

Subdivided Module Catalogue for the Subject

Games Engineering

as a Bachelor's with 1 major with the degree "Bachelor of Science" (180 ECTS credits)

Examination regulations version: 2017 Responsible: Faculty of Mathematics and Computer Science Responsible: Institute of Computer Science

JMU Würzburg • generated 02-Aug-2025 • exam. reg. data record 82|io6|-|-|H|2017



Learning Outcomes

German contents and learning outcome available but not translated yet.

Wissenschaftliche Befähigung

- Die Absolventinnen und Absolventen können die mathematischen, technischen, theoretischen und praktischen Grundlagen des Games Engineering anwenden.
- Die Absolventinnen und Absolventen verstehen die wesentlichen Zusammenhänge und Konzepte der einzelnen Teilgebiete des Games Engineering.
- Die Absolventinnen und Absolventen können tiefergehende Kenntnisse in mindestens einem Teilgebiet abrufen.
- Die Absolventinnen und Absolventen können unter Anleitung hard- und/oder softwaregetriebene Experimente durchführen, analysieren, auswerten und die erhaltenen Ergebnisse darstellen.
- Die Absolventinnen und Absolventen sind in der Lage, sich mit Hilfe von Fachliteratur in neue Aufgabengebiete einzuarbeiten und die Ergebnisse zu interpretieren und zu bewerten.
- Die Absolventinnen und Absolventen besitzen Abstraktionsvermögen, analytisches Denken, Problemlösungskompetenz und die Fähigkeit, Zusammenhänge zu strukturieren.
- Die Absolventinnen und Absolventen sind in der Lage, Methoden des Games Engineering unter Anleitung auf konkrete praktische oder theoretische Aufgabenstellungen anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.
- Die Absolventinnen und Absolventen setzen die erlernten theoretischen und praktischen Methoden in geschlossener Form unter Anleitung ein, um zu zeigen, dass sie zur Anwendung der Grundlagen wissenschaftlichen Arbeitens befähigt sind.
- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.

Befähigung zur Aufnahme einer Erwerbstätigkeit

- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.
- Die Absolventinnen und Absolventen sind in der Lage, konstruktiv und zielorientiert in einem Team zusammenzuarbeiten und auftretende Konflikte zu lösen (Teamfähigkeit).
- Die Absolventinnen und Absolventen können ihre erworbenen Kompetenzen in unterschiedlichen interkulturellen Kontexten und in international zusammengesetzten Teams anwenden.
- Die Absolventinnen und Absolventen kennen wichtige Anforderungen und Arbeitsweisen im gewerblichen Umfeld sowie in Forschung und Entwicklung. Die Absolventinnen und Absolventen sind befähigt, Probleme zu analysieren und zu lösen und sich in weniger vertraute Themenkomplexe einzuarbeiten.

Persönlichkeitsentwicklung

- Eigenverantwortlichkeit, Selbstständigkeit, Zeitmanagement, Teamfähigkeit
- Die Absolventinnen und Absolventen kennen die Regeln guter wissenschaftlicher Praxis und beachten sie.
- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.

Befähigung zum gesellschaftlichen Engagement

- Die Absolventinnen und Absolventen können naturwissenschaftliche Entwicklungen kritisch reflektieren und deren Auswirkungen auf die Wirtschaft, Gesellschaft und die Umwelt in Ansätzen erfassen, zum Beispiel Technikfolgenabschätzung, Ethik, IT-Recht oder Datenschutz.
- Die Absolventinnen und Absolventen haben ihr Wissen bezüglich wirtschaftlicher, gesellschaftlicher, naturwissenschaftlicher, kultureller etc. Fragestellungen erweitert und können begründet Position beziehen.



• Die Absolventinnen und Absolventen entwickeln die Bereitschaft und Fähigkeit, ihre Kompetenzen in partizipative Prozesse einzubringen und aktiv an Entscheidungen mitzuwirken.

Abbreviations used

Course types: \mathbf{E} = field trip, \mathbf{K} = colloquium, \mathbf{O} = conversatorium, \mathbf{P} = placement/lab course, \mathbf{R} = project, \mathbf{S} = seminar, \mathbf{T} = tutorial, $\ddot{\mathbf{U}}$ = exercise, \mathbf{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)):

09-Aug-2017 (2017-53)

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	Metho	od of	nage	
			credits	grad	ing	page	
Compulsory Courses (135 ECTS credits)							
10-GE-GL-1-162-m01	Game Lab	Principles and Languages	15	NU	Μ	19	
10-GE-GL-2-162-m01	Game Lab	I Architectures and Components	20	NU	Μ	20	
10-GE-GL-3-162-m01	Game Lab	II Systems	20	NU	Μ	21	
10-GE-GdP-172-m01	Fundament	tals of Programming	5	NU	Μ	17	
10-GE-ADS-162-m01	Algorithms	and data structures	10	NU	Μ	7	
10-GE-ST-162-m01	Software To	echnology	10	NU	Μ	34	
10-M-GE-1-162-m01	Mathemati	cs 1 for Games Engineering	10	NU	Μ	39	
10-M-GE-2-162-m01	Mathemati	cs 2 for Games Engineering	10	NU	Μ	40	
10-GE-SQ-162-m01	Software Q	uality	5	NU	Μ	33	
10-GE-NPP-162-m01	Network ar	nd Concurrent Programming	5	NU	М	28	
10-GE-GMCS-162-m01	Foundatior	is of Human-Computer Interaction	5	NU	М	22	
10-GE-AE-162-m01	Asset Deve	lopment (Modeling and Animation)	5	NU	Μ	8	
10-GE-IKI-162-m01	Interactive	Artificial Intelligence	5	NU	M	24	
10-GE-ICG-162-m01	Interactive	Computer Graphics	5	NU	M	23	
10-GE-SEM-162-m01	Seminar - C	Current Trends of Games Engineering	5	NU	M	32	
Compulsory Electives (10 E	CTS credits)		1			
10-GE-AT-1-162-m01	Selected To	opics of Games Engineering 1	5	NU	M	11	
10-GE-AT-2-162-m01	Selected To	opics of Games Engineering 2	5	NU	M	12	
10-GE-MK-162-m01	Computer S	Science in Media 1	6	NU	M	27	
10-GE-TIV-162-m01	Theoretical	Informatics	5	NU	M	36	
10-GE-TIT-172-m01	Tutorial The	eoretical Informatics	5	B/N	IB	35	
10-GE-LOG-162-m01	Logic for in	formatics	5	NU	M	26	
10-GE-AGT-162-m01	Algorithmic	c Graph Theory	5	NU	M	9	
10-GE-DB-162-m01	Databases		5	NU	M	15	
10-GE-WBS-162-m01	Knowledge	-based Systems	5	NU	M	38	
10-GE-APR-172-m01	Advanced I	Programming	5	NU	M	10	
10-GE-KD-162-m01	Cryptograp	hy and Data Security	5	NU	M	25	
10-GE-3D-162-m01	3D Point Cl	oud Processing	5	NU	M	6	
10-GE-RAK-162-m01	Computer /	Architecture	5	NU	M	30	
10-GE-RK-162-m01	Computer I	Networks and Communication Systems	8	NU	M	31	
10-GE-GI-162-m01	Selected B	asics of Computer Science	5	NU	M	18	
Kev Skills Area (20 ECTS c	redits)	·····		_			
General Key Skills (5 ECT	S credits)					-	
Students may also take n	nodules offe	red as part of the pool of general transferable skills	(ASQ) of JA	۸U.			
General Key Skills (subj	General Key Skills (subject-specific)						
10-GE-Tut-ASQ-162-	Work expe	ience as a research and teaching assistant	5	B/N	IB	37	
mo1 mo1 bolt experience as a research and teaching assistant 5 B/NB				<i>ו</i> כ			
Subject-specific Key Skills (15 ECTS credits)							
10-GE-BPrakt-162-m01	Practice/Jo	b-oriented Internship	15	B/N	IB	13	
Thesis Area (15 ECTS credi	ts)					·	
10-GE-EX-162-m01	Exhibition:	Game Lab III and Bachelor Thesis	3	NU	Μ	16	
10-GE-BT-162-m01	Bachelor T	nesis Games Engineering	12	NU	M	14	
Bachelor's with 1 major Games Engineering (2017) JMU Würzburg • generated 02-Aug-2025 • exam. reg. da- ta record Bachelor (180 ECTS) Games Engineering - 2017 pag					25/40		

