Republic of the Philippines
CEBU TECHNOLOGICAL UNIVERSITY
Province of Cebu
Website: http://www.ctu.edu.ph Email: thepresident@ctu.edu.ph
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COURSE SYLLABUS

in

GEC-MMW
(Course Code)

Mathematics in the Modern World
(Descriptive Title)

FIRST Semester, A.Y. **2021 – 2022**

Department/Area	:	Mathematics and Natural Sciences
Curriculum	:	General Education Curriculum
Curricular Year	:	First Year/Second Year
No. of Hours/Sem	:	54
Credit Unit(s)	:	3
Prerequisites	:	None

Vision of the University : A premier multidisciplinary-technological university

Mission of the University : The University shall primarily provide advanced professional and technical instruction for special purposes, advanced studies in industrial trade, agriculture, fishery, forestry, aeronautics and land-based programs, arts and sciences, health sciences, information technology and other relevant fields of study. It shall also undertake research and extension services, and provide progressive leadership in its areas of specialization.

Goals of the University : The University shall produce scientifically and technologically oriented human capital equipped with appropriate knowledge, skills, and attitudes. It shall likewise pursue relevant research, strengthen linkages with the industry, community and other institutions and maintain sustainable technology for the preservation of the environment.

Program Outcomes :

1. Articulate and discuss the latest developments in the specific field of practice,
2. Communicate effectively through oral and in written forms using both English and Filipino,

3. Work effectively and independently in multi-disciplinary and multi-cultural teams,
4. Act in recognition of professional, social, and ethical responsibilities, and
5. Preserve and promote "Filipino historical and cultural heritage" (based on RA 7722).

Course Description : This course deals with the nature of mathematics, appreciation of its practical, intellectual, and aesthetic dimensions, and application of mathematical tools in daily life.

Course Learning Outcomes :

1. Appreciate the nature and uses of mathematics in everyday life (*PO1, PO2, PO5*);
2. Use a variety of statistical tools to process and manage numerical data (*P02, PO3, PO4*);
3. Analyze codes and coding schemes used for identification, privacy, and security purposes (*PO1, PO2, PO4*); and
4. Use mathematics in other areas such as finance (*PO1, PO2, PO3, PO4*).

Course Content :

INTENDED LEARNING OUTCOMES (TIME ALLOCATION) Within the semester, the students are expected to:	**ASSESSMENT TASKS**	**TEACHING-LEARNING ACTIVITIES**	**CONTENTS**	**LEARNING RESOURCES**	**REMARKS**
1. Relate the course to the mission, vision, and goals of CTU and the College. (0.5 hours)	Introduction: In a synchronous class/recorded video do a self-introduction and your idea on the university's vision, mission and goals in relation to the course	Multimedia Teacher-facilitated discussion	Vision, Mission, Goals and Objectives of CTU and the College.	Video: https://www.youtube.com/watch?v=iuOtTWtqs2o	
2. Identify the patterns in nature and regularities in the world (CO1); (1.5 hours) 3. Articulate the importance of mathematics in one's life (CO1); (1 hour)	Rubric assessment (nature photography) Paper and pencil test [via Google	Multimedia Dimensional question approach Group dynamics	**Chapter 1** THE NATURE OF MATHEMATICS Lesson 1. Mathematics in our World • Patterns and Numbers in Nature and the World	Lecture Slides Video: https://www.youtube.com/watch?v=kkGeOWYOFoA&t=4s	

INTENDED LEARNING OUTCOMES (TIME ALLOCATION) Within the semester, the students are expected to:	**ASSESSMENT TASKS**	**TEACHING-LEARNING ACTIVITIES**	**CONTENTS**	**LEARNING RESOURCES**	**REMARKS**
4. Argue about the nature of mathematics, what it is, how it is expressed, represented, and used (CO1); (1 hour) 5. Express appreciation for mathematics as a human endeavor (CO1); (1 hour)	Forms](quiz on Fibonacci sequences) Rubric assessment (PPt presentation on an application of mathematics)	Q&A Activity in Quizizz	• The Fibonacci Sequence • Appreciation of Numbers		
6. Discuss the language, symbols, and conventions of mathematics (CO1, CO2); (1 hour) 7. Explain the nature of mathematics as a language (CO1); (1.5 hours) 8. Perform operations on mathematical expressions correctly (CO2); (3.0 hours) 9. Acknowledge that mathematics is a useful language (CO1, CO2); (2.5 hours)	Paper and pencil test [via Google Forms] (Quiz) Oral examination (matching symbols and sentences) /	Group Dynamics Discussion Q&A Activity in Quizizz	Lesson 2. Mathematical Language and Symbols • The Mathematical Language • Sets, Functions, Relations, and Operations • Logic	Computer and LCD Projector Lecture Slides	
10. Use different types of reasoning to justify statements and arguments made about mathematics and mathematical concepts (CO1, CO2); (1.5 hours) 11. Write clear and logical proofs (CO2); (1.5 hours) 12. Solve problems involving patterns and recreational problems following	Paper and pencil test [via Google Forms] (Quiz) Rubrics assessment (problem solving)	Film Showing Problem Solving Group Dynamics Q&A Activity in Quizizz	Lesson 3. Problem Solving and Reasoning • Inductive and Deductive Reasoning • Problem Solving • Recreational Problems	Lecture Slides Interactive website: https://www.mathinenglish.com/brainteasers.php Video: https://www.youtube.	

