Course Plan: Math 10 Foundations and Pre-Calculus
Course Instructor: Emily Taylor
Email: etaylor@sd44.ca

COURSE DESCRIPTION:

Math 10 FPC is one of the BC Provincial Mathematics 10 courses, offered in an online setting. The course follows the BC Provincial curriculum and satisfies the requirements for graduation. Math 10 FPC is the first course in the pathway leading to the senior math requirement for entrance into many post secondary math and science-based programs. For the complete Ministry Curriculum Math 10 FPC document, go to:

https://curriculum.gov.bc.ca/curriculum/mathematics/10/foundations-of-mathematics-and-pre-calculus

BIG IDEAS:

The Big Ideas consist of generalizations and principles and the key concepts important in an area of learning. They reflect the "Understand" component of the Know-Do-Understand model of learning. The big ideas represent what students will understand at the completion of the curriculum for their grade. They are intended to endure beyond a single grade and contribute to future understanding. Students will explore and understand the following five Big Ideas throughout the Math 10 FPC course:

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.

CORE COMPETENCIES:

A Core Competency is a skill that all learners need to have to be successful in all aspects of their life. There are 3 core competencies: Communication (Communicating & Collaborating), Thinking (Critical Thinking, Creative Thinking), and Personal & Social (Positive Personal & Cultural Identity, Personal Awareness & Responsibility, and Social Responsibility).
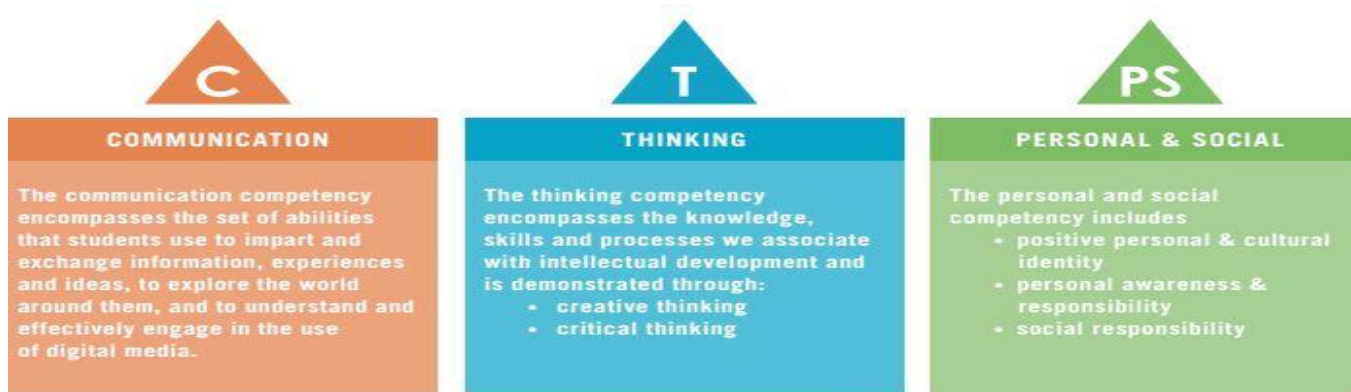
COURSE EXPECTATIONS:

- The self-paced nature of the course demands that students manage their time effectively to complete the course by the deadline (June 1st or as determined by your program requirements). Successful students should engage in coursework for at least one hour each day.

- Students must successfully attempt all activities in the course in order to receive a passing grade, including unit quizzes, unit assignments, unit tests, review packages, performance tasks, reflections, the portfolio and the final exam.

- Students must pass a minimum of half of the Unit Tests in order to receive a passing grade in this course.

- The course material is run in Moodle, which is an interactive Learning Module System. This course teaches the material through interactive video lessons with complete detailed explanations to the content. Each lesson includes a note taking supplement, practice homework, and video solutions to the practice assignments. All content, quizzes, review materials and additional studying resources are found in the course in Moodle.

