**EAST YORK COLLEGIATE INSTITUTE**

**MCF3M Course Outline 2016-2017**

This Course Outline is based upon the Ministry of Education and Training Ontario Curriculum for Grade 11 University/College

Mathematics as per the revised document of 2006.

***Board:*** Toronto District School Board ***School:*** East York Collegiate Institute ***Curriculum Leader:*** R.Singh

***Developing Teachers:*** P. Kianpour, G. Kyritsis

***Date of Revision:*** June 2014

***Course Title:*** Functions and Applications, Grade 11, University/College Preparation

***Grade:*** 11

***Course Code:*** MCF3M

***Credit Value:*** 1.0

***Pre-requisite:*** MFM2P or MPM2D

***Textbook:*** Functions & Applications 11, McGraw-Hill Ryerson, 2008

***Resources:*** Functions & Applications 11, Nelson, 2007

Access to Graphing Calculators, Fathom and Geometers’ Sketchpad

OMCA/OAME Materials

**Course Description**

This course introduces basic features of the function by extending students’ experiences with quadratic relations. It focuses on quadratic, trigonometric, and exponential functions and their use in modeling real-world situations. Students will represent functions numerically, graphically, and algebraically; simplify expressions; solve equations; and solve problems relating to applications. Students will reason mathematically and communicate their thinking as they solve multi-step problems. Throughout the course, students will engage in the following processes: Problem Solving, Reasoning and Proving, Reflecting, Selecting Tools and Computational Strategies, Connecting, Representing, Communicating.

**Strands**

Quadratic Functions 44 periods Exponential Functions 37 periods Trigonometric Functions 25 periods

**Program Planning Considerations**

***Exceptional Students****:* Additional time will be allowed for tests. Additional accommodations will be provided in consultation with the Guidance, Special Education and ESL departments.

***Technology:*** Manipulatives, Graphing Calculators, and Geometer’s Sketchpad will be utilized for hands-on and technology-related applications.

***Career Education:*** Links to related fields will be established throughout the course. ***Co-operative Education****:* These will be provided in association with Guidance Department. ***Mathematics Anxiety****:* Attention will be addressed according to the following:

• Cultural perspectives

• Positive reinforcements

• Variety of assessment techniques

• Group structures

• Consideration for Learning Styles

**Learning Skills**

Assessment of the learning skills will be done on an ongoing basis throughout the academic year by observations of students at work, checklists and interviews. This will include:

• Classwork/homework (Work habits, homework and organization)

• Completed work and seeking assistance (Organization and initiative)

• Persistence and independence at tasks (Working independently and initiative)

• Extension of task (Organization and initiative**)**

• Achievement of group goals (Team work)

**Assessment Strategies**

A variety of teaching/assessment strategies to address students’ needs will be used during the school year. Formative assessments will be ongoing throughout the academic year. These may include:

• Diagnostic assessment

• Formative assessment

• Performance assessment

• Portfolio assessment

• Rubrics

• Checklists

**Term Summative Evaluations (70% Term Work)**

• Tests, quizzes, tasks and other forms of term summative evaluations will occur throughout the academic year at the end of units of work as outlined in the accompanying course outline.

• Students will be provided with reasonable opportunities to master skills relating to the achievement of the curriculum

expectations before assessment and evaluation occurs.

• Major evaluations will be announced at least one week in advance.

• Accommodations will be made for school activities, statutory holidays, religious days, cultural days, sports events and other occurrences that may impact on any scheduled evaluation. It is the student’s responsibility to notify teachers of such absences in advance and to make up missed work.

• Absence on the day of an evaluation must be documented. If a student must miss an evaluation, s/he is expected to:

a) see the teacher before the absence to arrange for an alternative date to make up the evaluation; or

b) in case of illness or unexpected absence, present a note to the teacher, signed by a parent or guardian, immediately upon their return to explain the absence. An alternate evaluation will then be scheduled at a mutually convenient time.

• The EAST YORK Late Policy applies to all assignments and evaluations. See your Agenda book.

• Cheating will not be tolerated in any form and will be dealt with appropriately.