Module title			Abbreviation			
3D Point Cloud Processing			10-GE-3D-162-m01			
Module	e coord	inator		Module offered by		
holder	of the (Chair of Computer Scienc	e XVII	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Laser s d trees mappir	cannin, , registi 1g.	g, Kinect and camera mor ration, features, segment	dels, basic data struc ation, tracking, appli	tures (lists, arrays, c cations for airborne	oc-trees), calculating normals, k- mapping, applications to mobile	
Intende	ed learı	ning outcomes				
Studen munica data pr require	ts unde ite with ocessii ments,	erstand the fundamental engineers / surveyors / ng and have experienced in terms of memory requ	principles of all aspe CV people / etc. Stud that real application irements and in term	cts of 3D point cloud ents are able to solv scenarios are challe s of implementation	d processing and are able to com- re problems of modern sensor enging in terms of computational issues.	
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
S (2) +	Ü (2)					
Method ster, in	d of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written If anno examin prox. 19 Langua credita	examin unced ation o 5 minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and, bonus	minutes). inning of the course, prox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in						
Bachel	Bachelor's degree (1 major) Games Engineering (2016)					
Bachel	or's de	gree (1 major) Games Eng	ineering (2017)			

Module title	Abbreviation				
Algorithms and data structures	10-GE-ADS-162-m01				
Module coordinator		Module offered by	^		
Dean of Studies Informatik (Comput	er Science)	Institute of Comput	er Science		
ECTS Method of grading	Only after succ. cor	npl. of module(s)			
10 numerical grade					
Duration Module level	Other prerequisites	;			
1 semester undergraduate					
Contents					
Design and analysis of algorithms, r ta types, lists, trees, graphs, basic g	ecursion vs. iteration, s raph algorithms, progra	ort and search meth amming in Java.	ods, data structures, abstract da-		
Intended learning outcomes					
The students are able to independe students are familiar with the basic programs. The students are able to	ntly design algorithms a paradigms of the desig estimate the run-time b	as well as to precisely n of algorithms and a ehaviour of algorithm	y describe and analyse them. The are able to apply them in practical ns and to prove their correctness.		
Courses (type, number of weekly co	ntact hours, language –	- if other than Germa	ın)		
V (4) + Ü (2)					
Method of assessment (type, scope ster, information on whether module	, language — if other th e can be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-		
written examination (approx. 60 to a If announced by the lecturer at the k examination of one candidate each prox. 15 minutes per candidate). Language of assessment: German a creditable for bonus	120 minutes). Deginning of the course, (approx. 20 minutes) of nd/or English	the written examina an oral examinatior	tion may be replaced by an oral a in groups of 2 candidates (ap-		
Allocation of places					
Additional information					
Workload					
300 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelor's degree (1 major) Games	Engineering (2016)				
Bachelor's degree (1 major) Games	Engineering (2017)				
Bachelor's degree (1 major) Games	Engineering (2025)				

Module title			Abbreviation		
Asset Development (Modeling and Animation)			10-GE-AE-162-m01		
Module	e coord	inator		Module offered by	
holder	of the C	Chair of Computer Scienc	e IX	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
The pre sic fund In this i sed gra ted by a work w	cise m ctionali module phical automa ith thes	apping of the world or the ty for the effective use of basic methods of mode objects to the rigging of tic forward calculations of e engines and understar	e attractive represent interactive, real-time eling three-dimension complex animated ch of physical processes nd their basic principl	ation of complex col e systems and enable al assets are learned aracters. These man by means of approp les.	ntent ensures an important ba- es atmospheric computer games. d - from the design of mesh-ba- ual approaches are complemen- priate, real-time engines. We will
Intende	ed learr	ning outcomes			
After co and ani	ompleti imatior	on of the course, student of graphical, three-dime	ts have a solid backg ensional objects.	round knowledge ab	out the creation, presentation
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) + Module Course	Ü (2) e taugh type: a	t in: German or English Iternatively S (2) instead	of V	an Gorman, oyamina	tion offered - if not even some
ster, in	formati	on on whether module ca	an be chosen to earn	a bonus)	tion onered — it not every seme-
a) writt b) pres Langua credita	en exar entatio ge of a ble for	nination (approx. 60 to 1 n of project results (appr ssessment: German and, bonus	20 minutes) or ox. 20 minutes) ⁄or English		
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
150 h	150 h				
Teachir	Teaching cycle				
Teachir	Teaching cycle: every year, summer semester				
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)	
Module	e appea	rs in			
Bachel	or's de	gree (1 major) Games Eng	ineering (2016)		
Bachel	or's de	gree (1 major) Games Eng	ineering (2017)		

Module title			Abbreviation			
Algorithmic Graph Theory				10-GE-AGT-162-m01		
Module	e coord	inator		Module offered by		
holder	of the C	Chair of Computer Scienc	e l	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	on .	Module level	Other prerequisites			
1 seme	ster	undergraduate				
We disc colourin of grap program	ts cuss tyj ngs, wo h probl ns or h	pical graph problems: We ork with planar graphs an ems, we also become far ow we show that they are	e solve round trip pro d find out how the ra niliar with new conce e fixed parameter com	blems, calculate ma nking algorithm of G pts, for example hov putable.	ximal flows, find matchings and loogle works. Using the examples w we model problems as linear	
Intende	ed learn	ning outcomes				
The stu cipants course,	dents a are ab studer	are able to model typical le to decide which tool fr nts learn in detail how to	problems in compute om the course helps estimate the run time	er science as graph p solve a given graph e of given graph algo	problems. In addition, the parti- problem algorithmically. In this prithms.	
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V (2) +	Ü (2)					
Methoo ster, in	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written If anno examin prox. 1 <u>9</u> Langua credita	examin unced l ation o 5 minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and, bonus	minutes). inning of the course, prox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teaching cycle						
Teachir	Teaching cycle: every year, summer semester					
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)		
Module	e appea	in				
Bachel Bachel	or's dea or's dea	gree (1 major) Games Eng gree (1 major) Games Eng	rineering (2016) rineering (2017)			

Module title			Abbreviation		
Advanced Programming			10-GE-APR-172-m01		
Module coordinator			Module offered by		
holder of the Chair of Con	nputer Scienc	e ll	Institute of Comput	er Science	
ECTS Method of gradin	g	Only after succ. com	pl. of module(s)		
5 numerical grade					
Duration Module lev	/el	Other prerequisites			
1 semester undergrad	uate				
Contents					
With the knowledge of ba grams. If more complex p and code duplicates occu de a sensible structure. A cussed.	sic programm roblems are to Ir. In this lectu Iso, further to	ing, taught in introdu be tackled, suboptin ire, further knowledge pics in the areas of se	ictory lectures, it is p mal results like long e is to be conveyed o oftware security and	possible to realize simpler pro- , incomprehensible functions on how to give programs and co- parallel programming are dis-	
Intended learning outcon	ies				
Students learn advanced then implemented in mul allel processing concepts sing.	programming tiple language are introduce	paradigms especialless and their efficiency ed culminating in the	y suited for space ap measured using sta use of GPU architect	oplications. Different patterns are andard metrics. In addition, par- cures for extremely quick proces-	
Courses (type, number of	weekly conta	ct hours, language —	if other than Germa	n)	
V (2) + Ü (2)					
Method of assessment (ty ster, information on whet	ype, scope, la her module ca	nguage — if other tha an be chosen to earn	in German, examina a bonus)	tion offered — if not every seme-	
written examination (app If announced by the lectu examination of one candi prox. 15 minutes per canc Language of assessment: creditable for bonus	rox. 60 to 120 rer at the beg date each (ap lidate). German and/	minutes). inning of the course, i prox. 20 minutes) or or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocation of places					
Additional information					
Workload					
150 h					
Teaching cycle					
-					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelor's degree (1 major) Games Engineering (2017)					

Module	e title				Abbreviation	
Selected Topics of Games Engineering 1				10-GE-AT-1-162-m01		
Module	e coord	inator		Module offered by		
Dean o	f Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Selecte	d chap	ters of Games Engineerir	lg.			
Intende	ed learr	ning outcomes				
The stu ons of o	dents p comple	oossess special knowled x problems in this area a	ge in the area of Gam nd can transfer them	es Engineering. The to related questions	y are able to understand soluti- 5.	
Course	s (type,	number of weekly conta	ct hours, language —	if other than Germa	n)	
V (2) + Module Course	Ü (2) e taugh type: a	t in: German or English Iternatively S (2) instead	of V, T (2) instead of	Ü		
Method ster, int	d of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
b) pres Langua credita	entatio ge of a ble for	n of project results (appr ssessment: German and, bonus	ox. 20 minutes) /or English			
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	9				
Teaching cycle: if announced						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	e appea	rs in				
Bachel	or's de	gree (1 major) Games Eng	ineering (2016)			
Bachel	or's deg	gree (1 major) Games Eng	ineering (2017)			
Bachel	or's deg	gree (1 major) Games Eng	ineering (2025)			

