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Teacher Contact

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* **Was this course Previously Approved by UC?** No

* **Course Title:**	Integrated Math II
* **Transcript Title /Abbreviation:**	**Transcript Title /Abbreviation: Course Code** a-g Integrated Math II a-g Mathematics II
* **Seeking "Honors" Distinction:**	No
* **Subject Area:**	Mathematics
* **Category:**	Integrated Math 2
* **Grade Level for which this course has been designed:**	☐ 9 ☑ 10 ☑ 11 ☐ 12
* **Unit Value:**	1.0 (one year, 2 semesters, or 3 trimesters equiv.)

* **Is this course, or any separate section of this course, taught in an online learning** No

environment:

* **Is this course classified as a Career Technical Education:** No

* **Brief Course Description**

Integrated Mathematics Course II is the second of three mathematics courses required for college entrance. The course content expands upon the mathematical content and techniques of Integrated Mathematics Course I. In addition to further development of the strands with connections and applications, this course emphasizes unifying ideas such as mathematical modeling and argumentation, variation, algorithmic thinking, and multiple representations. The course emphasizes Geometry.

Pre-Requisites

Grade of C or better in Algebra I or Integ. Math I - Required

Co-Requisites

Context for Course (optional)

History of Course Development (optional)

Textbooks

TEXTBOOK 1

* **Title:**	Pearson Integrated Math II
* **Edition:**	CA
* **Publication Date:**	2010
* **Publisher:**	Pearson Learning
* **Author(s):**	Dr. Randall I. Charles et al.

TEXTBOOK 1

URL Resource:

* **Usage:** Primary Text

Read in entirety or near entirety

TEXTBOOK 2

* **Title:** Carnegie Integrated Math II

* **Edition:** CA

* **Publication Date:** 2004

* **Publisher:** Carnegie Learning Inc.

* **Author(s):** Hadley

URL Resource:

* **Usage:** Supplementary or Secondary Text

Read in entirety or near entirety

TEXTBOOK 3

* **Title:** Core Plus Mathematics Course 2

* **Edition:** CA

* **Publication Date:** 2007

* **Publisher:** McGraw-Hill

* **Author(s):** Christian R. Hirsch et al.

TEXTBOOK 3

URL
Resource:

* **Usage:** Supplementary or Secondary Text

Read in entirety or near entirety

Supplemental Instructional Materials

Solutions Manuel- A complete solution for each problem in the Student Edition lessons.

Khan Academy- www.khanacademy.org- Videos and extra practice to ensure student comprehension.

LearnZillion- www.learnzillion.com- Videos and extra practice to ensure student comprehension.

CSI Algebra I and CSI Geometry- 21st Century Math Projects- Group unit projects to help students connect concepts to the real-world.

* **Course Purpose**

The purpose of Math II is to expand upon the mathematical content and techniques of Integrated Math I course. This course will emphasize skills necessary for problem-solving and will continue growth in mathematics. Students will apply concepts of numbers and operations, algebraic relationships, geometric and spatial relationships, measurement, and data analysis and probability. The integrated math program is an alternative approach to achieve mathematical understanding. The content provides the foundation for future work in mathematics and science. An understanding of integrated mathematics is essential in preparation for careers that utilize or depend on mathematics. It provides students with the tools to represent and solve problems in a variety of ways. Students will better understand the language and abstract symbols of mathematics and how to use that language in real-life applications.

Throughout this course, common core standards are applied through Mathematical Practice Standards to ensure students experience mathematics as

useful, logical, and coherent. Math II provides opportunity for students to discover means of making sense of their world through their application of subject matter to real-world problems as well as making sense of the subject matter through its application to real-world encounters, while practicing and improving fluency in computation and communication. Students will look for and discover examples in their world where the ideas and methods of the course can be applied. They will look for and discover patterns, test conjectures and try multiple representations and approaches to analyze examples, discover solutions and verify the validity of their solutions. They will communicate their finding with precision and accuracy.

* **Course Outline**

The intent of Math II is to explore, investigate, and understand the importance of mathematics through real-world experiences. In mathematics, students will acquire the knowledge and skills to problem solve, communicate, reason, create models, and make connections.

The key assignments in each unit will include textbook problems, informal and formal assessments, group activities, and interactive learning problems, technology labs, and activity labs for each lesson found on the students online course access. These key assignments and labs will reinforce the necessary topics and skills needed to help students reach mastery of these topics and skills.

Math II focuses on the following 6 key units:

Unit 1: Students extend the laws of exponents to rational exponents and explore distinctions between rational and irrational numbers by considering their decimal representations. Students explore relationships between number systems: whole numbers, integers, rational numbers, real numbers, and complex numbers. The guiding principle is that equations with no solutions in one number system may have solutions in a larger number system.

At the end of this unit, the students will be able to:

- Extend the properties of exponents to rational exponents
- Use properties of rational and irrational numbers
- Reason quantitatively and use units to solve problems
- Perform arithmetic operations with complex numbers
- Use complex numbers in polynomial identities and equations

Unit 2: Students consider quadratic functions, comparing the characteristics of quadratic functions to those of linear and exponential functions. They select from among these functions to model phenomena. Students learn to anticipate the graph of a quadratic function by interpreting various forms or quadratic expressions. They expand their experience with functions to include more specialized functions, such as absolute value, step, and piecewise.

