

Syllabus: Fundamentals of Financial Mathematics (AQM1042)

Prof. Dr. Luis Chavez-Bedoya
Hochschule Pforzheim / Pforzheim University

Course:	AQM1042 – Fundamentals of Financial Mathematics
Assessment/ Examination:	Exam – 60 minutes
Workload:	2 ECTS Credits, 30 contact hours / 45 minutes each = 2 SWS
Prerequisites:	School knowledge in exponential and logarithmic functions
Validity Period:	Please complete
Instructor:	Prof. Dr. Luis Chavez-Bedoya Office: tba Office hours: tba Tel.: tba Fax: +49-231- 28-6666 Email: lchavezbedoya@esan.edu.pe
Time schedule:	Please see online time table (LSF)

Overview:

The lecture starts out with an introduction into the mathematical foundations necessary for the application of financial-mathematical methods. For that matter, exponential and logarithmic calculations as well as the handling of sums, series and sequences will be practiced. The core of the lecture is formed by the classical methods of financial mathematics, i.e. the computation of interest, capital budgeting, pension and amortization calculations, and interest instruments and derivatives. Here, a special focus will be put on the practical application in one's private life, as well as in a company's normal routine. In the prospects, there will be an introduction and a discussion concerning the functionality and the handling of derivatives; in the lecture the chosen examples will be taken from interest derivatives. Students will learn estimating not only the risks of derivatives, but also the opportunities, and know about their capabilities concerning the protection of underlying transactions.

Learning objectives:

The students...

1. know the classical financial products.
2. can critically evaluate different offers of financial investments and the borrowing of money.
3. know the functionality and area of application of modern financial instruments (especially of interest derivatives), as well as their risks and opportunities.
4. are proficient in the mathematical foundations necessary for the analysis of the offers listed under (2.).

Contribution to the Learning Goals of Hochschule Pforzheim

Goal	Contribution
1 Know-How	<ul style="list-style-type: none"> - introduction into fundamental financial-mathematical methods (cash method) - evaluation of investments using the present value method - calculation of the current and future value of annuities - calculation of amortisation tables - basic knowledge about derivatives
2.1 use of information technologies	Use of MS-Excel for the calculation of interests and investments, as well as for the compilation of funding and amortisation tables
3 critical thinking	Critical evaluation of offers made by financial service providers (e.g. pension plans, loans, derivatives)
4 ethical awareness	Evaluation of a ‚fair‘ offer, i.e. a market-driven one, and by that the ability to identify offers that are not in line with the market Sensitization to different strategies in the handling of derivatives
5 communication	-
6 teamwork	-

Preliminary time table:

Session (90 Min.)	Subject
1	Overview of the course, powers, quadratic equations
2	Logarithmic functions, sums, sequences
3	Sequences and series
4	Computation of interest
5	Computation of interest
6	Equivalence of series of payments, investments
7	Investments
8	Annuities
9	Annuities
10	Amortisation
11	Amortisation
12	Interest rate financial instruments
13	Introduction to interest rate derivatives
14	Introduction to interest rate derivatives
15	Preparation for the exam

Teaching and Learning Approach

The concept of the course is that of a "classical lecture" which is "loosened up" by examples, exercises and discussions. In the lecture the classical tools for analyzing questions from the field of financial mathematics is provided. The focus of the lecture is on the practical implementation of financial mathematical methods in practice and on their interpretation. Especially it is intended to promote abstract thinking and model building techniques.

Recommended literature:

Ross, S., Westerfield, R., and Jaffe, J. (2013). *Corporate Finance* (1072 p.) (10th ed.). New York.: McGraw-Hill/Irwin.

Luenberger, D. G.. (2013). *Investment Science* (2nd ed.). Oxford University Press.

Hull, J.C. (2015). *Options, Futures and Other Derivatives* (9th ed.). Pearson.

Grading/Examination

The course grade consists of a 60 minutes exam at the end of the term.