MATH 034

The Mathematics of Money

Sample Syllabus

Description

The mathematics of money course allows students to learn mathematical techniques that aid in the understanding of life's financial decisions, such as those involving interest, annuities, investments, retirement plans, taxes, credit cards, and mortgages. The goal of this course is to help students develop the knowledge and skills needed to make sound financial decisions. The U.S. Department of Treasury has stated that "Today's complex financial-services market offers consumers a vast array of products and providers to meet their financial needs. This degree of choice requires that consumers be equipped with the knowledge and skills to evaluate the options and identify those that best suit their needs and circumstances." This course will help students obtain this knowledge and skills.

Objectives

Upon successful completion of Math 034, the student should be able to:

- Understand the concept of the time value of money, recognize the reasoning behind the payment of interest and use the simple interest formula to find the principal, interest, simple interest rate, or term of a loan.
- Use linear equations, arithmetic sequences and linear functions to analyze interest problems.
- Use the simple discount formula to find the maturity value, proceeds, simple discount, simple discount rate, or term of a discount note.
- Use geometric sequences and partial geometric sums to understand the concept of compound interest.
- Use the basic compound interest formula, exponential functions and logarithms to solve problems of compound interest which entail different compounding frequencies, future values and present values.

- Use infinite geometric sums to approximate economic stimulation/impact.
- Use mathematical expectation to set interest associated with loan risk.
- Use geometric sequences and partial geometric sums to understand the concept of an annuity.
- Calculate the future and/or present value of an annuity and an annuity payment using annuity formulas and logarithms.
- Use graphical representations and interpretation to understand the concept of amortization.
- Understand the structure of state sales tax and federal income taxes, calculate the total taxes owed, and calculate the federal income tax withholding and FICA for payroll deductions.
- Use financial formulas and linear equations to calculate dividend rates, dividend yields, compound annual growth rates, and total rates of return for investments in stocks, bonds and mutual funds.
- Calculate the employee contribution and employer matching for different retirement plans and calculate the impact of contributions made to traditional and Roth IRAs.
- Use geometric sequences, partial geometric sums and linear systems of equations to solve problems which incorporate inflation and make projections for investments that take into account the impact of inflation.
- Use geometric sequences, partial geometric sums, linear equations, and exponential decay models to solve problems associated with depreciation.
- Calculate credit card interest and compare credit card offers for their annual fees and interest rates.
- Calculate the equity, maximum loan amount, and closing costs for a mortgage loan.
- Calculate the monthly payment on a lease, given the residual value and interest rate and understand the financial difference between leasing and buying.
- Calculate price, cost, percent markup or markdown, gross profit margin and net profit margin.
- Understand the concept of cost-revenue analysis and break-even points as it applies to financial problems.

Textbook

Business Math: The Mathematics of Money, Second Edition, by Timothy Biehler.

Course Schedule

Unit	Category	Topic(s)
1	The Basics - Time Value of Money	- Introduce and work with loans and associated interest calculations
2	Common Investment	- Work with basic investments such as annuities, stocks and bonds - Understand sales and income taxes - Introduce retirement planning
3	Business Applications and Personal Financial Planning	- Work with inflation and depreciation - Consider consumer implications associated with credit cards, mortgages and leasing - Consider profit margin and cost-revenue analysis associated with business

Grading

Quizzes	Midterm Exams	Final Exam (Comprehensive)
10 Weekly Quizzes (10 pts / each)	2 Midterm Exams (50 pts / each)	1 Proctored Exam
Each may be taken twice	First Midterm is Unproctored	
Best score recorded	Second Midterm is Proctored	
100 pts	100 pts	100 pts

Grading Scale

Letter Grade	% Score	Total Points
A	93-100%	279-300
A-	90-92%	270-278
B+	87-89%	261-269
B	83-86%	249-260
B-	80-82%	240-248
C+	77-79%	231-239
C	70-76%	210-230
D	60-69%	180-209
F	0-59%	0-179

Academic Integrity

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Accommodating Disabilities

Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The Student Disability Resources (SDR) website provides contact information for every Penn State campus . For further information, please visit Student Disability Resources website.

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines . If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

Counseling and Psychological Services

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

- Counseling and Psychological Services at University Park (CAPS): 814-863-0395
- Counseling and Psychological Services at Commonwealth Campuses
- Penn State Crisis Line (Available 24 hrs, 7 days a week): 877-229-6400
- Crisis Text Line (Available 24 hrs, 7 days a week): Text LIONS to 741741

Educational Equity / Report Bias

Penn State takes great pride to foster a diverse and inclusive environment for students, faculty, and staff. Acts of intolerance, discrimination, or harassment due to age, ancestry, color, disability, gender, gender identity, national origin, race, religious belief, sexual orientation, or veteran status are not tolerated and can be reported through Educational Equity via the Report Bias website.