Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Subdivided 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: 2015
Responsible: Faculty of Mathematics and Computer Science
Responsible: Institute of Computer Science

Course of Studies - Contents and Objectives

"Space Science and Technology" is a research-oriented program at the Faculty of Mathematics and Computer Science, the degree obtained is Master of Science (M.Sc.). With the degree Master of Science the student receives a higher professional and research-oriented degree. The international program "Space Science and Technology" with the degree "Master of Science" has the objective to provide in-depth knowledge and abilities in order to apply the interdisciplinary contents of Physics, Computer Science, Electronics, Mathematics, Natural and Engineering Sciences to solve challenging tasks in the field of Space Science and Technology. In particular, the program provides students with the following competences:

- Understanding of the interrelation of the special topics of "Space Science and Technology"
- Ability to apply technical subject matter in this discipline as well as scientific methods and findings
- Profound expertise for the professional world in space industry and in research institutes.

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:

ASPO2015

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

13-Jul-2015 (2015-24)

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	ECTS credits	Method of grading	page
Compulsory Courses (60 ECTS credits)				
Space Science (30,50 ECTS credits)				
10-I=ISP-152-m01	Space Physics (Introduction)	8	NUM	11
10-I=ORO-152-m01	Optics- and Radar-based Observations	7,50	NUM	12
10-I=SP-152-m01	Image Processing and Remote Sensing (Space Physics)	7,50	NUM	20
10-I=SEI-152-m01	Spacecraft Environment Interactions	7,50	NUM	19
Space Technology (29,50 ECTS credits)				
10-I=CSD-152-m01	CanSat / FloatSat Design Workshop	9	NUM	8
10-I=SSD-152-m01	Spacecraft System Design	8	NUM	21
10-I=SD-152-m01	Space Dynamics	5	NUM	18
10-I=EIS-152-m01	Electronics in Space	7,50	NUM	10
Compulsory Electives (30 ECTS credits)				
10-I=TDP-152-m01	Team Design Project	9	NUM	22
10-I=AA-152-m01	Advanced Automation	8	NUM	5
10-I=RO1-152-m01	Robotics 1	8	NUM	13
10-I=RO2-152-m01	Robotics 2	8	NUM	15
10-I=SA-152-m01	Aerospace Seminar	5	NUM	17
10-I=ATAI-152-m01	Advanced Topics in Aerospace and Informatics	5	NUM	7
Thesis (30 ECTS credits)				
10-I=ThesisSST-152-m01	Master's Thesis Space Science and Technology	25	NUM	23
10-I=DEF-152-m01	Oral Examination Space Science and Technology	5	B/NB	9

Module title			Abbreviation
Advanced Automation			10-I=AA-152-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)

V (4) + Ü (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. 60 to 120 minutes)
creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits):
IT,IS,ES,LR,GE

Workload

240 h

Teaching cycle

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

§ 22 II Nr. 3 b)

Module appears in

Master's degree (1 major) Space Science and Technology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's degree (1 major) Computer Science (2016)
Master's degree (1 major) Mathematics (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) Computer Science (2017)
Master's degree (1 major) Computer Science (2018)
Module studies (Master) Computer Science (2019)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Computational Mathematics (2022)

Master's degree (1 major) Mathematics (2022)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title			Abbreviation
Advanced Topics in Aerospace and Informatics			10-I=ATAI-152-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Selected topics in Aerospace and Informatics.

Intended learning outcomes

The students possess an advanced knowledge in the area of Aerospace and Informatics. They are able to understand solutions to complex problems in this area and to transfer them to related questions.

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

V (2) + Ü (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 (60 to 120 minutes)
Language of assessment: English
creditable for bonus

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 appears in

Master's degree (1 major) Space Science and Technology (2015)

Module title			Abbreviation
CanSat / FloatSat Design Workshop			10-I=CSD-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Computer Science VIII		Institute of Computer Science	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
9	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

CanSat (now known as FloatSat) is an interdisciplinary project designed - not only - for SpaceMaster students. It is designed for students with different backgrounds, e. g. in computer science, electronics, mechanical engineering, aerospace technology, physics, mathematics. A satellite project is an interdisciplinary project that requires knowledge and skills in this as well as in numerous other fields. CanSat is thus an ideal platform to combine all available skills in a single project. It covers the design and development of the space segment control software and the ground segment control software: telemetry and telecommanding in wireless communication: space segment - ground segment, electrical subsystem (energy, batteries), mechanical construction.

Intended learning outcomes

The students are able to build and integrate into the inside of the sphere the power unit, a control computer, a payload (camera) and attitude control devices: Gyros and reaction wheel of a pico satellite. The software of a CanSat "satellite" includes a real-time operating system (provided by us), commanding (immediate and time-tagged commands), telemetry (real time and history data), attitude control, power control, payload control, image processing and radio links communication. The ground segment ought to be able to generate and send telecommands and to get and (graphically) display the telemetry.

