Module Catalogue

for the Subject

Space Science and Technology

as a Master's with 1 major

with the degree "Master of Science"

(120 ECTS credits)

Examination regulations version: 2005
Responsible: Faculty of Mathematics and Computer Science

Module Catalogue for the Subject
Space Science and Technology
Master's with 1 major, 120 ECTS credits

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UNIVERSITÄT
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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:

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

26-Sep-2006 (2006-21)

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.

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Compulsory Courses

(60 ECTS credits)

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Space Science

(30 ECTS credits)

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Space Technology

(30 ECTS credits)

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Focus

(30 ECTS credits)

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Engineering Track

(30 ECTS credits)

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The Dynamics and Regulation of Systems and Structures

(30 ECTS credits)

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Space Robotics

(30 ECTS credits)

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Space Robotics and Control

(30 ECTS credits)

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Module title	Abbreviation
Advanced Automation	10-I-AA-072-m01

Module coordinator	Module offered by
holder of the Chair of Computer Science VII	Institute of Computer Science

ECTS	Method of grading	Only after succ. compl. of module(s)
8	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Advanced topics in automation systems as well as instrumentation and control engineering, for example from the field of sensor data processing, actuators, cooperating systems, mission and trajectory planning.

Intended learning outcomes

The students have an advanced knowledge of selected topics in automation systems. They are able to implement advanced automation systems.

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

Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

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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 Catalogue for the Subject
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Module title			Abbreviation
Team Design Project			10-I-TDP-072-m01

Module coordinator		Module offered by	
holder of the Chair of Computer Science VII		Institute of Computer Science	

ECTS	Method of grading	Only after succ. compl. of module(s)	
10	numerical grade	--	

Duration	Module level	Other prerequisites	
1 semester	graduate	--	

Contents

Multi-disciplinary project in the area of aerospace that covers areas such as mechanical components, electronics and software. In this context, current and relevant topics from research are reviewed.

Intended learning outcomes

Students will practise reviewing complex topics in interdisciplinary teams. They will be required to plan, execute and check their work. At the end of the course, they will have created a completely functional system.

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

P (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

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Allocation of places

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Additional information

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Module Catalogue for the Subject
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Module title		Abbreviation
Robotics		10-I-RO-072-m01

Module coordinator		Module offered by
holder of the Chair of Computer Science VII		Institute of Computer Science

ECTS	Method of grading	Only after succ. compl. of module(s)
8	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents
History, applications and properties of robots, direct kinematics of manipulators: coordinate systems, rotations, homogenous coordinates, axis coordinates, arm equation. Inverse kinematics: solution properties, end effector configuration, numerical and analytical approaches, examples of different robots for analytical approaches. Workspace analysis and trajectory planning, dynamics of manipulators: Lagrange-Euler model, direct and inverse dynamics. Mobile robots: direct and inverse kinematics, propulsion system, tricycle, Ackermann steering, holonomes and non-holonome restrictions, kinematic classification of mobile robots, posture kinematic model. Movement control and path planning: roadmap methods, cell decomposition methods, potential field methods. Sensors: position sensors, speed sensors, distance sensors.

Intended learning outcomes
The students master the fundamentals of robot manipulators and vehicles and are, in particular, familiar with their kinematics and dynamics as well as the planning of paths and task execution.

Courses (type, number of weekly contact hours, language — if other than German)
V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
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Allocation of places
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Additional information
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Module title		Abbreviation
Astronautics Seminar		10-I-SR-072-m01

Module coordinator		Module offered by
Dean of Studies Informatik (Computer Science)		Institute of Computer Science

ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Independent review of a current topic in computer science based on literature and, where applicable, software with written and oral presentation.

Intended learning outcomes

The students are able to independently review a current topic in aerospace information technology, to summarise the main aspects in written form and to orally present these in an appropriate way.

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

S (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

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Allocation of places

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Space Science and Instrumentation

(30 ECTS credits)

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Space Automation and Regulation

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Scientific Track

(30 ECTS credits)

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An Introduction to Physical Space Research in Astrophysics, Space Science and Planetology

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Physical Space Advanced Studies in Astrophysics, Space Science and Instrumentation

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Atmospheric and Space Physics

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Nicht zugeordnet

(60 ECTS credits)