COURSE INFORMATION

DATE: September 2023
SCHOOL: Yeshiva High School of Ottawa
DEPARTMENT HEAD: N/A
TEACHER: Mr. Atef Morcous
DEPARTMENT: General Studies, Maths and Sciences

CURRICULUM POLICY DOCUMENT		The Ontario Curriculum: Grades 11 and 12 – Mathematics (2007, revised)	
COURSE TITLE	Advanced Functions, Grade 12	**COURSE CODE**	MHF4U
PRE-REQUISITE	Functions, Grade 11, University Preparation, or Mathematics for College Technology, Grade 12, College Preparation	**GRADE & TYPE**	Grade 12 University
FULL YEAR / SEMESTER	Semester	**CREDIT VALUE**	1.0

COURSE DESCRIPTION
This course extends students' experience with functions. Students will investigate the properties of polynomial, rational, logarithmic, and trigonometric functions; develop techniques for combining functions; broaden their understanding of rates of change; and develop facility in applying these concepts and skills. Students will also refine their use of the mathematical processes necessary for success in senior mathematics. This course is intended both for students taking the Calculus and Vectors course as a prerequisite for a university program and for those wishing to consolidate their understanding of mathematics before proceeding to any one of a variety of university programs.

UNIT DESCRIPTIONS:

UNIT 1 — GRAPHS OF POLYNOMIAL FUNCTIONS	TIME: 15 HOURS
Students extend their knowledge of linear and quadratic functions to general polynomials and polynomials of degree greater than two. An emphasis is placed on making connections between the equations and the graphs of polynomials with the nature of change and rates of change being a crucial underlying theme. Students are introduced to the remainder and factor theorems to factor polynomial expressions, which is then applied to zeroes of graphs, roots of equations, and solving inequalities. A thorough treatment of symmetry, zeros, and behaviour around intercepts and at the ends provides students with a comprehensive set of analysis tools to draw upon throughout the course.	

UNIT 2 — MANIPULATING ALGEBRAIC EXPRESSIONS	TIME: 10 HOURS
Students extend their knowledge of rational functions to include those with degree greater than one in the numerator and/or the denominator, as well as those with oblique asymptotes. Students apply their knowledge of polynomials to rational expressions, including operations, simpli	

fication, solving, inequalities, graphing, and relevant applications. The underlying theme of rates of change is extended to include rational functions. A thorough treatment of the features of rational functions extends student understanding to include the location of various asymptotes and function behaviour approaching asymptotes.

UNIT 3 — THEORY AND COMPOSITION	TIME: 8 HOURS

Students investigate the periodic nature and graphical properties of trigonometric functions including the meaning and application of radian measure. Students explore the effects of transformations on their graphs and equations. They apply these concepts to model authentic problems.

UNIT 4 — MUSIC AND TECHNOLOGY	TIME: 6 HOURS

Students are introduced to the properties of exponential and logarithmic growth and their application in the world around us, e.g., bacterial growth, carbon dating, Richter, pH, and Decibel scales. Students develop understanding of the graphs and the inverse relationship of logarithmic and exponential functions. The laws of exponents are extended to develop the laws of logarithms. Students gain facility with operations involving logarithms and exponents within the context of a problem. Students apply their understanding of rates of change and function behaviour to exponential and logarithmic functions and use them to solve problems, including graph analysis and curve sketching.

UNIT 5 —CHARACTERISTICS OF FUNCTIONS	TIME: 11 HOURS

Students investigate the results of combining functions, including those resulting from addition, subtraction, multiplication, and division, and apply their knowledge to predict and describe the properties of the resulting functions. Students extend their understanding of functions to include the composition of two functions using both graphical and algebraic models. Using modelling and reasoning, students solve problems involving the application of combinations and compositions of function, with a particular emphasis on those with solutions that are not accessible by standard algebraic techniques.