Module	title				Abbreviation	
Selected Topics of Games Engineering 2					10-GE-AT-2-162-m01	
Module	e coordi	inator		Module offered by		
Dean o	f Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	numei	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Selecte	d chap	ters of Games Engineerir	ıg.			
Intende	ed learr	ning outcomes				
The stu ons of o	dents p comple	oossess special knowled x problems in this area a	ge in the area of Gam nd can transfer them	es Engineering. They to related questions	y are able to understand soluti- 5.	
Course	s (type,	number of weekly conta	ct hours, language —	if other than Germa	n)	
V (2) + Module Course	Ü (2) taught type: a	t in: German or English Iternatively S (2) instead	of V, T (2) instead of	Ü		
Method ster, inf	l of ass formati en exar	essment (type, scope, la on on whether module ca nination (approx, 60 to 1	nguage — if other tha an be chosen to earn 20 minutes) or	an German, examina a bonus)	tion offered — if not every seme-	
b) pres Langua credital	entatio ge of a ble for	n of project results (appr ssessment: German and/ bonus	ox. 20 minutes) /or English			
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
150 h						
Teachir	ng cyclo	9				
Teachir	Teaching cycle: if announced					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
		`				
Module	Module appears in					
Bachel	Bachelor's degree (1 major) Games Engineering (2016)					
Bachel	or's deg	gree (1 major) Games Eng	ineering (2017)			
Bachel	or's deg	gree (1 major) Games Eng	ineering (2025)			

Module title				Abbreviation	
Practice/Job-oriented Internship			10-GE-BPrakt-162-m01		
Module	coordi	nator		Module offered by	
holder o	of the C	hair of Computer Scienc	e IX	Institute of Comput	er Science
ECTS I	Metho	d of grading	Only after succ. com	pl. of module(s)	
15 ((not) s	uccessfully completed			
Duration	1	Module level	Other prerequisites		
1 semest	ter	undergraduate			
Contents	S				
Practical sciences cipants t	l exper s and t to take	ience is an important sk he related job descriptio part in an internship eit	ill and source of infor ns. This is also true fo her in the academic f	mation for application or Games Engineerin field or in the industi	on-oriented aspects of various ng. This course requires the parti- ry.
Intended	d learn	ing outcomes			
The parti qualifica	icipant ations v	ts will learn how potentia will be expected from the	al future jobs and em em.	ployments will be ch	naracterized and what kind of
Courses	(type,	number of weekly conta	ct hours, language —	if other than Germa	n)
P (o)					
Method ster, info	of ass ormatio	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
report or Languag	n work ge of as	placement (approx. 5 pa ssessment: German or Er	ages) Iglish		
Allocatio	on of p	laces			
Addition	nal info	ormation			
Addition	nal info	rmation on module dura	tion: no less than 12	weeks.	
Workloa	ıd				
450 h					
Teaching	g cycle	9			
Teaching	Teaching cycle: if announced				
Referred	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module appears in					
Bachelo	r's deg	gree (1 major) Games Eng	ineering (2016)		
Bachelo	r's deg	ree (1 major) Games Eng	ineering (2017)		

Module	title				Abbreviation
Bachelor Thesis Games Engineering			10-GE-BT-162-m01		
Module	coord	inator		Module offered by	
holder	of the C	Chair of Computer Scienc	e IX	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
12	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate	-		
Conten	ts				
The stu and do	dents l cument	nave to individually work t their results using good	on an assigned well- scientific standards.	defined problem in t	the field of Games Engineering
Intende	ed learr	ning outcomes			
Particip tured a ry of rel own co results.	ants w pproac ated w ncepts	Ill learn how to apply scie h starting from a definitio ork from scientific public and methods to tackle th	entific methods from on and motivation of ations and prior appr ne questions and how	the Games Engineer research questions a roaches. Following th v to implement them	and field. They will learn a struc- and the discussion and summe- nis they will learn how to develop and potentially to evaluate the
Courses	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
No cou	rses as	signed to module			
Method ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
Bachelo Langua	or's the ge of a	esis (approx. 30 pages) ssessment: German or Er	nglish		
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Time to	compl	ete: 12 weeks			
Worklo	ad				
360 h					
Teachir	ng cycl	9			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	Module appears in				
Bachelo	or's deg	gree (1 major) Games Eng	ineering (2016)		
Bachelo	or's deg	gree (1 major) Games Eng	ineering (2017)		
Bachelo	or's deg	gree (1 major) Games Eng	ineering (2025)		

Module title				Abbreviation		
Databases				10-GE-DB-162-m01		
Module	e coord	inator		Module offered by		
Dean of	f Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Relation ment.	nal alge	ebra and complex SQL st	atements; database ı	olanning and norma	l forms; transaction manage-	
Intende	ed learr	ning outcomes				
The stu	dents p	oossess knowledge abou	t database modelling	g and queries in SQL	as well as transactions.	
Course	s (type,	number of weekly conta	ct hours, language —	if other than Germa	n)	
V (2) +	Ü (2)					
Methoo ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written If annou examin prox. 15 Langua credital	examir unced l ation o 5 minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and/ bonus	minutes). inning of the course, oprox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teachir	Teaching cycle					
Teaching cycle: once a year, winter semester						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
			0			
Module	Module appears in					
Bachelo	or's deg	gree (1 major) Games Eng	ineering (2016)			
Bachelo	or's de	gree (1 major) Games Eng	ineering (2017)			

Module title				Abbreviation		
Exhibition: Game Lab III and Bachelor Thesis			10-GE-EX-162-m01			
Module	e coord	inator		Module offered by		
holder	of the C	Chair of Computer Scienc	e IX	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
3	numei	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Present science sults of	ation a s. This an ass	nd communication are in is specifically true for Ga ociated project to a large	nportant skills for ap mes Engineering. Th er audience in a and e	plication-oriented an is course requires th exhibition-like setup	nd practical aspects of various e participants to present the re-	
Intende	ed learr	ning outcomes				
The par differer	ticipan nt parts	ts will learn how to prese of an own exhibition boo	ent their own work to oth, and how to react	a larger audience, h individually to ques	ow to plan, design and set-up the tions from the audience.	
Course	s (type,	number of weekly conta	ct hours, language —	if other than Germa	n)	
S (1) Module	taugh	t in: German or English				
Methoo ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
present Langua credital	tation c ge of a ble for l	f results of Game Lab III ssessment: German and, bonus	project and of Bache or English	lor's thesis (approx.	10 minutes)	
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
90 h						
Teachir	Teaching cycle					
Teachir	Teaching cycle: every semester					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in						
Bachelor's degree (1 major) Games Engineering (2016)						
Bachelo	or's deរ្	gree (1 major) Games Eng	ineering (2017)			

Module	title				Abbreviation
Fundam	nentals	of Programming			10-GE-GdP-172-m01
Module	coord	inator		Module offered by	
holder	of the (Chair of Computer Science	e ll	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Data ty ject orie	pes, co entatio	ntrol structures, foundati n in Java, selected topics	ions of procedural pro of C++, further Java c	ogramming, selected oncepts, digression	topics of C, introduction to ob- : scripting languages.
Intende	ed leari	ning outcomes			
The stu and are	dents able t	oossess a fundamental k o independently develop	nowledge about prog average to high level	ramming languages Java programs.	(in particular Java, C and C++)
Courses	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) + I Module	Ü (2) e taugh	t in: German or English			
Methoo ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written If annou examin prox. 15 Langua credital	examin unced ation o minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and/ bonus	minutes). inning of the course, prox. 20 minutes) or ′or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	ng cycl	9			
Teachir	Teaching cycle: once a year, winter semester				
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
		<u> </u>		<u> </u>	
Module	appea	irs in			
Bachelo	or's de	gree (1 major) Games Eng	ineering (2017)		
Bachelo	or's de	gree (1 major) Games Eng	ineering (2025)		

