DE LA SALLE UNIVERSITY
College of Science
Mathematics and Statistics Department

THEOINT – *Theory of Interest*
Prerequisite: MATH115 *Prerequisite to: LIFECO1*

Instructor:_____ **Contact details:**_____
Consultation Hours:_____ **Class Schedule and Room:**_____

Course Description

A three-unit course on the theory of measurement of interest, annuities, extinction of debts by amortization and sinking funds, bonds and other securities.

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													
	At the end of the course, the student will	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Critical and Creative Thinker Effective Communicator Lifelong Learner	apply appropriate mathematical concepts, tools and softwares in the solution to various investment problems	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓

Program Outcomes (BS Statistics)

A graduate of the program should be able to

1. Demonstrate broad and coherent knowledge and understanding of the core areas of statistical theory and statistical modeling .
2. Apply critical and problem solving skills using the scientific method.
3. Interpret scientific data and make judgments that include reflection on relevant scientific and ethical issues.
4. Carry out basic mathematical and statistical computations and use appropriate technologies in (a) the analysis of data; and (b) In pattern recognition, generalization, abstraction, critical analysis and problem solving.
5. Communicate information, ideas problems and solutions, both, orally and in writing, to other scientists, decision makers and the public.
6. Relate science and mathematics with other disciplines.
7. Design and perform safe and responsible techniques and procedures in laboratory or field practices.
8. Critically evaluate input from others.
9. Appreciate the limitations and implications of science in everyday life.
10. Commit to the integrity of data.
11. Demonstrate broad and coherent knowledge and understanding in the core areas of statistics, computing and mathematics.
12. Generate information involving the conceptualization of a strategy for generating timely and accurate/reliable data, organizing a process for putting together or compiling the needed data, and transforming available data into relevant and useful forms.
13. Translate real-life problems into statistical problems.
14. Identify appropriate statistical tests and methods and their proper use for the given problems, select optimal solutions to problems and make decision in the face of uncertainty.

Final Course Output

As evidence of attaining the above learning outcomes, the student is required to submit the following during the indicated dates of the term.

Learning Outcome	Required Output	Due Date
At the end of the course, the student will apply appropriate mathematical and statistical concepts and processes, tools and softwares in the solution to various investment problems.	Inquiry-based group written report highlighting the uses of theory of interest in different problem situations encountered in business and related fields	Week 13

Rubric for assessment

Written Group Report

CRITERIA	Excellent (4)	Good (3)	Satisfactory (2)	Needs Improvement (1)
Content	Demonstrates in-depth understanding of concepts and skills with no error	Demonstrates understanding of concepts and skills with one or two errors	Demonstrates some understanding of concepts and skills with minimal errors	Demonstrates minimal understanding of concepts and skills with so many errors
Organization	Presented concepts/skills which were logically organized with complete supporting ideas	Presented concepts/skills which were logically organized with some supporting ideas	Presented concepts/skills which were minimally organized with minimal supporting ideas	Presented concepts/skills which were poorly organized and lacked supporting evidence
Integration	Demonstrates integration of the concepts presented	Demonstrates some integration of the concepts presented	Demonstrates limited integration of the concepts presented	Demonstrates no integration of the concepts presented
Accuracy of Computations/ Solutions	Computations/solutions are correct and explained correctly	Computations/solutions are correct but not explained well.	Computations/solutions have some errors.	Incorrect computations /solutions
Overall Presentation and creativity	Overall presentation is creative and artistic with innovative ideas	Overall presentation shows some effort in its creativity and artistic value with some innovative ideas	Overall presentation shows limited effort in its creativity and artistic value with limited innovative ideas	Overall presentation is neither creative nor artistic with no innovative ideas

Group Member Assessment

CRITERIA	EXCELLENT 4	VERY GOOD 3	SATISFACTORY 2	NEEDS IMPROVEMENT 1
Contribution	Group member completed an equal share of work and strived to maintain that equity throughout the project	Group member contributed significantly, but other members clearly contributed more	Group member contributed little toward the project	Group members contributions were insignificant or nonexistent .
Dependability	Group member provided contributions with 100% punctuality and always appeared for group work	Group member contributions were mostly punctual and almost always appeared for group work	Group member contributions were regularly late and often missed scheduled group work	Group member was undependable forcing other members to take up the slack

Efficiency	Work performed was very useful and contributed significantly to the final product	Participation was inefficient and thus contributions were less than expected	Work performed was inappropriate and mostly useless toward the final product	Work performed was completely ineffective and useless in the final product
Attitude	Group member was very positive and pleasant to work with	Group member didn't complain but offered little enthusiasm	Group member sometimes complained and was somewhat of a burden	Group member often complained and generally demoralized the group

Additional Requirements

Aside from the learning output, the student will be assessed at other times during the term by the following:

- Skills Check (Seatwork/Quizzes/Boardwork)
- Individual/Group Report
- Individual/Group Problem Set

