

RESTRICTIONS**RATIONALE*****Enduring Understanding:***

This unit covers important basic concepts in algebra and trigonometry that a tertiary student is expected to master to undertake advanced mathematical concepts, such as calculus. Emphasis is placed on developing strong foundation mathematical skills in the areas including: polynomial, rational, exponential, logarithmic and trigonometric functions. The unit also covers topics of analytical geometry, , sequences and statistics.

This course prepares future teachers by equipping them with a strong foundation of skills relating to a range of mathematical concepts that are needed in higher mathematics. Students will also investigate ways mathematics reveals the order of God's creation..

CONTENT

1. Algebra
2. Trigonometry
3. Functions and Graphs
4. Factoring and Fractions
5. Analytic Geometry
6. Exponential and Logarithmic Functions
7. Introduction to statistics
8. Sequences

LEARNING OUTCOMES

On completion of this unit, pre-service teachers will have provided evidence that they have:

1. developed fluency in quantitative, algebraic and graphical manipulations
Graduate Teacher Standards:
Graduate Attributes:
2. executed simple mathematics with accuracy and clarity
Graduate Teacher Standards:
Graduate Attributes:
3. solved problems involving elementary but key mathematical ideas in algebra, geometry, trigonometry, and statistics;
Graduate Teacher Standards:
Graduate Attributes:
4. developed and applied recognised processes to solve mathematical problems
Graduate Teacher Standards:
Graduate Attributes:
5. reflect on the order of God's creation which mathematics reveals and
Graduate Teacher Standards:

Graduate Attributes:

6. applied appropriate strategies to effectively communicate relevant mathematical concepts and arguments using either written English or mathematical notations, as appropriate
Graduate Attributes: 6

ASSESSMENT TASKS

In order to receive a passing grade a student must fulfil the following requirements:

- adequate submission/attempt of all assessment tasks
- achieve a summative exit grade of Pass or above

TASK 1: FOLIO (DEMONSTRATION)

Word Length/Duration: 1 each week
Weighting: 20%
Assessed: Weekly

TASK 2: INVESTIGATION AND MODELLING

Word Length/Duration: 1500 words
Weighting: 30%
Assessed: Week 8

TASK 3: EXAMINATION

Word Length/Duration: 3 hours
Weighting: 50%
Assessed: Examination Week

ASSESSMENT ALIGNMENT

Assessment Task	Learning Outcome	Content	Graduate Teacher Standards	Graduate Attributes
Task 1	1-4, 6-8			
Task 2	1-4,			
Task 3	1-8			

ASSESSMENT ELABORATION

Task 1: Folio (Demonstration)

Format of Task:

The weekly problem sets will require the students to attempt problems on the material presented in the previous week's lectures. Students are expected to clearly set out their answers and provide adequate explanations of what they have done.

Students are allowed to work individually or in small groups in accordance with the CHC Code of Conduct. If students work in small groups, each student needs to turn in a separate assignment.

Criteria & Marking:

Students will be assessed with respect to the presentation of the work and its correctness, both mathematically and logically. The tasks will be handed back to the students with feedback.

Satisfactory completion of a weekly homework task is defined as:

- All questions attempted.
- Presented in a logical manner.
- Demonstration of satisfactory understanding

Task 2: Research and Reflection

The investigation will be a combination of modelling of mathematical practice in answering multiple choice and problem-solving questions which target students' knowledge and understanding of mathematical content, knowledge and skills included in the course. Students will also be required to draw upon 'out of class' assigned readings and explain how mathematics reveals the order of God's creation. It will cover material from Weeks 1–6

Topics to include:

- Algebra
- Functions and Graphs
- Factoring and Fractions
- Trigonometric Functions
- Exponential and Logarithmic Functions
- Order of God's creation revealed through mathematics

Criteria & Marking:

The assessment task will give the students an opportunity to show their understanding of the course material and the relevant problem-solving skills. It will explicitly cover the material in the course presented in weeks 1 to 5. A portion of it will be multiple choice questions. The final question will be a 200-word reflection on how mathematics reveals the order of God's creation and will require students to draw upon 'out of class' assigned readings.