At the end of this unit, students will be able to:

- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations
- Build a function that models a relationship between quantities
- Build new functions from existing functions

Unit 3: Students focus on the structure of expressions, rewriting expressions to clarify and reveal aspects of the relationship they represent. They create and solve equations, inequalities, and systems of equations involving exponential and quadratic expressions.

At the end of this unit, students will be able to:

- Interpret the structure of expressions
- Write expressions in equivalent forms to solve problems.
- Perform arithmetic operations on polynomials
- Create equations that describe numbers or relationships.
- Understand solving equations as a process of reasoning and explain the reasoning
- Solve equations and inequalities in one variable
- Solve system of equations

Unit 4: Students will build on probability concepts that began in the middle grades and expand their ability to compute and interpret probabilities for compound events, independent events, and conditional probability. Students use probability to make informed decisions.

At the end of this unit, students will be able to:

- Summarize, represent, and interpret data on two categorical and

quantitative variables

- Understand independence and conditional probability and use them to interpret data
- Use the rules of probability to compute probabilities of compound events in a uniform probability model

Unit 5: Students build a formal understanding of similarity. They identify the criteria for similarity of triangles, use similarity to solve problems, and apply similarity in right triangles to understand right triangle trigonometry. They also pay particular attention to special right triangles and the Pythagorean Theorem. It is in this unit that students develop knowledge of geometric proof. They use that they know about congruence and similarity to prove theorems involving lines, angles, triangles, and other polygons. They also explore a variety of ways to write proofs.

At the end of this unit, students will be able to:

- Understand similarity in terms of similarity transformations
- Prove theorems involving similarity
- Define trigonometric ratios and solve problems involving right triangles

Unit 6: Students prove basic theorems about circles, which include theorems about chords, secants, inscribed angles, and tangents dealing with segment length and angle measures. When given the equation of a circle, they draw the graph in the coordinate plane and apply techniques for solving quadratic equations. Students develop informal arguments justifying common formulas for circumference, area, and volume of geometric objects.

At the end of this unit, students will be able to:

- Give an informal argument for the formulas for the circumference of a circle, areas of a circle, volume of a cylinder, pyramid, and cone.
- Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

*** Key Assignments**

- Unit by unit problem sets: Problem sets range from simple equations and move toward real life application problems that require a deeper understanding of concepts. Short answer and essay questions will also be included so students can justify steps, explain answers, etc. Daily homework assignments will be designed to increase fluency in computation, use formulas and process and accuracy in representations, and communication to basic concepts and terminology.
- Group projects/investigations: Group projects discussed at the beginning of each unit designed to develop cooperative communication and problem solving including brainstorming strategies and best problem-solving models in applied situations. Student based projects will incorporate practical applications of key concepts from each unit. Projects will include discussion of what models are used, why they were selected, how they were applied, the outcome of the application, and an analysis of their findings. Student projects may be presented orally, digitally, or in written form. Practical applications will include gathering, modeling, and analyzing data that is both linear and nonlinear and architectural representations of geometric concepts.
- Specific group projects will be selected from CSI Algebra and CSI Geometry 21st Century Math Projects. CSI Algebra and Geometry is a collection of different algebraic and geometric inspired mathematical puzzles. The puzzles are intended to target specific Algebra 1 and Geometry units, but also add additional challenging questions to each activity. Each puzzle has six "scenes" which will uncover a mystery variable. These six mystery variables will be used to decode a cryptic text message and if everything is correct, the result will match one of the six suspects. Students will be actively engaged in the puzzle solving element in these projects. Each puzzle uses a variety of levels of problems to keep a variety of learners engaged and challenged.

*** Instructional Methods and/or Strategies**

College Model of Education: Personalized Learning Model emphasizes independent study while attending Resource Center classes 2-3 times a week. Students may choose to meet weekly with their Personalized Learning Teacher and/or Highly Qualified Teacher instead. The same instructional methods are used in either case.

- Direct Instruction- From center classes 2-3 times a week
- Project/Group Work- In class and independently from CSI Algebra and CSI Geometry 21st Century Math Projects
- On-line/Interactive Instruction- Khan Academy and Learnzillion.com
- Presentation- Concepts are introduced, explained, and demonstrated during weekly class/teacher (Personalized Learning and Highly Qualified) meetings. Following the information, corresponding questions, writing assignments, and activities are given to evaluate comprehension.
- Discussion- Students analyze, discuss, and respond to issues and ideas stimulated by presentations and readings. Students work in small groups or one-on-one whenever possible to increase participation.
- Oral Presentation- Students present information during weekly class meetings both formally and informally. Presentations include Power Point, debate, and discussion, and always include an outline or handout and audiovisual aides.
- Visual and graphic descriptions of problems
- Hands-on projects and experimental learning
- Interactive online lessons and projects using iPads/Computers
- White boards
- Problem-based learning

* **Assessments Including Methods and/or Tools**

- Attendance at Resource Center class 2-3 times a week OR weekly review of work by Personalized Learning Teacher/Highly Qualified Teacher

- Discussions- Classroom participation and small group work. If not enrolled in Resource Center class then weekly discussion with Personalized Learning Teacher/Highly Qualified Teacher.
- Formative Assessment- Placement exams for incoming students to properly assess knowledge.
- Observational Assessment- Students are asked to participate, discuss, and explain methods to class. (Every day)
- Project-based Assessment- Students are asked to work together on projects. Projects are based on units learned throughout the text.
- Traditional Assessments- Includes end of chapter exams (multiple choice and written response). A final exam will be given at the end of each semester (multiple choice and written response).

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