**Final Mark Calculation**

Calculation of the Term Mark will be based upon the ***Categories*** of the ***Achievement Chart***. This chart is meant to assist teachers in planning instruction and learning activities for the achievement of the curriculum expectations. It is also used in designing assessment and evaluation tools and in providing feedback to students. Each mathematical topic will contain each category in the chart due to the integrated nature of the discipline in mathematics. Final marks will be calculated as follows:

**Term Work: 70%**

***Levels of Achievement:***

Knowledge and Understanding: 50% Level 1: 50 - 59%

Application: 20% Level 2: 60 – 69%

Thinking and Inquiry: 20% Level 3: 70 – 79%

Communication: 10% Level 4: 80 - 100%

30% final Evaluation

**Reporting**

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| **Report #1** | **Report #2** | **June Report** |
| 100% Term Work | 100% Term Work  (Cumulative Sept – Feb) | 70% Term Work + 10% Summative Tasks + 20% June Examination  (Cumulative Sept to June) |

**Communication**

***Access to extra help and mark records***. Students are encouraged to consult their teachers on a regular basis for extra help and guidance as it relates to improving their academic performance. Students are also expected to discuss strategies for improving their grades with their teachers. Students are expected to view their report cards as an indication of their current achievement and discuss with teachers for clarification.

***Communication with Parents/Guardians***. Comments pertaining to academic achievement and learning skills are placed on the report cards are primarily to provide feedback for parents/guardians as well as students. Parent/guardian nights can be used for one to one discussion. At times it may be necessary to contact parents/guardians by telephone to discuss a student’s performance. Parents/guardians are also encouraged to contact teachers as and when the need arises

EAST YORK COLLEGIATE INSTITUTE

**MCF3M Daily Course Outline 2014-2015**

**Textbook:** Functions & Applications 11, McGraw-Hill Ryerson, 2008

**Strand #1: Quadratic Functions (44 periods)**

Overall Expectations:

• To expand and simplify quadratic expressions, solve quadratic equations, and relate the roots of a quadratic equation to the corresponding graph;

• To demonstrate an understanding of functions, and make connections between the numeric, graphical, and algebraic

representations of quadratic functions;

• To solve problems involving quadratic functions, including those arising from real-world applications.

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| **PER** | **TOPIC** | **SECT** | **ASSIGNMENT** | **SUPPLEMENTARY SHEETS IN BINDER** |
| **UNIT #1: QUADRATIC FUNCTIONS (13 periods)** | | | | |
| 1 & 2 | Identify Functions | 1.1 | Investigations pp. 6-9 p. 12, #1-15 | OAME Sheets  Exercise sheet |
| 3 & 4 | Domain & Range | 1.2 | p. 20, #1-11 | OAME Sheets |
| 5 & 6 | Mini-test  Analyse Quadratic Functions | 1.3 | Investigations pp. 23-25 p. 28, #1-8, 11 | TI-83 Instructions Sheet  Modelling sheets |
| 7 | Stretches of Functions | 1.4 | Investigation p. 31-32 p. 38, #1-12 | Investigation Sheet |
| 8 | Translations of Functions | 1.5 | Investigations pp. 41-43 p. 45, #1-9 | Investigation Sheet |
| 9 | Sketch Functions using Transformations | 1.6 | Investigation p. 47 p. 51, #1-6 | OAME Investigations  Summary Sheet |
| 10 | Applications | 1.6 | p. 52, #7-12 |  |
| 11 | Review |  | pp. 54-57 |  |
| 12 | TEST |  |  |  |
| 13 | Performance Task – Height of Plane |  | p. 58-59 |  |
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| **UNIT #2: FACTOR QUADRATIC EXPRESSIONS (13 periods)** | | | | |
| 1 | Quadratic Functions: Exploring Forms | 2.1 | p. 71, #1-7 |  |
| 2 | Applications | 2.1 | p. 72, #8-16 |  |
| 3 | Quadratic Functions: Comparing Forms | 2.2 | Investigations pp. 76 & 86 p. 83, #1-7 |  |
| 4 | Applications | 2.2 | p. 84, #8-18 |  |
| 5 & 6 | Mini-test  Factoring ax2+bx+c | 2.3 | Investigation p. 88 p. 96, #1-13 | Factoring Sheets |
| 7 & 8 | Select & Apply Factoring Strategies | 2.4 | Investigation p. 98 p. 105, #1-9 | Factoring Sheets |
| 9 | Solving Quadratic Functions by Factoring | 2.5 | Investigation p. 108 p. 112, #1-2 |  |
| 10 | Applications | 2.5 | p. 112, #3-10 |  |
| 11 | Review |  | pp. 114-117 |  |
| 12 | TEST |  |  |  |
| 13 | Performance Task – Processor Fabrication |  | p. 118-119 |  |

