M5 Core Mathematics

Course Syllabus - 2025 Term 2

Teacher: Les Smith **Department**: Mathematics **Periods per week**: 2

Credits: 1.0 **Subject Code**: MA32102

Course Description

This course will begin with sequences and series as students will explore arithmetic, quadratic, and geometric sequences. Students will learn summation notation and develop formulas for calculating finite and, when possible, infinite sums of arithmetic and geometric sequences.
The second part of the course will review basic statistics based around sampling methods and measures of central control. Students will then learn how to ;calculate measures of spread from date, study and analyze statistical graphs, calculate and estimate percentiles, and finally compare two samples using the t-statistic and the z-statistic.

Course Content

4. **Unit 4: Statistics**
   - 4.1. Statistics Review
   - 4.2. Sampling Methods
   - 4.3. Methods of Central Tendency
   - 4.4. Grouped Data
   - 4.5. Measures of Variation
   - 4.6. Ground Data and Variation
   - 4.7. Statistics Graphs
   - 4.8. Histograms
   - 4.9. Percentile and Skewness
   - 4.10. Discrete Percentile
   - 4.11. Skewed Distribution
5. **Unit 5: Sequences**
   - 5.1. Sequences and Notation
   - 5.2. Arithmetic Sequences
   - 5.3. Higher Order Sequences
   - 5.4. Geometric Sequences
6. **Unit 6: Series**
   - 6.1. Introduction of Series
   - 6.2. Arithmetic Series
   - 6.3. Geometric Series
   - 6.4. Infinite Series

Learning Outcomes

<u>Statistics</u>

- Students will learn about different types of data and how to design a statistical research project by defining population parameters
- Students will learn different sampling methods such as simple random, stratified, and cluster sampling
- Students will learn how to calculate and interpret measures of central tendency such as mean, median, and mode

- Students will learn how to calculate and interpret measures of dispersion such as range, interquartile range, variance, and standard deviation
- Students will learn statistical graphs such as pie charts to summarize qualitative data
- Students will learn statistical graphs such as stem-and-leaf plots, histograms, ogives, and box-and-whisker plots to summarize the distribution of quantitative data
- Students will learn how to calculate and interpret percentiles
- Students will learn how to compare two sample means with the t-statistic and two sample proportions with the z-statistic

Sequences and Series

- Students will recognize and define arithmetic sequences as well as find the nth term of an arithmetic sequence and solve other problems involving their applications.
- Students will recognize and define quadratic or higher order sequences.
- Students will recognize and define geometric sequences as well as find the nth term of a geometric sequence and solve other problems involving their applications.
- Students will convert summation notation into a sum and vice versa.
- Students will find finite partial sums from arithmetic and geometric sequences and solve problems involving their applications.
- Students will identify when an infinite geometric series converges to a finite sum and calculate it as well as solve problems involving their applications.

Learning Resources

- McGraw Hill Precalculus
- Finite Mathematics, Rolf 7th ed.
- GeoGebra interactive algebra and geometry software
- Google Suite: Forms, Slides
- Lesson workbooks per unit

Assessment Methods

Guided Practice and Assignments (30%)

The guided practice must be submitted on the due date for full credit.

Workbooks: submit after completing both guided practice and the assignment. The workbook will be submitted with the mastery check after it has been taken. In some cases, if time permits, the workbooks will be submitted before the mastery check.

Late: If the workbook is submitted afterward the due date and time, an automatic 20% reduction will be applied. If you're absent without informing the teacher, the 20% reduction will be auto applied. If you did inform the teacher of your absence no loss of points will be incurred. After the initial 20%, a 10% reduction will be applied until 50% after which, if complete, the maximum score available is 50%.

Knowledge Check (10%)

Online forms: If the knowledge check is submitted after I have checked the form submission, you will lose points for the entire form.

Mastery Checks (20%)

These are paper based. You can use your Guided practice and Assignment workbook during the check. The mastery check and workbook will be submitted at the same time. In some cases the workbook will be submitted before the check

Enrichment (extra credit)

These assignments are also located in the workbook. Completing them will be extra credit or varying amounts. The extra credit applied will not be more than the total point for the student work. It will be used to raise the point values for any points lost.

Unit Tests (10%)

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Closed book summative assessment. 50 min at the end of each unit.

Evaluation Breakdown

Student Work	**G**uided *In-Class* Practice	**0.35**
	Assignments	
	Enrichment	
	Projects	**0.05**
Formative Assessments	**M**astery Check	**0.20**
	Unit Tests	**0.10**
Final Exam		**0.30**

National Thai Curriculum Standards

Strand 2: Measurement

- ☐ Standard M2.1: Understanding the basics of measurement; ability to measure and estimate the size of objects to be measured
  - ☐ Grade 10-12/1: Apply knowledge of trigonometric ratio of angles in estimating distance and height.
- ☐ Standard M2.2: Solving measurement problems
  - ☐ Grade 10-12/1: Solve problems on length and height by applying trigonometric ratio.

Strand 5: Data Analysis and Probability

- ☐ Standard M5.1: Understanding and ability to apply statistical methodology for data analysis
  - ☐ M5.1 Gr. 10-12/1: Understand simple methodology for opinion polling.
  - ☐ M5.1 Gr. 10-12/2: Find arithmetic mean, median, mode, standard deviation and percentile of data.
  - ☐ M5.1 Gr. 10-12/3: Select central tendency suitable to data and objectives.
- ☐ Standard M5.2: Application of statistical methodology and knowledge of probability for valid estimation
  - ☐ M5.2 Gr. 10-12/1: Apply opinion poll results for projecting events that may happen in given situations.
  - ☐ M5.2 Gr. 10-12/2: Explain random sampling, events, probability of events, and apply results obtained for projecting events that may happen in given situations.
- ☐ Standard M5.3: Application of knowledge of statistics and probability for decision-making and problem-solving
  - ☐ M5.3 Gr. 10-12/1: Apply data, information and statistics for decision-making and problem-solving.
  - ☐ M5.3 Gr. 10-12/2: Apply knowledge of probability for decision-making and problem-solving.

Strand 6: Mathematical Skills and Processes

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- ☐ Standard M6.1: Capacity for problem-solving, reasoning, and communication; communication and presentation of mathematical concepts; linking various bodies of mathematical knowledge and linking mathematics with other disciplines; and attaining ability for creative thinking
  - ☐ Grade 10-12/1: Apply diverse methods for problem-solving.
  - ☐ Grade 10-12/2: Appropriately apply mathematical and technological knowledge, skills and processes for problem-solving in various situations.
  - ☐ Grade 10-12/3: Suitably provide reasoning for decision-making and appropriately present the conclusions reached.
  - ☐ Grade 10-12/4: Accurately and succinctly use mathematical language and symbols for communication, communication of concepts and presentation.
  - ☐ Grade 10-12/5: Link various bodies of mathematical knowledge and link mathematical knowledge, principles and processes with those of other disciplines.
  - ☐ Grade 10-12/6: Attain ability for creative thinking.

[Total 15 indicators]