Grading System

	FOR EXEMPTED STUDENTS (w/out Final Exam)	FOR STUDENTS with FINAL EXAM	
		with no missed quiz	*with one missed quiz*
Average of quizzes	90%	60%	50%
Seatworks, Boardwork, Assignment,Project	10%	10%	10%
Final exam	--	30%	40%

Scale:

95-100%	4.0
89-94%	3.5
83-88%	3.0
78-82%	2.5
72-77%	2.0
66-71%	1.5
60-65%	1.0
<60%	0.0

Learning Plan

LEARNING OUTCOME	TOPIC	WEEK NO.	LEARNING ACTIVITIES
At the end of the course, the student will apply appropriate mathematical concepts, tools and softwares in the solution to various investment problems	**I. THE MEASUREMENT OF INTEREST** 1.1 Accumulation and Amount Functions 1.2 The Effective Rate of Interest 1.3 Simple Interest and Compound Interest 1.4 The Effective Rate of Discount 1.5 Simple Discount and Compound Discount 1.6 Nominal Rates of Interest and Discount	Week 1-3	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	1.7 **Forces of Interest and Discount** 1.8 **Varying Interest** 1.9 **Solutions to Problems in Interest**		
	Quiz No1	Week 4	
	II. SOLUTIONS OF PROBLEMS IN INTEREST 2.1 **The Basic Problem** 2.2 **Equation of Value** 2.3 **Finding Unknown Time and Rate of Interest**	Week 4-5	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	Quiz No 2	Week 5	

	III. BASIC ANNUITIES 3.1 **Annuity-Due and Annuity-Immediate** 3.2 **Annuity Values on Any Date** 3.3 **Perpetuities** 3.4 **Nonstandard Terms and Interest Rates** 3.5 **Finding Unknown Time and Rate of Interest** 3.6 **Varying Interest** 3.7 **Annuities Not Involving Compound Interest**	Week 6-8	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity reflection
	Quiz No 3	Week 9	
	IV. MORE GENERAL ANNUITIES 4.1 **Annuities Payable at Different Frequency than Interest is Convertible** 4.2 **Continuous Annuities** 4.3 **Basic and More General Varying Annuities** **4.4 Continuous Varying Annuities**	Week 9 – 11	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	V. AMORTIZATION SCHEDULES AND SINKING FUNDS 5.1 **Finding the Outstanding Loan Balance** 5.2 **Amortization Schedules** 5.3 **Sinking Funds**	Week 11 – 12	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	Final Examination		

*Problem sets are given weekly and the students are expected to work on the solutions for their fourth hour activity. At the end of the term, the solutions to the problems will be compiled and submitted as one of the course outputs.

References

Brown, R.L. and Zima, P. (1996) *Shaum's Outline of Theory and Problems of Mathematics of Finance.* New York: McGraw-Hill

Hart, William. (1980).*Mathematics of Investment.* Manila: National Bookstore

Kellison S., (1991) *The Theory of Interest*, (2nd edition). Boston: McGraw Hill

Ong, A. and Gabriel P. (1988) *Mathematics of Investment.* Manila: Island Publishing House

Online Resources

Annuity Due. Accessed October 25, 2012 from: www.annuities-financial-planning.com/annuity-due.html

Amortization Schedule Calculator. Accessed October 25, 2012 from: www.amortization-schedule.info

Yield Rate Definition. Accessed October 25, 2012 from: www.allbusiness.com/glossaries/yield-rate/4946301-1.html

Class Policies

1. The required minimum number of quizzes for a 3-unit course is 3, and 4 for 4-unit course. No part of the final exam may be considered as one quiz.
2. Cancellation of the lowest quiz is not allowed even if the number of quizzes exceeds the required minimum number of quizzes.
3. As a general policy, no special or make-up tests for missed exams other than the final examination will be given. However, a faculty member may give special exams for
   A. approved absences (where the student concerned officially represented the University at some function or activity).
   B. absences due to serious illness which require hospitalization, death in the family and other reasons which the faculty member deems meritorious.
4. If a student missed two (2) examinations, then he/she will be required to take a make up for the second missed examination.
5. 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.
6. Students who get at least 89% in every quiz are exempted from taking the final examination. Their final grade will be based on the average of their quizzes and other prefinal course requirements. The final grade of exempted students who opt to take the final examination will be based on the prescribed computation of final grades inclusive of a final examination. Students who missed and/or took any special/make-up quiz will not be eligible for exemption.
7. Learning outputs are required and not optional to pass the course.
8. Mobile phones and other forms of communication devices should be on silent mode or turned off during class.
9. 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.
10. Sleeping, bringing in food and drinks, and wearing a cap and sunglasses in class are not allowed.
11. 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.
12. Students who are absent from the class for more than 5 meetings will get a final grade of 0.0 in the course.
13. 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