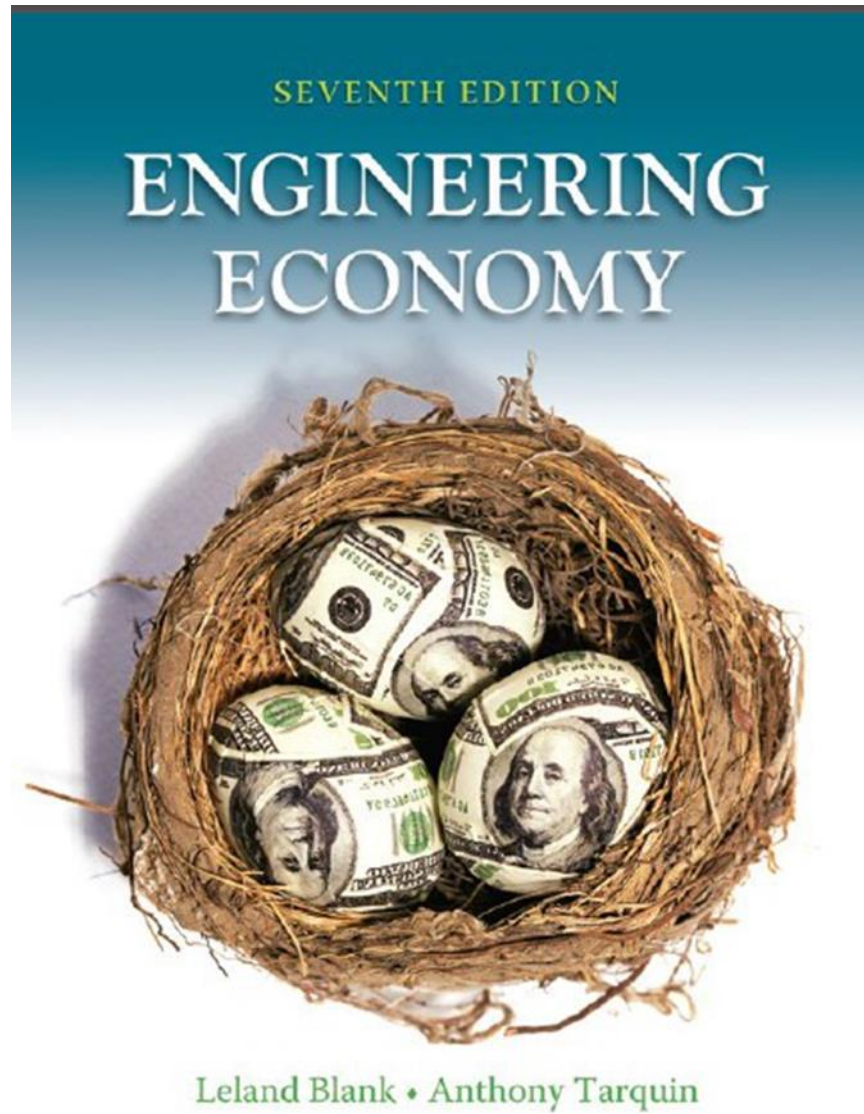University of Diyala

Engineering Economy

Lecture 2

3rd Stage

Communication department / Engineering collage

Lecturer Marwa Mohammed

Chapter 1

Foundation of Engineering Economy

Time Value of Money (TVM)

Description: TVM explains the change in the amount of money over time four funds owned by or owned by a corporation or individual.

