SCHOLÉ ACADEMY
CLASSICAL ACADEMIC PRESS

Programming Harmony

Yearlong - 2018/19

ELIGIBLE STUDENTS:

Grades (Advanced 10th graders and 11th and 12th grade): Students should have completed Algebra 2 and Trigonometry, or show strong math skills with a willingness to learn some content from the previously mentioned courses on their own.

Class Dates: Begin Wednesday, September 5, 2018; running through Friday, May 24, 2019.
Class Times: Mondays, Wednesdays & Fridays: 2:00— 3:15 PM (EST)
Instructor: Dr. Michael Robinson
E-mail: mrobinson@scholeacademy.com

SCHEDULE FOR PROGRAMMING HARMONY:

CLASS SESSIONS DATES:

Classes will take place on Mondays, Wednesdays & Fridays: 2:00 — 3:15 PM (EST) for 32 weeks and 95 classes on the following dates* --

September (11): 5,7,10,12,14,17,19,21,24,26,28
October (14): 1,3,5,8,10,12,15,17,19,22,24,26,29,31
November (10): 2,5,7,9,12,14,16, [Thanksgiving Break] 26,28,30
December (6): 3,5,7,10,12,14 [Christmas Break]
January (11): [Christmas Break], 7,9,11,14,16,18 [End 1st Semester], 21,23,25,28,30
February (9): 1,4,6,8,11,13,15, [Winter Break],25,27
March (13): 1,4,6,8,11,13,15,18,20,22,25,27,29
April (10): 1,3,5,8,10,12, [Holy Week], 22,24,26,29
May (11): 1,3,6,8,10,13,15,17,20,22,24 [End 2nd Semester]

**Please note the above dates and times are the anticipated class sessions for this course. However, all dates are subject to change as the instructor's circumstances might dictate (e.g. illness, family emergency). Any classes canceled by the instructor will be made up at an alternate time designated by the instructor.*

PROGRAMMING HARMONY COURSE MAP:

QUARTER 1

1. Basics of programming
2. Shape and color
3. Linear and circular patterns
4. Pattern and music

QUARTER 2

1. Animations
2. Programming control and logic
3. Randomness and patterns
4. Creating functions

QUARTER 3

1. Object oriented programming
2. Digital biology
3. The best possible world
4. Digital physics

QUARTER 4

1. Student project 1
2. Discussion of projects and presentations
3. Student project 2
4. Discussion of projects and presentations

OFFICE HOURS: In addition to scheduled class times, teachers will generally designate an optional weekly session as needed. During "Office Hours" students may raise questions, seek assistance, or review class material.

REQUIRED COURSE TEXTS:

The course text is *Processing: A Programming Handbook for Visual Designers and Artists (2nd Edition) ISBN# 978-0262028288,* which is available from Amazon.com

PROGRAMMING HARMONY COURSE DESCRIPTION:

Our world is full of harmony; from the smallest organisms to orbiting planets, we see the elements of life held in intricate balance. This class will bring together science, math, art and technology to explore the wonderful equilibrium of the universe. We will learn how to write computer programs as tools for our inquiry, as well as how to think about and communicate our results using numbers and graphics. For this purpose, the free programming language Processing is an excellent starting point; it is user-friendly and will allow us to quickly make graphic designs. It is also very similar to the most popular programming languages in use today, so it should be easy for you to learn other languages in the future. Visit processing.org to learn more. For our textbook, we will use Processing: A Programming Handbook for Visual Designers and Artists (2nd Edition).

In addition to enriching your appreciation for the order all around us, this class is an excellent opportunity to prepare for college. Like advanced placement classes, this course will help you adjust to the pace of an introductory college class in a supportive environment. We will make use of material from many of your math and science classes, giving you an opportunity to review and strengthen key concepts, and also to apply what you have learned in your previous classes to produce unexpected and beautiful results.

I have been involved in teaching college classes for the last seven years, and I know that programming and communication skills will be valuable for many different paths. Even so, the thing that I am most excited about with Programming Harmony is the opportunity to create the class that I always wanted to take - a class that combines the satisfaction of applied knowledge with the fulfilment of a myriad of meaningful connections to our shared world.

The assignments in this class will be based around writing computer programs to simulate or analyze the natural and man-made world. You will also develop creative ways to communicate through writing and images. By the end of the year, you will have crafted a substantial portfolio of individual projects that should be a strong asset when applying to colleges or prospective employers. Students will need to have the willingness and the ability to devote the time needed outside of class. This course has been designed as an AP-level STEM course (though, no AP credit will be given). As a result, students should plan to commit approximately four (4) hours per week outside of class. There will also be a summer assignment to help you get a jump-start on programming.

STUDENT EXPECTATIONS: EXECUTIVE FUNCTION SKILLS

Students enrolling in Scholé Academy will be expected to show development of Executive Function Skills throughout the year. Executive Function Skills speaks to a set of qualities and skill sets students can develop and hone to better approach the courses, lectures, readings and teachers they will face in their future academic coursework.

Each teacher will invariably have his own set of requirements and skills he requires students to bring to their studies. *Generally* speaking, I believe there are five such qualities that are necessary for my students in various subjects; and I believe they would be accepted as "good" by many other teachers as well.

1. An Engaged Student: One who is willing to step into the arena of class discussion, ask questions, supply answers, generate the internal dialogue necessary to determine if what's being discussed is important and necessary to himself.

2. Note Taking: A student who during and after being engaged with the class has been trained to note important and relevant content in an organized fashion. His notes would then be consulted, independently, for application in assignments and assessments.

