AAA66

Klagenfurt 2003

The 66th International Workshop on General Algebra

| June 19 - 21, 2003 | University of Klagenfurt |

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Program

Abstracts

Sponsors and partners

The following sponsors and partners have contributed to this conference's success:

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Dear participants of the AAA66-workshop, ladies and gentlemen,

welcome to Carinthia, welcome to our university! We are here at the intersection of three cultures and at the intersection of the old paths through the Alps which connect them, the Roman, the Slavic and the German culture. We do not underrate the contribution of the participants from abroad, but it strikes us to be of a symbolic character that most of our participants stem from one of these cultures. This university also offers to be an institution for the spiritual paths between them.

AAA is a series of workshops on Algebra which was founded by Rudolf Wille - whom we heartily welcome among us - in the early seventies of the last century. It is hold biannually in Germany and in Austria and also sometimes in Switzerland and in the Czech Republic. This proves how vivid our old science is! Remember that it was Hermann von Kärnten who translated the arithmetic book of al-Khwarizmi (ca. 780-850) from Arabic into Latin in 1143 and that two colleagues of him, namely Robert of Chester and Gerhard of Cremona translated another work of al-Khwarizmi entitled "Hisab aljabr w'almuqabalah", thereby introducing the word "Algebra" into our culture and our civilization.

This conference could only be accomplished with the combined help of many. First we express our gratitude to the participants. Then we thank the public and private sponsors, above all the Province of Carinthia, the City of Klagenfurt, the Rector of the University of Klagenfurt, Kärntner Universitätsbund, Kärntner Landesversicherung, Bank Austria. Special thanks to our secretary, Mrs Christa Mitterfellner for her great efforts.

The single lectures are attributed to four sections, Universal Algebra, Lattice Theory, Classical Algebra and Applications of Algebra. We have strived in vain to group every single lecture in the requested section but finally we had to shift some lectures into others; please excuse us when you do not find your lecture in the requested section.

We perceive our main job in offering a platform for the exchange of ideas. We wish you a pleasant stay, interesting discussions and - last but not least - wonderful days in our beautiful country.

Klagenfurt, June 2003

Hermann Kautschitsch Willi More Johannes Schoißengeier

Contents

General information

Conference address

The 66th International Conference on General Algebra
Institut für Mathematik, Universität Klagenfurt
Universitätsstraße 65-67
A-9020 Klagenfurt (Austria)

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Registration office

Oman hall z-129, by the main entrance
Universität of Klagenfurt
Main building (Zentralgebäude)
Universitätsstraße 65-67
Voice: +43 (0) 463 2700 9042 – only at opening times (see below)

Opening times:

Thursday, June, 19th	17:45-20:00	5:45 p.m. to 8 p.m.
Friday, June, 20th	8:15-12:00	8:15 a.m. to 12

Internet and Electronic mail

During the conference, participants will have access to PCs in the room z-123.
Use username: guest17, password: 22266
Moreover, all over the university there are “kiosks” for internet surfing where e-mail is only accessible per web-browser.

Technical support

Queries for technical support should be addressed to the registration desk. Please, announce your needs as early as possible.

Important addresses and telephone numbers

First Aid:	Tel. 144 – or address registration desk or desk clerk at main entrance
Pharmacy:	Uni-Apotheke, Universitätsstraße 23 open Fr 8 a.m. to 12.30 p.m., 3 to 6.30 p.m. and Sa 8 a.m. to 12
Banking:	Bank Austria University branch, Universitätsstraße 98 Raiffeisen University branch, Universitätsstraße 33
Postoffice:	Universitätsstraße 92: open 8 a.m. to 1 p.m., 2.30 p.m. to 5:30 p.m.

Program – Sections review

Thursday, June 19th, 2003

17:45 Registration, Oman hall, z-129 by the main entrance
18:15 Informal welcome, central hall of main building

Friday, June 20th, 2003

8:15 Registration, Oman hall z-129 by the main entrance

Friday	HS 1	HS 2	HS 3	HS 4
09:00	Opening address, HS 1			
09:30-10:15	Plenary: Rosenberg			
	Coffee break			
11:00-11:30	Chajda	Wille	Pálfy	D. Artamonov
11:30-12:00	Eigenthaler	Schweigert	Wiesenbauer	N. Artamonov
12:00-12:30	Denecke	Kartashova	Winkler	V. Artamonov
	Lunch			
14:00-14.45	Plenary: Kowol			
15:00-15.30	Graczyñska	Riecanova	Frisch	Romanowska
	Coffee break			
16:00-16:30	Länger	Halas	Galuszka	Dorninger
16:30-17:00	Márki	Radeleczki	Glazek	Kautschitsch
17:00-17:30	Pinsker	Dorfer	Aichinger	Bodirsky
17:30-18:00	Saeid	Jenca	Ecker	Pech

Saturday, June 21st, 2003

Saturday	HS 1	HS 2	HS 3
09:00-09.45	Plenary: Wiegandt		
10:00-10:30	Goldstern	Ponjavic	Bell
	Coffee break		
11:00-11:30	Pöschel	Pilitowska	Wendt
11:30-12:00	Reilly	Paseka	Kühr
12:00-12.30	Zadori	Kwuida	Usenko
	Lunch		
14:00-14:45	Plenary: Willard		
15:00-15:30	Slapal	Bhavanari	Gasparyan
	Coffee break		
16:00-16:30	Katsov		Bican
16:30-17:00	Ricci		Pham
17:00-17:30	Stanovsky		
17:45	Farewell, HS 1		
19:30	Conference dinner: Mensa building		

