

# **STEM University Preparation Program (STEM UPP)**

University of California, Irvine



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# UNIVERSITY of CALIFORNIA - IRVINE

## STEM University Preparation Program (STEM UPP)



## Get A Jump on College Success

UC Irvine's STEM University Preparation Program (STEM UPP) is a set of affordable online modules designed to prepare students for university level work in STEM (science, technology, engineering, mathematics) subjects.

Delivered entirely online, the program modules cover general quantitative skills, calculus, chemistry, physics, and biology. They offer a quick, convenient, and effective way for students to refresh their knowledge in STEM subjects essential for college success.

### Special Feature

Students begin by taking a **Free Diagnostic Exam** that helps identify gaps in STEM topic knowledge and skills needed for particular majors, and recommends a set of modules to help prepare for success in relevant introductory math and science courses.

### Who Should Attend:

- New and incoming college students who want to prepare for university level work in STEM subjects
- College bound senior high school students who wish to get a head start on their undergraduate study

### Program Benefits:

- Get prepared to succeed in university courses
- Learn from anywhere in fully online modules
- Affordable modules, which includes all text and software needs
- Interact with peers in the Quantitative Skills discussion sections

### Offered This Summer:

- Quantitative Skills
- Pre-Calculus
- Pre-Chemistry
- Pre-Physics

### ENROLL NOW

ONLINE:  
[extension.uci.edu/stemupp](http://extension.uci.edu/stemupp)

PHONE:  
(949) 824-5414

### CONTACT US

STUDENT SERVICES  
(949) 824-5414  
[unex-services@unx.uci.edu](mailto:unex-services@unx.uci.edu)

As a leading research institution, the University of California, Irvine is committed to developing innovative programs to serve undergraduate students. It is in this context that this program is being executed in coordination with the UC Irvine School of Education.

# Outline

- Motivation
- Program overview
- Learning assets
- Pilot results
- Next steps

# Motivation

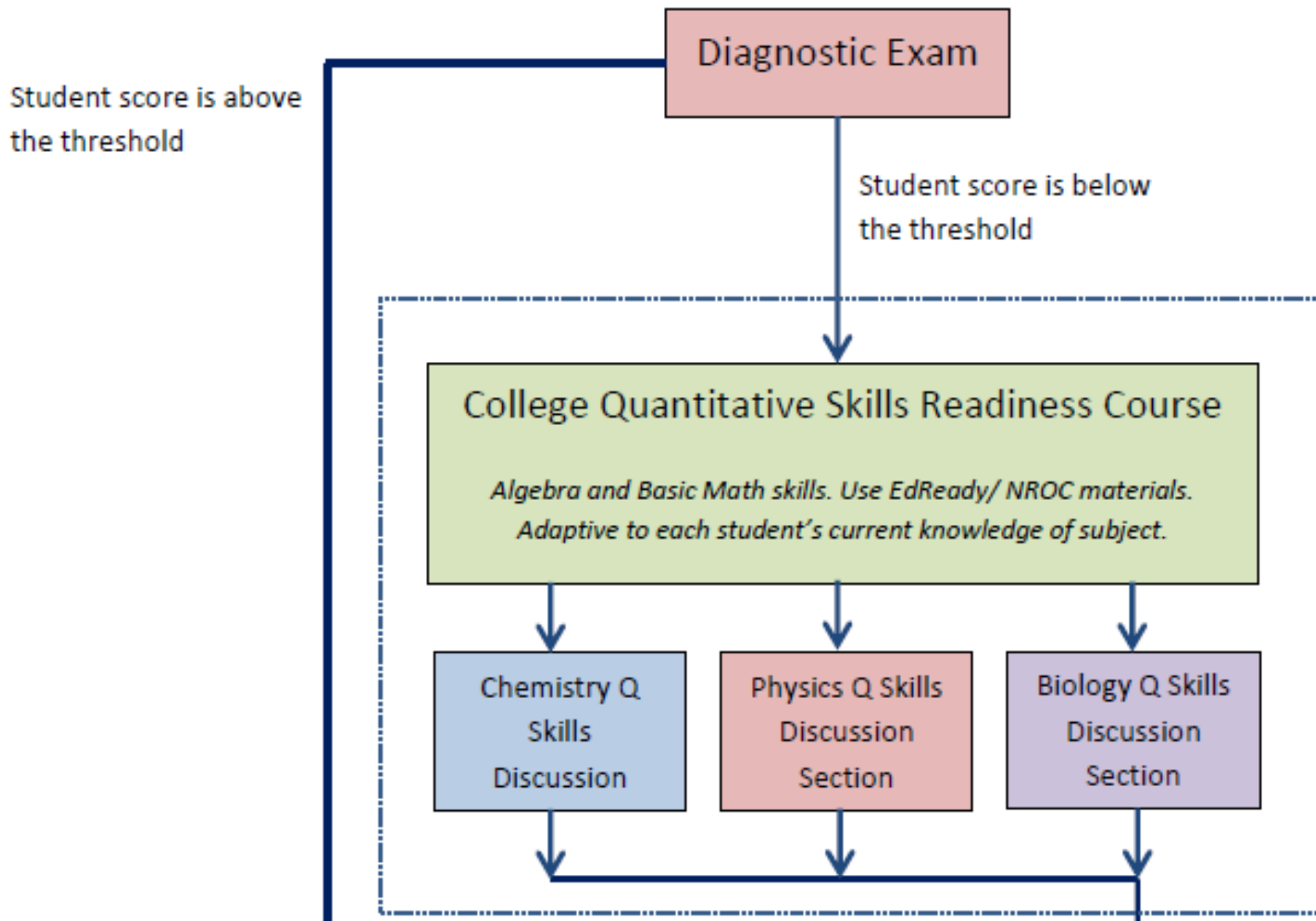


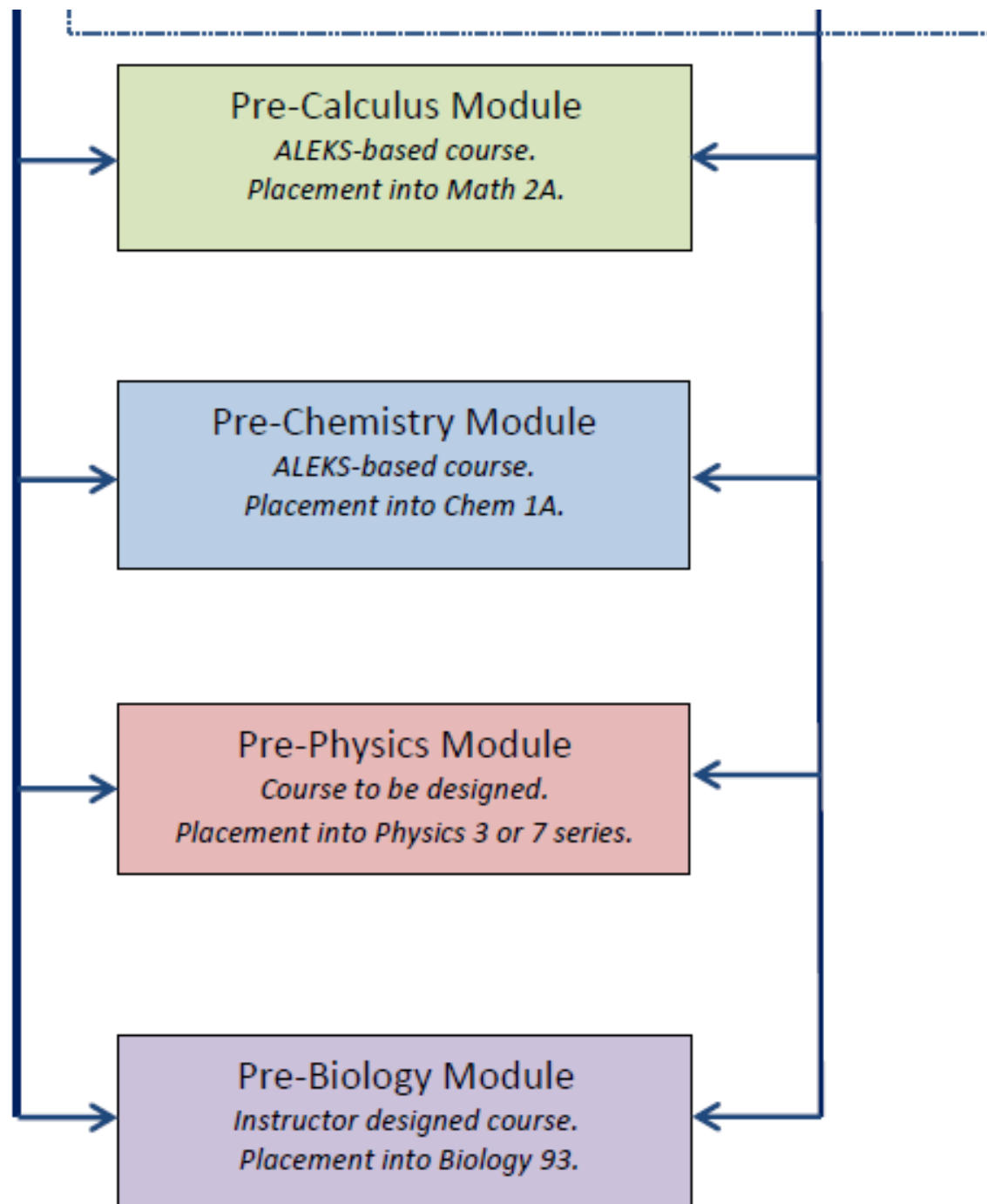
- US President's Council of Advisors on Science and Technology provides evidence that the US will need to increase its production of experts in the STEM disciplines in order to fill the careers that benefit from science background (*PCAST, 2012*).
- A strong predictor of student success in college is the level of preparation upon arrival (*Tinto, 2003*).
- Low levels of academic preparation can be counteracted by extra academic support (*Arendale 1997, Wischusen 2010*)

