## Module title

**Pseudo Riemannian and Riemannian Geometry**

### Abbreviation

10-M=VPRG-161-m01

## Module coordinator

Dean of Studies Mathematik (Mathematics)

## Module offered by

Institute of Mathematics

## ECTS

10

## Method of grading

Numerical grade

## Only after succ. compl. of module(s)

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## Duration

1 semester

## Module level

Graduate

## Other prerequisites

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## Contents

The module builds on the topics covered in module 10-M=ADGM and discusses these in more detail: Riemannian and pseudo-Riemannian manifolds, Levi-Civita connection and curvature, geodesics and the exponential map, Jacobi fields, comparison theorems in Riemannian geometry, submanifolds, integration, d’Alembert and Laplace operators, causal structure of Lorenz manifolds, Einstein equations and applications in general relativity theory.

## Intended learning outcomes

The student is acquainted with advanced topics in differential geometry on Riemannian and pseudo-Riemannian manifolds. He/She is able to establish a connection between his/her acquired skills and other branches of mathematics and questions in physics.

## Courses

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<th>Type</th>
<th>Number of weekly contact hours</th>
<th>Language — if other than German</th>
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Module taught in: German and/or English

## Method of assessment

- a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate)

Assessment offered: In the semester in which the course is offered and in the subsequent semester

Language of assessment: German or English

## Allocation of places

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## Additional information

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## Referred to in LPO I

(Examination regulations for teaching-degree programmes)

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## Module appears in

- Master's degree (1 major) Mathematics (2016)
- Master's degree (1 major) Physics (2016)
- Master's degree (1 major) Mathematical Physics (2016)
- Master's degree (1 major) Computational Mathematics (2016)
- Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
- Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
- Master's degree (1 major) Computational Mathematics (2019)
- Master's degree (1 major) Mathematics (2019)