Module	title				Abbreviation
Selected Basics of Computer Science 10-GE-GI-162-mo1				10-GE-GI-162-m01	
Module	coord	inator		Module offered by	
Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Selecte	d topic	s in computer science.			
Intende	ed learr	ning outcomes			
The stu them to	dents a relate	are able to understand so d topics.	olutions to fundamen	tal problems in com	puter science and to transfer
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +	Ü (2)				
Method ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written If annot examin prox. 15 Langua credital	examir unced l ation o minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and, bonus	minutes). inning of the course, prox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	ng cycl	9			
Teachir	ng cycle	e: if announced			
Referre	Referred to in LPO L (examination regulations for teaching-degree programmes)				
		(
Module	appea	rs in			
Bachel	or's des	gree (1 maior) Games Fng	ineering (2016)		
Bachel	or's deg	gree (1 major) Games Eng	ineering (2017)		

Game Lab I Principles and Languages 10-GE-GL-1-162-m01 Module coordinator Module offered by holder of the Chair of Computer Science IX Institute of Computer Science ECTS Method of grading Only after succ. compL of module(s) Tormerical grade - - Duration Module level Other prerequisites - Contents - - - In the GameLab 1, the foundations and languages ??of established engines are learned. In group work, the students conceptualise develop, test and polish a comprehensive game prototype. Introductory lectures explain basis concepts from the world of computer grames as well as comprehensive topics such as Serious Games. In addition, the lectures are held in related research areas, including software engineering, interactive computer gramphics, interactive physics, visualisation, human-machine interaction, procedural content generation, sound and music production and scientific work. Intended Learning outcomes	Module	title				Abbreviation
Module coordinator Module offered by holder of the Chair of Computer Science IX Institute of Computer Science ECTS Method of grading Only after succ. compl. of module(s) 5 numerical grade Duration Module level Other prerequisites 2 semester undergraduate Contents In the GameLab 1, the foundations and languages ?? of established engines are learned. In group work, the students conceptualise develop, test and polish a comprehensive game prototype. Introductory lectures explain basic concepts from the world of computer grames as well as comprehensive topics such as Serious Games. In addition, the lectures are held in related research areas, including software engineering, interactive computer grame. Accordingly, students acquired basic knowledge of the design, development cycle of a computer game. Accordingly, students acquired basic knowledge of the design, development and scientific testing of games and interactive, real-time systems in general. Courses (type, number of weekly contact hours, language – if other than German) R (a) Module taught in: German or English	Game Lab I Principles and Languages				10-GE-GL-1-162-m01	
holder of the Chair of Computer Science IX Institute of Computer Science ECTS Mether of grading Only after succ. compl. of module(s) 15 numerical grade Module level Other preequisites 2 semester undergraduate Contents In the GameLab 1, the foundations and languages ??of established engines are learned. In group work, the students concepts from the world of computer games as well as comprehensive game prototype. Introductory lectures explain basic concepts from the world of computer games as well as comprehensive topics such as Schous Games. In addition, the lectures are held in related research areas, including software engineering, interactive computer game, so world a content generation, sound and music production and scientific work. Interactive physics, visualisation, human-machine interaction, procedural content generation, sound and music production and scientific work. Interde learning outcomes	Module	coord	inator		Module offered by	
ECTS Method is grading Only after succ. compl. of module(s) 15 numerical grade 15 module level Other prerequisites 2 semistive undergraduate Content Contents In the GameLab	holder	of the (Chair of Computer Scienc	e IX	Institute of Comput	er Science
15 numerical grade Duration Module level Other prerequisites 2 semester undergraduate Contents In the GameLab 1, the foundations and languages ??of established engines are learned. In group work, the students conceptualise develop, test and polish a comprehensive game prototype. Introductory lectures explain badition, the lectures are held in related research areas, including software engineering, interactive computer graphics, interactive physics, visualisation, human-machine interaction, procedural content generation, sound and music production and scientific work. Intended learning outcomes At the end of GameLab 1, the students have worked out the entire development cycle of a computer game and interactive, real-time systems in general. Courses (type, number of weekly contact hours, language — if other than German) R (8) Module taught in: German or English	ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
Duration Module level Other prerequisites 2 semester undergraduate Contents Contents In the GameLab 1, the foundations and languages ?? of established engines are learned. In group work, the students concepts from the world of computer games as well as comprehensive topics such as Serious Games. In addition, the lectures are held in related research areas, including software engineering, interactive computer game photosyne topics, such as Serious Games. In addition, the lectures are held in related research areas, including software engineering, interactive computer game, Accordingly, students acquired basic knowledge of the design, development cycle of a computer game. Accordingly, students acquired basic knowledge of the design, development and scientific testing of games and interactive, real-time systems in general. Courses (type, number of weekly contact hours, language — if other than German) R (8) Module taught in: German or English	15	nume	rical grade			
2 semester undergraduate - Contents In the GameLab 1, the foundations and languages ??of established engines are learned. In group work, the stu- dents conceptualise develop, test and polish a comprehensive game prototype. Introductory lectures explain ba- sic concepts from the world of computer games as well as comprehensive topics such as Serious Games. In ad- dition, the lectures are held in related research areas, including software engineering, interactive computer gra- phics, interactive physics, visualisation, human-machine interaction, procedural content generation, sound and music production and scientific work. Intende learning outcomes At the end of GameLab 1, the students have worked out the entire development cycle of a computer games and inter- active, real-time systems in general. Courses (type, number of weekly contact hours, language — if other than German) R (8) Module taught in: German or English Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) presentation of project results (so to 45 minutes) Language of assessment: German and/or English Allocation of places	Duratio	n	Module level	Other prerequisites		
Contents In the GameLab 1, the foundations and languages ?? of established engines are learned. In group work, the students conceptualise develop, test and polish a comprehensive game prototype. Introductory lectures explain basic concepts from the world of computer games as well as comprehensive topics such as Serious Games. In addition, the lectures are held in related research areas, including software engineering, interactive computer graphics, interactive physics, visualisation, human-machine interaction, procedural content generation, sound and music production and scientific work. Intended learning outcomes At the end of GameLab 1, the students have worked out the entire development cycle of a computer game. Accordingly, students acquired basic knowledge of the design, development and scientific testing of games and interactive, real-time systems in general. Courses (type, number of weekly contact hours, language — if other than German) R (8) Module taught in: German or English 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) presentation of project results (30 to 45 minutes) Language of assessment: German and/or English Allocation of places - - Morkload 450 h - Teaching cycle - - - Morkload - - - Allocation of places - <t< td=""><td>2 seme</td><td>ster</td><td>undergraduate</td><td></td><td></td><td></td></t<>	2 seme	ster	undergraduate			
In the GameLab 1, the foundations and languages ??of established engines are learned. In group work, the stu- dents conceptualise develop, test and polish a comprehensive game prototype. Introductory lectures explain ba- sic concepts from the world of computer games as well as comprehensive topics such as Serious Games. In ad- dition, the lectures are held in related research areas, including software engineering, interactive computer gra- phics, interactive physics, visualisation, human-machine interaction, procedural content generation, sound and music production and scientific work. Intended learning outcomes At the end of GameLab 1, the students have worked out the entire development cycle of a computer game. Accor- dingly, students acquired basic knowledge of the design, development and scientific testing of games and inter- active, real-time systems in general. Courses (type, number of weekly contact hours, language — if other than German) R (8) Module taught in: German or English Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) presentation of project results (30 to 45 minutes) Language of assessment: German and/or English Allocation of places Additional information Workload 4jo h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Conten	ts				
Intended learning outcomes At the end of GameLab 1, the students have worked out the entire development cycle of a computer game. Accordingly, students acquired basic knowledge of the design, development and scientific testing of games and interactive, real-time systems in general. Courses (type, number of weekly contact hours, language — if other than German) R (8) Module taught in: German or English 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) presentation of project results (30 to 45 minutes) Language of assessment: German and/or English Allocation of places	In the G dents c sic cond dition, f phics, i music p	iameLa oncept cepts fi the lec nteract	b 1, the foundations and ualise develop, test and rom the world of compute tures are held in related r ive physics, visualisatior ion and scientific work.	languages ??of estat polish a comprehens er games as well as co research areas, incluo n, human-machine in	blished engines are l ive game prototype. omprehensive topics ling software engine teraction, procedura	learned. In group work, the stu- Introductory lectures explain ba- s such as Serious Games. In ad- ering, interactive computer gra- l content generation, sound and
At the end of GameLab 1, the students have worked out the entire development cycle of a computer game. Accordingly, students acquired basic knowledge of the design, development and scientific testing of games and inter- active, real-time systems in general. Courses (type, number of weekly contact hours, language — if other than German) R (8) Module taught in: German or English Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) presentation of project results (30 to 45 minutes) Language of assessment: German and/or English Allocation of places Additional information Workload 450 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Intende	ed learı	ning outcomes			
Courses (type, number of weekly contact hours, language — if other than German) R (8) Module taught in: German or English Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) presentation of project results (30 to 45 minutes) Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Workload 450 h Teaching cycle Referred to in LPOI (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	At the e dingly, active,	end of (studen real-tin	GameLab 1, the students ts acquired basic knowle ne systems in general.	have worked out the edge of the design, de	entire development evelopment and scie	cycle of a computer game. Accor- ntific testing of games and inter-
R (8) Module taught in: German or English Method of assessment (type, scope, language – if other than German, examination offered – if not every seme- ster, information on whether module can be chosen to earn a bonus) presentation of project results (30 to 45 minutes) Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Workload 450 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Courses	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
Method of assessment (type, scope, language – if other than German, examination offered – if not every seme- ster, information on whether module can be chosen to earn a bonus) presentation of project results (30 to 45 minutes) Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Workload 450 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	R (8) Module	e taugh	t in: German or English			
presentation of project results (30 to 45 minutes) Language of assessment: German and/or English creditable for bonus Allocation of places 	Method ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
Allocation of places Additional information Workload 450 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	present Langua credital	tation o ge of a ble for	of project results (30 to 4) ssessment: German and, bonus	5 minutes) /or English		
Additional information Workload 450 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Allocat	ion of p	olaces			
Additional information Workload 450 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)						
 Workload 450 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Additio	nal inf	ormation			
Workload 450 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)						
450 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Worklo	ad				
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	450 h					
Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Teachir	Teaching cycle				
Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)						
Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)						
Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Module	appea	irs in			
Bachelor's degree (1 major) Games Engineering (2017)	Bachelo	or's de	gree (1 major) Games Eng	ineering (2016)		
	Bachelo	or's deg	gree (1 major) Games Eng	ineering (2017)		

