

COURSR OUTLINE – FMP 10

TERM: January – April 2019

CLASS TIME:

INSTRUCTOR: Ali Seyedarshi

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TEXTBOOK: Foundations of Mathematics & Pre-Calculus 10
Mickelson 2nd Edition

LEARNING OUTCOME:

This course enables students to consolidate their understanding of linear relations and extend their problem-solving and algebraic skills through investigation, the effective use of technology, and hands-on activities. Students develop and graph equations in analytic geometry; solve and apply linear systems, using real-life examples; and explore and interpret graphs of quadratic relations. Students will investigate similar triangles, the trigonometry of right triangles, and the measurements of three-dimensional figures. Students will consolidate their measurement of three-dimensional figures. Students will consolidate their measurement of three-dimensional figures. Students will consolidate their mathematical skills as they solve problems and communicate their thinking.

TOPICS:

- Operations on **powers** with integral exponents
- **Prime factorization**
- **Functions and relations:** connecting data, graphs, and situations
- **Linear functions and systems:** slope and equations of lines
- **Arithmetic sequences**
- **Multiplication** of polynomial expressions and functions
- Primary **trigonometric** ratios

ASSESSMENT:

Formative

Oral quizzes, self-assessment, homework, presentations, quick summaries, and open-ended questions.

Summative:

Unit tests, graphing calculator, research project, midterm and final exams

EVALUATION:

Unit Tests	25%
Technology	5%
Mid-Term Exam	30%
Final Exam	35%
Research Project	<u>5%</u>
Total	100%

LETTER GRADES AND THEIR EQUIVALENTS

A (86-100%)	Excellent
B (73-85%)	Very Good
C+(67-72%)	Good
C (60-66%)	Average
C- (50-59%)	Minimal Achievement
I (0-49%)	Incomplete
F (0-49%)	Fail (Final Grade)

To avoid an undeserved low grade, if you stop attending class, it is your responsibility to officially withdraw through the office.

FPPL:

Learning ultimately support the well-being of the self, the family, the community, the land and the ancestors.

BIG IDEAS

Algebra allows us to generalize relationships through abstract thinking.	The meanings of, and connections between, each operation extend to powers and polynomials.	Constant rate of change is an essential attribute of linear relations and has meaning in different representations and contexts.	Trigonometry involves using proportional reasoning to solve indirect measurement problems.	Representing and analyzing situations allows us to notice and wonder about relationships.
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The First Peoples Principles of Learning:

- Learning ultimately supports the well-being of the **self**, the family, the community, the land, the spirits, and the ancestors.
- Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place)

Core Competencies:

By the end of this course students will be expected to:

- Acquire and communicate mathematical ideas using appropriate language, connections, and representation.
- Collaboratively develop, analyze, and carry out mathematical modeling based on proven mathematical concepts.
- Reflect on experiences and accomplishments to demonstrate one's own progress in learning.

Curricular Competencies:

Students are expected to do the following:

Reasoning and modeling

- Develop **thinking strategies** to solve puzzles and play games
- Explore, **analyze**, and apply mathematical ideas using **reason, technology, and other tools**
- Develop, demonstrate, and apply mathematical understanding through **play, story, inquiry, and problem solving**

- **Visualize** to explore and illustrate mathematical concepts and relationships
- **Explain and justify** mathematical ideas and **decisions** in **many ways**
- **Represent** mathematical ideas in concrete, pictorial, and symbolic forms
- Use mathematical vocabulary and language to contribute to **discussions** in the class room
- Take risks when offering ideas in classroom **discourse**

Connecting and reflecting

- **Reflect** on mathematical thinking
- **Connect mathematical concepts** with each other, other areas, and personal interests
- Use **mistakes as opportunities to advance learning**
- **Incorporate** first peoples worldviews, perspectives, **knowledge**, and **practices** to make connections with mathematical concepts

Curriculum Organizer	Teaching Strategies and Assessment	Big Ideas & Core Competences	Exploration of Curriculum
Operation on Power Week 1	<ul style="list-style-type: none"> • Analysis of power rules • Meaning of zero power and negative power • Operation with powers • Understanding power to power and combined operations • Quizzes and tests • Self-assessment 	<ul style="list-style-type: none"> • The meaning of, and connection between each operation extend to powers and polynomials • Power zero means two numbers with the same power have been divided • Negative power mean two numbers with the same base have been divided by the bigger power belonging to the divisor 	<ul style="list-style-type: none"> • Understand the need to use power in mathematical contests • Develop, demonstrate, and apply rules of power to solve variety of questions • Understand that very small numbers can be written in power form • Understand the fact that radicals can be written in terms of power

FPPL:

- Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, or reciprocal relationships, and a sense of place).

Curriculum Organizer	Teaching Strategies and Assessment	Big Ideas & Core Competences	Exploration of Curriculum
Functions and Relations Week 4-5	<ul style="list-style-type: none"> • Define a relation • Write a set of ordered pairs and apply the in a real world problem • Define a function • Compare and contrast a function and non-function • Define linearity • Give examples of non-linear functions • Quizzes and tests • Self-assessment 	<ul style="list-style-type: none"> • A picture is worth thousand words • How can a graph give us an accurate picture of complex variations • Is it possible to represent a graph by numbers only • Can a graph of population increase, be used to predict the future of population 	<ul style="list-style-type: none"> • Explain the meaning of set of ordered pairs. Give an example • Explain different kind of functions • Understand non-linearity • Give real world examples of non-linearity and draw your conclusion • Write a problem and explain the solution: <ol style="list-style-type: none"> 1. Graphically 2. Numerically 3. Analytically 4. descriptively

FPPL:

- Learning involves generational roles and responsibilities.

