Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Subdivided Module Catalogue

for the Module studies (Bachelor)

Quantum Technology

Examination regulations version: 2021
Responsible: Faculty of Physics and Astronomy

Abbreviations used

Course types: **E** = field trip, **K** = colloquium, **O** = conversatorium, **P** = placement/lab course, **R** = project, **S** = seminar, **T** = tutorial, **Ü** = exercise, **V** = lecture

Term: **SS** = summer semester, **WS** = winter semester

Methods of grading: **NUM** = numerical grade, **B/NB** = (not) successfully completed

Regulations: **(L)ASPO** = general academic and examination regulations (for teaching-degree programmes), **FSB** = subject-specific provisions, **SFB** = list of modules

Other: **A** = thesis, **LV** = course(s), **PL** = assessment(s), **TN** = participants, **VL** = prerequisite(s)

Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

In accordance with

the general regulations governing the degree subject described in this module catalogue:

associated official publications (FSB (subject-specific provisions)/SFB (list of modules)):

15-May-2019 (2019-36)

27-Jun-2019 (2019-41)

14-Nov-2019 (2019-52)

22-Jan-2020 (2020-13)

06-May-2020 (2020-39)

22-Jul-2020 (2020-57)

17-Dec-2020 (2020-110)

10-Mar-2021 (2021-17)

09-Jun-2021 (2021-58)

22-Dec-2021 (2021-85)

05-Jul-2022 (2022-52)

31-Jan-2023 (2022-86)

15-Jun-2023 (2023-58)

13-Dec-2023 (2023-107)

07-Aug-2024 (2024-82)

22-Jan-2025 (2025-1)

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.

The subject is divided into

Abbreviation	Module title		Method of grading	page
Winter Term 2021				
11-BXP8-152-m01	Current Topics in Physics	8	NUM	11
11-BXP6-152-m01	Current Topics in Physics	6	NUM	10
11-BXP5-152-m01	Current Topics Physics	5	NUM	9
11-BXN5-212-m01	Current Topics in Quantum Technology	5	NUM	6
11-BXN6-212-m01	Current Topics in Quantum Technology	6	NUM	7
11-BXN8-212-m01	Current Topics in Quantum Technology	8	NUM	8
11-CSEM6-152-m01	Selected Topics in Energy and Material Science	6	NUM	12
11-CSF6-152-m01	Selected Topics in Solid State Physics	6	NUM	13
11-CSN6-212-m01	Selected Topics in Quantum Technology	6	NUM	14
Summer Term 2022				
11-BXP8-152-m01	Current Topics in Physics	8	NUM	11
11-BXP6-152-m01	Current Topics in Physics	6	NUM	10
11-BXP5-152-m01	Current Topics Physics	5	NUM	9
11-BXN5-212-m01	Current Topics in Quantum Technology	5	NUM	6
11-BXN6-212-m01	Current Topics in Quantum Technology	6	NUM	7
11-BXN8-212-m01	Current Topics in Quantum Technology	8	NUM	8
11-CSEM6-152-m01	Selected Topics in Energy and Material Science	6	NUM	12
11-CSF6-152-m01	Selected Topics in Solid State Physics	6	NUM	13
11-CSN6-212-m01	Selected Topics in Quantum Technology	6	NUM	14
Winter Term 2022				
11-BXP8-152-m01	Current Topics in Physics	8	NUM	11
11-BXP6-152-m01	Current Topics in Physics	6	NUM	10
11-BXP5-152-m01	Current Topics Physics	5	NUM	9
11-BXN5-212-m01	Current Topics in Quantum Technology	5	NUM	6
11-BXN6-212-m01	Current Topics in Quantum Technology	6	NUM	7
11-BXN8-212-m01	Current Topics in Quantum Technology	8	NUM	8
11-CSEM6-152-m01	Selected Topics in Energy and Material Science	6	NUM	12
11-CSF6-152-m01	Selected Topics in Solid State Physics	6	NUM	13
11-CSN6-212-m01	Selected Topics in Quantum Technology	6	NUM	14
Summer Term 2023				
11-BXN5-212-m01	Current Topics in Quantum Technology	5	NUM	6
11-BXN6-212-m01	Current Topics in Quantum Technology	6	NUM	7
11-BXN8-212-m01	Current Topics in Quantum Technology	8	NUM	8
11-BXP5-152-m01	Current Topics Physics	5	NUM	9
11-BXP6-152-m01	Current Topics in Physics	6	NUM	10
11-BXP8-152-m01	Current Topics in Physics	8	NUM	11
11-CSN6-212-m01	Selected Topics in Quantum Technology	6	NUM	14
11-CSEM6-152-m01	Selected Topics in Energy and Material Science	6	NUM	12
11-CSF6-152-m01	Selected Topics in Solid State Physics	6	NUM	13
Winter Term 2023				
11-BXP8-152-m01	Current Topics in Physics	8	NUM	11

