



Module 2

Financial management in tourism companies

Lesson 4 - Introduction to Mathematics for Finance

1.1.- INTRODUCTION TO MATHEMATICS FOR FINANCE

1.1.1.- Definition of Financial Mathematics

According to the blog specialized ClickBalance, s/n (2018), you can define the Financial Mathematics as: “a derivation of applied mathematics that studies the value of money over time, combining the capital, the rate and the time to get a yield or interest, by methods of assessment that allow you to make investment decisions.

Financial mathematics also called investment analysis, investment management or engineering economic...

Relates multidisciplinary, with the accounting, because it provides at precise times or specific, reasoned information, based on technical records of the operations carried out by a private or public entity, that allow you to take the informed decision at the time of making an investment”.

1.1.2.- Some Tools in Financial Mathematics: Capitalization Simple and Composite

The capitalization simply consists in calculating a capital at a later time of the investment, generating these a few interests.

But in this operation, unlike in the capitalization composed of the capital which produces the interest is always the same, because the interest that is being generated is not added to the initial capital. As a result of this, all of the interests that occur in each of the periods are equal.

Laws based on the simple interest is often used in financial operations with a duration equal to or less than the year.

The capitalization composite also allows you to calculate the equivalent of a capital at a later time.

Erasmus+ Strategic Partnership 2018-1-ES01-KA204-050711

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



These operations are characterized because the capital which serves as the basis for calculating interest varies at the beginning of each period, since we are adding the interests, unlike what happens in capitalization simple. That is to say, while in the compounding simple interest is generated only by the initial capital, in the capitalization composite in addition to the initial capital, the interest generated by this are also generating interest.

Laws based on compound interest are often used in financial operations with a duration greater than one year.

1.1.3.- Calculations on the Capitalization Simple

HOW DO YOU CALCULATE THE TOTAL INTEREST CAPITALIZATION SIMPLE?

The interest of each period is the result of multiplying the initial capital for the interest rate of the operation.

We can see then that the total interest is obtained by adding together the interests of all and each one of the periods.

$$I = I_1 + I_2 + I_n$$

The formula cuts to calculate the total interest is

$$I = C_0 \cdot i \cdot n$$

¿HOW TO CALCULATE THE FINAL CAPITAL CAPITALIZATION SIMPLE?

The final capital is the amount that is received by the operation and this is the sum of the initial capital and of the total interest.

$$C_n = C_0 + I$$

Erasmus+ Strategic Partnership 2018-1-ES01-KA204-050711

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



The formula short to calculate the final capital without having to first calculate the total interest is

$$C_n = C_0 \cdot (1 + (i \cdot n))$$

¿HOW TO CALCULATE THE INITIAL CAPITAL IN CAPITALIZATION SIMPLE?

We can calculate the initial capital from any of the two formulas mentioned above.

If you cleared the initial capital of the formula for the total interest

$$I = C_0 \cdot i \cdot n \quad - \quad C_0 = I / (i \cdot n)$$

And if the cleared of the formula of the final capital

$$C_n = C_0 \cdot (1 + (i \cdot n)) \quad - \quad C_0 = C_n / (1 + (i \cdot n))$$

¿HOW TO CALCULATE THE OF INTEREST CAPITALIZATION SIMPLE?

We can calculate the interest from the formula for the total interest or of the capital end.

If you cleared the both of the interest of the formula for the total interest

$$I = C_0 \cdot i \cdot n \quad - \quad i = I / (C_0 \cdot n)$$

And if you cleared it of the formula of the final capital

Erasmus+ Strategic Partnership 2018-1-ES01-KA204-050711

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



$$C_n = C_0 \cdot (1 + (i \cdot n)) - i = C_n - C_0 / (C_0 \cdot n)$$

¿HOW TO CALCULATE THE TIME IN CAPITALIZATION SIMPLE?

As with the initial capital and the interest, the time is obtained by clearing the “n” of the formula for the total interest or of the capital end.

The formula for the total interest we get

$$I = C_0 \cdot i \cdot n \quad - \quad n = I / (C_0 \cdot i)$$

And the formula of the final capital

$$C_n = C_0 \cdot (1 + (i \cdot n)) - n = C_n - C_0 / (C_0 \cdot i)$$

As we have seen, the two formulas are the most important formula to calculate the total interest and the final capital, from these two we get the rest of the formulas, simply punting.

1.1.4.- Calculations on the Capitalization Composite

CALCULATION OF THE FINAL CAPITAL

The final capital capitalization compound has the following formula:

$$C_n = C_0 \cdot (1 + i)^n$$

This is considered to be the fundamental formula of capitalization composed. From it we can calculate any of the other data.

Erasmus+ Strategic Partnership 2018-1-ES01-KA204-050711

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



CALCULATION OF THE INITIAL CAPITAL

The initial capital can be calculated from the formula of the final capital, being the formula

$$C_0 = C_n / (1+i)^n$$

CALCULATION OF BOTH INTEREST

We can also obtain the formula for both of interest of the formula of the final capital.

$$i = (C_n/C_0)^{1/n} - 1$$

CALCULATION OF THE TIME

The formula for time is:

$$n = (\log C_n - \log C_0) / \log (1+i)$$

CALCULATION OF THE TOTAL INTEREST

The total interest is the difference between the initial capital and the final capital.

$$I = C_n - C_0$$

1.2.- OTHER TOOLS IN FINANCIAL MATHEMATICS

Although in the previous section we have studied the basic formulas relating to this subject matter, it should be noted other methods that are part of Financial Mathematics, and that we will quote below but there is very wide:

Erasmus+ Strategic Partnership 2018-1-ES01-KA204-050711

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



- The net present value (NPV) is a criterion of investment, which consists of updating the collections and payments of a project or investment to know how much you are going to win or lose with that investment. It is also known as net present Value (NPV), net present value or net present value (npv).

To do this bring all cash flows to the present moment descontándolos to a type of particular interest. The VAN is going to express a measure of profitability of the project in absolute terms net, that is to say, in the number of monetary units (euros, dollars, pesos, etc).

- The Internal Rate of Return (IRR) is the interest rate, or profitability that provides a return on investment. That is to say, it is the percentage of benefit or loss that will have an investment for the amounts that have not been removed from the project.

It is a measure used in the evaluation of investment projects is highly correlated with the Net present Value (NPV). It is also defined as the value of the discount rate that makes the NPV equal to zero, for an investment project given.

- The payback or recovery period is a criterion for evaluating investments is defined as the period of time required to recover the initial capital of an investment. It is a static method for the evaluation of investments.

By means of the payback we know the number of periods (usually years) it takes to recover the money disbursed at the beginning of an investment. What is crucial when deciding whether to embark on a project or not.

Erasmus+ Strategic Partnership 2018-1-ES01-KA204-050711

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



Co-funded by the
Erasmus+ Programme
of the European Union



Erasmus+ Strategic Partnership 2018-1-ES01-KA204-050711

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



ASSET
BASILICATA