Curriculum Organizer	Teaching Strategies and Assessment	Big Ideas & Core Competences	Exploration of Curriculum
<p>Functions and Linear Systems</p> <p>Week 6-7 Students will meet and review current grades to understand areas needing growth</p>	<ul style="list-style-type: none"> Slope: Positive, negative, zero, and undefined Type of equations of a line (point slope, slope intercept, and general) Equations of parallel and perpendicular lines Connections between representations, graphs, tables, and equations Domain and range, both in situational and in non-situational contexts Use of technology in graphing Quizzes and tests Self-assessment 	<ul style="list-style-type: none"> Concept of slope is important to describe rate of change in almost all aspects of human life Constant rate of change is an essential attribute linear relations and has meaning in different representations and context Graph of a function yields an accurate picture of a complex variations A relation is a set of ordered pairs that can be graphed or can give a set of numerical data Not all the functions are linear and linear functions are the building block of advanced mathematics 	<ul style="list-style-type: none"> Understand domain and range Graph, linear, and non-linear functions Understand test for a function Use function notations Slope Zero and undefined slopes Slopes of parallel and perpendicular lines Graphs, tables, and equations

FPPL:

- Learning recognizes the role of indigenous knowledge.

Curriculum Organizer	Teaching Strategies and Assessment	Big Ideas & Core Competences	Exploration of Curriculum
Arithmetic Sequences	<ul style="list-style-type: none"> Applying formal language (common 	<ul style="list-style-type: none"> Sequences are the building blocks of 	<ul style="list-style-type: none"> Understand the difference between the

Week 8-9	<p>difference, first term, general term) to increasing and decreasing linear patterns</p> <ul style="list-style-type: none"> • Connecting to linear relations • Extensions: exploring arithmetic series • Use of technology in graphing sequences • Quizzes and tests • Self-assessment 	<p>advanced mathematics</p> <ul style="list-style-type: none"> • Linear functions are the general terms of a particular sequence • Extend the idea of series to calculate the formula for regeneration of rodents and some insects and see the wonderful and astonishing results 	<p>sequences and the series</p> <ul style="list-style-type: none"> • Explain arithmetic series and sequences using numbers, symbols, and real life examples • Extend the idea of arithmetic sequences and series to a more complicated series with non-linear terms • Find sum to an arithmetic increasing or decreasing series • Explain the meaning of “arithmetic mean” and determine the sequence, using arithmetic means • Given the first term and the common difference construct a sequence and the corresponding series
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FPPL:

- Learning is embedded in memory, history, and story.

Curriculum Organizer	Teaching strategies and Assessment	Big Ideas & Core Competences	Exploration of Curriculum
Multiplication and Factoring of Polynomial Expressions	<ul style="list-style-type: none"> • Multiplication: applying the distributive property between two polynomials including trinomials 	<ul style="list-style-type: none"> • Definition of polynomial function leads to constructing more advanced functions like rational function 	<ul style="list-style-type: none"> • Understand the definition of monomial, binomial, trinomial, and polynomial • Explain the

<p>Week 10-12 Students will meet and review current grades to understand areas needing growth</p>	<ul style="list-style-type: none"> • Connecting the product of binomials with an area model • Factoring GCF of a polynomial • Simpler cases involving trinomials and difference of squares • Quizzes and tests • Self-assessment 	<ul style="list-style-type: none"> • Polynomials can be used to define numbers systems with different bases • Factoring polynomials leads to the solution of more complicated equations • Changing different functions to a polynomial summation is the basis of the computer algorithm to graph all sorts of complex functions 	<ul style="list-style-type: none"> • coefficient of leading term, the ascending and the descending order • Understand the meaning of like terms and add or subtract like terms • Connect the product of binomials with an area model • Apply the distributive property between two polynomials including trinomials
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FPPL:

- Learning involves patience and time., Learning requires exploration of ones identity

Curriculum Organizer	Teaching Strategies and Assessment	Big Ideas & Core Competences	Exploration of Curriculum
<p>Primary trigonometric ratios</p> <p>Week 13</p>	<ul style="list-style-type: none"> • Sine, cosine and tangent ratios • Right triangle problems: determining missing sides and/or angles using trigonometric ratios • Pythagorean theorem • Trigonometry is the generalization of Pythagorean theorem • Direct and indirect 	<ul style="list-style-type: none"> • Trigonometry involves using proportional reasoning to solve indirect measurement problems • Using Pythagorean theorem, many relations can be found amongst trigonometric ratios • Measuring height of inaccessible mountains s and width of the rivers 	<ul style="list-style-type: none"> • Use scientific calculator to determine the sine, cosine, and tangent of different angles • Solve triangles to find unknown angles and sides • Understand the fact that in complementary angles sine of one is the same as cosine of other • Understand why the tangent of 90 degree is

	measurement <ul style="list-style-type: none">• Quizzes and tests• Self-assessment	is possible using trigonometry	undefined
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FPP:

- Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations.