is squished into the last half of Ph1c in the strawman proposal.

Some professors and students are concerned about the new version of Ph1c, which is a half-term of electricity and magnetism and a half-term of twentieth century physics. “If we don’t need Ph2ab, which is fine by me, that is a faculty decision—then it means that we don’t need quantum mechanics, that we squish it onto Ph1c,” said Professor Joe Zorn.

**Math**

“The proposed math requirements... resemble the current core but with the deletion of the current version of Math 1a, which is a proof-based single-variable calculus class.” – preliminary report

Ma1a is notorious for its difficult problem sets and emphasis on proof techniques. For many Caltech freshmen, rigorous mathematical proofs are a radical departure from the techniques used in high school math courses.

Prior to the town hall discussion, almost all CCTF members were in favor of getting rid of Ma1a because it added unnecessary stress to the student coursework, said CCTF student member Neal Bansal. More specifically, opponents of Ma1a often argue that Ma1a doesn’t accomplish its dual goals— to introduce students to proof-based math or to strengthen single variable calculus skills—efficiently. One anonymous student said that he did well in Ma1a not by learning, but by taking examples to problem problems in the textbook and modifying them slightly for homework and tests.

“I wouldn’t be surprised if the committee heard more complaints from students about this one course than all other courses combined. I met with students who begged that it be eliminated, and others insisted that it come later than a student’s first term,” said CCTF Co-Chair Scott Fraser wrote in an email. “Interestingly, the proposal to drop it from the core brought pass/fail... “It is an all too common story among the hum faculty that students will find the minimum core requirement absurd enough to just Enough to stay above it with no further effort or improvement. We therefore propose to require courses in humanities classes and reduce 12 required courses down to 10.”

**Statistics**

“We propose that biology, as one of the foundations of the core, receive more emphasis than in the current core... Every Caltech student should have basic programming skills... The proposed algorithms requirement will introduce Caltech undergraduates to the analysis, implementation and applications of algorithms...” – preliminary report

In addition to the major changes to the current Core courses, there will be brand new requirements: Algorithms, EngagX Seminar, Design and Build Lab, Bio menu, Breadth Menu, and a required programming course. All these courses will be met with support at the town hall meeting as the majority of the students gave thumbs up in support. Algorithm was added based on argument that the curriculum does not reflect the current state of science.

“There’s theoretical science, experimental science, and then there’s computational science-- this is not reflected in Core at all,” said Brown. In addition, there were also modifications to lab requirements. ChsA, which carries a reputation of tedious lab reports and work, will no longer be required. Students will still be required to take two terms of data analysis labs, just not restrictive to ChsA. “I don’t have any concerns about the contents of the new courses, but there is the general concern that there will not be enough to stay above it with no further effort or improvement. We therefore propose to require courses in humanities classes and reduce 12 required courses down to 10.”

**HumaniTies**

Caltech students might not like it, but writing is so important,” said CCTF member Neal Bansal to the changes in humanities requirements to rid the pass/fail option in humanity classes and reduce 12 required courses down to 10.

With science and engineering courses being top priorities and perhaps the only priorities to Caltech students, writing a 6-8 page hum paper is often seen as gruesome and dreadful. The call for the need for more serious writing and humanities courses roots from the alumni surveys in which alumni said they wished they took more writing and taken more humanities courses seriously because the courses proved to be unexpectedly valuable, especially when their career paths took them into non-academic settings.

According to the CCTF report, one graduate from the period 1999-2003 noted, “Ironically, many of my electives (clinical psychology, federal law, business, Japanese, electrical engineering, and computer science) turned out to have a far more lasting impact on my life than...” – preliminary report

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The More Things Change...

By Travis Scholten
UNDERGRADUATE

At the Core Curriculum Task Force meeting in December, Professor Mike Brown emphasized the importance of a reform in the philosophy of the Core. According to Brown, “As faculty, we are all too worried that students who graduate have been exposed to too many concepts but don’t understand them, and that actually worsens.” This quote, taken in the context of speaking about the Core, is quite understandable, and indeed, is very easy to agree with.

