

UCLA Engineering

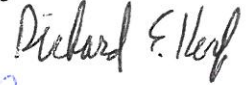
HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Computer Science Department

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To: Professor Jeff Eldredge, FEC Chair

From: Richard Korf, Vice Chair for Undergraduate Programs, Computer Science Department
Glenn Reinman, Vice Chair for Graduate Programs, Computer Science Department
Mario Gerla, Chair of Computer Science Department



Date: October 12, 2017

Re: CS and CS&E Course Changes, Request for Approval

We propose changes to the following Computer Science courses: Computer Science 132, Computer Science 35L, Computer Science CM124, and Computer Science M276A. We propose the creation of a new course, Computer Science M186LS. We also propose a change to the area name "Information and Data Management," requesting that it be changed to "Data Science Computing." We request that these changes take effect for Winter 2018.

Regarding Computer Science 132:

We propose to modify the requirements of CS 132 such that we replace the current enforced prerequisites of CS 131 and 181 with enforced prerequisites of only CS 131. Professor Palsberg has offered the course twelve times in 2003-2016, and he has discovered that students can easily be successful in CS 132 without knowledge of any CS 181 material. Moreover, Professor Palsberg teaches CS 132 in a way that assumes no knowledge of CS 181 material. So, the requisite of CS 181 is unnecessary for CS 132.

Regarding Computer Science 35L:

We would like to increase the number of units for CS 35L from 2 to 3. Computer Science and Computer Science and Engineering students have complained for a number of years that it is too much work for 2 units, and the instructor agrees. The outside study hours would be increased from 2 to 4 hours to reflect the increase in units.

Regarding Computer Science CM124:

We would like to add the prerequisite of Mathematics 33A, remove prerequisites Biostatistics 110A and 100A, and change the instructor to Eran Halperin. The course, CM124 covers some topics such as multivariate statistics and principal component analysis. These topics require knowledge of linear algebra (Math 33A). Most students enrolled in the course already have this prerequisite so it should not affect enrollment significantly. It will encourage students to take Math 33A before taking this course. Biostatistics 110A is no longer offered and thus should not be listed. Biostatistics 100A does not cover probability to the same depth as the other course options, which is why we request its removal as an option for the prerequisite.

Regarding Computer Science M276A:

We would like to add a discussion section. This machine learning course has 5 projects which involve training statistical models with large image data and use heavy codes from deep learning literature. The projects are important for students to get first hand experiences on topics that are rapidly evolving. A majority of the students do not have the background to finish these projects on their own in such a short time, and therefore TA discussion is crucial for addressing student's questions on system settings, data explanation, and code debugging etc.

Regarding Computer Science M186LS:

This new course follows a novel minimal-math approach, providing a biosystems modeling course for relatively math-poor students who want or need to develop skills in explicit modeling of dynamic biological systems.

Systems modeling skills are usually developed in engineering courses at the upper division level, typically following two years of lower division math. Much of the conceptual framework for systems modeling, however, is structure-object-connection oriented, and can be extracted isomorphically or homeomorphically from the biology, using diagramming and graphing tools, providing structured models using little or no mathematics – as a first step.

Professor DiStefano's current CM186 course requires learning math concepts beyond what is covered in the math series taken by students in Bioengineering, Computer Science & other engineering departments. Nearly all students in life science departments lack the needed math skills to comprehend the material because they take few math courses as part of their major. Professor DiStefano has learned this well, having taught CM186 for many years to mixed classes of upper division students primarily from Engineering and Computer Science departments. Students successfully completing CM186/286 typically have more applied math, including intermediate linear algebra (Math 115), systems and signals (EE102) and/or feedback and control systems (e.g. EE141). Engineers who have taken only 6 quarters of required Calculus are typically challenged by the systems, signals and transform methods introduced (not in depth) in the course, the basic methodology of the modeling methodologies that underlie the course focus. This is a weakness of 186/286 and part of the motivation for the new 186LS course - which circumvents the need for mathematical depth by focusing on structural modeling concepts, ultimately morphing into differential equations of biosystems -- node by node -- from the biology -- a novel animation approach that Professor DiStefano is currently developing for this pedagogy.

More than half of the new course is focused on structural and diagramming methods drawn from engineering systems and control paradigms. We believe this approach is quite novel, with a new textbook to support it. We also anticipate that M186LS will have a large following once it's established, as no other related courses are planned and M186LS is unique. Professor DiStefano inquired about acceptable suffixes, and LS was deemed appropriate as it can be interpreted as "Life Sciences." This course is indeed meant to attract Life Science students, as well as Engineering and Computer Science students interested in modeling dynamic biosystems in the life sciences.

We will later propose that the course become part of the Bioinformatics minor (discussed with E. Eskin), the Computational & Systems Biology Major (Van Savage), and at least an elective course for undergraduates in CS & Bioengineering. Additionally, this course has been approved by the Computer Science departmental Academic Policy Committee for proposal.

Regarding the area name change of “Information and Data Management:”

The need to revise the area name of, “Information and Data Management” to “Data Science Computing,” follows from the significant changes that have occurred in this fast-evolving technical area, which are also reflected in the research interests of the faculty in this field and in the classes that the faculty offer.

We appreciate your kind consideration.