IB Math Studies

Course Outline

Board Approved: March 27, 2012

I. Course Information

A. Course Title: International Baccalaureate Math Studies

B. Course Code Number: 6MA702

C. Course Length: Two Years SL

D. Grade Level: 11 - 12

E. Units of Credit: 10 Credits (per year)

F. Prerequisites: Math placement determined on multiple measures

G. Type of Course: Required: Meets the UC/CSU entrance “c” requirement

II. Course Description

This mathematical studies course, available in standard level only, is for students with varied backgrounds and abilities. The course is designed to build confidence and encourage and appreciation of mathematics in students who do not anticipate a need for mathematics in their future studies. Students taking this course, however, should be already equipped with fundamental skills and a rudimentary knowledge of basic processes.

Diploma Programme subject outline—Group 5: mathematics and computer science

School name	Edgewood High School	**School code**	
Name of the DP subject	Mathematical Studies		
Level *(indicate with X)*	Higher [ ] Standard completed in two years [x] Standard completed in one year * [ ]		
Name of the teacher who completed this outline	Erin Bauer	**Date of IB training**	
Date when outline was completed		**Name of workshop** *(indicate name of subject and workshop category)*	

* All Diploma Programme courses are designed as two-year learning experiences. However, up to two standard level subjects, excluding languages ab initio and pilot subjects, can be completed in one year, according to conditions established in the *Handbook of procedures for the Diploma Programme*.

1. Course outline

- Use the following table to organize the topics to be taught in the course. If you need to include topics that cover other requirements you have to teach (for example, national syllabus), make sure that you do so in an integrated way, but also differentiate them using italics. Add as many rows as you need.
- This document should not be a day-by-day accounting of each unit. It is an outline showing how you will distribute the topics and the time to ensure that students are prepared to comply with the requirements of the subject.
- This outline should show how you will develop the teaching of the subject. It should reflect the individual nature of the course in your classroom and should not just be a “copy and paste” from the subject guide.
- If you will teach both higher and standard level, make sure that this is clearly identified in your outline.

	Topic/unit (as identified in the IB subject guide) *State the topics/units in the order you are planning to teach them.*	Contents	Allocated time One class is 56 minutes. In one week there are 5 classes.	Assessment instruments to be used	Resources *List the main resources to be used, including information technology if applicable.**
Year 1	Number and Algebra	sets of numbers: rational, integer, real; scientific notation; international units; arithmetic, geometric sequences and series; solutions of linear and quadratic systems	15 hours	Students will take teacher designed assessments throughout the course. At the end of the second year, students will sit for the group 5 Math Studies exam designed, written, and graded by the International Baccalaureate Organization. Math Studies students will also complete an independent project during this class that focuses on data collection and written interpretation of results.	*Mathematics Studies Standard Level for the IB Diploma*; Pearson Baccalaureate *Mathematics for the International Student: Mathematics Studies SL;* Haese & Harris Publications: Australia *Geometry Connections*; College Preparatory Mathematics *Algebra 2 Connections;* College Preparatory
	Sets, logic, and probability	set theory; Venn diagrams; sample space; symbolic logic- proposition, conjunction- notation of; truth tables; converse, inverse, contrapositive; tree diagrams; probability rules	30 hours		

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	Statistics and probability	classification of discrete and continuous data; histograms, stem plots, box plots; measures of central tendency and dispersion; scatter plots, best fit lines, correlation, regression lines, chi-squared test for independence, p-values, hypothesis tests	40 hours		Mathematics *Precalculus with Limits*; Brooks/Cole
	Functions	concept of mapping; graphing linear, quadratic, exponential and trigonometric; properties of each function	30 hours		
	Geometry and Trigonometry	points, lines, midpoints, distances; right triangle trigonometry; law of sines, cosines; geometry of three dimensional shapes	30 hours		
	Project		5 hours		

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Year 2	Introductory differential calculus	behavior of gradient lines, power rule for derivatives, equation of the tangent line, increasing and decreasing functions, local max and min points	45 hours		
	Financial mathematics	currency conversions, simple and compound interest, depreciation, construction of loan and repayment schedules, stock and bond investments, international currency trading FOREX	40 hours		
	Project		20 hours		
	Exam Preparation		45 hours		

2. IB internal assessment requirement to be completed during the course

Briefly explain how and when you will work on it. Include the date when you will first introduce the internal assessment requirement to your students, the different stages and when the internal assessment requirement will be due.

