



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna University of Technology



FG Mathematische
Modellbildung und
Simulation



blended learning quality

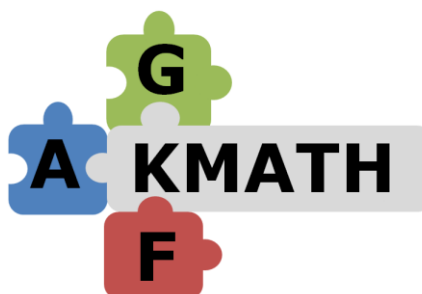
Blended Learning in Science: Math Courses at the Vienna UT

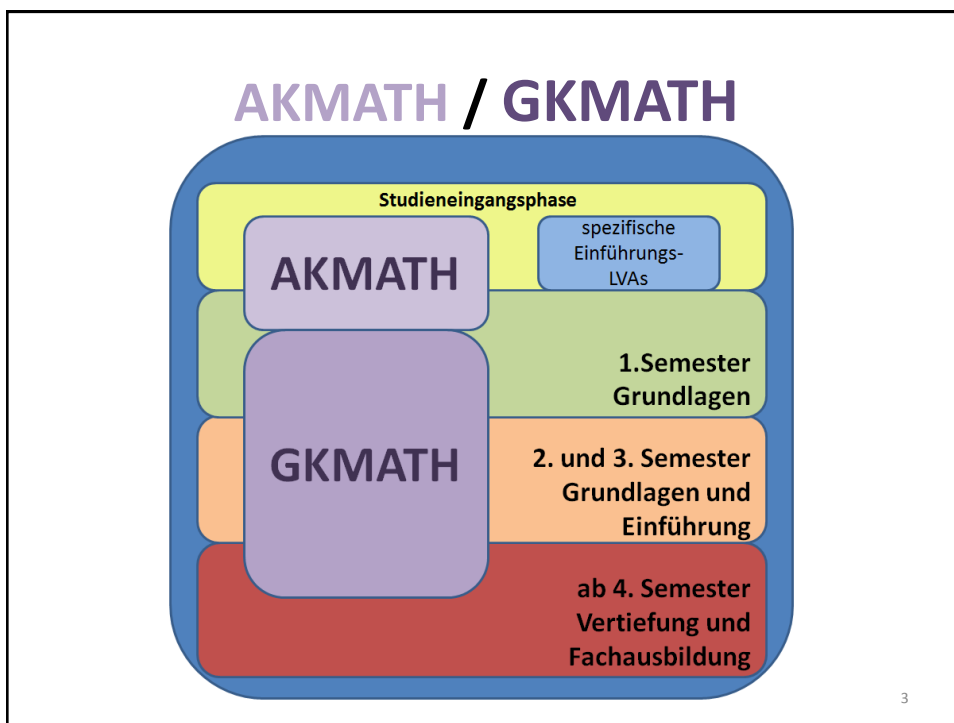
Andreas Körner, Stefanie Winkler

Blended learning quality Conference Wr. Neustadt, 21th Feb 2014

Overview

- AKMATH
- GKMATH
- MTA
- MMT
- E-Exam





AKMATH

refresher course for mathematics

Goals and requirements:

- Create a common mathematical level
- Short course duration
- Big amount of students
- Using of e-learning
- Focus on practice
- Coordination with regular lectures