3. Attention to Detail & Preparedness: These students are ones who consistently adhere to deadlines, submission requirements, confirm technology is working prior to the start of class, be responsible to determine how to proceed after an absence, be responsible for consulting his course syllabus and adjusting as the class proceeds, etc.

4. Employ Critiques: These students are ones who receive feedback to one of their submissions, and then are sure to apply that feedback to future assignments rather than repeating mistakes. These students also glean information from the live class critiques

of fellow students and note mistakes to avoid by learning from others.

5. Initiative/Maturity: These students will start assignments early enough that they are able to get help if they have any questions, and will hold themselves to a high degree of understanding mastery.

Student Expectations In Action

Students will be expected to come to class prepared. This will mean completing any assignments before class, and coming to class ready to discuss results. There will also frequently be reading assignments, or other online resources, which will need to be completed before class.

During class discussion, students will review answers, pose questions, explain and justify their answers and solution. Each week the teacher will lead discussions informed by issues and problems raised by students, as well as issues introduced by the teacher.

In this class, students will be expected to listen attentively, participate actively in class discussions and practices. Students are expected to arrive to class on time and with all assigned material completed. The instructor will facilitate learning for the student, but the responsibility for staying up-to-date with classwork and assignments ultimately falls to the student.

All assignments will be due into the appropriate Schoology Assignment folder prior to the start of class each day. Some assignments may need to be scanned in, but please do not submit pictures of the assignment as they can be very hard to read. Since we will be discussing assignments in class, late assignments will in general not be accepted. Exceptions may be made on a case-by-case basis

Student Evaluation: Grading

While pursuing Programming Harmony through Scholé Academy will be "restful" we also recognize the need to provide grades for students who will be using this course as part of their prepared college transcript. It's a delicate balance to achieve both restful learning and excellent academic performance. Earning a specific grade should not overshadow achievement goals for mastery of this discipline. I will assign the following grades to your student's level of achievement: *magna cum laude* (with great praise); *cum laude* (with praise); *satis* (sufficient, satisfactory) and *non satis* (not sufficient).

Ideally, every average student working diligently should do praiseworthy work (cum laude). Those who excel beyond this expectation will be the *magna cum laude* students. Students who do adequate but not praiseworthy work be designated *satis*. *Non satis* means lacking sufficiency or adequacy.

Inasmuch as you might be fully on board with this grading method in theory, there will undoubtedly be the need to complete a college transcript with either a numeric or traditional letter grade. Traditional percentage grades will be provided and will be readily accessed on the Programming Harmony Schoology page. Additionally, Dr. Robinson will provide a transcript of that grade to the requesting parent at the end of the year.

Student Evaluation: Mastery Portrait

Mastery portrait: Students who are prepared to take Programming Harmony are toward the end of their pre-college school work. By this time they have learned much about math and science, but likely have not had a chance to apply that knowledge in different ways so that it becomes a part of how they look at the world. Programming Harmony will provide that opportunity with the end in mind of cultivating firm mathematical and scientific thinking as well as virtuous living and gratitude for creation.

- At the completion of this course *cum laude* students will be able to break down a programming problem into smaller logical steps, and successfully program a computer to execute each of those steps.
- Students will also be able to communicate effectively about order and harmony in both technical and non-technical ways
- Additionally, students will be guided to understand how the virtues represent a correct ordering of our lives in line with the order we see in the rest of the universe.

Student Evaluation: Assignments, Types & Weights

Dr. Robinson will communicate with students regarding assignment feedback and grading through the free online grading system, Schoology. He will provide students with more detailed information and access to the Programming Harmony course page.

Student's grades will be comprised of:
1. Quizzes: 20% of the grade
2. Class participation: 20% of the grade
3. Programming assignments and homework 40% of the grade.
4. Final projects: 20% of the grade

Student Evaluation: Academic Dishonesty

Students will often take assessment tests and/or quizzes privately at home. Students are on their honor to abide by Scholé Academy's Learning Philosophy which assumes the personal cultivation of Student-Virtues described in the Student-Parent Handbook.

Additionally, plagiarism is a serious and punishable offense. Proper citation of all sources is essential to the academic endeavor. Remember to cite any source if the information is not common knowledge or is an opinion obtained through any source. A plagiarized assignment will result in a failing grade. Students should consult their chosen style manual

(see Student Expectations above) for specific direction on obtaining, quoting and paraphrasing sources.

THE VIRTUAL CLASSROOM:

We will be using the free online "virtual classroom" software provided by Zoom, one of the leading companies that provides such software. The virtual classroom will provide students with interactive audio, text chat and an interactive whiteboard in which texts, diagrams, video and other media can be displayed and analyzed. We will provide students with a link (via email) that will enable students to join the virtual classroom.

Specific information regarding the technology used by Scholé Academy (including required technology) can be found by visiting the Technology in the Classroom section of the Student Parent Handbook.

Students will submit documents by scanning and uploading them to their personal computer as pdfs. They will then submit their work to the *Programming Harmony* Schoology assignment page (access granted after enrollment is secured).

ABOUT THE INSTRUCTOR:

Michael Robinson is an engineer, teacher and lover of the arts. As an engineer, he develops new ways for people to interact with computer-controlled machines. He holds a Ph.D. in mechanical engineering from Penn State and has researched assistive devices for the blind and algorithms for autonomous vehicles. He has taught at a middle school and at large and small colleges in the United States and Africa. He also sojourns in the world of art by writing code to create visual works, which he hopes might help us better understand our experiences. He and his wife, Gabrielle, live in State College, Pennsylvania.