11-BXP6-152-m01	Current Topics in Physics	6	NUM	10
11-BXP5-152-m01	Current Topics Physics	5	NUM	9
11-BXN5-212-m01	Current Topics in Quantum Technology	5	NUM	6
11-BXN6-212-m01	Current Topics in Quantum Technology	6	NUM	7
11-BXN8-212-m01	Current Topics in Quantum Technology	8	NUM	8
11-CSN6-212-m01	Selected Topics in Quantum Technology	6	NUM	14
11-CSEM6-152-m01	Selected Topics in Energy and Material Science	6	NUM	12
11-CSF6-152-m01	Selected Topics in Solid State Physics	6	NUM	13
Summer Term 2024				
11-BXP8-152-m01	Current Topics in Physics	8	NUM	11
11-BXP6-152-m01	Current Topics in Physics	6	NUM	10
11-BXP5-152-m01	Current Topics Physics	5	NUM	9
11-BXN5-212-m01	Current Topics in Quantum Technology	5	NUM	6
11-BXN6-212-m01	Current Topics in Quantum Technology	6	NUM	7
11-BXN8-212-m01	Current Topics in Quantum Technology	8	NUM	8
11-CSN6-212-m01	Selected Topics in Quantum Technology	6	NUM	14
11-CSEM6-152-m01	Selected Topics in Energy and Material Science	6	NUM	12
11-CSF6-152-m01	Selected Topics in Solid State Physics	6	NUM	13
Winter Term 2024				
11-BXP8-152-m01	Current Topics in Physics	8	NUM	11
11-BXP6-152-m01	Current Topics in Physics	6	NUM	10
11-BXP5-152-m01	Current Topics Physics	5	NUM	9
11-BXN5-212-m01	Current Topics in Quantum Technology	5	NUM	6
11-BXN6-212-m01	Current Topics in Quantum Technology	6	NUM	7
11-BXN8-212-m01	Current Topics in Quantum Technology	8	NUM	8
11-CSEM6-152-m01	Selected Topics in Energy and Material Science	6	NUM	12
11-CSF6-152-m01	Selected Topics in Solid State Physics	6	NUM	13
11-CSN6-212-m01	Selected Topics in Quantum Technology	6	NUM	14
Summer Term 2025				
11-BXP8-152-m01	Current Topics in Physics	8	NUM	11
11-BXP6-152-m01	Current Topics in Physics	6	NUM	10
11-BXP5-152-m01	Current Topics Physics	5	NUM	9
11-BXN5-212-m01	Current Topics in Quantum Technology	5	NUM	6
11-BXN6-212-m01	Current Topics in Quantum Technology	6	NUM	7
11-BXN8-212-m01	Current Topics in Quantum Technology	8	NUM	8
11-CSEM6-152-m01	Selected Topics in Energy and Material Science	6	NUM	12
11-CSF6-152-m01	Selected Topics in Solid State Physics	6	NUM	13
11-CSN6-212-m01	Selected Topics in Quantum Technology	6	NUM	14

Module title			Abbreviation
Current Topics in Quantum Technology			11-BXN5-212-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Current topics in experimental physics. Credited academic achievements, e.g. in case of change of university or study abroad.

Intended learning outcomes

The student posseses advanced knowledge meeting the requirements of a module in Nanosciences or Quantum Technology on Bachelor's level. He/She
commands knowledge in a current field in Quantum Technology or Nanosciences and insight into the measuring and evaluation methods which are necessary to acquire this knowledge. He/She is able to classify and to link the learnt. He/She knows about fields of application.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + R (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) Written examination (approx. 90 to 120 minutes) or
b) oral examination of one candidate each (approx. 30 minutes) or
c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or
d) report on practical course (approx. 8 to 10 pages) or
e) presentation/talk (approx. 30 minutes)
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English

Allocation of places

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Additional information

Approval from examination committee required.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title			Abbreviation
Current Topics in Quantum Technology			11-BXN6-212-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Current topics in experimental physics. Credited academic achievements, e.g. in case of change of university or study abroad.

Intended learning outcomes

The student posseses advanced knowledge meeting the requirements of a module in Nanosciences or Quantum Technology on Bachelor's level. He/She
commands knowledge in a current field in Quantum Technology or Nanosciences and insight into the measuring and evaluation methods which are necessary to acquire this knowledge. He/She is able to classify and to link the learnt. He/She knows about fields of application.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + R (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) Written examination (approx. 90 to 120 minutes) or
b) oral examination of one candidate each (approx. 30 minutes) or
c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or
d) report on practical course (approx. 8 to 10 pages) or
e) presentation/talk (approx. 30 minutes)
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English

Allocation of places

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Additional information

Approval from examination committee required.