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AKMATH Vienna UT- Planning

KURSTYP		TESTS VORHER			KURSKERN			TESTS NACHHER		VERWALTUNG		
			ETest	KTest	VO	GUE	SUE	ZFTests	FTest	ANM	KOM	BEN
BKM	C-Learning K	D	-	Klass.	Klass.	Klass.	Klass.	-	Klass.	Klass.	Klass.	Klass.
		U	-	Kopien	Kopien	Kopien	Kopien	-	Kopien	Listen	Aushang	Listen
BKM	C-Learning K - TUW	D	-	Klass.	Klass.	Klass.	Klass.	-	Klass.	(TUW)	TUW	TUW
		U	-	TUW	TUW	TUW	TUW	-	TUW	(TUW)	TUW	TUW
BKM	S-Learning K - TUW - dI	D	-	TUW dI	Klass.	Klass.	Klass.	-	TUW dI	(TUW)	TUW	TUW
		U	-	TUW	TUW	TUWEL	TUWEL	-	TUW	(TUW)	TUW	TUW
BKM	S-Learning K - TUW - MTA-dI	D	-	MTA d	Klass.	Klass.	Klass.	-	MTA dI	MTAEXT	TUW	TUW
		U	-	MTA	TUW	TUW	TUW	-	MTA	TUW	TUW	TUW
BKM	S-Learning K - TUW - MTA-dIs	D	MTA dI	MTA dI	Klass.	Klass.	Klass.	MTA dI	MTA dI	MTAEXT	TUW	MTA
		U	MTA	MTA	TUW	TUW	TUW	MTA	MTA	TUW	TUW	TUW
BKM	B-Learning K - TUW - MTA	D	MTA dI	MTA dI	Klass.	Klass.	MTA dU	MTA dI	MTA dI	MTAEXT	TUW	MTA/TUW
		U	MTA	MTA	TUW	TUW	MTA	MTA	MTA	TUW	TUW	TUW
BKM	B-Learning MTA - K - TUW	D	MTA dI	MTA dI	Klass.	Klass.	MTA dU	MTA dI	MTA dI	MTAEXT	TUW	MTA/TUW
		U	MTA	MTA	TUW	MTA dU	MTA	MTA	MTA	TUW	TUW	TUW
BKM	B-Learning MTA - K	D	MTA dI	MTA dI	Klass.	MTA dU	MTA dU	MTA dI	MTA dI	MTAEXT	MTA	MTA/TUW
		U	MTA	MTA	MTA	MTA	MTA	MTA	MTA	TUW	TUW	TUW
BKM	E-Learning MTA - K	D	MTA dI	MTA dI	PC-K	MTA dU	MTA dU	MTA dI	MTA dI	MTA	MTA	MTA
		U	MTA	MTA	MTA	MTA	MTA	MTA	MTA	MTA	TUW	TUW
BKM	E-Learning MTA	D	MTA dI	MTA dI	MTA dU	MTA dU	MTA dU	MTA dI	MTA dI	MTA	MTA	MTA
		U	MTA	MTA	MTA	MTA	MTA	MTA	MTA	MTA	MTA	MTA

classical

Blended TUWEL

Blended MTA

MTA - Blended

classical

TUWEL

MTA

AKMATH Vienna UT- Planning

KURSTYP		TESTS VORHER			KURSKERN			TESTS NACHHER		VERWALTUNG		
			ETest	KTest	VO	GUE	SUE	ZFTests	FTest	ANM	KOM	BEN
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		U	-	Kopien	Kopien	Kopien	Kopien	-	Kopien	Listen	Aushang	Listen
BKM	C-Learning K - TUW	D	-	Klass.	Klass.	Klass.	Klass.	-	Klass.	(TUW)	TUW	TUW
		U	-	TUW	TUW	TUW	TUW	-	TUW	(TUW)	TUW	TUW
BKM	S-Learning K - TUW - dI	D	-	TUW dI	Klass.	Klass.	Klass.	-	TUW dI	(TUW)	TUW	TUW
		U	-	TUW	TUW	TUWEL	TUWEL	-	TUW	(TUW)	TUW	TUW
BKM	S-Learning K - TUW - MTA-dI	D	-	MTA d	Klass.	Klass.	Klass.	-	MTA dI	MTAEXT	TUW	TUW
		U	-	MTA	TUW	TUW	TUW	-	MTA	TUW	TUW	TUW
BKM	S-Learning K - TUW - MTA-dIs	D	MTA dI	MTA dI	Klass.	Klass.	Klass.	MTA dI	MTA dI	MTAEXT	TUW	MTA
		U	MTA	MTA	TUW	TUW	TUW	MTA	MTA	TUW	TUW	TUW
BKM	B-Learning K - TUW - MTA	D	MTA dI	MTA dI	Klass.	Klass.	MTA dU	MTA dI	MTA dI	MTAEXT	TUW	MTA/TUW
		U	MTA	MTA	TUW	TUW	MTA	MTA	MTA	TUW	TUW	TUW
BKM	B-Learning MTA - K - TUW	D	MTA dI	MTA dI	Klass.	MTA dU	MTA dU	MTA dI	MTA dI	MTAEXT	TUW	MTA/TUW
		U	MTA	MTA	TUW	MTA dU	MTA	MTA	MTA	TUW	TUW	TUW
BKM	B-Learning MTA - K	D	MTA dI	MTA dI	Klass.	MTA dU	MTA dU	MTA dI	MTA dI	MTAEXT	MTA	MTA/TUW
		U	MTA	MTA	MTA	MTA	MTA	MTA	MTA	TUW	TUW	TUW
BKM	E-Learning MTA - K	D	MTA dI	MTA dI	PC-K	MTA dU	MTA dU	MTA dI	MTA dI	MTA	MTA	MTA
		U	MTA	MTA	MTA	MTA	MTA	MTA	MTA	MTA	TUW	TUW
BKM	E-Learning MTA	D	MTA dI	MTA dI	MTA dU	MTA dU	MTA dU	MTA dI	MTA dI	MTA	MTA	MTA
		U	MTA	MTA	MTA	MTA	MTA	MTA	MTA	MTA	MTA	MTA