- Corporate investments are expected to earn a return

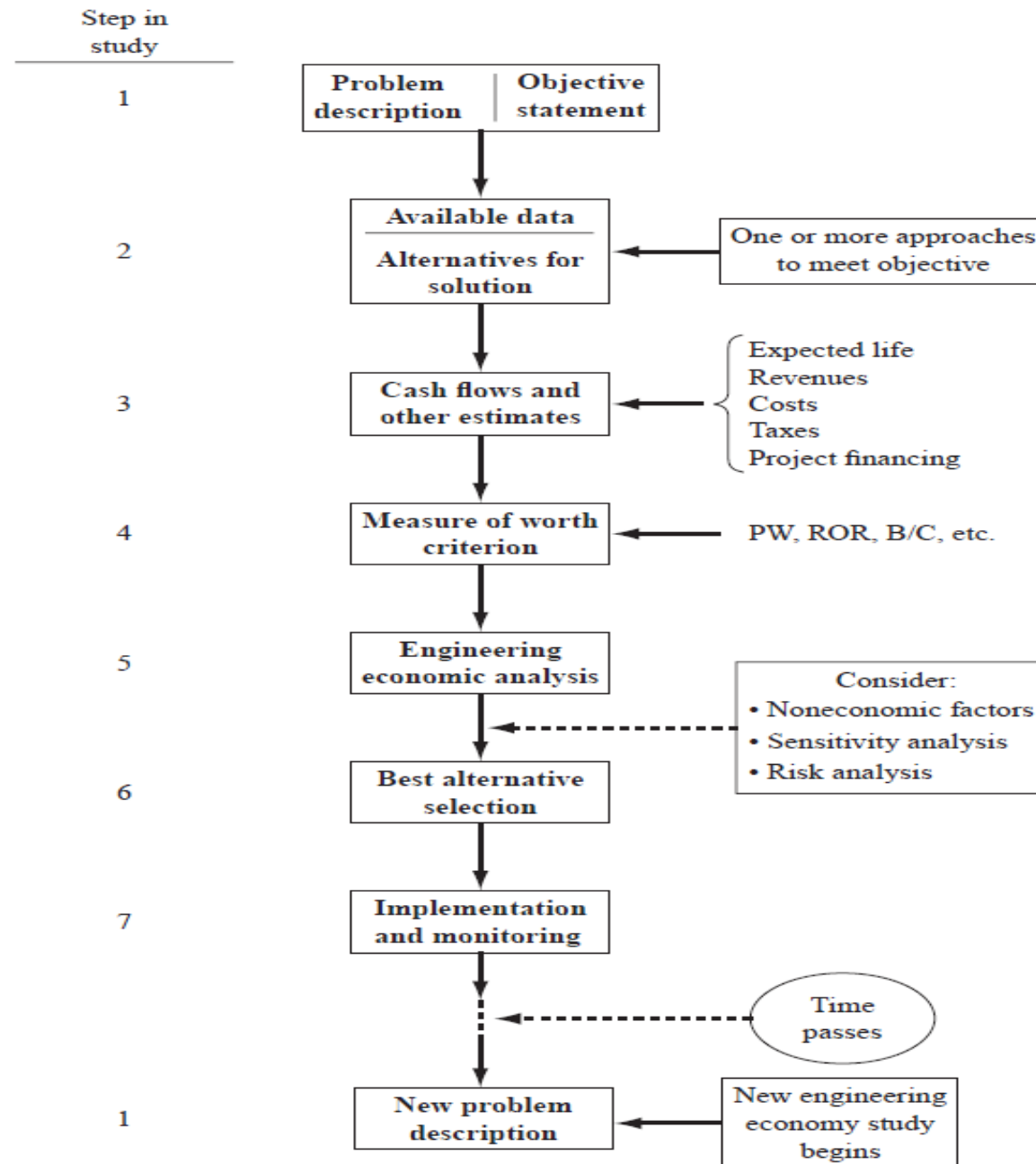- Investment involves money

- Time has a time value

Time Value of Money is the most important concept in engineering economy

Engineering Economy

Engineering Economy involves:

1. Formatting

2. Estimation

3. Evaluation

Steps in an engineering economy study

Interest and Interest Rate

- **<u>Interest</u>** is the manifestation of the time value of money

- **<u>Interest</u>** is the difference between an ending amount of money and the beginning amount.

If the difference is zero or negative ,there is no interest.

- There are always two perspectives to an amount of interest—interest paid and interest earned.

Interest = amount owed now – principal

<u>Interest rate</u> is defined as interest paid over a specific time unit is expressed as a percentage of the principal.

- Interest rate (%) = $\dfrac{interest\ accrued\ per\ time\ unit}{principal} *100\%$ [1]

Example 1

An employee at LaserKinetics.com borrows $10,000 on May 1 and must repay a total of $10,700 exactly 1 year later. Determine the interest amount and the interest rate paid.

Solution

The perspective here is that of the borrower since $10,700 repays a loan. Apply the equation to determine the interest paid.

Interest paid: $10,700 -10,000 = $700

the interest rate paid for 1 year.

Percent interest rate= $\dfrac{\$700}{\$10,000} * 100\% = 7\%$ per year

Example 2

Stereophonics, Inc., plans to borrow $20,000 from a bank for 1 year at 9% interest for new recording equipment.

(*a*) Compute the interest and the total amount due after 1 year.