Workload

180 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title			Abbreviation
Current Topics in Quantum Technology			11-BXN8-212-m01
Module coordinator			**Module offered by**
Managing Director of the Institute of Applied Physics			Faculty of Physics and Astronomy
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
8	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Current topics in experimental physics. Credited academic achievements, e.g. in case of change of university or study abroad.

Intended learning outcomes

The student posseses advanced knowledge meeting the requirements of a module in Nanosciences or Quantum Technology on Bachelor's level. He/She
commands knowledge in a current field in Quantum Technology or Nanosciences and insight into the measuring and evaluation methods which are necessary to acquire this knowledge. He/She is able to classify and to link the learnt. He/She knows about fields of application.

Courses (type, number of weekly contact hours, language — if other than German)

V (4) + R (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, 30 minutes per candidate) or report on practical course (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes).
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English

Allocation of places

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Additional information

Approval from examination committee required.

Workload

240 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title			Abbreviation
Current Topics Physics			11-BXP5-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Approval from examination committee required.	

Contents

Current topics of Experimental and Theoretical Physics. Accredited academic achievements, e.g. in case of change of university or study abroad.

Intended learning outcomes

The students have advanced competencies corresponding to the requirements of a module of Experimental or Theoretical Physics of the Bachelor's programme of Nanostructure Technology. They have knowledge of a current subdiscipline of Physics and understand the measuring and/or calculation methods necessary to acquire this knowledge. They are able to classify the subject-specific contexts and know the application areas.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + R (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes).
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title			Abbreviation
Current Topics in Physics			11-BXP6-152-m01
Module coordinator			**Module offered by**
chairperson of examination committee			Faculty of Physics and Astronomy
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Approval from examination committee required.	

Contents

Current topics of Experimental and Theoretical Physics. Accredited academic achievements, e.g. in case of change of university or study abroad.

Intended learning outcomes

The students have advanced competencies corresponding to the requirements of a module of Experimental or Theoretical Physics of the Bachelor's programme of Nanostructure Technology. They have knowledge of a current subdiscipline of Physics and understand the measuring and/or calculation methods necessary to acquire this knowledge. They are able to classify the subject-specific contexts and know the application areas.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + R (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes).
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

180 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title			Abbreviation
Current Topics in Physics			11-BXP8-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
8	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Approval from examination committee required.	

Contents

Current topics of Experimental and Theoretical Physics. Accredited academic achievements, e.g. in case of change of university or study abroad.

Intended learning outcomes

The students have advanced competencies corresponding to the requirements of a module of Experimental or Theoretical Physics of the Bachelor's programme of Nanostructure Technology. They have knowledge of a current subdiscipline of Physics and understand the measuring and/or calculation methods necessary to acquire this knowledge. They are able to classify the subject-specific contexts and know the application areas.

Courses (type, number of weekly contact hours, language — if other than German)

V (4) + R (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes).
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

240 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title			Abbreviation
Selected Topics in Energy and Material Science			11-CSEM6-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Approval from examination committee required.	

Contents

Selected topics of energy and materials research.

Intended learning outcomes

The students have basic knowledge of energy and material research and understand the measuring and evaluation methods necessary to acquire this knowledge. They are able to classify the subject-specific contexts and know the application areas.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + R (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes).
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

180 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title			Abbreviation
Selected Topics in Solid State Physics			11-CSF6-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Approval from examination committee required.	

Contents

Selected topics of Solid-State Physics.

Intended learning outcomes

The students have basic knowledge of a specialist field of Solid-State Physics and understand the measuring and evaluation methods necessary to acquire this knowledge. They are able to classify the subject-specific contexts and know the application areas.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + R (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes).
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

180 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title			Abbreviation
Selected Topics in Quantum Technology			11-CSN6-212-m01
Module coordinator			**Module offered by**
Managing Director of the Institute of Applied Physics			Faculty of Physics and Astronomy
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Current topics in experimental physics. Credited academic achievements, e.g. in case of change of university or study abroad.

Intended learning outcomes

The student posseses advanced knowledge meeting the requirements of a module in Nanosciences or Quantum Technology on Bachelor's level. He/She
commands knowledge in a current field in Quantum Technology or Nanosciences and insight into the measuring and evaluation methods which are necessary to acquire this knowledge. He/She is able to classify and to link the learnt. He/She knows about fields of application.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + R (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, 30 minutes per candidate) or report on practical course (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes).
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English

Allocation of places

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Additional information

Approval from examination committee required.

Workload

180 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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