AKMATH Vienna UT

Field of Studies :

- Geodesy and Geoinformation (2006)
- Electrical Engineering (2008)
- Mechanical Engineering and Mechanical Engineering Economics (2009)
- Technical Physics (2010)
- Civil Engineering (2011)
- Urban and Regional Planning (2011)
- Course for „everyone“ (2012)

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AKMATH - Structure

- Entrance test
- Knowledge test
- Course modules
- Closing test

whole
September

Last week of
September, 1st-3rd
week of Oktober

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AKMATH - Content

- Basics and Introduction
 - Number Ranges
 - Basics of Equations
 - Linear equation systems
- Elementary functions and equations
- Vector calculus
 - Geometry in plane
 - Geometry in space
 - Vector products
 - Matrix calculations (for some field of studies)
- Komplexe numbers
- Differential Calculus
- Integral Calculus

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AKMATH – Course Structure

- 6-8 modules focusing on different topics
- one module contains:
 - 1 ½ h classical lecture
 - 2 h classical exercises combined with Maple T.A. , guided self education
 - $\rightarrow \infty$ practising on MTA

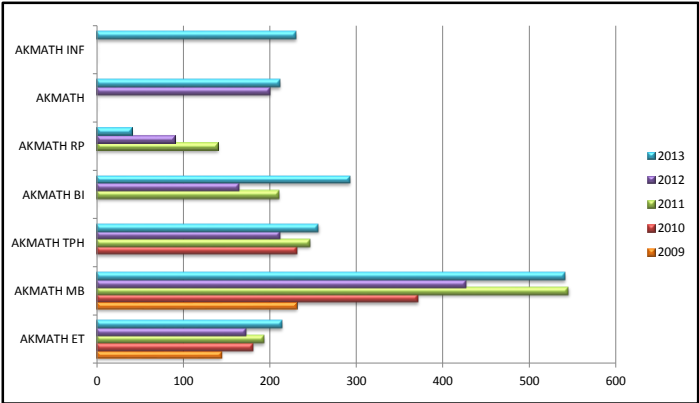
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AKMATH Vienna UT



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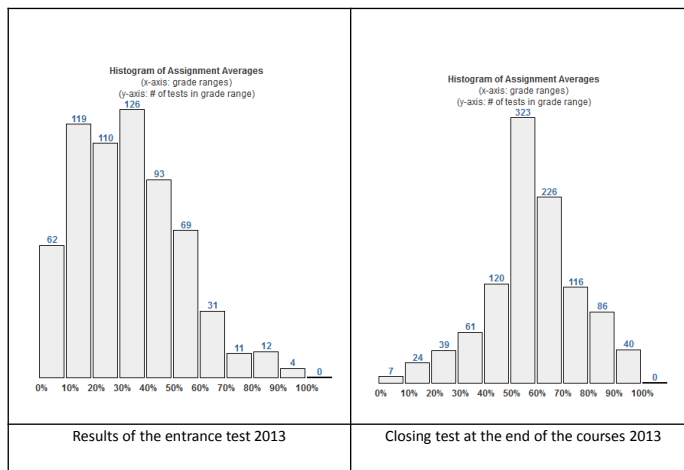
AKMATH – Facts



2013	ET	MB	TPH	BI	INF	VG	DIV	total
total	214	541	256	292	230	43	211	1787

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AKMATH – Facts



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GKMATH – basic mathematical courses

B-Learning Courses

- Testing and Assessment
 - Lectures, exercises in mathematics 1 & 2 (ET)
 - Lectures & exercises mathematics 1 & 2 (ET)
- Demonstration and Visualisation
 - Lectures, exercises in mathematics 1 & 2 (VG)
 - Deeping in mathematics for electrical eningeers (ET)