However, after considering the suggestions and proposed reforms that the CCTF have suggested, Professor Brown’s quote is equally applicable. How can it be that the elimination of a math and other science courses and the implementation of a programming class, an algorithms class, a freshman seminar, a design lab, and another biology course is part of any attempt to ensure that students graduate with a solid understanding of the sciences? In fact, such an attempt would seem counterproductive, as it compromises an understanding of the foundations of science in favor of having students learn a little bit in the other sciences. That is to say, under the proposed changes to the philosophy of Core (The CCTF’s “content and breadth” philosophy), students could very possibly leave Caltech with a less comprehensive understanding of science than under the current Core.

Moreover, the proposed changes do nothing to address the issue of the workload at Caltech (the so-called “Caltech Syndrome”). According to the Student Experience Conference Report, “A sign that the Core may be the culprit of Caltech Syndrome is that many students find that the workload improves significantly after Core.” Under the CCTF recommendations, the Core remains consists of 5 classes each term, which is in and of itself a major source of stress and frustration for students – especially in the area of problem sets. As the SEC Report points out, “They [students] will often trudge through material in order to complete problem set as quickly as possible and not fall behind in other work.” Therefore, any changes to the Core should relieve some of the pressure students feel due to their workload. The CCTF proposals do not. Instead, they add further requirements and additional classes, all without actually adjusting the course load here at Caltech.

First Term Sleep Deprivation and Second Term Resolutions

By Yang Hu
UNDERGRADUATE

At Caltech, all freshmen are given two terms of pass/fail, a no-grades system that allows students to experiment with their habits and to adjust to college life. By the end of first term, I was convinced that life at Caltech is not only about learning science but also about coping with chronic sleep deprivation.

Expecting to be on top of things, I came to Caltech planning to get to bed at 10pm and start my day at 7am. I was a strict believer of Ben Franklin’s quote, “early to bed, early to rise, makes a man healthy, wealthy, and wise.”

Perhaps, I was a bit too optimistic. Perhaps, I only thought I was a good sleeper. Regardless, every effort of getting to bed early was thwarted.

During orientation, I rotated out of Fleming house. My temporary room was situated right by the Dubney courtyard. On those first nights, I would attempt to sleep at 10pm. Every time I would end up in Darbs. At first, I had to endure four hours of music, which I shut out by closing the windows. Then, movies and “Rock Band” were projected into my room. I used blinds to deal with the projector lights. Alas, the problems kept coming. On the next night, the fire alarm went off at 2am (it probably had to do with the Darbs).

I was okay with these minor nocturnal disturbances because I assumed they would be temporary.

I told myself, “I will have a normal sleep schedule when term officially starts.”

I did not. My hope was to get away from the nighttime hustle by residing in Avery house, where I knew I could get a full night’s rest without having to put on a pair of earplugs. Apparently, getting less sleep would not have me be a ‘slave’ (the other houses gave this nickname to Avery students for their studiousness) but instead, a Rudd. Ruddock is a fine house filled with helpful students, especially freshmen who share the same enthusiasm as I for getting homework done on time. The only downside is that everyone—freshmen included—is a walking time bomb.

Walking through the house late at night, one may see students frantically doing homework or gaming. Because everyone slept past midnight, it was much easier to go with the flow than to ride against it. By the second week, my sleep schedule became skewed and the time spent sleeping dwindled. Campus activities such as midnight madness, midnight Millikan pumpkin drop, and midnight coffeehouse served to positively reinforce staying up late. House social activities such as dances, ice skating, and laser tag also occurred late into the night.

Unfortunately, college is not only about social interaction but also academics and sleep is often sacrificed to make up for time spent in these two important areas of college life. Some of us are too busy, others waste too much time, and still others have bad habits of staying up late. It’s no particular reason (I was in the last category during first term), but we should not let these excuses rob us of a full night’s rest.

Sleep is essential for a person’s health and wellbeing. Many wonder why the NSF (National Sleep Foundation) says so. Research done by the Harvard Women’s Health Watch suggest that chronic sleep loss contributes to health problems such as weight gain, high blood pressure, and a decrease in one’s immune system. Other sources suggest an increased risk of more gruesome health problems.

