Assignment 1 (15%)

Let *X* denote a continuous stochastic variable with the following cumulative probability function

$$F(x) = \begin{cases} 0 & for\ x \leq 0 \\ \frac{3}{4}x^2 - \frac{1}{4}x^3 & for\ 0 < x < 2 \\ 1 & for\ x \geq 2 \end{cases}$$

a) Compute $P(X \leq 0{,}5)$ og $P(X > 1)$

b) Show that the density function $f(x)$ for *X* is

$$f(x) = \begin{cases} \frac{3}{4}(2x - x^2) & for \quad 0 < x < 2 \\ 0 & Otherwise \end{cases}$$

c) Find the expected value and variance of *X*

Assignment 2 (20%)

Grades for ALI1 and SMP1 in 2014 were as follows:

	SMP1 Grade			
ALI1 Grade	*12*	*10*	*7*	*other*
12	25	6	17	13
10	17	16	15	6
7	18	4	18	10
Other	10	8	11	20

a) If a randomly chosen student from the ALI1 course is chosen and turns out to have received a 12 in ALI1, what is the probability that this student also received a 12 in SMP1?
b) Test whether the grades in ALI1 and SMP1 are independent using a 0,01 level of significance
c) What is the probability that a person will receive a 12 in SMP1, given that they received less than 7 in ALI?
d) What is the probability of receiving a 12 in ALI1 *or* a 12 in SMP?

Assignment 3 (15%)

A computer scientist is investigating the usefulness of two different design languages in improving programming tasks. Twelve expert programmers, familiar with both languages, are asked to code a standard function in both languages, and the time (in minutes) is recorded. The data follows below

a) Determine the mean, standard deviation and interquartile range for both sets of data
b) Setup a 95% confidence interval on the mean time in minutes for both sets of data. What do these confidence intervals indicate with regard to one design language being preferable?
c) Test the hypothesis that the mean time in minutes for coding the standard function of the two languages are equal

	Time	
Programmer	Design language 1	Design language 2
1	17	18
2	16	14
3	21	19
4	14	11
5	18	23
6	24	21
7	16	10
8	14	13
9	21	19
10	23	24
11	13	15
12	18	20

Assignment 4 (20%)

There are currently 368 students enrolled at the ICT programme. 62 of these students are females.

a) What probability distribution would be appropriate to model female students at the ICT programme?
b) What is an estimate of the population proportion of female ICT students?
c) Compute a 95% confidence interval for the estimate found in (b).
d) In a class with 40 students, what is the probability that the class will consist of at least 25% females?

Assignment 5 (30%)

The Excel file 'TV Viewing.xlsx' provides sample data on the number of hours of TV viewing per week for different adults.

a) Using the data, develop a simple linear regression model for estimating TV viewing time as a function of age?
b) Based on the correlation of determination, determine if a significant relationship exists between age and TV viewing time
c) Is the model developed in a) a good predictor model? Base your answer in the correlation of determination.