Module	title				Abbreviation	
Game Lab II Architectures and Components			10-GE-GL-2-162-m01			
Module	e coord	inator		Module offered by		
holder	of the C	Chair of Computer Scienc	e IX	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
20	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
2 seme	ster	undergraduate				
Conten	ts					
Based of sting ga being d bility of In the c develop	on the l ame en levelop f the so ourse o o indivi	knowledge and abilities l gines. From now on, pow ed. In addition to the tec ftware products are of gr of the lecture and practice dual engine extensions i	earned in GameLab 1 erful and equally acc hnical challenges, the eat importance in ord e the basic theoretica n teams iteratively.	, GameLab 2 identifi essible engine exter e technical documer er to meet the requi l concepts and prac	ies specific ways to expand exi- nsions (including plugins) are ntation and the universal applica- rements of a product prototype. tical skills are learned in order to	
Intende	ed learn	ning outcomes				
At the e domain works. way an	end of t of the At the s d how t	he GameLab 2, the stude learned knowledge is all same time, students have to document them in a sc	ents worked out the en ready deep in the pro- e learned how to desi- bund and comprehens	ntire development c grammatic backend gn complex system sible manner.	ycle of an engine extension. The of complex game engine frame- components in an accessible	
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
R (10) Module	e taugh	t in: German or English				
Method ster, in	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	in German, examina a bonus)	tion offered — if not every seme-	
present Langua credita	tation o ge of a ble for	of project results (30 to 4 ssessment: German and, bonus	5 minutes) ⁄or English			
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
600 h						
Teachi	Teaching cycle					
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)		
			0			
Module	Module appears in					
Bachel	or's de	gree (1 major) Games Eng	ineering (2016)			
Bachel	or's deg	gree (1 major) Games Eng	ineering (2017)			

Module title				Abbreviation	
Game L	ab III S.	ystems			10-GE-GL-3-162-m01
Module	e coord	inator		Module offered by	
holder	of the C	Chair of Computer Scienc	e IX	Institute of Compute	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
20	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
2 seme	ster	undergraduate			
Conten	ts				
The bas puter G are inte jects ar be crea lecture	raphics raphics grated re realiz ted. Th and pr	ciples of game engines a s, Interactive Artificial Int in order to develop a cor red in groups. Depending e necessary theoretical c actice.	re taught in the class elligence and Asset D nprehensive engine i on the student's inte oncepts and practica	es of Human-Compu pevelopment. In Gam ndependently. As in erest, highly speciali l skills are strengthe	ter Interaction, Interactive Com- eLab 3 these different aspects the GameLabs 1 and 2, the pro- zed and innovative engines can ened within the framework of the
Intende	ed learr	ning outcomes			
After co gines a project	ompleti nd the s as we	on of the course, student interplay of integrated su Il as a later application p	s will have a deep un Ibengines. In particul erspective can be rea	derstanding of the s ar the uniform organ alized by the student	oftware architecture of Game En- ization of large-scale software
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
R (10) Module	e taugh	t in: German or English			
Methoo ster, in	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
present Langua credita	tation c ge of a ble for	of project results (30 to 4 ssessment: German and, bonus	5 minutes) ′or English		
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
600 h					
Teachin	ng cycl	9			
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)	
Module	e appea	in in			
Bachel	or's deg	gree (1 major) Games Eng	ineering (2016)		
Dachel		Siee (I majoi) Games Ellg	(201/)		

Module	e title				Abbreviation	
Founda	ations o	of Human-Computer Inter	action		10-GE-GMCS-162-m01	
Module	e coord	inator		Module offered by		
holder	of the (Chair of Computer Scienc	e IX	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Human puting introdu user ar existin The conversion ve syst niques deskto this fie Intendo After th	I-Comp system action in nd relat g as we urse co ems, p , interfa ps to m ld, i.e., ed learn ne cours ter syst	uter Interaction is concer is for human use and with nto the principle biologica es these constraints to th ell as prospective interact vers topics about human rominent evaluation meth ace technology, and exan nultimodal interfaces. Acco prominent evaluation me ning outcomes se, the students will have terms. They will understan	ned with the design, in the study of major p al, physiological, and the conceptual and tec ion metaphors betwee perception and cogn nods, the principles of nples of typical intera companying lab-work ethods and prototypi	evaluation and impli- ohenomena surround I psychological cons chnical solutions of t een humans and com ition, memory and a of computer systems action metaphors, fro will introduce stude ng of interfaces.	ementation of interactive com- ding them. This course gives an traints as defined by the human today's computer systems and nputers. Ittention, the design of interacti- , typical input processing tech- om text-based input to graphical ents to typical tasks involved in g principles of human users and ent user interfaces and they will	
compu learn a	bout th	e necessary steps applie	d in user-centered de	esign and developme	ent user interfaces and they will ent approaches.	
V (2) +	ü (1)	, number of weekly conta	ct nours, language –	- If other than Germa	in)	
Module	e taugh	t in: German or English				
Metho ster, in	d of ass formati	sessment (type, scope, la ion on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written Langua credita	examinage of a ble for	nation (approx. 60 to 120 ssessment: German and, bonus	minutes) /or English			
Allocat	ion of j	olaces				
Additio	onal inf	ormation				
Worklo	ad					
150 h	150 h					
Teachi	Teaching cycle					
Teachi	ng cycle	e: once a year, winter sen	nester			
Referre	ed to in	LPOI (examination regu	lations for teaching-o	legree programmes)		
Module	e appea	ars in				
Bachel	or's de	gree (1 major) Games Eng	gineering (2016)			
Bachel	or's de	gree (1 major) Games Eng	gineering (2017)			

Module title				Abbreviation		
Interac	tive Co	mputer Graphics			10-GE-ICG-162-m01	
Modul	e coord	inator		Module offered by		
holder	of the (of the Chair of Computer Science IX Institute of Computer Science			er Science	
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
5	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
Compu- cificall conten about jection line wi Accom or Dire Intend At the compu- active Course V (2) + Modul Metho ster, in a) writh b) press Langua credita	Contents Computer graphics studies methods for digitally synthesising and manipulating visual content. This course spe- cifically concentrates on interactive graphics with an additional focus on 3D graphics as a requirement for many contemporary as well as for novel human-computer interfaces and computer games. The course will cover topics about light and images, lighting models, data representations, mathematical formulations of movements, pro- jection as well as texturing methods. Theoretical aspects of the steps involved in ray-tracing and the raster pipe- line will be complemented by algorithmical approaches for interactive image syntheses using computer systems. Accompanying software solutions will utilise modern graphics packages and languages like OpenGL, GLSL and/ or DirectX. Intended learning outcomes At the end of the course, the students will have a broad understanding of the underlying theoretical models of computer graphics. They will be able to implement a prominent variety of these models, to build their own inter- active graphics applications and to choose the right software tool for this task. Courses (type, number of weekly contact hours, language — if other than German) V (2) + Û (2) Module taught in: German or English Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) a) written examination (approx. 6 to 120 minutes) or b) presentation of project results (approx 20 minutes) or					
Alloca	tion of p	places				
Additio	onal inf	ormation				
Worklo	bad					
150 h						
Teachi	Teaching cycle					
Teaching cycle: every year, summer semester						
Referre	ed to in	LPOI (examination regu	lations for teaching-o	legree programmes)		
Modul	e appea	ars in				
Bache	lor's de	gree (1 major) Games Eng	ineering (2016)			
Bache	lor's de	gree (1 major) Games Eng	ineering (2017)			
Bache	3achelor's degree (1 major) Games Engineering (2025)					