Not only does sleep loss take a toll on one’s physical health, but it also impairs one’s ability to learn effectively. While many students pass off doing off during lecture or being constantly being tired as a common dilemma among college students to be shrugged off, long term sleep deprivation is more academically deleterious than one can expect.

Not only is there a higher tendency to encounter in class, but there are also higher tendencies to be late for class or even skip class entirely, skip breakfast (the most important meal of the day), fail as good doing homework, dedicate entire weekends to sleeping in (recent research suggests sleep debt cannot be repaid), and worse yet, to begin the process anew by sleeping late the following night. Plus, stress levels tend increase exponentially. Having a late sleeper as a dorm roommate, I have observed the detrimental consequences happen to him on a daily basis.

Of course, it’s commonness to get enough sleep. Who hasn’t experienced the pain of wanting to fall asleep at an inappropriate time? Yet, sleep, especially an early one, seems to take second priority for college students. Stress from a heavy workload, time commitments, and life always seems to interfere with getting enough shuteye. It only takes a simple redetiling of priorities to fix this problem (for those who consider it one). Why not create a list of resolutions with “getting enough sleep” as your first priority? If at first you don’t succeed, try again. Persistence will eventually pay off (at least that’s the hope).

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Brad Filipponi, Chair of the Core Curriculum Steering Committee, i.e., the committee entrusted with maintaining the current physics core. This committee was asked if they would consider replacing this proposed Ph1c... it may be very painful for the student, and I wouldn’t want to teach it either."

According to CCTF member Neil Bansal,combining physics courses has been done in previous Core Curriculum committees, with unfortunates. The result. The current Ph2ab used to be Ph2abc, but was shortened to reduce the number of required physics courses. Teaching the same amount of material in fewer terms just doesn’t work, said Bansal. CCTF member and Astronomy and Physics Professor Fiona Harrison agrees partly with the specifics of the strawnman proposal. “Physics 2 has always been fairly difficult to engage students in, and I support a reduction of the number of terms of physics required,” wrote Harrison in an email. “That being said, I don’t think we need to cover all of E&M and give an intro real introduction to modern physics in three terms.”

The proposed changes to physics Core sparked much discussion at the town hall meeting as changes to Pass/Fail, Humanities, or Ma1a, but a few students defended the length of the current physics Core. One student took issue with “renormalization” of Core requirements, arguing that math and physics were more fundamental subjects than biology and chemistry-- as such, the proposed changes to math and physics Core would devitalize the Caltech degree, producing a way for people to understand their limits, but I’m not sure if the second term is necessary, said New Danny, student member of the CCTF.

Faculty on the CCF feels that losing pass/fail is necessary and appropriate in complementing the addition of multiple paths in Core courses. “It’s important to keep in mind that the proposal is not,” said Warren Brown, faculty spokesperson. "keep current courses and let P/F for Core (except for 1st term and two HSS electives)." The proposal is: “create appropriate courses and get rid of P/F for Core (except for 1st term and two HSS electives),” said Pierce emphasized.
MY HOBBY: ABUSING DIMENSIONAL ANALYSIS

PLANCK ENERGY × PRIOUS COMBINED EPA GAS MILEAGE
PRESSURE AT THE EARTH'S CORE MINIMUM WIDTH OF THE ENGLISH CHANNEL

IT'S CORRECT TO WITHIN EXPERIMENTAL ERROR, AND THE UNITS CHECK OUT. IT MUST BE A FUNDAMENTAL LAW.

BUT WHAT IF THEY BUILD A BETTER PRIUS?

THEN ENGLAND WILL DRAFT OUT TO SEA.

I need money.

Make more.

Become a Professional Cage Fighter.

What the frak was I thinking? No way!

Oh, yeah. I'm fragile.

Sell some stuff.

Battlestar Galactica collection?

Soul?

Let's think.

Buyback is over? Stupid procrastination.

Sell old textbooks back to the college bookstore.

Lend self to medical research.

Doc, why does everything smell like toast?

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