UNIT 6 — FINAL SUMMATIVE ASSESSMENT	TIME: 11 HOURS

STUDENT EVALUATION CRITERIA					
TERM – 70%		**FINAL – 30%**		**FINAL REPORT CARD GRADE CALCULATION**	
Knowledge/Understanding	25%	Knowledge/Understanding	25%		
Inquiry/Thinking	25%	Inquiry/Thinking	25%	**TERM TOTAL + FINAL TOTAL**	
Communication	25%	COMMUNICATION	25%	**= REPORT CARD MARK**	
Application	25%	Application	25%		

ASSESSMENT METHODS		
OBSERVATIONS:	**CONVERSATIONS:**	**PRODUCTS:**
• Informal presentations • Reading skills • Writing process steps (graphic organizers, research notes, outlines, drafts, editing checklists) • Listening and speaking skills • Self-assessment • Records of practice including checklists, anecdotal notes (homework, classroom contributions, metacognition charts, notetaking)	• Peer feedback / editing • Group work records • Conferences (student- teacher, group) • Classroom contributions • Composition/ arrangements • Response Journals	• Review quizzes • Unit tests • Projects • Oral presentations • Assignments • Summative tasks • Final Examination (30%)

LEARNING SKILLS	
Report Cards will include a letter grade for the following Learning Skills:	
INDEPENDENT WORK	**The student:** ▪ accomplishes tasks independently ▪ accepts responsibility for accomplishing tasks ▪ follows instructions ▪ regularly completes assignments on time and with care ▪ uses time effectively
COLLABORATION	**The student:** ▪ works willingly and cooperatively with others ▪ listens attentively, without interrupting ▪ takes responsibility for his/her share of the work to be done ▪ helps to motivate others, encouraging them to participate ▪ shows respect for the ideas and opinions of others
ORGANIZATION	**The student:** ▪ organizes work when faced with a number of tasks ▪ devises and follows a coherent plan to complete a task ▪ demonstrates ability to organize and manage information ▪ follows an effective process for inquiry and research
RESPONSIBILITY	**The student:** ▪ completes homework on time and with care ▪ follows directions ▪ shows attention to detail ▪ perseveres with complex projects that require sustained effort ▪ applies effective study practices
INITIATIVE	**The student:** ▪ seeks out new opportunities for learning ▪ seeks necessary and additional information ▪ requires little prompting to complete a task, ▪ approaches new learning situations with confidence and a positive attitude ▪ seeks assistance when needed
SELF-REGULATION	**The student:** ▪ sets individual goals and monitors own progress ▪ seeks clarification or assistance when needed ▪ reflects and assesses critically own strengths, needs and interests ▪ perseveres and makes an effort when responding to challenges

NOTE: The above chart is a reformatting of the skills identified in the Ministry of Education's _**Guide to the Provincial Report Card, Grades 9 – 12**_ : _**Appendix C: pages 27 to 29**_ .

POLICIES AND PROCEDURES	
ATTENDANCE	The Ontario Ministry of Education requires 110 hours of instruction for each course. As such, it is essential for the students to arrive punctually to each class. Students arriving more than ten minutes late will be marked "Late" on their report card. Students who are absent for an acceptable reason (see below) still have to make up the number of hours missed under the supervision of a teacher or the principal according to their availability. It is the student's duty to determine and arrange this supervision, and YHSO does not guarantee teacher's or principal's availability. ***Students who are absent for non-acceptable reasons will forfeit their credit.*** ACCEPTABLE REASONS FOR ABSENCE • Medical reason (may require a physician's note) • Family trips or special occasions (up to four missed classes per course) Regardless of reason for an absence, if a student misses more than 26 classroom hours they will forfeit their credit.
ASSIGNMENTS	Students are responsible to complete all their assignments and homework on time. Teachers will write all assignments, homework and tests on a classroom board, along with their due dates, but students are accountable to complete these assessments punctually. ***Assignments handed in late may result in a deduction of marks.*** Teachers will post all assessments and assignments and their due dates on Google Classroom. Students and their parents will have access to the Google Classroom for their courses.
BEHAVIOUR	Students may not act in any manner that disrupts the education of another, or distracts a teacher. This includes: • Excessive noise • Physical disruptions • Eating (unless granted individual permission) • Use of technology not for schoolwork purposes • Acts of disrespect such as name calling, abusive or offensive language or gestures Failure to adhere to these rules will result in disciplinary action as described in the Student Handbook and Course Calendar.
PLAGIARISM	Academic integrity and honesty is expected from every student in Yeshiva High School of Ottawa. We take all instances of suspected dishonesty, plagiarism, or any form of "cheating" very seriously. A student who submits work that is, in whole or in part, plagiarized, will be subject to academic penalties. Repeated infractions may result in the loss of a credit and further disciplinary action. A student who assists another student in academic dishonesty may face academic consequences, including revocation of a credit.