Calculus 1 and 2 with Support at Mt. SAC (with Lisa Morales & Paula Young)

Units and Registration: Calculus and Analytic Geometry I (4 units) + Support (2 units).
Calculus and Analytic Geometry II (4 units) + Support (2 units).

Students register for two separate courses that are hard-linked, but the target course and support course are integrated, focusing on just-in-time support for calculus when needed.

Placement: All STEM students have access to Calculus or Calculus with support.

Weekly Schedule: Calculus is typically offered 2 days a week for 2 hours and 5 min. The support is either offered on a third day for 2 hours OR offered two days a week for 1 hour, before or after the target course.

Embedded Tutors/Supplemental Instructor: Classes may have a student employee who is an embedded tutor or supplemental instructor. They attend classes and help to facilitate group work or help students who need additional support. They also hold outside sessions.

Textbook: Calculus by Stewart (8^{th} edition) [Some faculty do not require the book and use free resources and self-made lectures notes and homework]

Canvas: Our school uses the Canvas LMS and both the target course and support course have their own separate Canvas.

Grading in target course (letter grade):

- **Watching video lessons** (6%): Students watch an instructor-made video lesson prior to each class. They must submit a page of notes and small set of practice problems to earn credit for watching.
- **Assignments** (6%): Students complete a worksheet assignment for each section and submit weekly on Canvas. Full solutions to these assignments are posted.
- **Daily Quizzes** (15%): Students take a quiz at the end of each class on the content from that day and/or the previous class.
- **Mini-exams** (16% - 2 at 8% each) Student take 2 shorter written exams (1-hour exams)
- **Exams** (32% - 2 at 15% each) Students take 2 longer written exams (2-hour exams)
- **Final Exam** (25%): Students take a cumulative written final exam.

Grade in support course (pass/no pass):

- **Attendance & 360-board work** (10%): Students earn credit for arriving on time and participating in the daily board work.
- **Calculus Jumpstart Modules & Workbook** (20%): Student review Canvas modules and complete precalculus problems from the Mt. SAC Calculus workbook.
- **Calculus Workbook** (20%): Students complete calculus problems from the Mt. SAC Calculus workbook
- **Post Exam Corrections/Reflections** (20%): After each exam, students complete a reflection and corrections to emphasize the exam is a formative learning experience.
- **Final exam** (30%): Students complete a take home final exam review to prepare them for the final exam in the target course. An answer key (not full solutions) are provided.

Typical Class Day (3 hours)

1. **Review Video Lesson:** (10 min) Instructor reviews the set of problems pertaining to the video lesson students should have completed prior to class.
2. **360- board work:** (30 min) Students are broken into different groups of 3 each class and sent to the board all at the same time to work on the same set of 2-3 problems. Then instructor reviews written work with entire class to emphasize various solutions and/or common mistakes.
3. **Group work:** (30-60 min) Students work in groups of 4 with students that sit nearby (usually the same group all semester) on assignments while instructor circulates the room to answers questions about target content or prerequisite content.
4. **Additional lecture (if needed):** (30-45 min) If the assigned video lesson did not cover all the calculus material for the day, we will continue the lecture in class.
5. **Group work:** (30-60 min) Students work in groups of 4 with students that sit nearby (usually the same group all semester) on assignments while instructor circulates the room to answers questions about target content or prerequisite content.
6. **Quiz:** (30 min) Students take a written quiz on the topic for the day and/or the topics from the previous class.

Additional information about our class/resources:

Flipped learning: Our class is a flipped/blended learning model. Students are required to watch a video lesson before each class meeting and they earn credit for watching them. These videos vary in length from 35-60 minutes. After watching the video, student submit one page of notes and a small set of practice problems that they need to attempt, but don't have to get correct to earn credit for watching the video.

Calculus Jumpstart Modules: The Calculus Jumpstart Modules were created by Mt. SAC math faculty to help support students who plan to take or are currently enrolled in Calculus I or II. They were designed to provide students with a chance to revisit previous math topics right before they need them in Calculus. The modules guide students through detailed examples and short video lessons and then provide opportunities to learn by doing. Each modules takes approximately 45+ minutes to complete, depending on prior math experience. At the end of each module, there is also a short Canvas quiz to check their understanding.

Calculus Workbook: Mt. SAC math faculty created Calculus I and II practice workbooks to distribute for free to all students. Each workbook has practice problems on both prerequisite (non-calculus) topics and extra calculus practice problems. The answer key is in the back and full solutions are found at support centers on campus.

Building Habits for Student Success: A group of Mt. SAC faculty created a Student Success Handbook to distribute to students and created research-based modules, with student input, on topics that college students often identify they need help with like time management, active vs. passive studying, test anxiety, and procrastination. Students are asked to remain open-minded to the topics presented. There are multiple chances for personal reflection, and these resources encourage students to challenge their habits and make changes that will benefit their academic experience. The handbook has two parts: getting ahead and catching up. The modules were designed to take approximately 20-30 minutes to complete.

Building Community: Since we do a lot of group work in the class, we feel it is important to build community in the classroom. We attempt to do this starting on day 1 by having students break into groups of 4 immediately, introduce themselves and share some information about themselves, and work on an activity together. Then we have student reflect on how well they would have done if they had to do the activity independently. This leads to a class discussion about the benefits of working with others, even with varying abilities, and explaining math to help reinforce concepts.