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GKMATH – Exercises for ET

- **Classic examples („Kreuzerlbeispiele“):** the students have to prepare minimal 60% of all examples to pass the course positive
- **online examples:** additional to classical examples, autonomous learning, test preparation
- **Blackboard performance:** students have to present some of the prepared examples
- **MTA-Tests:** 3 tests during each semester, students have to pass two of three

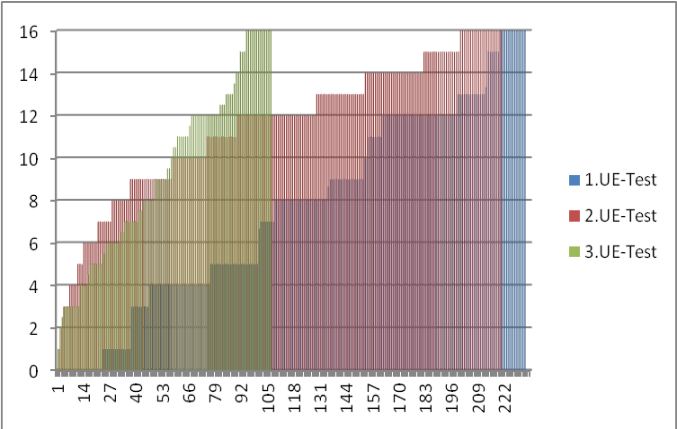
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GKMATH – Exercises for VG


- **Classic examples („Kreuzerlbeispiele“):** the students have to prepare minimal 60% of all examples to pass the course positive
- **online examples:** additional to classical examples, autonomous learning (MMT)
- **Blackboard performance:** students have to present some of the prepared examples
- **Matlab:** 5 homeworks programming examples, 50% should work

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GKMATH - Facts



Maple T.A.

**System Homepage**

TU Wien Admin

tuwienadmin

[My Profile]

System Homepage

System Admin

Help

Logout

First classes open for registration

All Active Classes

Class Name	Parent Class
Anonymer Kontrolltest	
Aufführungskurs Mathematik	
Aufführungskurs Mathematik für BI	Aufführungskurs Mathematik
Aufführungskurs Mathematik für ET	Aufführungskurs Mathematik
Aufführungskurs Mathematik für MB und WB-MB	Aufführungskurs Mathematik
Aufführungskurs Mathematik für SP	Aufführungskurs Mathematik
Aufführungskurs Mathematik für TPW	Aufführungskurs Mathematik
Maple T.A. Demonstration Class	
Mathematik 1 für ET	
Mathematik 1 für ET Prüfungen Sz	
Mathematik 2 für ET	
Mathematik 3 für ET	
Mathematik C für Vermessung und Geoinformation	Aufführungskurs Mathematik
Prüfungskurs für TUNEL	Maple T.A. Demonstration Class
Prüfungen Mathematik 1 für ET	
Prüfungen Mathematik 1 für ET Sz	Prüfungen Mathematik 1 für ET
Prüfungen Mathematik 2 für ET	

MMT – Mathematics, Modelling and Tools

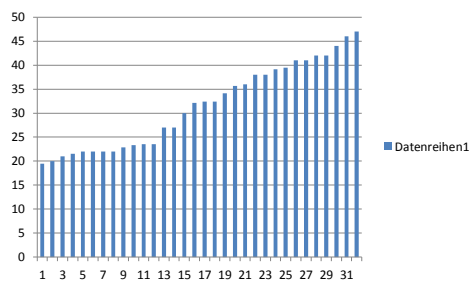


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E-Exams

- Examination for ET: written exams (2h)
- Exam Blended Assessment:

**written as E-Test
& oral exam**



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Discussion

- AKMATH necessary
- missing sustainability of basic mathematics
- different levels of knowledge
- gap between graduation and university
- Service for students vs. pupil behaviour
- Decreasing Drop-out rate

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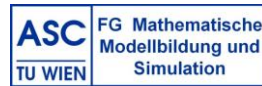
Discussion

- Necessity of E-Learning
- E-Learning use
- E-Learning acceptance
- E-Learning additional benefit
- E-Assessment needs administration
- E-Learning AKMATH → GKMATH
- Evaluation

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Thank you for your attention!