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

R (6)

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)

project and oral presentation delivered by one candidate each, weighted 4:1

Allocation of places

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Additional information

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Workload

270 h

Teaching cycle

Teaching cycle: every year, winter semester

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

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Module appears in

Master's degree (1 major) Space Science and Technology (2015)

Module title			Abbreviation
Oral Examination Space Science and Technology			10-l=DEF-152-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	(not) successfully completed	10-l=ThesisSST	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Presentation of research conducted by the participant on a defined problem in space science and technology.

Intended learning outcomes

The students know how to present a defined research problem.

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

K (0)

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)

final colloquium (approx. 60 minutes)
comprising: talk on thesis (45 minutes) and subsequent defence of thesis (15 minutes); defence usually public

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 appears in

Master's degree (1 major) Space Science and Technology (2015)

Module title			Abbreviation
Electronics in Space			10-I=EIS-152-m01
Module coordinator			**Module offered by**
Swedish partner university in Master's degree programme Space Science and Technology			Institute of Computer Science
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7,50	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This course covers the area electronics in space. It is part of the international SpaceMaster and is taught at the Swedish partner university.

Intended learning outcomes

The students master electronics in space.

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

V (0) + P (0)
In Lulea/Sweden

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. 60 to 120 minutes)

Allocation of places

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Additional information

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Workload

225 h

Teaching cycle

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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) Space Science and Technology (2015)

Module title			Abbreviation
Space Physics (Introduction)			10-I=ISP-152-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

1. Overview 2. Dynamics of charged particles in magnetic and electric fields 3. Elements of space plasma physics 4. Sun and heliosphere 5. Acceleration and transport of energetic particles in the heliosphere 6. Instruments for measuring energetic particles in space.

Intended learning outcomes

The students possess a fundamental knowledge about space physics and, in particular, the description of the dynamics of charged particles in the heliosphere and in space. They are familiar with the relevant parameters, their theoretical formulation and the methods to measure them.

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

V (4) + Ü (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. 60 to 120 minutes)
creditable for bonus

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 appears in

Master's degree (1 major) Space Science and Technology (2015)

Module title			Abbreviation
Optics- and Radar-based Observations			10-I=ORO-152-m01
Module coordinator			**Module offered by**
Swedish partner university in Master's degree programme Space Science and Technology			Institute of Computer Science
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7,50	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This course covers the area optics and radar-based observations. It is part of the international SpaceMaster and is taught at the Swedish partner university.

Intended learning outcomes

The students master optical and radar-based observations.

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

V (0) + P (0) + T (0)
In Lulea/Sweden

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. 60 to 120 minutes)

Allocation of places

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Additional information

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Workload

225 h

Teaching cycle

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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) Space Science and Technology (2015)

Module title			Abbreviation
Robotics 1			10-I=RO1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Computer Science XVII		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 (4) + Ü (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. 60 to 90 minutes)
creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IS,ES,LR,HCI

Workload

240 h

Teaching cycle

Teaching cycle: every year, winter semester

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

§ 22 II Nr. 3 b)

Module appears in

Master's degree (1 major) Space Science and Technology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's degree (1 major) Computer Science (2016)
Master's degree (1 major) Mathematics (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) Computer Science (2017)
Master's degree (1 major) Satellite Technology (2018)

Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (2019)

Module title			Abbreviation
Robotics 2			10-I=RO2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Computer Science XVII		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

Foundations of dynamic systems, controllability and observability, controller design through pole assignment: feedback and feed-forward, state observer, feedback with state observer, time discrete systems, stochastic systems: foundations of stochastics, random processes, stochastic dynamic systems, Kalman filter: derivation, initialising, application examples, problems of Kalman filters, extended Kalman filter.

Intended learning outcomes

The students master all fundamentals that are necessary to understand Kalman filters and their use in applications of robotics. The students possess a knowledge of advanced controller and observer methods and recognise the connections between the dual pairs controllability - observability as well as controller design and observer design. They also recognise the relationship between the Kalman filter as a state estimator and an observer.

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

V (4) + Ü (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. 60 to 90 minutes)
creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT, ES, LR

Workload

240 h

Teaching cycle

Teaching cycle: every year, summer semester

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

§ 22 II Nr. 3 b)

Module appears in

Master's degree (1 major) Space Science and Technology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's degree (1 major) Computer Science (2016)
Master's degree (1 major) Mathematics (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) Computer Science (2017)
Master's degree (1 major) Computer Science (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (2019)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Module title			Abbreviation
Aerospace Seminar			10-I=SA-152-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

Current topics in the area of aerospace.