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| **UNIT #3: REPRESENT QUADRATIC FUNCTIONS (15 periods)** | | | | |
| 1 & 2 | Complete the Square | 3.1 | Investigation p. 124 p. 132, #1-11 |  |
| 3 | Applications | 3.1 | p. 133, #12-19 |  |
| 4 & 5 | Quiz  Quadratic Formula | 3.2 | p. 142, #1-4, 11 | Extra Practice Sheets |
| 6 | Applications | 3.2 | p. 143, #5-10, 12-14 |  |
| 7 & 8 | Quiz  Real Roots of Quadratic Equations | 3.3 | Investigation p. 145 p. 150, #1-15 | Extra Practice Sheet |
| 9 | Multiple Forms of Quadratic Functions | 3.4 | Investigation p. 153 p. 161, #1-7 | Extra Practice Sheets |
| 10 | Applications | 3.4 | 162, #9-13 |  |
| 11 & 12 | Model with Quadratic Equations | 3.5 | Investigations pp. 164-168 p. 169, #1-12 | OAME Sheets |
| 13 | Review |  | pp. 174-177 |  |
| 14 | TEST |  |  |  |
| 15 | Performance Task – Roller Coaster |  | pp. 178-179 |  |
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| **1 & 2 CUMULATIVE REVIEW - see binder**  **3 CUMULATIVE TEST #1 (Units #1-3)** | | | | |

**Strand #2: Exponential Functions (37 periods)**

Overall Expectations:

• To simplify and evaluate numerical expressions involving exponents, and make connections between the numeric, graphical, and algebraic representations of exponential functions;

• To identify and represent exponential functions, and solve problems involving exponential functions, including those arising from real- world applications;

• To demonstrate an understanding of compound interest and annuities, and solve related problems.

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| **UNIT #4: EXPONENTIAL FUNCTIONS (17 periods)** | | | | |
| 1 & 2 | Exponent Rules | 6.1 | Investigations pp. 280-282 p. 285, #1-15 | Extra Practice Sheet |
| 3 & 4 | Evaluate Powers with Integer Exponents | 6.2 | Investigation p. 288 p. 293, #1-17 | Extra Practice Sheet |
| 5 & 6 | Evaluate Rational Exponents | 6.3 | p. 302, #1-14 | Extra Practice Sheet |
| 7 & 8 | Mini-test  Model Data with Exponential Functions | 6.4 | Investigations pp. 305-308 p. 309, #1-9 | OAME Sheets |
| 9 & 10 | Exponential Functions & Their Properties | 6.5 | Investigations pp. 312-316 p. 317, #1-10 | OAME Sheets |
| 11 & 12 | Compare Linear, Quadratic & Exponential  Functions | 6.6 | Investigations pp. 319-322 p. 323, #1-11 | OAME Sheets  Extra Practice Sheets |
| 13 & 14 | Exponential Growth & Decay | 6.7 | p. 331, #1-11 |  |
| 15 | Exponential Regression  Performance Task – Modelling Exponentials |  | pp. 334-335 pp. 340-341 |  |
| 16 | Review |  | pp. 336-339 |  |
| 17 | TEST |  |  |  |
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| **UNIT #5: COMPOUND INTEREST (10 periods)** | | | | |
| 1 & 2 | Explore Simple vs Compound Interest | 7.1 | Investigation p. 346 p. 352, #1-14 | Additional Activity Sheets |
| 3 & 4 | The Compound Interest Formula | 7.2 | Investigation p. 355 p. 359, #1-16 |  |
| 5 | Present Value | 7.3 | p. 365, #1-10 |  |
| 6 & 7 | Solve Financial Problems Using Technology | 7.4 | Investigation p. 367 p. 370, #1-17 | TVM Instructions |
| 8 | Review |  | pp. 372-375 |  |
| 9 | TEST |  |  |  |
| 10 | Performance Task – Bank Accounts |  | p. 376-377 |  |

