

**STATISTICS 2**  
**WS 2023/24 (Mag. Thomas Forstner)**

Course-Number: 366.554

---

- 30) Somebody has discovered that there is a strong positive linear correlation between the number of crimes and the number of policemen / policewomen. Despite the fact that correlation is not causation; this is a little bit surprising. A statistician argues that the population figure of the cities has to be considered as a possible confounder for the observed correlation. Use the data below to verify the statistician ( $\alpha = 5\%$ ).

	number of crimes per 10.000 inhabitants	number of policemen / policewomen per 10.000 inhabitants	population of the city
City 1	210	20	30.000
City 2	234	21	40.000
City 3	279	23	50.000
City 4	179	19	20.000
City 5	160	18	10.000
City 6	136	15	5.000

- 31) The influence of specific diets on hepatomegaly (enlargement of the liver) is investigated in an animal experiment with mice. Three diets were given, which differed in the amount of carbohydrate they contained: 8 mice received a low carbohydrate diet, 8 received an intermediate carbohydrate diet, and 8 mice received a diet with a high amount of carbohydrate. The liver weights are expressed as a percentage of body weight.

	Liver weight [expressed as percentage of body weight]							
Low carbohydrate	3,64	3,77	4,18	4,21	3,88	3,93	3,91	3,96
Intermediate carbohydrate	3,42	3,96	3,87	4,19	3,58	3,76	3,84	3,98
High carbohydrate	3,17	3,63	3,38	3,47	3,39	3,41	3,55	3,44

- a) Formulate appropriate statistical hypotheses for this research question.  
b) Choose an appropriate statistical test (type I error = 5%) for evaluating this research question. Don't forget to verify the assumptions of the statistical test.