EFFECTUS
University of Applied Sciences

**DESCRIPTION OF THE COLLEGE**

| **GENERAL INFORMATION** | | |
|---|---|---|
| Course leader | **Ph.D. Višnja Jurić** | |
| Name of the course | **Mathematics for Economists** | |
| Study program | **Professional Short Study Entrepreneurship** | |
| Course status | Compulsory | |
| Year | First year | |
| Point value and method of teaching | ECTS student load coefficient | 7 |
| | Number of hours (L+E+S) | (30+45+0) |

| **DESCRIPTION OF THE COLLEGE** |
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| 1.1. Objectives of the college |
| *Developing the ability to adopt mathematical methods and calculations in the field of economic mathematics and applying acquired knowledge in the field of economics with a focus on entrepreneurship. Students are expected to apply knowledge of mathematical modeling of phenomena in economic practice, explain the motivation for choosing a particular mathematical model, and interpret the obtained results to develop the ability to use mathematical terminology used in entrepreneurial practice.* |
| 1.2. *Conditions for course enrollment* |
| - |
| 1.3. *Expected learning outcomes for the course* |
| ***1. Apply the rules of simple interest calculation to compute interest, initial, and final principal values.***<br>***2. Apply the rules of compound interest calculation to compute interest, initial, and final principal values.***<br>***3. Utilize compound interest calculations in various economic applications.***<br>***4. Calculate repayment schedules for various types of loans.***<br>***5. Apply polynomial zero point calculation in economic examples.***<br>***6. Apply differential calculus in economic and business practice.*** |
| 1.4. *Course content* |
| Percentage calculation.<br>Basics of percentage calculation.<br>Percentage over a hundred, percentage less than a hundred.<br>Simple interest calculation.<br>Basic concepts of interest calculation.<br>Basic formula of simple interest calculation. |

Methods of interest calculation (degressive and anticipative interest calculation).
Compound interest calculation.
Compound interest, degressive and anticipative interest factor. Nominal and effective interest rate.
Conformal interest periods.
Equivalent interest periods.
Discrete capitalization.
Final and initial value of prenumeranda and postnumeranda periodic payments/disbursements.
Loan.
Definition and basic concepts.
Loan with nominal equal annuities.
Determination of loan amount and nominal equal annuities.
Preparation of repayment schedule.
Loan with equal repayment quotas.
Accuracy control of calculated elements of the repayment schedule. Loan conversion.
Consumer credit.
Basic concepts and definition.
Methods of consumer credit repayment.
Determination of polynomial zero points.
Linear function. Quadratic function.
Application of elementary functions in economics (total cost function, revenue function, profit function).
Determination of polynomial zero points, application in economics. Interpretation.
Derivatives. Application of basic differential calculus in economics.
Concept of limit and derivatives.
Tabular derivation.
Average cost. Marginal cost. Rate of growth. Elasticity coefficient.

| 1.5. *Types of teaching* | ☒ lectures<br>☐ seminars and workshops<br>☒ exercises<br>☐ distance education<br>☐ field work | ☒ independent tasks<br>☐ multimedia and network<br>☐ laboratory<br>☐ mentoring work<br>☐ the rest<br>_____ |
|---|---|---|

1.6. *Obligations of students*

*The obligations of students are prescribed in detail in the Statute, the Rules of Study and the Instructions on Student Obligations. The key obligations of students are:*
*ATTENDANCE AT CLASSES: students have an obligation to attend classes, actively monitor lectures and exercises, and participate constructively in classes, and in order to acquire the right to sit for the exam, it is necessary to attend classes in the percentages prescribed by the Study Regulations. For each student, his attendance at classes is recorded through the Infoeduk digital attendance system. The minimum obligations are;*
*• Full-time students must attend at least 70% of the total number of hours of classes in order to exercise the right to sign.*
*• Part-time students must attend at least 50% of the total number of hours of classes in order to exercise the right to sign.*
*EXAMINATION: in order to obtain a positive grade in the subject, it is necessary to obtain at least 54 points from the subject, but also at least 50% points for each learning outcome. The method of taking the exam is described in more detail in the section Assessment and evaluation of students' work during classes and on the final exam.*

