**MTH101A** – Foundation Course in Mathematics *Prerequisite to*

**Instructor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Consultation Hours: \_\_\_\_\_\_\_\_\_\_\_\_\_**

**Contact details: \_\_\_\_\_\_\_\_\_\_\_\_\_  
Class Schedule and Room: \_\_\_\_\_\_\_\_**

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| **Course Description** |
| This is a course on pre-calculus covering the following topics: Basics of algebra, equations and inequalities in one variable, functions and their graphs, exponential and logarithmic functions, trigonometric functions, trigonometric identities, inverse trigonometric functions, trigonometric equations, polar coordinate system, coordinates and lines, curve sketching, conic sections, systems of equations, sequences, mathematical induction, and the binomial theorem. |

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| **Learning Outcomes** |
| On completion of this course, the student is expected to present the following learning outcomes in line with the Expected Lasallian Graduate Attributes (ELGA) and the outcomes prescribed by the CHED Memorandum Order for the BS Mathematics program.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | ELGA | Learning Outcome | Program Outcome | | | | | | | | | Critical and Creative Thinker  Effective Communicator  Lifelong Learner | At the end of the course, the student will | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | apply appropriate pre-calculus concepts, thinking processes, tools, and technologies in the solution to various conceptual or real-world problems. | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |  | 🗸 | |

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| **Program Outcomes (BS Mathematics)** |
| A graduate of the program should be able to |
| 1. Apply analytical, critical and problem solving skills using the scientific method. |
| 1. Carry out basic mathematical and/or statistical computations and use appropriate technologies in the analysis of data, and in pattern recognition, generalization, abstraction, critical analysis, and problem solving. |
| 1. Gain mastery in the core areas of mathematics: algebra, analysis and geometry |
| 1. Demonstrate skills in pattern recognition, generalization, abstraction, critical analysis, problem-solving and rigorous argument. |
| 1. Develop an enhanced perception of the vitality and importance of mathematics in the modern world, including the interrelationships within mathematics and its connection to other disciplines |
| 1. Appreciate the concept and role of proof and reasoning and demonstrate knowledge in reading and writing mathematical proofs. |
| 1. Make and evaluate mathematical conjectures and arguments and validate their own mathematical thinking |
| 1. Communicate mathematical ideas orally and in writing using clear and precise language |

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| **Additional Requirements** |
| * **2 Quizzes and skills check** * **Midterm Exam** * **Final Exam** |

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| |  |  |  | | --- | --- | --- | |  | **FOR STUDENTS**  **with FINAL EXAM** | | | *with*  *no missed quiz* | *With*  *one missed quiz* | | Average of quizzes | 40% | 30% | | Midterm Exam | 30% | 35% | | Final exam | 30% | 35% |   **Passing Grade: 65%** |