- Students should take care that their communication with the instructor and with other students, through email, Moodle-messaging, and/or forums, is course related, clear in message and respectful in tone.

- This course is mainly to be completed by distance, although unit tests and the final exam must be completed under the supervision of a Online Learning Teacher. Unit Tests must be completed at either the Mountainside or other North Vancouver District High School OL centers. The Final Exam must be completed at the Mountainside OL Center. Assignments and online quizzes may be completed at home.

- **Course work must be original; students are expected to complete their own work on an individual basis unless otherwise stated by the teacher. Any student who plagiarizes the work of another or does not do the work themselves, either in test situations or on major assignments, will face disciplinary action. This may range from receiving a zero on an assignment or test to disciplinary action by the administration**.

LEARNING STANDARDS: Curricular Competencies

Students are expected to be able to do the following:

Reasoning and modelling
- Develop **thinking strategies** to solve puzzles and play games
- Explore, **analyze**, and apply mathematical ideas using **reason**, **technology**, and **other tools**
- **Estimate reasonably** and demonstrate **fluent, flexible, and strategic thinking** about number
- **Model** with mathematics in **situational contexts**
- **Think creatively** and with **curiosity and wonder** when exploring problems

Understanding and solving
- Develop, demonstrate, and apply mathematical understanding through play, story, **inquiry**, and problem solving
- **Visualize** to explore and illustrate mathematical concepts and relationships
- Apply **flexible and strategic approaches** to **solve problems**
- Solve problems with **persistence and a positive disposition**
- Engage in problem-solving experiences **connected** with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures

Communicating and representing
- **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 classroom
- 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

The Student Substantive Activities will cover the following **Learning Outcomes (Curricular Competencies).**

- Model with mathematics in situational contexts
- Apply **flexible and strategic approaches** to **solve problems**
- Use mistakes as opportunities to advance learning

These are 3 of the 18 learning outcomes in the course curriculum, which comprises 16% of the course Learning Outcomes/Activities. (3/18 =16%)

LEARNING STANDARDS: Course Content

Students are expected to know the following:

- operations on **powers** with integral exponents
- **prime factorization**
- **functions and relations:** connecting data, graphs, and situations
- **linear functions:** slope and equations of lines
- **arithmetic sequences**
- **systems** of linear equations
- **multiplication** of polynomial expressions
- polynomial **factoring**
- primary **trigonometric** ratios
- **financial literacy:** gross and net pay

UNIT OVERVIEWS:

Unit 1: Exponents

Big Idea(s): *The meaning of, and connections between, each operation extend to powers and polynomials. Algebra allows us to generalize relationships through abstract thinking.*
Core Competency Focus: *Thinking, Communiation*
First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: The Exponents unit will focus on positive and negative exponents, exponent laws, evaluating, numerical and variable bases. Students will understand operations on powers with integral exponents, and they will work on developing computational fluency, which requires a strong sense of number. Students will apply whole number strategies to rational numbers and algebraic expressions. Performance tasks will include creating a graphic organizer (which can be used for studying purposes) outlining exponent laws and examples of applications of these laws.

Unit 2 - 4: Relations & Functions, Linear Relations, and Linear Systems

Big Idea(s): *Constant rate of change is an essential attribute of linear relations and has meaning in different representations and contents. Algebra allows us to generalize relationships through abstract thinking. Representing and analyzing situations allows us to notice and wonder about relationships.*
Core Competency Focus: *Thinking*
First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: The Linear Relations units will focus on communicating domain and range in contextualized situations, one or more types of equations of lines (parallel and perpendicular), and solving linear equations both graphically and algebraically. Students will analyze relationships among data, graphs, situations, and linear relations, as well as work with slope and equations of lines in order to solve linear systems. They will examine patterns in order to identify regularities and form generalizations. In addition, they will use concrete materials and dynamic interactive technology in order to model situations graphically and/or symbolically.