# STEM UPP

- Provide intensive summer STEM preparatory training
- Leverage adaptive learning to efficiently remediate student knowledge gaps
- Provide diagnostic exam for students to assess readiness for university STEM coursework
- Focus on transferability of math skills to other disciplines







# Key Features of STEM UPP

- Low-cost
  - \$125 per student per module, includes course access, software, e-book and proctoring
- Convenient access
- Individualized
- Modularized
- Application focused
- Instructor facilitated
- Community discussion driven
- Scalable
- Adaptable to high school hybrid/flipped courses



# Q Skills Learning Assets

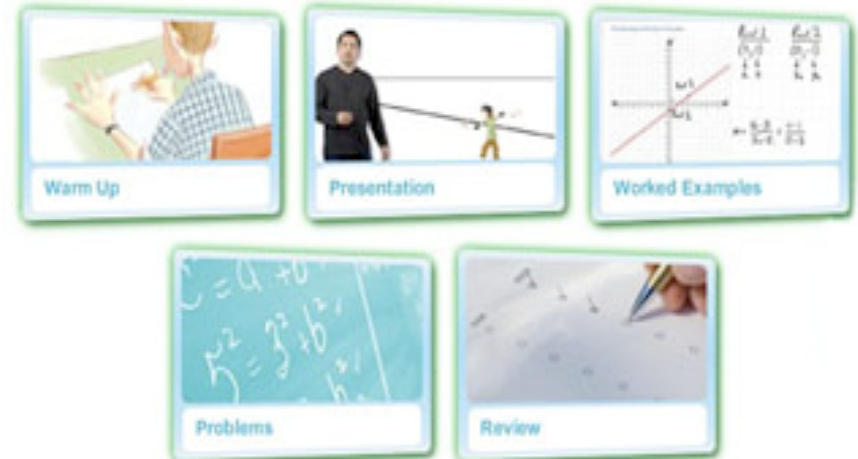


**EdReady**

a game-changing  
application  
for college readiness.



## Content Assets



## Delivery Platform

- Adaptive learning system
- Individualized paths of study for each student
- Reevaluates students for mastery learning

# VirBELA



- Pre-Calculus



- Pre-Chemistry



- Pre-Physics



- Pre-Biology



# Pilot Study



- ~80 students enrolled in Summer 2013
- Mathematics and Chemistry UPP modules offered
- 80% pass rate of UPP students in subsequent gateway STEM course
- Persistence was a challenge in 5 week UPP module
- High school did a hybrid course in parallel with Math UPP
- Biology did a special Coursera MOOC in Pre-Biology with invite to admitted UCI students.