Module ti	itle			Abbreviation	
Interactiv	e Artificial Intelligence			10-GE-IKI-162-m01	
Module c	oordinator		Module offered by		
holder of	the Chair of Computer Scienc	e IX	Institute of Comput	er Science	
ECTS N	Nethod of grading	Only after succ. com	npl. of module(s)		
5 n	umerical grade				
Duration	Module level	Other prerequisites			
1 semeste	er undergraduate				
Contents					
Artificial I which let tive meth pics abou constrain stems. Th stems as particular Intended After the o used in ir build thei Courses (V (2) + Ü Module ta Method o ster, infor a) written b) presen	Artificial Intelligence (AI) studies the science and engineering of making intelligent machines, that is, methods which let machines or software exhibit intelligent behaviour. This course specifically concentrates on interac- tive methods applicable to novel human-computer interfaces and computer games. The course will cover to- pics about problem solving in general, search methods, semantic representation, logic and deduction methods, constraint satisfaction methods, as well as algorithmical approaches to apply these methods to interactive sy- stems. The latter includes the identification of necessary software modules and requirements for AI-enabled sy- stems as well as APIs for building so-called world interfaces. An introduction to inductive learning approaches, in particular Q-Learning and Evolutionary Algorithms concludes the lecture. Intended learning outcomes After the course, the students will have a broad understanding of the underlying theoretical models and methods used in interactive Artificial Intelligence. They will be able to implement a prominent variety of these methods, to build their own intelligent interactive applications, and to choose the right software tool for this task. Courses (type, number of weekly contact hours, language — if other than German) $V (2) + \ddot{U} (2)$ Module taught in: German or English Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)				
creditable	e for bonus				
Allocation	n of places				
Additiona	al information				
Workload	l				
150 h					
Teaching	cycle				
Referred	Referred to in LPO I (examination regulations for teaching-degree programmes)				
			0		
Module a	ppears in				
Bachelor'	s degree (1 major) Games Eng	ineering (2016)			
Bachelor'	s degree (1 major) Games Eng	gineering (2017)			
Bachelor'	s degree (1 major) Games Eng	gineering (2025)			

Module	e title				Abbreviation	
Crypto	graphy	and Data Security			10-GE-KD-162-m01	
Module	e coord	inator		Module offered by		
Dean o	f Studie	es Informatik (Computer :	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	on .	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Private	key cry	ptography systems, Verr	iam one-time pad, AE	S, perfect security, p	oublic key cryptography systems,	
million	aire pro	blem, secure circuit eval	luation, homomorpho	ous encryption.	sponse methods, secret sharing,	
Intende	ed leari	ning outcomes	,			
The stu	dents	oossess a fundamental a	nd applicable knowle	edge in the areas of	private key cryptography sy-	
stems,	Vernan	n one-time pad, AES, per	fect security, public k	ey cryptography, RS	A, Diffie-Hellman, Elgamal, Gold-	
wasser	-Micali	, digital signature, challe	nge-response method	d, secret sharing, mi	llionaire problem, secure circuit	
Course	s (type	number of weekly conta	ct hours, language —	if other than Germa	n)	
V (2) +	Ü (2)	, <u> </u>			,	
Method	d of ass	essment (type, scope, la	nguage — if other tha	an German. examina	tion offered — if not every seme-	
ster, in	formati	on on whether module ca	an be chosen to earn	a bonus)	,	
written	exami	nation (approx. 60 to 120	minutes).			
If anno	unced l	by the lecturer at the beg f one candidate each (ar	inning of the course,	the written examination	tion may be replaced by an oral	
prox. 1	s minut	es per candidate).	prox. 20 minutes) or		in groups of 2 candidates (ap-	
Langua	ge of a	ssessment: German and,	/or English			
credita	ble for	bonus				
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
	<u> </u>					
Worklo	ad					
150 n		•				
Teachir	reaching cycle					
Deferre	d to in	IPOL (oxamination room	lations for toaching a	lagraa programmac)		
Referre			tations for teaching-0			
Module	annea	urs in				
Bachel	or's de	gree (1 major) Games Eng	ineering (2016)			
Bachel	or's de	gree (1 major) Games Eng	gineering (2017)			
	(

Module	e title				Abbreviation
Logic fo	or infor	matics			10-GE-LOG-162-m01
Module	e coord	inator		Module offered by	
Dean of	f Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Syntax nite for	and se mula s	mantics of propositional ets, syntax and semantic	logic, equivalence ar s of predicate logic.	nd normal forms, Ho	rn formulas, SAT, resolution, infi-
Intende	ed learı	ning outcomes			
The stu normal	dents a forms,	are proficient in the follow Horn formulas, SAT, resc	wing areas: syntax an olution, infinite formu	d semantics of prop la sets, syntax and s	ositional logic, equivalence and semantics of predicate logic.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) +	Ü (2)				
Methoo ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
lf anno examin prox. 15 Langua credital	examin unced ation o 5 minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and, bonus	minutes). inning of the course, oprox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	Teaching cycle				
Teachir	ng cycle	e: once a year, winter sen	nester		
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
Module	appea	in and a second s			
Bachel	or's de	gree (1 major) Games Eng	gineering (2016)		
Bachel	or's de	gree (1 major) Games Eng	gineering (2017)		

Module	e title				Abbreviation
Compu	ter Scie	ence in Media 1			10-GE-MK-162-m01
Module	e coord	inator		Module offered by	
holder	of the (Chair of Computer Scienc	e V	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
6	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
The mo overvie	dule M w of cu	edieninformatik 1 (Media rrent digital media types	a Informatics 1) provic ·	les students with a b	basic knowledge and a practical
Intende	ed learı	ning outcomes			
Studen sing wi	ts are f th a sp	amiliar with the concepts ecial focus on digital mee	s of media informatics dia.	s. They have basic ki	nowledge of information proces-
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) + Course	Ü (2) type: a	lternatively T (2) instead	ofÜ		
Method ster. in	d of ass formati	essment (type, scope, la	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writt b) oral c) term d) portf Langua credita	en exan examin paper folio (a ge of a ble for	nination (approx. 60 min ation (approx. 20 minute (approx. 20 pages) or oprox. 20 pages) ssessment: German and, bonus	utes) or es) or /or English		
Allocat	ion of p	olaces			
Additio	onal info	ormation			
Worklo	ad				
180 h					
Teachi	ng cycl	e			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module	e appea	in in			
Bachel	or's de	gree (1 major) Games Eng	ineering (2016)		
Bachel	or's de	gree (1 major) Games Eng	ineering (2017)		
Bachel	or's de	gree (1 major) Games Eng	(ineering (2025)		

