Summer@SaMi Summer Camp Curriculum

Core Courses

Tadpoles
- Course Description
  - In Tadpoles classes, students learn the concepts of quantity, greater than and less than along with mastering counting to 100 Including by 2s, 5s, and 10s and reading and writing up to 10. They will learn not to confuse order with quantity. They will also learn to recognize the basic geometric shapes and understand greater and less than in terms of geometric shapes, quantities, size and other comparisons.
- Notes to Students
  - Students in grade K or 1 can attend.
- Topics
  - Monday: Counting.
  - Tuesday: Addition and subtraction.
  - Wednesday: Comparing.
  - Thursday: Measurement.
  - Friday: Fraction.

Andromeda
- Course Description
  - The Andromeda classes explain and demonstrate number theory and system by looking for a pattern. They use logic to solve problems. They expose students to basic geometry concepts including angles and triangles.
- Notes to Students
  - Students in grade 4 or 5 can attend.
- Topics
  - Monday: The Four Operations.
  - Tuesday: Number Theory.
  - Wednesday: Logic.
  - Thursday: Reminder.
  - Friday: Angles and Triangles.

Algebra I
- Course Description
  - In Algebra I, students will learn concepts in Algebra, Numbers, and Geometry, and will begin an introduction into statistics.
- Notes to Students
  - Students in grade 6, 7, 8, 9, 10, 11, or 12 can attend.
  - Students are expected to have prior mastery of pre-algebra.
- Topics
  - Monday: Integers.
  - Tuesday: Expression and Equation.
  - Wednesday: Statistics, GFC, LCM.
  - Thursday: Fraction, Ratio, Rate.
  - Friday: Decimal, Percent, Exponent.

Whirlpool
- Course Description
  - In Whirlpool classes develop understanding of and fluency with the addition and subtraction within 1000 and algebraic thinking in problem solving. They will learn measurements of time, weight, temperature, and money. They will also learn how to read tables and graphs to do data analysis and probabilities.
- Notes to Students
  - Students in grade 2 or 3 can attend.
- Topics
  - Monday: Addition and Subtraction.
  - Tuesday: Expression and Measurement.
  - Wednesday: odds and Evens.
  - Thursday: Algorithm.
  - Friday: Problem Solving.

Pre-algebra
- Course Description
  - A five-day crash course to enhance students for pre-algebra, SaMi tutors will teach students about problem solving, logic, integers, and decimals.
- Notes to Students
  - Students in grade 5, 6, 7, or 8 can attend.
- Topics
  - Monday: Multiplication and Division.
  - Tuesday: Logic.
  - Wednesday: Fraction.
  - Thursday: Factors and Integers.
  - Friday: Decimals.

Algebra II
- Course Description
  - Algebra II will allow students to learn topics such as Numbers, Algebra, Geometry, and Probability.
- Notes to Students
  - Students in grade 6, 7, 8, 9, 10, 11, or 12 can attend.
  - Students should already know and understand the Algebra I curriculum.
- Topics
  - Monday: Numbers (real number system, complex number system, prime numbers, zero factor theorem, domain).
  - Tuesday: Algebra (polynomials, factoring, quadratics, discriminant, exponents and logarithms).
  - Wednesday: Geometry (Graphing, conic sections, area/volume, trigonometry, vector addition).
  - Thursday: Probability and intro to Counting.
  - Friday: Test and Virtual Party.

Calculus
- Course Description
  - This Calculus crash course focuses on the key topics you really need to know for Calculus. It will help you become more pragmatic in your approach to study this subject.
- Notes to Students
  - Students in grade 8, 9, 10, 11, or 12 can attend. Students are expected to have prior mastery of Algebra II.
- Topics
  - Monday: Limits. o Tuesday: Derivatives. o Wednesday: Applications of the Derivative.
  - Thursday: Integration.   o Friday: Applications of Integration.

Enrichment Courses

Mathematical Games and Fun
- Course Description
  - Students will use math and logic to build their own methods for thinking. They should begin with mastery of simple arithmetic skills such as the basic operations.
- Note to Students
  - Students in grade K, 1, 2, 3, 4, or 5 can attend.
  - Students need to prepare some simple materials such as paper, scissor, toothpick, etc. Details will be sent to students enrolled.
- Topics
  - Monday: Prisms and Antiprisms.
  - Tuesday: Squiggle Maps.
  - Wednesday: Stitching Curves.
  - Thursday: Toothpick Puzzles.
  - Friday: The Game of Nim.