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| **Learning Plan** | | | |
| **LEARNING OUTCOMES** | **TOPIC** | **WEEK NO.** | **LEARNING ACTIVITES** |
| At the end of the course, the student will apply appropriate pre-calculus concepts, thinking processes, tools, and technologies in the solution to various conceptual or real-world problems. | **1. Equations and Inequalities in One Variable**  1.1 Linear Equations  1.2 Quadratic and Rational Equations  1.3 Linear, Quadratic and Rational Inequalities  1.4 Equations and Inequalities Involving Absolute Values | Weeks 1-2  1.5 hrs  1.5 hrs  3 hrs  2 hrs | * Cooperative Learning * Skills Exercises * Seatwork/Homework |
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| **2. Functions and Their Graphs**  2.1. Functions (Domain, range, graph, vertical line test, increasing/decreasing functions)  2.2. Evaluating Functions  2.3. Types of Functions (Linear and constant, absolute value, quadratic, polynomial, rational)  2.4. Operations on Functions  2.5. Piecewise-defined Functions  2.6 One to one Functions and the Horizontal Line Test  2.7 Inverse Functions  **QUIZ 1 (1.5hrs)**  **3. Exponential and Logarithmic Functions**  3.1. Exponential Functions  3.2. Logarithmic Functions  3.3. Laws of Logarithms  3.4. Exponential and Logarithmic Equations | Weeks 2-5  4 hrs  5 hrs  2 hrs  3 hrs  Week 6  5 hrs | * Cooperative Learning * Skills Exercises * Seatwork/Homework |
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| **4. Coordinates and Lines**  4.1. The Coordinate Plane  4.2. Distance Formula and Midpoint Formula  4.3. Lines (Inclination and slope of a line, forms of equations of a line, parallel and perpendicular lines)  4.4. Distance from a Point to a Line | Weeks 7  5 hrs | * Cooperative Learning * Skills Exercises * Seatwork/Homework |
|  | **MIDTERM EXAM (2 hrs)** | | |
|  | **5. Conic Sections**  5.1. Circles  5.2. Parabolas  5.3. Ellipses  5.4. Hyperbolas  \* Include finding equations of conics satisfying certain properties  **6. Trigonometric Functions**  6.1. Angle Measure  6.2. Trigonometric Functions of Angles and Trigonometric Ratios  6.3. Coterminal Angles and Reference Angles  6.4. Trigonometric Functions of Real Numbers  6.5. Graphs of Trigonometric Functions  **7. Trigonometric Identities**  7.1. Fundamental Identities and Pythagorean Identities  7.2. Sum and Difference Identities  7.3. Double-Angle and Half-Angle Identities  **QUIZ 2 (1.5hrs)**  **8. Inverse Trigonometric Functions**  **9. Trigonometric Equations** | Week 8  5 hrs  Weeks 9-12  7 hrs  5 hrs  2.5 hrs  2.5 hrs | * Cooperative Learning * Skills exercises * Seatwork/Homework |
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|  | **10. Mathematical Induction**  Proofs by Mathematical Induction  \*Include examples using sequences  **11. The Binomial Theorem**  11.1 The Binomial CoefficientS  11.2 The Binomial Theorem | Weeks 13  2 hrs  2 hrs | * Cooperative Learning * Skills exercises * Seatwork/Homework |
| **FINAL EXAMINATION (2 hrs)** | | | |

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| **References** |
| Blitzer, R., (2004). Algebra and Trigonometry (2nd Edition). Pearson Education (Asia) PTE Ltd.  Leithold, L., (2002). College Algebra and Trigonometry. Pearson Education (Asia) PTE Ltd.  Rees, P., Sparks, F. and Sparks Rees, C., (2003). College Algebra (10th Edition), McGraw-Hill Publishing Company  Sobel, M. and Lerner, N., (1979). Algebra and Trigonometry - a Pre-Calculus Approach (2nd Edition). Prentice-Hall, Inc.  Stewart, J., Redlin, L. and Watson, S., (2007). Algebra and Trigonometry, (2nd Edition). Brooks/Cole (Thomson Learning) |
| **Online Resources** |
| *Paul’s Online Math Notes.* Accessed July 5, 2018 from[*http://tutorial.math.lamar.edu/*](http://tutorial.math.lamar.edu/)  *Spector, L., The Math Page.* Accessed July 5, 2018 from[*http://www.themathpage.com/*](http://www.themathpage.com/) |

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| **Class Policies** |
| 1. There will be 2 quizzes, a midterm exam and a final exam. Students who missed the Midterm and/or Final Exams needs to make up for the missed exam. 2. Cancellation of the lowest quiz is not allowed. 3. As a general policy, no special or make-up tests for missed exams other than the midterm or final examination will be given. However, a faculty member may give special exams for 4. approved absences (where the student concerned officially represented the University at some function or activity). 5. absences due to serious illness which require hospitalization, death in the family and other reasons which the faculty member deems meritorious. 6. If the student has no valid reason for missing an exam (for example, the student was not prepared to take the exam) then the student receives 0% for the missed quiz. 7. Mobile phones and other forms of communication devices should be on silent mode or turned off during class. 8. Students are expected to be attentive and exhibit the behavior of a mature and responsible individual during class. They are also expected to come to class on time and prepared. 9. Sleeping, bringing in food and drinks, and wearing a cap and sunglasses in class are not allowed. 10. Students who wish to go to the washroom must politely ask permission and, if given such, they should be back in class within 5 minutes. Only one student at a time may be allowed to leave the classroom for this purpose. 11. Students who are absent from the class for more than 5 meetings will get a final grade of 0.0 in the course. 12. Only students who are officially enrolled in the course are allowed to attend the class meetings. |

Approved by:  **DR. JOSE TRISTAN F. REYES**

Chair, Mathematics and Statistics Department

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*September 2018/ R. Ponsones,Y.Lim,E.Nocon,L.Ruivivar,S.Tan,F.Campeña*