



Wintersemester 24/25

# Module Guide

for the study of

## Nursing Science

Erstfach im Zwei-Fächer-Bachelorstudiengang „Berufliche Bildung –  
Pflegerwissenschaft“

valid in connection with the examination regulations BPO 2020/2022

Gemäß Prüfungsordnung zum Zweifach Mathematik im Zwei-Fach-Bachelorstudiengang Berufliche Bildung - Pflegewissenschaft vom 03. Mai 2020.

Generated: October 12, 2024

## Musterstudienplan - Studienfach Mathematik im Zwei-Fächer-Bachelorstudiengang Berufliche Bildung - Pflegewissenschaft\*

	<b>Fachwissenschaft (Pflichtmodule)</b>
<b>1. Sem.</b>	Lineare Algebra 15 CP
<b>2. Sem.</b>	
<b>3. Sem.</b>	
<b>4. Sem.</b>	Stochastik 9 CP
<b>5. Sem.</b>	
<b>6. Sem.</b>	Geometrie 6 CP

Credit Points (kurz: CP) geben den durchschnittlichen Arbeitsaufwand für eine Veranstaltung bzw. ein Modul an, wobei 1 CP = 30 Std.

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\* Gemäß geltender Regelung für das Zweifach Mathematik beschlossen am 03.05.2020 (inkl. etwaiger Änderungsordnungen bzw. Berichtigungen)

## Index by areas of study

### 1) Research Subject (15 CP)

Pflichtmodule im Umfang von 30 CP. Auflistung gemäß Studienverlaufsplan.

03-MAT-BA-MGY1a: Linear Algebra (15 CP).....	3
03-MAT-BA-MGY7: Stochastics (9 CP).....	5
03-MAT-BA-MGY2: Geometry (6 CP).....	7

**Module 03-MAT-BA-MGY1a: Lineare Algebra**

## Linear Algebra

**Assignment to areas of study:**

- Research Subject

**Content-related prior knowledge or skills:**

None

**Learning content:**

- Sets, logic
- Linear systems of equations: solvability criteria, Gaussian elimination
- Vector spaces: axiomatics, linear (in)dependence, basis, dimension. Complex numbers
- Linear mappings: Kernel, image, dimension theorem, matrix calculus, change of basis
- Scalar products: Orthonormal bases, Gram-Schmidt method
- Determinants: axiomatic and explicit description, properties
- Eigenvalues: characteristic polynomial, multiplicities, diagonalizability, Jordan normal form (without proof), minimal polynomial, spectral theorems
- Symmetric bilinear forms over the real numbers: Classification, orthogonal complements.

**Learning outcomes / competencies / targeted competencies:**

- Students master basic mathematical skills
- Students can independently develop mathematical concepts and facts
- Students have active knowledge of proof strategies and techniques
- Students solve linear algebra problems independently
- Students know how linear algebra relates to school mathematics, theoretical mathematics and real world situations

**Calculation of student workload:**

212 h Preparation / follow-up work

70 h Exam preparation

168 h SWS / presence time / working hours

**Are there optional courses in the modules?**

no

**Language(s) of instruction:**

German

**Responsible for the module:**

Prof. Dr. Eva Maria Feichtner

**Frequency:**

winter semester, yearly

**Duration:**

2 semester[s]

**The module is valid since / The module is valid until:**

SoSe 24 / -

**Credit points / Workload:**

15 / 450 hours

**Module examinations****Module examination:** Kombinationsprüfung zur Linearen Algebra**Type of examination:** combination exam**Form of examination:**

Announcement at the beginning of the semester

**The examination is ungraded?**

no

**Number of graded components / ungraded components / prerequisites of the examination:**

1 / 1 / -

**Language(s) of instruction:**

Deutsch

## Module courses

**Course:** Vorlesung mit Übung zur Linearen Algebra 1

**Frequency:**

winter semester, yearly

**Language(s) of instruction:**

Deutsch

**Contact hours:**

6,00

**University teacher:**

**Teaching method(s):**

**Associated module examination:**

Kombinationsprüfung zur Linearen Algebra

**Course:** Vorlesung mit Übung zur Linearen Algebra 2

**Frequency:**

summer semester, yearly

**Language(s) of instruction:**

Deutsch

**Contact hours:**

6,00

**University teacher:**

**Teaching method(s):**

**Associated module examination:**

Kombinationsprüfung zur Linearen Algebra

## Module 03-MAT-BA-MGY7: Stochastik Stochastics

### Assignment to areas of study:

- Research Subject

### Content-related prior knowledge or skills:

Knowledge from the modules 03-MAT-BA-MGY1 and 03-MAT-BA-MGY3.

