### IV.16.4 Actuarial mathematics 2

<table>
<thead>
<tr>
<th>module designation</th>
<th><strong>Insurance Mathematics 2</strong></th>
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<tbody>
<tr>
<td>abbreviation</td>
<td><strong>B-VE2</strong></td>
</tr>
<tr>
<td>course</td>
<td>actuarial science</td>
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<tr>
<td>Module manager</td>
<td>Prof. Dr. Michael Fröhlich</td>
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<tr>
<td>lecturer</td>
<td>Prof. Dr. Michael Fröhlich, Dr. Doris Augustine</td>
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<tr>
<td>Assignment to the Curriculum B.Sc.:</td>
<td>Conscription, 6. o. 7. Sem.</td>
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<tr>
<td>Lehrform / SWS</td>
<td>Seminar-based instruction, exercises / 4 SWS</td>
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<tr>
<td>workload in hours</td>
<td>Attendance study: 60 h, Self-study: 90 h</td>
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<tr>
<td>credit points</td>
<td>5 ECTS</td>
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<tr>
<td>recommended</td>
<td>B-AN1,2: Analysis 1,2; B-LA1,2: Lineare Algebra 1,2; B-WS1,2: Probability theory and 1, 2; B-VE1: Actuarial mathematics 1</td>
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<tr>
<td>requirements</td>
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#### Learning goals:

**Professional competence**

- After successfully completing the module, the students are able to
  - with the basic terms and methods of sick and familiar with pension actuarial mathematics (2),
  - to know (1) and to be able to apply (3) the elimination regulations in pension actuarial mathematics,
  - calculate the settlement amount and present value of pension obligations (3),
  - calculate the actuarial pension reserve (3),
  - understand the context and content of pension commitments (1) and calculate the partial value (3),
  - to know tariff types in private health insurance (PKV) (1),
  - Understand head damage statistics in PKV and apply (3),
  - Carry out premium calculation for new business in private health insurance (3),
  - to determine the aging reserves of private health insurance portfolios (2),
  - The calculation of the private health insurance premium for existing customers to change tariffs (3),
  - to know the problem of old people in private health insurance (1).

**Personal competence**

- See preliminary remarks of this module handbook

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Continued next page
### Contents
- Environment and content of pension commitments
- Elimination rules
- Settlement amount and present value of pension obligations
- Premiums in pension insurance
- Actuarial reserve
- Practical issues
- Economic and legal environment of private health insurance
- Tariffs
- Head damage stats
- Premium calculation for new business
- Inventory aging reserve
- Tariff change
- Surplus sharing for contribution reduction in old age
- Actuarial control cycle for inventory contribution
- Actuarial models to quantify the risk

### Study/examination achievements
- Written examination (90-120 min.) or oral exam (15-45 min.)
  - Note weight: 4

### Media forms
- board, projector,

### Literature
- **Bohn, K.:** The mathematics of German private health insurance, Karlsruhe 1980
- **Heubeck, K.:** Richttafeln 2005 G, Köln 2005
- **Neuburger, E.:** Pension insurance mathematics, in: Neuburger, E. (ed.): Mathematics and technology of company pension commitments, Karlsruhe 1997
  -**Neuburger, E.:** Formulas of pension insurance mathematics, www.neuburger.com/formeln/formeln.html
- **Thullen, P.:** Mathematical methods of social security, VVW
- **Wolfsdorf, K.:** Insurance mathematics part 1, 2nd edition, Stuttgart 1997
- **Wolfsdorf, K.:** Insurance mathematics part 2, Stuttgart 1988