

The Senate Administration Work Group (SAWG) on Admissions. The [SAWG Report](#) was produced for the UCSD Academic Senate in November and has generated a lot of discussion, both at UCSD and across the state and the country. The SAWG was formed in Spring 2025 to examine changes over the last several years in the college preparation of incoming students in both mathematics and english (reading and writing). In particular, the goal was to better understand the reasons for the rapid increase in the number of underprepared students at UCSD since 2020, and to also better understand why the level of underpreparedness has expanded beyond gaps in high school education, to material taught before high school.

Existing and Emerging Challenges to College Math Preparation. The SAWG report identifies a number of factors contributing to the decrease in preparedness since 2020 which fall into four general categories. (1) *Nation-wide challenges* (Covid-19 impacts, transition to online teaching in K-12 and beyond, the launch of Chegg and similar websites, and now the emergence of widely-available AI/LLM systems); (2) *California-wide challenges* (uneven K-12 education quality and availability, severe grade inflation driven by removal of standardized testing in college admissions); (3) *UC/CSU system-wide challenges* (removal of standardized tests from admissions, combined with high school grade inflation); and (4) *challenges unique to UCSD* (being one of the most STEM-focused of the UC campuses with more than 80% of our majors requiring some math, combined with an increase in our percentages of enrollments from under-resourced schools that have fewer math preparation opportunities). While we are directly aware of the decrease in preparedness that other UC campuses are also experiencing, a number of the stories currently appearing in the national media describe similar changes in preparedness being observed at many other colleges and universities across the country.

The Math Faculty and our Teaching Mission at UCSD. While our department is filled with faculty who regularly win awards for their research, we also have a group of permanent teaching-focused faculty who are both mathematics subject matter experts and also experts in mathematics pedagogy and teaching. Both groups of faculty regularly win teaching awards. Our teaching-focused faculty work exclusively on undergraduate education, and both groups of faculty work closely together, often with visiting instructors and teaching fellows, to carefully design syllabi and assessments for our lower division courses, and to monitor and adjust testing and placement decisions (using SAT/ACT/AP/IB scores and/or the Math Placement Exam) based on closely tracked outcomes for follow-on classes every year. While we have a very large undergraduate math major (with a number of different major focuses), our teaching contribution to the campus is dominated by lower-division undergraduate math courses for students majoring in aerospace engineering, biochemistry, biology, chemistry, cognitive science, computer science, data science, economics, electrical engineering, environmental systems, human development, international studies, mechanical engineering, public health, psychology, structural engineering, and in a number of other STEM and STEM-adjacent majors. In fact, as a STEM-focused campus with more than 80% of majors at UCSD requiring math, *the mathematics department teaches more students every year than any other department at UCSD, and in fact we teach more students than each of the individual schools (collections of departments) across the entire campus. This places on us an extraordinary responsibility.*

Math 2 and Math 3B: Courses Meeting Students Where They (*the Students*) Are. *A foundational principle of our department is to meet every enrolled student where they are, and then do everything we possibly can, within the constraints of our resources, to help each student have the best chance of success in their selected major.* About ten years ago, our department noticed that a very small number of incoming students (under 50 students, less than 1% of the incoming class) were not prepared to succeed in either of our lowest-level math courses that we offered at that time (Math 3C and 4C, which are, respectively, 10-week precalculus on-ramps to the 10 and 20 calculus sequences). In an effort to best help these students succeed, in 2016 we launched Math 2 as a 10-week rapid-pace course that would fill gaps from high school math subjects (algebra I-II and geometry, or the three equivalent integrated math courses taught in high school). This course (*unique within the UC System*) was successful in moving most Math 2 students into either 3C or 4C (or further) within 10 weeks. However, by Fall 2023 the number of students in need of this kind of help *increased ten-fold* (to about 500), and we also discovered that many of these students had gaps in knowledge that predated high school. Again, in an effort to best help these students succeed, we quickly redesigned Math 2 for Fall 2024 so that it could focus on helping students who need to fill gaps in material from grades 1-8, and then also introduced a new course, Math 3B, that could focus on helping students who only need to fill gaps in material from grades 9-11. Despite extraordinary budget challenges the last two years, to best support students in Math 2/3B we also launched the ASC@Math Center in Fall 2024 (housed on the second floor of APM) and fully staffed it with Math 2/3B learning assistants. *It is difficult to point to another UC campus that has done more to provide the infrastructure to meet students where they are in their math education when they arrive on campus their first day.*