### Learning content:

Probability measures and distributions (on discrete sets, the real numbers  $\mathbb{R}$  and on  $\mathbb{R}^n$ ), random variables, density functions and distribution functions, stochastic independence and convolutions, expected value, variance, covariance, correlation, law of large numbers. Further topics may include, for example, convergence of random variables and distributions, the central limit theorem, statistical estimation methods and hypothesis testing.

### Learning outcomes / competencies / targeted competencies:

Students should be familiar with the mathematical modeling of chance and probability, know basic stochastic models and analytical concepts and be able to apply these to concrete situations (e.g. games of chance, election forecasts, clinical studies). Students should be able to use stochastic modeling in applications and be able to apply advanced basic concepts (such as statistical estimation methods, Markoff chains, stochastic processes) in elementary models.

### Calculation of student workload:

84 h SWS / presence time / working hours

46 h Exam preparation

140 h Preparation / follow-up work

### Are there optional courses in the modules?

no

### Language(s) of instruction:

German

### Responsible for the module:

Prof. Dr. Thorsten-Ingo Dickhaus

### Frequency:

### Duration:

The module is valid since / The module is valid until:

SoSe 24 / -

### Credit points / Workload:

9 / 270 hours

**This module is ungraded!**

## Module examinations

**Module examination:** Kombinationsprüfung zur Stochastik

**Type of examination:** combination exam

### Form of examination:

Announcement at the beginning of the semester

### The examination is ungraded?

no

**Number of graded components / ungraded components / prerequisites of the examination:**

1 / 1 / -

**Language(s) of instruction:**

Deutsch

**Description:**

Type of Examination: Oral or Written Exam.

The Coursework requirements will be decided upon by the Lecturer at the beginning of the course (Weekly Worksheets, Midterm Exam, etc.).

**Module courses**

**Course:** Vorlesung mit Übung zur Stochastik

**Frequency:**

summer semester, yearly

**Language(s) of instruction:**

Deutsch

**Contact hours:**

6,00

**University teacher:**

**Teaching method(s):**

**Associated module examination:**  
Kombinationsprüfung zur Stochastik

## Module 03-MAT-BA-MGY2: Geometrie

### Geometry

**Assignment to areas of study:**

- Research Subject

**Content-related prior knowledge or skills:**

none

**Learning content:**

- Axiomatic structure of Euclidean geometry
- Geometry in space (volumes and surface areas of solids and their lateral surfaces)
- Extracts from analytical geometry
- Conic sections
- Non-Euclidean geometries

**Learning outcomes / competencies / targeted competencies:**

The students

- Understand concepts of the axiomatic structure of geometry
- Derive basic theorems of geometry by logical reasoning from the given axioms
- Master fundamental concepts and factual relationships within plane geometry
- Sensibly use dynamic geometry software (e.g. GeoGebra, Cinderella) to understand problems and generate knowledge
- Can independently solve problems in the field of geometry and prove central theorems
- Deepen and further develop skills in spatial imagination
- Can name and present examples of non-Euclidean geometries

**Calculation of student workload:**

84 h Preparation / follow-up work

26 h Exam preparation

70 h SWS / presence time / working hours

**Are there optional courses in the modules?**

no

**Language(s) of instruction:**

German

**Responsible for the module:**

Dr. Arsen Narimanyan

**Frequency:**

summer semester, yearly

**Duration:**

1 semester[s]

**The module is valid since / The module is valid until:**

SoSe 24 / -

**Credit points / Workload:**

6 / 180 hours

**This module is ungraded!**

## Module examinations

**Module examination:** Kombinationsprüfung zur Geometrie

**Type of examination:** combination exam



<b>Form of examination:</b> Announcement at the beginning of the semester	<b>The examination is ungraded?</b> no
<b>Number of graded components / ungraded components / prerequisites of the examination:</b> 1 / 1 / -	
<b>Language(s) of instruction:</b> Deutsch	
<b>Description:</b> Type of Examination: Oral or Written Exam. The Coursework requirements will be decided upon by the Lecturer at the beginning of the course (Weekly Worksheets, Midterm Exam, etc.).	

### Module courses

<b>Course:</b> Vorlesung mit Übung zur Geometrie	
<b>Frequency:</b> summer semester, yearly	<b>Language(s) of instruction:</b> Deutsch
<b>Contact hours:</b> 6,00	<b>University teacher:</b> Dr. Arsen Narimanyan
<b>Teaching method(s):</b>	<b>Associated module examination:</b> Kombinationsprüfung zur Geometrie