*CLASS ACTIVITY: Solving tasks on the board, writing optional homework, answering more complex tasks*

1.7. *Monitoring of students' work (add X next to the appropriate form of monitoring)*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Class attendance | X | Class activity | X | Seminar work | | Experimental work | |
| Written exam | X | Oral exam | | Essay | | Research | |
| Project | | Continuous verification of knowledge | | Report | | Practical work | |
| Portfolio | | | | | | | |

1.8. *Assessment and evaluation of student work during classes and at the final exam*

*Assessment and evaluation of students' work during classes and at the final exam is carried out based on the Study Regulations of the EFFECTUS University.*

*To adopt the material through smaller teaching units during the semester, continuous monitoring of students' knowledge acquisition is carried out through tests (quizzes) and two midterm exams in which the acquisition of the content of outcomes 1, 2 and 3 (midterm exam 1) and outcomes 4, 5 and 6 (midterm exam 2) is tested.*

*Assessment and Student Engagement in the Course*

*The course structure is designed to encourage active student participation and ensure a comprehensive evaluation of their knowledge and practical skills. The total ECTS credit allocation for the course is 7, distributed across different assessment components, including class attendance, continuous knowledge assessment, class participation, and the final exam. Each component contributes to the overall learning experience, ensuring that students develop both theoretical understanding and practical problem-solving abilities.*

*Class Attendance*

*Class attendance is a fundamental aspect of the course and carries 2.5 ECTS credits. Students are expected to actively participate in lectures and exercises, which cover learning outcomes 1 to 6. Attendance is systematically recorded; however, it does not contribute to the final grade as it is a prerequisite for course completion.*
*Continuous Knowledge Assessment*

*A key component of student evaluation is continuous knowledge assessment, which carries 4 ECTS credits. This assessment consists of two quizzes and two midterm exams:*

*Quiz 1 evaluates learning outcome 1*
*Midterm 1 evaluates learning outcomes 1, 2, and 3*
*Quiz 2 evaluates learning outcome 4*
*Midterm 2 evaluates learning outcomes 4, 5, and 6*

*Students participate in written knowledge assessments through shorter quizzes with basic tasks and midterm exams that include more complex problem-solving tasks. The grading distribution is as follows:*

*Quiz 1: 4 points (two tasks, 2 points each)*
*Midterm 1: 12, 16, and 16 points for learning outcomes 1, 2, and 3, respectively*
*Quiz 2: 4 points (one task worth 4 points)*
*Midterm 2: 12, 16, and 16 points for learning outcomes 4, 5, and 6, respectively*
*Total possible score: 0 - 96 points*

*Class Participation*

*Class participation is an optional activity designed to encourage engagement beyond standard assessments. It carries 0.5 ECTS credits and includes activities such as:*

*Solving tasks on the board*
*Completing (optional) homework assignments*
*Answering complex questions during lectures*

*Students can earn a maximum of 4 points for active participation.*

*Final Exam*

*The final exam is a comprehensive assessment covering all six learning outcomes. It consists of problem-solving questions related to specific financial models applied to real-world business scenarios. The exam is graded based on the accuracy of answers, with a maximum of 96 points.*

*Total ECTS and Grading Distribution*

*The overall assessment structure amounts to 7 ECTS credits and a total of 100 points. The course is designed to foster active learning, analytical thinking, and practical application, ensuring that students develop both a strong theoretical foundation and real-world problem-solving skills.*