# Pre-Calculus F2F vs. Online

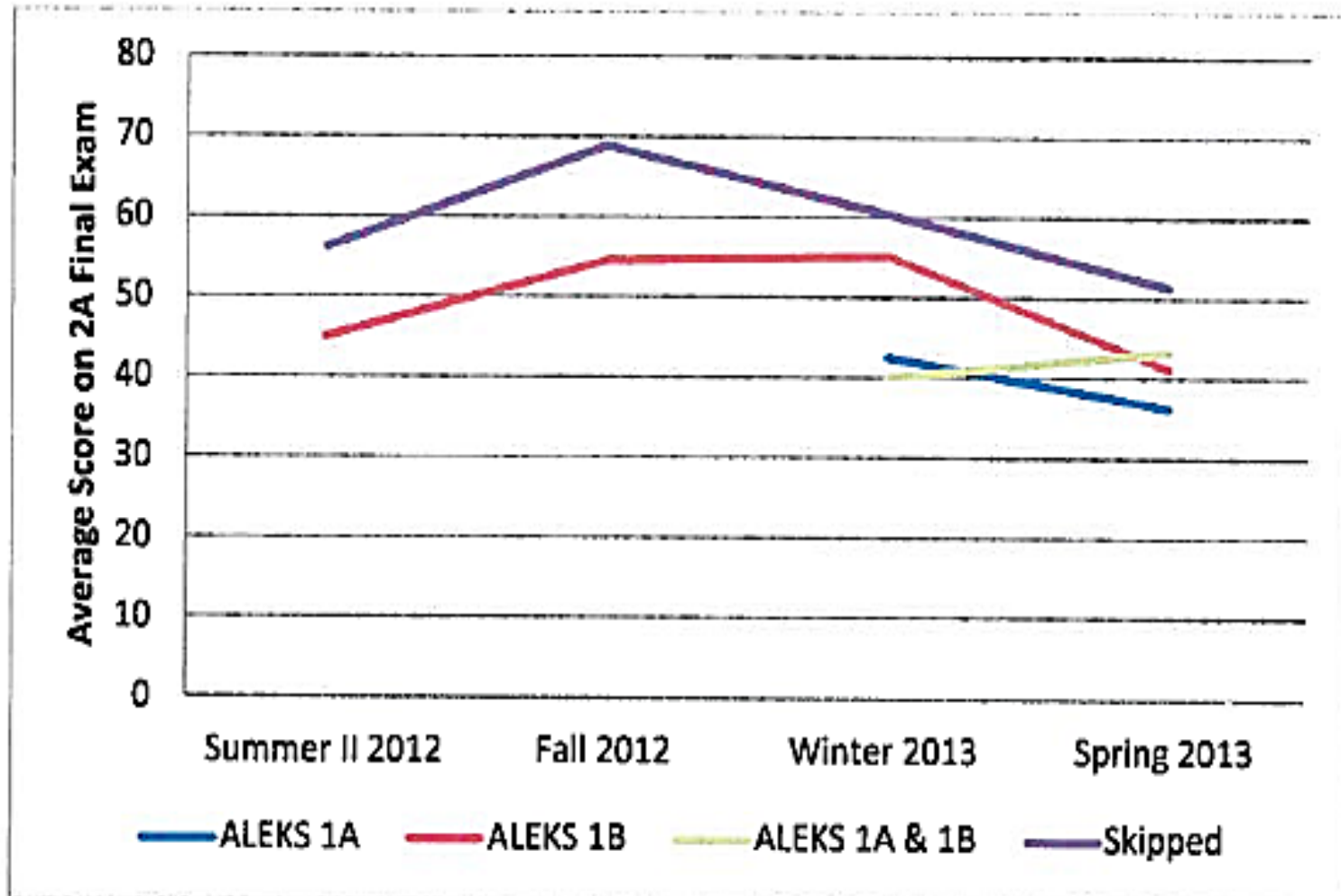
## Indicators and Findings

- Grades and Final Exams in Pre-Calculus
  - Too many confounding factors to analyze grades effectively
  - Final exam performance on paired problems shows **no discernable difference** between online and F2F
- Time spent on problem solving
  - F2F students reported spending **6 hrs/wk** on course work
  - Online students spent on average **11 hrs/wk** in ALEKS
- Instructor/Course Evaluations
  - Online students much **less happy** with course, but this is improving
- Common Final Exam for Calculus I and Calculus II
  - Online does **2-5% better** on Calculus final than F2F students
  - In progress: Drill down on individual topics



# Pre-Calculus F2F vs. Online

Average Score on the 2A Final Exam for each term in 2012-2013 school year



# Pre-Calculus F2F vs. Hybrid

## The Study

- University System of Maryland
- Embedded repurposed MOOC content into hybrid course
- Goal “to explore the potential for MOOCS ... to improve student learning” and “to understand the conditions that make use of these materials more or less effective and efficient for student learning”

## The Results

- 2 out of 6 sections taught as hybrid with MOOC content
- Hybrid sections were larger and had less class time
- Hybrid sections were 2<sup>nd</sup> and 3<sup>rd</sup> highest scores on common course assessment
- \*\* Several confounding factors still not studied

# Next Steps



- [www.extension.uci.edu/stemupp](http://www.extension.uci.edu/stemupp)

- Thank you!
- Questions?



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