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| UNIT #6: ANNUITIES (7 periods) | | | | |
| 1 & 2 | Future Value of an Ordinary Annuity | 8.1 | Investigations pp. 382-383 p. 387, #1-10 | OAME Sheets |
| 3 & 4 | Present Value of an Ordinary Simple  Annuity | 8.2 | Investigation p. 390 p. 395, #1-11 | OAME Sheets |
| 5 & 6 | Payments & Total Interest | 8.3 | Investigation p. 397 p. 401, #1-14 | OAME Sheets |
| 7 | Effects of Changing Conditions of an  Ordinary Simple Annuity | 8.4 | Investigations pp. 405-407 p. 409, #1-11 | OAME Sheets |
| 8 | Review |  | pp. 412-415 |  |
| 9 | TEST |  |  |  |
| 10 | Performance Task – Postsecondary  Education |  | pp. 416-417 |  |
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| **1 & 2**  **3** | **CUMULATIVE REVIEW – see binder**  **CUMULATIVE TEST #2 (Units #4-6)** | | | |

**Strand #3: Trigonometric Functions (25 periods)**

Overall Expectations:

• To solve problems involving trigonometry in acute triangles using the sine law and the cosine law, including problems arising from real- world applications;

• To demonstrate an understanding of periodic relationships and the sine function, and make connections between the numeric, graphical,

and algebraic representations of sine functions;

• To identify and represent sine functions, and solve problems involving sine functions, including those arising from real-world applications.

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| **UNIT #7: ACUTE ANGLE TRIGONOMETRY (13 periods)** | | | | |
| 1 & 2 | Use Trigonometry to Find Lengths | 4.1 | Investigation p. 186 p. 189, #1-16 | Extra Practice Sheet |
| 3 | Use Trigonometry to Find Angles | 4.2 | p. 194, #1-12 | Extra Practice Sheet |
| 4 | Solve Problems Involving Two Right  Triangles | 4.3 | p. 200, #1-8 | Extra Practice Sheet |
| 5 & 6 | Mini-test  Investigate the Sine Law | 4.4 | Investigation p, 202 p. 206, #1-16 | Extra Practice Sheet |
| 7 & 8 | Investigate the Cosine law | 4.5 | Investigation p. 210 p. 214, #1-13 | Extra Practice Sheet |
| 9 & 10 | Make Connections with the Sine & Cosine  Law | 4.6 | Investigation p. 216 p. 219, #1-16 | Extra Practice Sheet |
| 11 | Review |  | pp. 222-225 |  |
| 12 | TEST |  |  |  |
| 13 | Performance Task |  | pp. 226-227 |  |
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| **UNIT #8: TRANSFORMATIONS OF THE SINE FUNCTION (12 periods)** | | | | |
| 1 & 2 | Periodic Functions | 5.1 | Investigation p. 232 p. 235, #1-12 |  |
| 3 & 4 | Circles & the Sine Ratio | 5.2 | Investigation p. 239 p. 245, #1-17 |  |
| 5 | Investigate the Sine Function | 5.3 | Investigations pp. 248-251 p. 252, #1-3 |  |
| 6 & 7 | Investigate Transformations of Sine Curves | 5.4 | Investigations pp. 254-255 p. 261, #1-14 |  |
| 8 & 9 | Make Connections with Sine Functions | 5.5 | Investigations pp. 264-265 p. 266, #1-7 |  |
| 10 | Review |  | pp. 268-271 |  |
| 11 | TEST |  |  |  |
| 12 | Performance Task – Earth Rotation |  | pp. 272-273 |  |
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| **June Cumulative Review (Units #1-8) – See binder**  **SUMMATIVE TASKS (10%) & JUNE EXAMINATION (20% of Final Mark)** | | | | |