Unit 5 - 6: Polynomials and Factoring

Big Idea(s): *The meaning of, and connections between, each operation extend to powers and polynomials. Algebra allows us to generalize relationships through abstract thinking. Representing and analyzing situations allows us to notice and wonder about relationships.*
Core Competency Focus: *Thinking*
First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview:
The Polynomial and Factoring units will focus on the distributive property between two polynomials, the greatest common factor, and varying complexities of trinomial expression, and difference of squares. Students will continue to work on their sense of computational fluency and use algebraic reasoning to describe and analyze mathematical relationships. They will practice using flexible strategies, which involves choosing an appropriate strategy to solve problems (e.g. common factor, difference of squares, factor by grouping).

Unit 7: Trigonometry

Big Idea(s): *Trignometry involves using proportional reasoning to solve indirect measurement problems. Algebra allows us to generalize relationships through abstract thinking. Representing and analyzing situations allows us to notice and wonder about relationships.*
Core Competency Focus: *Thinking*
First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: The Trigonometry unit will focus on how proportional reasoning is used to make sense of multiplicative relationships. Students will recognize the primary trigonometric ratios (sine, cosine, and tan) and understand when to use each ratio. Students will develop an understanding of how trigonometry helps us understand ourselves and the world around us (e.g. daily activities, local and traditional practices, and the environment). They will use tools and/or technology to analyze relationships and test conjectures, and they will be given the opportunity to represent mathematical ideas in a variety of ways.

Big Idea(s): *Algebra allows us to generalize relationships through abstract thinking. Representing and analyzing situations allows us to notice and wonder about relationships.*
Core Competency Focus: *Thinking, Personal/Social*
First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: The Financial Literacy unit will focus on types of income, income tax, other deductions, gross and net pay. Students will develop an understanding of how stories can be told using mathematic evidence and reasoning. They will be asked to connect mathematical concepts to each other and to other areas and personal interest, as well as explain and justify mathematical ideas and reflect how mathematics can be used to support personal choices.

STUDENT LEARNING ACTIVITIES AND STRATEGIES:

- online lessons
- online practice homework
- paper-based unit assignments
- online lessons quizzes
- unit tests and final exam
- portfolio – collection of notes
- online and paper based review packages
- online games, activities and interactions
- reflective writing
- performance tasks (grasp tasks)

ASSESSMENT:

The course will include many formative assessment opportunities where students will receive teacher feedback and also have the opportunity to incorporate self-reflection and self-assessment tools. Summative assessment will be used on individual performance tasks that are incorporated in throughout the units. After each unit test, the teacher will provide feedback based on criteria and performance standards. The North Vancouver Curriculum Hub Principles of Assessment - http://nvsd44curriculumhub.ca/assessment/

Formative
- practice homework/video solutions, self-marking of unit assignments, online lesson quizzes, review exercises – checking for completion and understanding of lessons.
- Teacher/student appointments to discuss work and progress

Summative:
- unit assignments, unit tests, performance tasks, review packages, final exam, portfolio – written feedback, rubric assessment and grade

EVALUATION:

Based on performance standards and criteria as outlined in each assignment:

Assessment	Percentage of Final Mark
Unit Assignments	12%
Unit Tests	52%
Portfolio	8%
Unit Quizzes	8%
Final Exam	10%
GRASP Tasks	10%
Course Total	100%

RESOURCES:

The required readings and assignments are provided online for each lesson. Students must have access to a computer with internet capabilities, as well as to a functioning printer. The DL center at Mountainside is available for students who do not have computer/printer access at home or who would like to meet with the teacher for support. There is no textbook required.

NOTE: ***THERE IS NO LONGER A PROVINCIAL EXAM**. The *Course Final Exam* is still a **mandatory** component of this course.

As of January 2018, all students must take a **NUMERACY EXAM** at least ONE time during grades 10 – 12. The Numeracy Exam is not necessarily based on Math 10 FPC content, but rather based on foundational math skills.