As the task takes the form of a proper test, it needs to be turned in at the end of the class on the due date with a cover sheet and signature from the reception desk, provided by the lecturer. In the event that a student cannot attend class to complete the test, please refer to point 6 on Extensions, the task should be scanned and emailed to the lecturer by the beginning of class time (e.g., Thursday at 12:10pm).

This is an individual task and needs to be completed without direct use of the textbook.

Task 3: Examination

Format of Examination:

The examination will be a combination of multiple-choice questions and problem-solving questions which target students' knowledge and understanding of mathematical content knowledge included in the course. The final exam will cover material from Weeks 1 – 10. Topics to be examined include:

- Plane Analytic Geometry
- Introduction to Statistics
- Sequences and the Binomial Theorem Sequences

Criteria & Marking:

The final exam will test the students understanding of the course material and the relevant problem-solving skills. It will also require them to articulate in more depth examples of God's creation in mathematics. The final exam will explicitly examine the material in the whole course.

- Developed fluency in quantitative, algebraic and graphical manipulations.

- Executed simple mathematics with accuracy and clarity.
- Solved problems involving elementary but key mathematical ideas in algebra, geometry, and trigonometry.
- Developed and applied recognized processes to solve mathematical problems essential for tertiary studies in education, science, engineering, and business.

SPECIALIST FACILITIES OR EQUIPMENT

TI-84 Plus Graphing Calculator

PRESCRIBED TEXTS

Washington, A. (2013). *Basic technical mathematics with calculus*. (10th ed.). New York, NY: Pearson.

Selected readings will be available via the Moodle™ site for this unit.

RECOMMENDED READINGS

CURRICULUM READINGS

Abramson, J. (2014). *PreCalculus*. Houston, TX: OpenStax College.

Croft, A., & Davison, R. (2020). *Foundation Maths*. (7th ed.). Essex, UK: Prentice-Hall.

Larson, R. (2021). *Precalculus*. (11th ed., metric ed.). Boston, MA: Cengage Learning.

Safier, F. (2019). *Schaum's outline of precalculus*. (4th ed.). New York, NY: McGraw-Hill.

Stewart, J., Redlin, L., & Watson, S. (2016). *Precalculus: Mathematics for calculus*. (7th ed.). Boston, MA: Cengage Learning.

Sullivan, M. (2018). *Precalculus*. (10th ed.). New York, NY: Pearson.

OTHER

In addition to the resources above, students should have access to a Bible, preferably a modern translation such as The Holy Bible: The New International Version 2011 (NIV 2011) or The Holy Bible: New King James Version (NKJV).

These and other translations may be accessed free on-line at <http://www.biblegateway.com>. The Bible app from LifeChurch.tv is also available free for smart phones and tablet devices.

UNIT REVIEW

SEMESTER	FEEDBACK AND RESPONSE

RUBRIC

TASK 1: DEMONSTRATION

LO	CRITERIA	HIGH DISTINCTION	DISTINCTION	CREDIT	PASS	FAIL
		Satisfactory completion 9, 8 homework submissions	Satisfactory completion 7,6 homework submissions	Satisfactory completion 5, 4 homework submissions	Satisfactory completion 3, 2 homework submissions	Unsatisfactory Less than 2 homework submissions

COMMENT



RUBRIC

TASK 2: INVESTIGATION

LO	CRITERIA	HIGH DISTINCTION	DISTINCTION	CREDIT	PASS	FAIL
	Overall percentage	85 % or above	75% or above	65% or above	50 % or above	Below 50%

COMMENT



RUBRIC

TASK 3: EXAMINATION

LO	CRITERIA	HIGH DISTINCTION	DISTINCTION	CREDIT	PASS	FAIL
	Overall percentage	85 % or above	75% or above	65% or above	50 % or above	Below 50%

COMMENT

