# Advanced Topics in Mathematics II

Ms. Abby Brown – Torrey Pines High School
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***Course Description***

Advanced Topics in Mathematics II is a project-based math class. Students will have the opportunity to work individually and in groups to study a variety of topics. The course includes a heavy emphasis on using computers and programming with *Mathematica*. Students will present their work to the class and other audiences. There is also a community service component to this course. Prerequisite: Successful completion of AP Calculus AB or BC. (Note: Students do *not* need to complete Advanced Topics in Mathematics I before taking ATM II.) Students have the option to receive college credits through San Diego State University as described below.

***San Diego State University Credits***

Students will have the option to enroll in two courses through SDSU as listed below:

- Fall Semester: Math 241, Mathematics Software Workshop, 1 semester unit, $92
- Spring Semester: Math 118, Topics in Mathematics, 3 semester units, $276

All students will receive high school credit for this course. College credit is optional. (Note that this is different than the requirements for the Calc II/C, Calc III/D, and Linear Algebra courses.) Details about enrollment and payment will be explained in class.

***Course Materials and Technology***

We will be using the computer program *Mathematica* every day. Students will also be expected to use the program outside of class. *Mathematica* will be available for free for students in the class who bring their own laptop computers. Limited numbers of school-owned laptop computers may be available for checkout to students to use during class time. Students are responsible for all materials checked out to them including (but not limited to) hardware, software, books, and accessories. Students with laptop computers are expected to bring them to class every day and to take care that they are well maintained.

***Guidelines and Expectations***

- Respect
  - Each other (paying attention, letting everyone participate, etc.)
  - Environment (classroom, materials, furniture, ***no food or drinks***, etc.)
  - Honesty: **The TPHS Academic Honesty Policy will be carefully followed and strictly enforced.**
  - Students should NOT take pictures or record video in class, whether during instruction, breaks, or other free time. Ms. Brown's policy statement on taking pictures in class is posted on her web site.
- Effort
  - Ask questions, have a positive attitude, be willing to try new things.
  - You must turn work in on time to receive full credit.
  - Work neatly and thoroughly.
  - Your work during class time must be for this class. **No phones unless directly related to this class.**
- Evaluation
  - Question the quality of your own work.
  - Is this work you would expect of a college student?
  - Let me, the teacher, know when something goes well or poorly or how I can help you learn better.

***Projects***

The project work in this class will be done individually and in small groups. Some assignments and projects will have specific guidelines and instructions. For most work, students will have a lot of choice in the topics and styles of their projects. Students will complete projects in four general categories. Many projects will fit into multiple categories. More details about project categories and types will be distributed in class.

- *Mathematics Projects*: Explore, demonstrate, write a lesson for, and/or create an activity about a mathematical topic previously studied or something new to you. Other projects in this category could include creating projects that help others learn features of *Mathematica*.

- *Interdisciplinary Projects*: Choose a topic that uses mathematics in another field such as physics, biology, chemistry, economics, music, art, psychology, history, or sports.

- *Reading and Research*: Read a book, part of a book, journal article, and/or internet sources about a mathematical topic. Report on your research to the class, teach a lesson, and/or create a project inspired by your reading.

- *Community Service*: Create a lesson or activity designed for other teachers and students to use to better learn and understand a particular topic. You may work directly with other teachers to create something specific for their classes and needs. You may also work with someone outside of school for client-based projects. Community service may also include participating as an instructor in *Mathematica* workshops for teachers and other students.

There will be several smaller assignments throughout the year. First semester will have more assignments and second semester will have more projects. Students will be expected to write about their experiences in this class. There will be some quizzes to check for understanding. It is unlikely there will be any formal tests with the exception of the *Mathematica* Student Certification Exam administered by Wolfram Research. Students will be informed of any changes. More details about specific assignments, distribution of activities, and the course calendar are available on the class web site: www.MathematiClub.com/class.

***Grades***

| *Fall Semester* | *Spring Semester* |
|---|---|
| 20% Participation & Presentations | 20% Participation & Presentations |
| 50% Assignments | 20% Assignments & Quizzes |
| 10% Quizzes | 40% Projects 3, 4, 5, & 6 |
| 20% Projects 1 & 2 | 20% Open House Project & Presentation |
| 100% Total | 100% Total |

Projects and assignments can vary in length, difficulty, and creativity. What may be challenging for one student may not be for another. Below are general descriptions of what will be expected of students to earn the grades they want and deserve.

- "A" students do all assignments thoroughly and turn in work on time. They come to class on time every day and use the class time well for their projects. They also work on their assignments and projects outside of regular class time. They complete projects in all four categories doing some work individually and some with other students. They pick projects that are challenging, yet not impossible. Projects are always finished in a timely manner, shared with the class, and prepared for posting on the class web site. "A" students also contribute to the class by leading special projects and participating in activities such as workshops, field trips, web forum discussions, and the Math Open House at the end of the year. To earn an "A" students must complete the *Mathematica* Student Certification Exam.

- "B" students do all assignments thoroughly and turn in work on time. They come to class every day and use the class time well for their projects. They also work on their assignments and projects outside of regular class time. They complete projects in all four categories doing some work individually and some with other students. They mostly pick projects that are challenging. Projects are usually finished in a timely manner, shared with the class, and prepared for posting on the class web site. "B" students also contribute to the class by participating in activities such as workshops, field trips, web forum discussions, and the Math Open House at the end of the year.

- "C" students do most assignments. They come to class every day, but sometimes use the class time ineffectively. They occasionally work on their assignments and projects outside of regular class time. They complete projects in all four categories doing some work individually and some with other students, but they pick projects that are less challenging and/or do not contribute equally to group projects. Projects are not always finished or done in a timely manner. "C" students rarely contribute to the class as a whole.

- Students who rarely attend class, use class time ineffectively, do not complete assignments and projects, and do not participate are in danger of receiving a "D" or an "F" for the course.

Students who take this course usually have a history of doing well in mathematics and they enjoy the subject. It is expected that students will work hard, challenge themselves, work independently and with others, and contribute to the class as a whole. If students or parents/guardians have questions at any time about progress or grades, please contact Abby Brown at abby.brown@sduhsd.net (preferred) or (858) 755-0125 ext. 2120 (voice mail).

Name: _____ Period: _____

*Please print this page, sign the form below, and return this entire page to Ms. Brown.*

I have read and understand the class description and agree to do my best to fulfill the requirements for Ms. Brown's Advanced Topics in Mathematics II class for the year. I also understand that the optional college credits will cost $92 for first semester and $276 for second semester paid to SDSU.

Abigail S. Brown Abigail S. Brown

Teacher Signature

Student (print) Signature

Parent/Guardian (print) Signature

*Syllabus Updated: 8/2018*