Modul	e title				Abbreviation	
Netwo	rk and (Concurrent Programming	g		10-GE-NPP-162-mo:	1
Modul	e coord	inator		Module offered by	•	
holder	of the (Chair of Computer Scien	ce IX	Institute of Comput	ter Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 Seme	nts	undergraduate				
This m of netw lated A gramm mes, v licatio includ archite with th cise se Intend The str comm	Contents This module will give the students the opportunity to learn and practice the skills essential to the development of networked and multithreaded applications. This module will give an overview of networking protocols and re- lated APIs (application programmer interfaces), and familiarize the students with concurrent and distributed pro- gramming paradigms, focusing in particular on the realtime interactive systems (RIS) domain (such as video ga- mes, virtual reality or mixed reality applications). Issues faced when developing a concurrent or distributed app- lication will be tackled, including synchronization and security issues. Examples of abstractions will be studied, including concurrency design patterns, distributed objects models and architectures. Classical and innovative architectures and deployment will be studied. Students will be given the opportunity to experiment and practice with the issues studied through the use of suitable libraries and middleware (e.g, game engine) during the exer- cise sessions. Intended learning outcomes The students possess an solid understanding of computer network systems, classical networking protocols and communication models on private networks and Internet and of the issues faced when developing distributed					evelopment ocols and re- stributed pro- as video ga- ributed app- l be studied, innovative and practice ing the exer- protocols and distributed ixed reality
applic applic The str quate model	ations v ations. udents a design s, such es (type	are able to to design and patterns and communica as threads and processe , number of weekly cont	I develop concurrent a ation models and hav es, and the different c act hours, language –	and networked appli e an overview of diff ommunication mode - if other than Germa	cations through the erent concurrent pro els they can support an)	use of ade- gramming
V (2) + Modul	U (2) e taugh	t in: German or English				
Metho ster, ir	d of ass nformati	essment (type, scope, l on on whether module o	anguage — if other th an be chosen to earn	an German, examina a bonus)	ition offered — if not	every seme-
a) writ b) pres Langu credita	ten exa sentatio age of a able for	mination (approx. 6o to n of project results (app ssessment: German anc bonus	120 minutes) or rox. 20 minutes) I/or English			
Alloca	tion of p	olaces				
Additi	onal inf	ormation				
Workl	oad					
150 h	150 h					
Teach	Teaching cycle					
			_			
Referr	ed to in	LPOI (examination reg	ulations for teaching-	degree programmes))	
Modul	e appea	irs in				
Bache	lor's de	gree (1 major) Games En	gineering (2016)			
Bachelor's	s with 1 ma	ior Games Engineering (2017)	JMU Würzburg • ta record Bache	generated 02-Aug-2025 • ex lor (180 ECTS) Games Engine	am. reg. da- ering - 2017	page 28 / 40



Bachelor's degree (1 major) Games Engineering (2017) Bachelor's degree (1 major) Games Engineering (2025)

Module title				Abbreviation	
Compu	ter Arcl	hitecture			10-GE-RAK-162-m01
Module	e coord	inator		Module offered by	
Dean of	f Studie	es Informatik (Computer	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Instruct ling, ca	tion set ches, v	architectures, command ector processors, multi-c	l processing through ore processors.	pipelining, statical a	and dynamic instruction schedu-
Intende	ed learn	ning outcomes			
The stu compile	dents r ers and	naster the most importar operating systems.	nt techniques to desig	gn fast computers as	s well as their interaction with
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) +	Ü (2)				
Methoo ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written If annou examin prox. 15 Langua credital	examir unced l ation o 5 minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and, bonus	minutes). inning of the course, oprox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Workload					
150 h					
Teaching cycle					
Teaching cycle: every year, summer semester					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachel	or's deg	gree (1 major) Games Eng	ineering (2016)		
Bachelor's degree (1 major) Games Engineering (2017)					

Module title				Abbreviation	
Computer Networks and Communication Systems					10-GE-RK-162-m01
Module	e coord	inator		Module offered by	
holder	of the C	Chair of Computer Scienc	e III	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
8	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Propert of comp and stru- chies, c and ISC Mobile works.	ies of c outer n ucture dataflov) archit commu	computer and communicate etworks and communicate of computer networks: networks of w control and traffic contra- ecture models. Internet: unication networks: fund	ation systems: data tr tion systems: problen etwork structure, netw rol, transfer network. structure and basic m amental concepts, GS	raffic in distributed s n statement and intr vork access, access Communication pro nechanism, TCP/IP, 1 SM, UMTS. Future co	systems. Performance analysis roduction to method architecture methods, digital transfer hierar- tocols: fundamental principles routing, network management. mmunication systems and net-
Intende	ed learr	ning outcomes			
The stu as well	dents p as func	oossess an intricate knov damental principles to ra	vledge of the structur te these systems.	e of computer netwo	orks and communication systems
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +	Ü (2)				
Methoo ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written If annou examin prox. 15 Langua credital	written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English craditable for banus				
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	Workload				
240 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachel	or's de	gree (1 major) Games Eng	ineering (2016)		
Bachel	Bachelor's degree (1 major) Games Engineering (2017)				

Module title				Abbreviation	
Seminar - Current Trends of Games Engineering					10-GE-SEM-162-m01
Module	e coord	inator		Module offered by	
holder	of the (Chair of Computer Scienc	e IX	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Indepe ble, so	ndent r ftware v	eview of a current topic in with written and oral pres	n the field of Games I sentation.	Engineering based o	n literature and, where applica-
Intende	ed learı	ning outcomes			
The stu summa	idents j arize the	possess the skills to inde e main points in written fo	pendently review a c orm and to give a ple	urrent topic in the fie asant oral presentat	eld of Games Engineering, to ion.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
S (2)					
Metho ster, in	d of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
presen Langua credita	tation (ige of a ble for	approx. 20 minutes) with ssessment: German and/ bonus	ı handout (approx. 5 /or English	pages)	
Allocat	ion of p	olaces			
Additio	onal info	ormation			
Workload					
150 h					
Teaching cycle					
Teaching cycle: every semester					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachel	or's de	gree (1 major) Games Eng	ineering (2016)		
Bachel	Bachelor's degree (1 major) Games Engineering (2017)				

Module title				Abbreviation	
Software Quality					10-GE-SQ-162-m01
Module	e coord	inator		Module offered by	
holder	of the (Chair of Computer Scienc	e IX	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
How do recogni The mo testabi ming gr code qr light ty	o we de ise and odule w lity, acc uidelino uality a pical ex ed lean	velop high quality softwa write high quality softwa ill focus on developing th curacy, security, portabili es as well as code examp nd ensure high software camples and key concept ning outcomes	are? How do we write are code. The skills to meet critic ty and maintainabilit bles will illustrate con quality production. D s.	good code? This mo al software quality r y as well as efficienc cepts, techniques an ifferent programmin	dule will teach students how to equirements such as reliability, cy in time and space. Program- nd tools that lead to professional g languages will be used to high-
At the e thods f and so	end of t or prod ftware i	he course, the students v lucing high quality code. requirements specificatio	will have gained a sol They will also have g ms.	id background know ained a broad under	vledge on the theory and the me- standing of testing techniques
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) Module	e taugh	t in: German or English			
Method ster, in	d of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written Langua credita	examin ge of a ble for	nation (approx. 60 to 120 ssessment: German and, bonus	minutes) /or English		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachel	or's de	gree (1 major) Games Eng	ineering (2016)		
Bachel	or's deg	gree (1 major) Games Eng	(2017)		
Bachelor's degree (1 major) Games Engineering (2025)					

Module title				Abbreviation	
Software Technology					10-GE-ST-162-m01
Module	e coord	inator		Module offered by	
Dean of	f Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Object- bases a cesses,	oriente and obj , unifie	ed software development ect-relational mapping, f d process, agile software	with UML, developm oundations of web p development, projec	ent of graphical user rogramming (HTML,) t management, qual	r interfaces, foundations of data- XML), software development pro- lity assurance.
Intende	ed learı	ning outcomes			
The stu softwar	dents j e syste	possess a fundamental th ems.	neoretical and practic	al knowledge on the	e design and development of
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +	Ü (2)				
Methoo ster, inf	l of ass formati	s essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written If annou examin prox. 15 Langua credital	examin unced ation o 5 minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg of one candidate each (ap res per candidate). ssessment: German and, bonus	minutes). inning of the course, pprox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
300 h					
Teaching cycle					
Teaching cycle: every year, summer semester					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelo	Bachelor's degree (1 major) Games Engineering (2016)				
Bachelor's degree (1 major) Games Engineering (2017)					

Module title	Abbreviation			
Tutorial Theoretical Informatics			10-GE-TIT-172-m01	
Module coordinator		Module offered by		
Dean of Studies Informatik (Computer	Science)	Institute of Comput	er Science	
ECTS Method of grading	Only after succ. com	pl. of module(s)		
5 (not) successfully completed				
Duration Module level	Other prerequisites			
1 semester undergraduate				
Contents				
Computability, decidability, countabili guages, context-sensitive languages, c	ty, finite automata, re omplexity of calculat	gular sets, generativ ions, P-NP problem,	/e grammars, context-free lan- NP completeness.	
Intended learning outcomes				
The students possess a fundamental a tability, finite automata, regular sets, g complexity of computations, P-NP prot	nd applicable knowle generative grammars, plem, NP completenes	edge in the areas of a context-free languas ss.	computability, decidability, coun- ges, context-sensitive languages,	
Courses (type, number of weekly conta	ict hours, language —	if other than Germa	n)	
Ü (2)				
Method of assessment (type, scope, la ster, information on whether module c	inguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
 a) exercises (consisting in completion the exercise groups as well as approx. b) written examination (approx. 180 to Method of assessment to be selected 	of approx. 11 home w 5 short assessments 240 minutes) by the candidate.	ork exercise sheets, written in the exerci	presentation of own solutions in se group) or	
Allocation of places				
Additional information				
Workload				
150 h				
Teaching cycle				
Teaching cycle: every year, summer semester				
Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module appears in				
Bachelor's degree (1 major) Games Eng	gineering (2017)			