Math 3C/4C and Beyond: Students Meeting Courses Where They (*the Courses*) Are. With the vast majority of majors at UCSD relying on various levels of mathematics knowledge to build their courses from, *departments from across the campus depend crucially on the Mathematics Department to deliver prepared students for their major-specific courses.* These departments need to have confidence that a student earning a C- or better in one of our calculus courses such as 20B means that the student has sufficient mastery of all topics that appear on a standardized syllabus so that they can then succeed in the next course. With 20B depending directly on mastery of topics in 20A, it is similarly vital that a 20B instructor in the math department be able to assume that a student achieving a C- or better on 20A would have sufficient mastery of the material in 20A to succeed in 20B. For these reasons, we work very hard to try to make sure our learning objectives are aligned with grading standards in our courses. *While we meet every student where they are if they begin in Math 2 or Math 3B when they arrive, by the time they move into 3C/4C or later courses, the students must now begin to meet the courses where they (*the courses*) are,* due to need to achieve learning objectives for every course after 3B. This is necessary for students to transition successfully to later math courses and into their major-specific course work that depends on mathematics. If our department fails to live up to this fundamental obligation to the other campus departments, and we instead allow unprepared students to move into the major-specific courses that rely on math knowledge from our courses, *then students fail more severely at the next step, with cascading failures that occur in multiple downstream courses.* These later failures cannot be remedied easily without going back to the underlying single math course where deficiencies still exist.

How Mathematics Learning Happens. *The sequential scaffolding of knowledge in mathematics*, where a new topic builds crucially on knowledge of a previous topic, *is fundamental to mathematics* and adjacent fields such as physics; it is partly what makes math so powerful, but that feature also places constraints on how learning takes place: sequentially. This scaffolding is present to a greater or lesser extent in most fields of study, but it is truly fundamental to what mathematics is. A second feature of learning mathematics (and math-adjacent fields such as physics and engineering) is the *importance of solving math problems* (typically as homework or class work), or maybe better described as “*struggling through the solution of math problems*”. Whereas in other disciplines one often learns by reading and retaining information (possibly involving class discussion, answering questions on the reading, etc), in mathematics one learns material by first reading (or listening to a lecture) about concepts, and then follows this by working on (sometimes many) different problems where the concepts are crucial to solving the problem. This is often referred to as “*One learns mathematics by doing mathematics*”, and there is probably no truer description of how one learns math. This fact is a key aspect of how mathematics courses are taught, and why homework and regular assessments such as quizzes and exams play such important roles.

Enabling Mathematics Learning in a World Filled with Smart Phones and AI. *Our instructors are deeply committed professionals doing very challenging work with our students, and in many cases they are making truly heroic efforts to help students succeed.* This commitment is evident in the long hours they spend preparing and giving their lectures, the time and energy invested in the Canvas materials they provide and the design of homeworks, quizzes, and exams, their time spent with students in office hours, their extensive interactions with the class on Piazza, etc. In this rapidly changing world filled with smart phones and AI, it is becoming *increasingly difficult to get students in mathematics courses to engage with course material sufficiently* to become proficient: lecture attendance, discussion section participation, and dedicated time spent working homework problems, *have all dropped to alarmingly low levels over the last 3-4 years*. We encourage our instructors to try innovative methods to increase engagement in lectures, discussions, and especially homeworks, such as including regular repeated low-stakes assessments in different forms such as quizzes, crafting grading schemes that reward engagement with the material and the class, and so forth. We also encourage our students to make the most of these opportunities for engagement as they are designed to help them get a better learning outcome.

We are a Community. In closing, I want to remind us all of a few things. *Every single student enrolled at UCSD is uniquely special and deserves to be here*, and it is the sacred responsibility of our department to *do everything our resources allow to give that student a path to succeed* here. *Our faculty and instructors fully embrace this responsibility.* All of us (students, faculty, and instructors) are human beings just trying our best; let's work together, with patience and respect, to achieve the successful student outcomes that every single one of us is aiming for.