Intended learning outcomes

The students possess a fundamental and applicable knowledge about advanced topics in software engineering with a focus on modern software architectures and fundamental approaches to model-driven software engineering.

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

S (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)

Seminar paper (approx. 20 pages)

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)

§ 22 II Nr. 3 b)

Module appears in

Master's degree (1 major) Space Science and Technology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)

Module title			Abbreviation
Space Dynamics			10-I=SD-152-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Fundamental principles of astrodynamics, orientation control of satellites, sensors, actuators, control software, example realisations, spin-stabilised satellites, 3-axis stabilised satellites.

Intended learning outcomes

The students master the fundamentals of dynamic aspects of the design of spacecraft and are familiar with the essential sensors and actuators as well as their areas of use in spaceflight.

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

V (2) + Ü (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. 60 to 120 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

Teaching cycle: every year, winter semester

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

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Module appears in

Master's degree (1 major) Space Science and Technology (2015)

Module title			Abbreviation
Spacecraft Environment Interactions			10-I=SEI-152-m01
Module coordinator		**Module offered by**	
Swedish partner university in Master's degree programme Space Science and Technology		Institute of Computer Science	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7,50	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This course covers the area spacecraft environment interaction. It is part of the international SpaceMaster and is taught at the Swedish partner university.

Intended learning outcomes

The students master optical and radar-based observations.

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

V (0) + P (0)
In Lulea/Sweden

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. 60 to 120 minutes)

Allocation of places

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Additional information

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Workload

225 h

Teaching cycle

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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) Space Science and Technology (2015)

Module title			Abbreviation
Image Processing and Remote Sensing (Space Physics)			10-l=SP-152-m01
Module coordinator		**Module offered by**	
Swedish partner university in Master's degree programme Space Science and Technology		Institute of Computer Science	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7,50	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This course covers the area image processing and remote sensing (space physics). It is part of the international SpaceMaster and is taught at the Swedish partner university.

Intended learning outcomes

The students master image processing and remote sensing (space physics).

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

V (0) + P (0) + T (0)
In Lulea/Sweden

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. 60 to 120 minutes)

Allocation of places

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Additional information

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Workload

225 h

Teaching cycle

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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) Space Science and Technology (2015)

Module title			Abbreviation
Spacecraft System Design			10-I=SSD-152-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

Introduction: history of space flight, system design of spacecraft. Space dynamics: two-body dynamics, Kepler orbits, disturbance forces, transfer orbits. Mission analysis: earth and sun-synchronous orbits, shadows, solar angle of incidence. Thermal control of satellites: thermal analysis, thermal design and technologies, verification of thermal designs. Telecommunication: ground contact analysis, data transmission, satellite monitoring (telemetry, telecommando). Structure and mechanisms. Energy systems: primary, secondary, management, power generation: solar cells. On-board data processing. Propulsion systems. Tests (mechanical, electrical). Operation of spacecraft. Ground segment.

Intended learning outcomes

The students master system aspects of the layouting of technical systems. Using the example of spacecraft, major subsystems and their integration into a working whole are being analysed.

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

V (4) + Ü (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. 60 to 120 minutes)
creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): ES, LR

Workload

240 h

Teaching cycle

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

§ 22 II Nr. 3 b)

Module appears in

Master's degree (1 major) Space Science and Technology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's degree (1 major) Computer Science (2016)
Master's degree (1 major) Computer Science (2017)
Master's degree (1 major) Computer Science (2018)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Computer Science (2021)

Module title			Abbreviation
Team Design Project			10-I=TDP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Computer Science VIII		Institute of Computer Science	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
9	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)

R (6)

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. 60 to 90 minutes) or
b) project (approx. 20 pages) or
c) oral examination of one candidate each or oral examination in groups (15 to 30 minutes per candidate)

Allocation of places

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Additional information

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Workload

270 h

Teaching cycle

Teaching cycle: every semester

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

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Module appears in

Master's degree (1 major) Space Science and Technology (2015)

Module title			Abbreviation
Master's Thesis Space Science and Technology			10-l=ThesisSST-152-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)**	
25	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
	graduate	--	

Contents

Researching and writing on a defined problem in space science and technology within a given time frame and adhering to the principles of good scientific practice.

Intended learning outcomes

The students are able to research and write on a defined problem, adhering to the principles of good scientific practice.

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

No courses assigned to module

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 thesis (50 to 100 pages)

Allocation of places

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Additional information

Time to complete: 6 months

Workload

750 h

Teaching cycle

Teaching cycle: every semester

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

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Module appears in

Master's degree (1 major) Space Science and Technology (2015)