The internal assessment will be introduced to students during the second semester of the first year of the course, allowing students to work independently on the project throughout the summer. Students will receive additional guidance and time in class throughout the first semester of the second year of the course, culminating in the ultimate completion of the project during the beginning of the second semester of the second year.

3. Links to TOK

You are expected to explore links between the topics of your subject and TOK. As an example of how you would do this, choose one topic from your course outline that would allow your students to make links with TOK. Describe how you would plan the lesson.

Topic	Link with TOK (including description of lesson plan)
Geometry and Trigonometry	Most students tend to think of knowledge systems as being fully formed and sprung upon them. This lesson allows the student to explore the development of a system of knowledge. Students will briefly research specific topics in geometry and trigonometry, including historical backgrounds and developments of both Asian and European frameworks for specific mathematical knowledge, and to explore the possibility of a common heritage. (See below for further description of process.) Each student will describe his/her findings and discuss questions concerning conventional mathematical assumptions, as related to the theory of knowledge. For example: What is the role of inductive and deductive reasoning in mathematical knowledge? What is the connection between mathematics and logic? How do you explain the impact of culture or politics on mathematical knowledge? What is mathematical truth? Are the conclusions of mathematics concerned with truth or validity? Is mathematics invented or discovered?

4. International mindedness

Every IB course should contribute to the development of international mindedness in students. As an example of how you would do this, choose one topic from your outline that would allow your students to analyse it from different cultural perspectives. Briefly explain the reason for your choice and what resources you will use to achieve this goal.

Topic	Contribution to the development of international mindedness (including resources you will use)
Geometry and Trigonometry	Students will briefly research specific topics in geometry and trigonometry, including historical backgrounds and developments of both Asian and European frameworks for specific mathematical knowledge, and to explore the possibility of a common heritage. Each student will describe his/her findings and discuss questions concerning conventional mathematical assumptions, as related to international mindedness. For example: Can mathematical knowledge be called the most international of all systems of knowledge? Does Western mathematical theory diverge from Eastern mathematical theory? Why is the vast Asian learning in mathematics so little known in the rest of the world? Asian students are expected to do well in mathematics; what is the basis of this expectation? Is mathematics invented or discovered? (For example, Pythagoras- or his school- is recognized for the theorem relating the lengths of the sides of a right-angled triangle. It should be noted, however, that this was known in China some 400 years before Pythagoras. It is thought that Pythagoras' discovery was independent of the claim of the Chinese. This example, along with others- Newton and Leibniz are given credit for their independent discoveries of calculus during the nineteenth century- supports the argument that mathematics more or less exists in nature and is waiting to be discovered.)

5. Development of the IB learner profile

Through the course it is also expected that students will develop the attributes of the IB learner profile. As an example of how you would do this, choose one topic from your course outline and explain how the contents and related skills would pursue the development of any attribute(s) of the IB learner profile that you will identify.

Topic	Contribution to the development of the attribute(s) of the IB learner profile
Statistics and Probability	In developing knowledge and skills of statistics, students will develop qualities of open-mindedness as they consider new points of view, value different approaches to solving problems, and accept that other perspectives and solutions may also be valid. Students will become risk-takers as they become willing to risk being mathematically wrong, venture beyond their comfort zone, explore unfamiliar ideas and surroundings, and construct their own meanings through ever-increasing levels of mathematical abstraction. Students will develop inquiry abilities when they ask questions, pose problems of real world issues related to statistics and probability, and search for answers. They will research tasks and explore mathematical issues that impact their daily lives, while developing their natural curiosity and show internal motivation.

6. Resources

Describe the resources that you and your student will have to support the subject. Indicate whether they are sufficient in terms of quality, quantity and variety. Briefly describe what plans are in place if changes are needed.

*Basic and supplemental instructional materials will be recommended by site staff and district instructional services. The District Curriculum Advisory Committee will review all recommended textbooks and resources. The West Covina Unified School District Board of Education will review all final recommendations prior to approval.