Theoretical Informatics 10-GE-TIV-162-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 undergraduate - Connutability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages. Intended learning outcomes The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, countations and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages. Courses (type, number of weekly contact hours, language — if other than German) V (4) 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). If anounced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Alditional information <t< th=""><th colspan="3">Module title</th><th>Abbreviation</th></t<>	Module title			Abbreviation		
Module concerning formation matrix (Computer Science) 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 Contents Contents billity, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages. Intended learning outcomes Courses (type, number of weekly context sensitive languages, context-sensitive languages, context free language, context sensitive languages. Courses (type, number of weekly context sensitive languages. Courses (type, number of weekly context sensitive language. Courses (type, number of weekly context sensitive language. 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 of one candidate each (aprox. 20 minutes). If announced by the lecturer at the beginning of the course, the written examination in groups of 2 candidate (aprox. 20 minutes) or an oral examination in groups of 2 candidates (approx. 10 minutes) peraversity in use ser candidate)	Theoretical Informatics					10-GE-TIV-162-m01
Dean of Studies Informatik (Computer Science) Institute of Computer Science ECTS Method of grading Only after succ. compl. of module(s) 5 numerical grade 5 numerical grade 1 sem ester undergraduate Contents Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages. Intended learning outcomes The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages. Courses (type, number of weekly contact hours, language – if other than German) V (4) 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. 6o to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of	Module	coord	inator		Module offered by	
ECTS Metw→ of grading Only after succ. compl. of module(s) 5 numerical grade Duration Module level Other prerequisites 1 semesting undergraduate Contents Ombut allity, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages. Intended learning outcomes The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, countability, and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages. Courses The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, countability, decidability, countability, and tability, countability, decidability, countability, and tability, countability, decidability, countability, and tability, and ta	Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Comput	er Science
5 numerical grade Duration Module level Other prerequisites 1 semester undergraduate Contents Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages. Intended learning outcomes The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context free languages	ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
Duration Module level Other prerequisites 1 semester undergraduate Contents Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages. Intended learning outcomes The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages. Courses (type, number of weekly contact hours, language – if other than German) V (4) 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) If anonuced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 20 minutes). Allocation of places	5	nume	rical grade			
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Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite auto- mata and regular sets, generative grammars, context-free languages, context-sensitive languages. Intended learning outcomes The students possess fundamental and applicable knowledge in the area of computability, decidability, coun- tability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages. Courses (type, number of weekly contact hours, language — if other than German) V (4) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 6o to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Allocation of places Moditional information Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2016)	Conten	ts				
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The students possess fundamental and applicable knowledge in the area of computability, decidability, coun- tability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages. Courses (type, number of weekly contact hours, language — if other than German) V (4) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Allocation of places Additional information Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO 1 (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Intende	ed learn	ning outcomes			
Courses (type, number of weekly contact hours, language — if other than German) V (4) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Allocation of places Additional information Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	The stu tability, gramma	dents p compl ars, cor	possess fundamental and lexity of calculations, Boo ntext free languages, con	d applicable knowled blean functions and c text sensitive langua	ge in the area of con ircuits, finite automa ges.	nputability, decidability, coun- ata and regular sets, generative
V (4) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Allocation of places Additional information Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Courses	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Allocation of places Additional information Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	V (4)					
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Allocation of places Additional information Workload 1 Vorkload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	written If annou examin prox. 15	examir unced l ation o ; minut	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate).	minutes). inning of the course, pprox. 20 minutes) or	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Additional information Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Allocati	ion of p	olaces			
Additional information Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)						
 Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017) 	Additio	nal inf	ormation			
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150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Worklo	ad				
Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	150 h					
Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Teaching cycle: every year, summer semester					
Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)						
Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major) Games Engineering (2017)	Module appears in					
Bachelor's degree (1 major) Games Engineering (2017)	Bachelor's degree (1 major) Games Engineering (2016)					
	Bachelo	or's de	gree (1 major) Games Eng	ineering (2017)		

Module title Abbreviat				Abbreviation	
Work e	xperie	nce as a research and tea	ching assistant		10-GE-Tut-ASQ-162-m01
Module	e coord	inator		Module offered by	<u> </u>
Dean o	f Studi	es Informatik (Computer '	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
5	(not) s	successfully completed		1	
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Tutorin	g activi	ities in the area of compu	iter science.		
Intende	ed lear	ning outcomes			
Imparti	ng kno	wledge and skills to stud	lents of computer sci	ence.	
Course	s (type	, number of weekly conta	ict hours, language –	· if other than Germa	n)
P (o)					
Methoo ster, in	d of ass formati	sessment (type, scope, la ion on whether module ca	inguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
report ((approx	k. 2 pages)			
Allocat	ion of _l	olaces			
	-				
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Teaching cycle: every semester					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelor's degree (1 major) Games Engineering (2016)					
Bachel	or's de	gree (1 major) Games Eng	gineering (2017)		
Bachelor's degree (1 major) Games Engineering (2025)					

Module title					Abbreviation
Knowledge-based Systems					10-GE-WBS-162-m01
Module	coord	inator		Module offered by	
holder	of the C	Chair of Computer Science	e VI	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
Founda thods, l	tions iı knowle	n the following areas: kno dge acquisition, learning	owledge managemen , guidance dialogue,	t systems, knowledg semantic web.	ge representation, solving me-
Intende	ed learr	ning outcomes			
The stu system:	dents p s inclu	oossess theoretical and p ding knowledge formalisa	practical knowledge for a strain and have acquired at the second strain and have acquired at the second strain at	or the understanding red experience in a s	g and design of knowledge-based small project.
Courses	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
S (2) + l	Ü (2)				
Method ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written If annou examin prox. 15 Langua credital	examin unced l ation o minut ge of a ole for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and/ bonus	minutes). inning of the course, prox. 20 minutes) or for English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Workload					
150 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelo	or's deg	gree (1 major) Games Eng	ineering (2016)		
Bachelo	or's deg	gree (1 major) Games Eng	ineering (2017)		

Module title				Abbreviation	
Mathematics 1 for Games Engineering					10-M-GE-1-162-m01
Module	e coord	inator		Module offered by	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Proposi integer: system	itional s; elem s of lin	logic, set theory, proof te entary group theory; resi ear equations.	chniques, relations; due class rings; basi	sequences, limits ar cs in linear algebra,	nd lambda-symbols; the ring of linear maps and matrix calculus,
Intende	ed learr	ning outcomes			
The stu to appl is able	dent ge y these to inter	ets acquainted with fund methods to problems in pret the results.	amental concepts and natural and engineer	d methods of advand ring sciences, in part	ced mathematics. He/She learns ticular in computer science, and
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +	Ü (2)				
Methoo ster, int	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writte b) oral c) oral e Langua credital	en exar examin examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and, bonus	80 minutes, usually o ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	:hosen) or 5) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Workload					
300 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachel	or's deg	gree (1 major) Games Eng	ineering (2016)		
Bachel	or's de	gree (1 major) Games Eng	ineering (2017)		
Bachel	Bachelor's degree (1 major) Games Engineering (2025)				

Module title				Abbreviation	
Mathematics 2 for Games Engineering					10-M-GE-2-162-m01
Module	coord	inator		Module offered by	
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Determ distribu	inants, Itions,	eigenvalue theory; even parameter estimates; ba	t and probability spa sics in analysis.	ces, combinatorics,	random variables, examples of
Intende	ed learn	ning outcomes			
The stu to apply is able	dent ge y these to inter	ets acquainted with funda methods to problems in pret the results.	amental concepts an natural and enginee	d methods of advan ring sciences, in par	ced mathematics. He/She learns ticular in computer science, and
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +	Ü (2)				
Methoo ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writte b) oral e c) oral e Langua credital	en exar examin examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and/ bonus	80 minutes, usually o ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	chosen) or 5) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
300 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelo	or's deg	gree (1 major) Games Eng	ineering (2016)		
Bachelo	or's deg	gree (1 major) Games Eng	ineering (2017)		
Bachelo	Bachelor's degree (1 major) Games Engineering (2025)				