*The results of the examinations are shown in more detail in the table below:*

| ***NAME OF THE LEARNING OUTCOME*** | ***MEĐUISPIT/ISPIT*** | ***AKTIVNOST NA NASTAVI*** | ***QUIZ 1*** | ***QUIZ 2*** | ***TOTAL*** |
|---|---|---|---|---|---|
| OUTCOME 1 | *12* | *0* | *4* | *0* | *16* |
| OUTCOME 2 | *16* | *0* | *0* | *0* | *17* |
| OUTCOME 3 | *16* | *0* | *0* | *0* | *17* |
| OUTCOME 4 | *12* | *0* | *0* | *4* | *16* |
| OUTCOME 5 | *16* | *0* | *0* | *0* | *17* |
| OUTCOME 6 | *16* | *0* | *0* | *0* | *17* |
| *OUT OF THE OUTCOME* | | *4* | | | *4* |
| ***TOTAL*** | ***88*** | ***4*** | ***4*** | ***4*** | ***100*** |

*Acquired knowledge, skills and competences, i.e. the degree of adoption of the learning outcomes determined by the syllabus from each individual subject is determined (assessed):*

*a. during classes in the semester - through written tests of knowledge (quizzes and mid-term exams);*

*b. at the end of the class - by taking an exam.*

*The first written intermediate exam determines the mastery of the material covered by the first three learning outcomes (IU 1, IU 2 and IU 3); on the second written intermediate exam, the mastery of the materials covering the following three learning outcomes (IU 4, IU 5 and IU 6) is determined.*

**FINAL EXAMINATION - a student who, during the continuous assessment of knowledge, did not meet the requirements for passing the exam (achieved a total of at least 54 points in the course and met the lower point threshold for acceptance of each learning outcome, i.e. a minimum of 50% points for each learning outcome), can take the learning outcome of the course in the final exam. On the final exam, it is possible to get a maximum of 96 points (100 – class activity 4 points = 96 points). The student can get additional points on the Challenge learning outcome.*

*EVALUATION:*

*To achieve a positive grade in the course, the student must cumulatively fulfill two conditions:*

*1) Achieve a total of at least 54 (fifty-four) points*

*2) Achieve the minimum number of points from each individual learning outcome (50% of the total points of the learning outcome).*

*Grades are calculated based on the following distribution of points:*

| *NUMBER OF POINTS* | *GRADE* |
|---|---|
| *0,00 – 53,90* | Unsufficient (1) |
| *54,00 – 64,90* | Sufficient (2) |
| *65,00 – 79,90* | Good (3) |
| *80,00 – 89,90* | Very Good (4) |
| *90,00 i više* | Excellent (5) |

*The assessment is carried out in a transparent way by collecting points. The subject is evaluated with 100.00 points (with the possibility of obtaining an additional max. 8 points on the Challenge learning outcome).*

*CHALLENGE LEARNING OUTCOME - the student independently, with the consent of the course instructor, chooses the topic to be covered and is obliged, by a certain date in the semester, and before the end of the class, to report the creation and presentation of the Challenge learning outcome topic. Points for the Challenge learning outcome are not distributed by learning outcome, but the number of points achieved is added to the total sum of points achieved from other learning outcomes.*

*Before taking the final written exam, every student must meet the prescribed conditions, which primarily means that he has attended the % of classes determined by the Study Regulations and that he has received*

*an electronically coded permission to take the exam.*

1.9. *Mandatory literature and the number of copies in relation to the number of students currently attending classes in the course*

| *Title* | *Number of copies* | *Number of students* |
|---|---|---|
| *Šego, B.; Lukač, Z.; Gardijan Kedžo,M.: Financial mathematics, Zagreb, 2019* | *50* | *50* |

*1.10. Supplementary literature*

Babić, Z; TomićPlazibat, N: Business mathematics, University of Split, 2017.

*1.11. Methods of quality monitoring that ensure the acquisition of output knowledge, skills and competences*

*• Statistical processing and analysis of exam results (checking for Gaussian curve/normal distribution of success, comparing and tracking exam results across different cohorts, analyzing understanding of individual modules/questions on the exam, etc.),*
*• Conducting surveys among students,*
*• Evaluation and self-assessment of instructors,*
*• Achieved results and level of knowledge demonstrated during the preparation and defense of the final thesis (for students who choose a thesis in this subject),*
*• Analysis of quality center manager reports,*
*• Feedback from graduates on the usefulness of the content of this subject in their professional activities.*