C++ for Beginners
- Course Description
  - Students will be exposed to the principles of programming and the C++ programming language. C++ is known to be a very powerful and efficient language. It is often used to develop game engines, games and desktop apps. It is also a language used in the USA Computing Olympiad.
- Notes to Students
  - Students in grade 6, 7, 8, 9, 10, 11, or 12 can attend.
  - Students are expected to have 30+ wpm (word per minute) typing speed. They can test their typing speed at https://www.typingtest.com/.
  - Students need to use their own computers.
- Topics
  - Monday: Get Started (comments, I/O, keywords, data types, variables, operators).
  - Tuesday: Statements (conditional operators, if, for, while do-while, break, continue).
  - Wednesday: Array (create an array, passing array in function).
  - Thursday: String.
  - Friday: Class and Object.

Java Coding Camp
- Course Description
  - This is an intensive coding camp in Java. Students will be given a variety of problems and need to program their solutions in a limited time. The level is similar to AP Computer Science A.
- Notes to Students
  - Students in grade 6, 7, 8, 9, 10, 11, or 12 can attend.
  - Pre-requisite: Java for Beginners or an equivalence.
- Topics
  - Monday-Friday: Coding Problem Sets.

C++ Coding Camp
- Course Description
  - This is an intensive coding camp in C++. Students will be given a variety of problems and need to program their solutions in a limited time. The level is similar to AP Computer Science A.
- Notes to Students
  - Students in grade 6, 7, 8, 9, 10, 11, or 12 can attend.
  - Pre-requisite: C++ for Beginners or an equivalence.
- Topics
  - Monday-Friday: Coding Problem Sets.

Python for Kids
- Course Description
  - Python for Kids is a playful introduction to programming. Students will get the opportunity to create something from nothing, use logic to turn programming constructs into a form that a computer can run, and, when things don't work quite as well as expected, use problem solving to figure out what has gone wrong. This course is a fun, sometimes challenging, and occasionally frustrating activity. The skills learned from it can be useful both in school and in extracurricular activities.
- Notes to Students
  - Students in grade 3, 4 or 5 can attend.
  - Students are expected to have 15+ wpm (word per minute) typing speed. They can test their typing speed at https://www.typingtest.com/.
  - Students need to use their own computers.
- Topics
  - Monday: Get Started.
  - Tuesday: Things in Python (strings, lists, tuples, and maps).
  - Wednesday: Drawing with the Turtle.
  - Thursday: Control Statements (ifs).
  - Friday: Going Loopy.

Java for Beginners
- Course Description
  - Java is a cross-platform, high-level language. Students will learn Java fundamentals. Through this course, we will instill the basics of programming concepts that are generic and apply well to a range of object-oriented programming languages.
- Notes to Students
  - Students in grade 6, 7, 8, 9, 10, 11, or 12 can attend.
  - Students are expected to have 30+ wpm (word per minute) typing speed. They can test their typing speed at https://www.typingtest.com/.
  - Students need to use their own computers.
- Topics
  - Monday: Your First Java Program.
  - Tuesday: Data Types and Variables.
  - Wednesday: Objects and Classes.
  - Thursday: Decision-Making and Loop.
  - Friday: File and Exception Handling.

Bytes of AI
- Course Description
  - This course will be taught in Stanford AI4All Open Learning Platform (https://ai-4-all.org/open-learning/) by a college professor. Students will learn what AI and Machine Learning are, the benefits and risks of AI and Machine Learning to the world and to themselves, and how they can be involved in the work of AI and Machine Learning.
- Notes to Students
  - Students in grade 8, 9, 10, 11, or 12 can attend.
  - No AI or computer science experience necessary.
  - This course will be taught by a college professor specialized in AI.
- Topics
  - Monday: AI & Drawing.
  - Tuesday: AI & Facial Recognition.
  - Wednesday: AI & the Environment.
  - Thursday: AI & the Criminal Legal System.
  - Friday: AI & Ethics.