(*b*) Construct a column graph that shows the original loan amount and total amount due after 1 year used to compute the loan interest rate of 9% per year.

Solution

(a) Compute the total interest accrued by solving the Equation for interest accrued.

Interest = $20,000(0.09) = $1800

The total amount due is the sum of principal and interest.

Total due = $20,000 + 1800 = $21,800

(b) Figure [1] shows the values used in Equation [1]: $1800 interest, $20,000 original loan
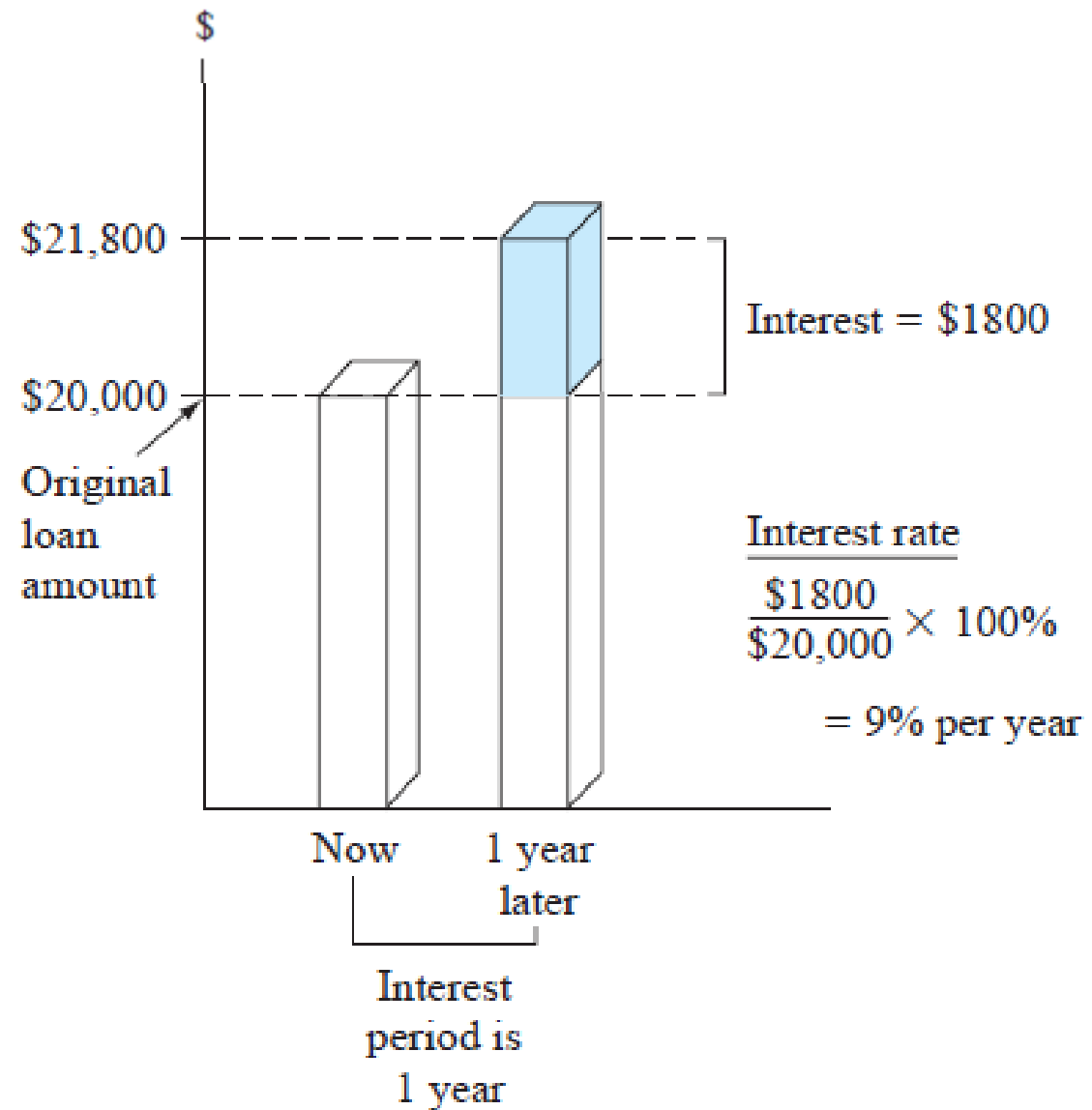
principal, 1-year interest period.

Figure 1 show the Values used to compute an interest rate of 9% per year.