INTENDED LEARNING OUTCOMES (TIME ALLOCATION) Within the semester, the students are expected to:	**ASSESSMENT TASKS**	**TEACHING-LEARNING ACTIVITIES**	**CONTENTS**	**LEARNING RESOURCES**	**REMARKS**
Polya's four steps (CO2); (1.5 hours) 13. Organize one's methods and approaches for proving and solving problems (CO2); (1.5 hours)				com/watch?v=FLbz_Crdaa4	
PRELIM EXAMINATION (1.5 hours)					
14. Use a variety of statistical tools to process and manage numerical data (CO2); (8.5 hours) 15. Use the methods of linear regression and correlations to predict the value of a variable given certain conditions (CO2); (3 hours) 16. Advocate the use of statistical data in making important decisions (CO1, CO2); (1.5 hours)	Paper and pencil test [via Google Forms] (quiz) Research study Group term paper Rubrics assessment (final presentation)	Courseware Discussion Problem Solving Case Study Reporting Panel Discussion Q&A Activity in Quizizz	**Chapter 2**. MATHEMATICS AS A TOOL (Part I) Lesson 4. Data Management • Basic Statistical Concepts • Measures of Central Tendency • Measures of Dispersion • Measures of Relative Position • Probability and the Normal Distribution • Correlation and Linear Regression • Chi-square	Lecture Slides	
MIDTERM EXAMINATION (2 hours)					
17. Support the use of mathematics in various aspects and endeavors of life (CO1, CO2, CO4); (6 hours)	Paper and pencil test [via Google Forms] (Quiz) Term Paper	Courseware Case study Reporting	**Chapter 3.** MATHEMATICS AS A TOOL (Part II) Lesson 5. The Mathematics of Finance	Lecture Slides RA 9474: Truth in Lending Act	

INTENDED LEARNING OUTCOMES (TIME ALLOCATION) Within the semester, the students are expected to:	**ASSESSMENT TASKS**	**TEACHING-LEARNING ACTIVITIES**	**CONTENTS**	**LEARNING RESOURCES**	**REMARKS**
		Q&A Activity in Quizizz	• Simple and compound interest • Credit cards and consumer loans • Stocks, bonds, and mutual funds • Home ownership	Loan Tables	
SEMIFINAL EXAMINATION (1.5 hours)					
18 Use coding schemes to encode and decode different types of information for identification, privacy, and security purposes. (CO3); (3 hours) 19 Exemplify honesty and integrity when using codes for security purposes (CO1, CO3); (3 hours) and 20 Support the use of mathematics in various aspects and endeavors of life (CO1, CO2, CO3). (3 hours)	Paper and pencil test (quiz)	Discussion Problem Solving Peer Teaching Q&A Activity in Quizizz	Choose 1 from the following lessons: <u>Lesson 6</u>. Codes • Binary Codes • Introduction to Modular Arithmetic • Basic Cryptology <u>Lesson 7</u>. Apportionment and Voting • Introduction to apportionment • Introduction to voting • Weighted voting systems	Lecture Slides Computer and LCD Projector	
FINAL EXAMINATION (2 hours)					

References:

- CTU Student's Manual Revision 2015
- Alejan, et al. (2018). *Mathematics in the modern world*. Mutya.
- Stewart (1995). *Nature's Numbers*. Basic Books
- Feng. *Patterns in Nature and the Mathematics Behind It*. FGCU
- Grigas (2013). *The Fibonacci Sequence*. Liberty University
- Mathigon. *Applications of Mathematics*. URL: https://mathigon.org/applications.
- Jamison (2000). *Learning the language of mathematics*.
- Fisher (1993). *One Mathematical Cat, Please!*
- MathCentre (2003). *Mathematical Language*
- Handbook of Mathematics: Key Terms, Definitions & Formulas.
- van den Dries (2016). *Mathematical Logic*
- Aufmann, et al. (2013). *Mathematical excursions*. Cengage
- Hersh (1997). *What is mathematics, really?*. Oxford University Press
- Virginia Department of Education (2011). *Mathematics Enhanced Scope and Sequence – Geometry*
- Berkeley Math. *Polya's problem solving techniques*
- Madachy. *Recreational Mathematics*
- Bian. *Basic Statistics I*.
- Laerd Statistics. *Measures of Central Tendency*.
- Laerd Statistics. *Measures of Spread*.
- Lumen. *Measures of Relative Standing*.
- Khan Academy. *Probability: the Basics*.
- MathisFun. *Normal Distribution*.
- Laerd. *Pearson's Product Moment Correlation*.
- Laerd. *Linear Regression using SPSS Statistics*
- CMM Project Support: *Simple and Compound Interest*
- Debt.Org. *How is credit card interest calculated?*
- Perry (2018). *The Difference Between Stocks vs Bonds vs Mutual Funds*. Pure Financial Advisors
- WSU Math. *The costs and advantages of home ownership*

- COMAP, Inc. (2011). *For All Practical Purposes: Mathematical Literacy in Today's World*
- Moser & Chen (2012). *A Student's Guide to Coding and Information Theory*. Cambridge University Press
- Rosen (2011). *Elementary Number Theory*. Pearson

Course Requirements:

- Fifty percent (50%) cutoff score
- Satisfactory attendance
- Others as specified in the course content

Evaluation Procedure:

Major Exams		**40%**
Class Standing		**60%**
Quizzes	30%	
Graded Oral Presentation	20%	
Projects/Assignments/Final Reports	10%	
TOTAL		**100%**

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Revision Date: 31 August 2021

Submission Date: 01 September 2021

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