Introduction to Probability, Statistics and Data Handling	**Basic Definition and Concepts**
Tutorial 1	

Subjects for discussion:

1. What is the role of ***statistics***?
2. What is meant by the terms: ***population, sample***? Give examples.
3. What is a random ***experiment, outcome, sample space, event***? Describe.
4. How would like to measure the ***probability*** of an event?

Problem Set 1: Basic probability

1. A fair coin is tossed three times.
   a) define the population and construct a sample space, how many outcomes are possible?
   b) find a probability that at least one head will appear,
   c) define:
      - two outcomes that are mutually exclusive,
      - two outcomes and find the sum of them,
      - two outcomes with non-zero intersection;
   d) calculate the probability that:
      - the coin lands heads more often than tails,
      - the coin lands heads at least twice.
      - the coin lands heads on the last toss.
2. We have 10 students in our group. Four of them learn Spanish (event A), two German (B), and one German and Spanish. Are A and B independent?
3. The table describes the distribution of a random sample S of 100 individuals, organized by gender and whether they are right- or left-handed. Let's denote the events M = the subject is male, F = the subject is female, R = the subject is right-handed, L = the subject is left-handed. Compute the following probabilities:

	R	**L**
Males	43	9
Females	44	4

   a) $P(M)$
   b) $P(F)$
   c) $P(R)$
   d) $P(L)$
   e) $P(M \text{ AND } R)$
   f) $P(F \text{ AND } L)$
   g) $P(M \text{ OR } F)$
   h) $P(M \text{ OR } R)$
   i) $P(F \text{ OR } L)$
   j) $P(M')$
   k) $P(R|M)$
   l) $P(F|L)$
   m) $P(L|F)$
4. Carlos plays college soccer. He makes a goal 65% of the time he shoots. Carlos is going to attempt two goals in a row in the next game. A = the event Carlos is successful on his first attempt. $P(A) = 0.65$. B = the event Carlos is successful on his second attempt. $P(B) = 0.65$. Carlos tends to shoot in streaks. The probability that he makes the second goal **GIVEN** that he made the first goal is 0.90.
   a) What is the probability that he makes both goals?
   b) What is the probability that Carlos makes either the first goal or the second goal?
   c) Are A and B independent?
   d) Are A and B mutually exclusive?