Scientific program – Plenary sessions

Gerhard Kowol, Austria
Polynomial Functions on Groups – a Survey
Friday 14:00, HS 1

Ivo G. Rosenberg, Canada
Uniformly delayed algebras; theory and the completeness problem
Friday 9:30, HS 1

Richárd Wiegandt, Hungary
Radical theory and its interpretation in various categories
Saturday 9:00, HS 1

Ross Willard, Canada
The finite basis problem
Saturday 14:00, HS 1

Scientific progam – Detailed timetable

Friday, June 20th, 2003

Friday 9:30 – 10:15

HS 1 Plenary
Uniformly delayed algebras; theory and the completeness problem
Ivo G. Rosenberg, Canada

Friday 11:00 – 11:30

Section 1 – HS 1
Deductive systems in Universal Algebra
Ivan Chajda, Czech Republic

Section 2 – HS 2
An Order-theoretic Mathematization of Linear Continuum Structures
Rudolf Wille, Germany

Section 3 – HS 3
Prime divisors of character degrees
Péter P. Pálfy, Hungary

Section 4 – HS 4
Free cochains with locally constant coefficients
Dmitry Artamonov, Russia

Friday 11:30 – 12:00

Section 1 – HS 1
Congruence classes in universal algebra
Günther Eigenthaler, Austria

Section 2 – HS 2
On distributive semi near lattice
Dietmar Schweigert, Germany

Section 3 – HS 3
Über Probleme der Vertauschbarkeit in Kompositionshalbgruppen
Johann Wiesenbauer, Austria

Section 4 – HS 4
Localization of spectrum for polynomials over C*-algebras
Nikita Artamonov, Russia

Friday 12:00 – 12:30

Section 1 – HS 1
Identities of Clones
Klaus Denecke, Germany

Section 2 – HS 2
Lattices of topologies of unary algebras
Anna Kartashova, Russia

Section 3 – HS 3
Maximal abelian subgroups of Aut(R,<)
Reinhard Winkler, Austria

Section 4 – HS 4
Algebraic theory of quasicrystals
Viatcheslav Artamonov, Russia

Friday 14:00 – 14:45

HS 1 Plenary
Polynomial Functions on Groups – a Survey
Gerhard Kowol, Austria

Friday 15:00 – 15:30

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On P-compatible identities
Ewa Graczyñska, Poland

Section 2 – HS 2
Topological effect algebras
Zdenka Riecanova, Slovakia

Section 3 – HS 3
Integral closure and minimal polynomials of matrices
Sophie Frisch, Austria

Section 4 – HS 4
Feasible sets of finite posets
Anna Romanowska, Poland

Friday 16:00 – 16:30

Section 1 – HS 1
Determined congruence classes
Helmut Länger, Austria

Section 2 – HS 2
Distributive lattices with sectionally antitone involutions
Radomir Halas, Czech Republic

Section 3 – HS 3
Totally commutative idempotent groupoids
Jan Galuszka, Poland

Section 4 – HS 4
Chebyshev polynomials related to molecular graphs
Dietmar Dorninger, Austria

Friday 16:30 – 17:00

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László Márki, Hungary

Section 2 – HS 2
Linear orders on general algebras
Sándor Radeleczki, Hungary

Section 3 – HS 3
General independence notions
Kazimierz Glazek, Poland

Section 4 – HS 4
Polynomialrings and the Feed-Back-Cyclization Property
Hermann Kautschitsch, Austria

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Clones on the natural numbers
Michael Pinsker, Germany

Section 2 – HS 2
Ordering convex directed subsets of a poset and congruences
Gerhard Dorfer, Austria

Section 3 – HS 3
Lower Bounds on the number of polynomial functions
Erhard Aichinger, Austria

Section 4 – HS 4
The Polymorphism Clones of omega-Categorical Structures
Manuel Bodirsky, Germany

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Quotient of Hyper BCK-algebras
Arsham Borumand Saeid, Iran

Section 2 – HS 2
Orthocomplete homogeneous effect algebras
Gejza Jenca, Slovakia

Section 3 – HS 3
1-affine complete Frobenius groups
Jürgen Ecker, Austria

Section 4 – HS 4
Algebraic Moore-Machines
(an interplay between algebraic- and coalgebraic automata theory)
Christian Pech, Germany

Saturday, June 21st, 2003

Saturday 09:00 – 09:45

HS 1 Plenary
Radical theory and its interpretation in various categories
Richárd Wiegandt, Hungary

Saturday 10:00 – 10:30

Section 1 – HS 1
The Galois connection between relations and automorphisms
Martin Goldstern, Austria

Section 2 – HS 2
On long chains in the partially ordered set of traces of maximal clones
Maja Ponjavic, Serbia and Montenegro (at present Germany)

Section 3 – HS 3
Some center-like subsets of rings
Howard Bell, Canada

Saturday 11:00 – 11:30

Section 1 – HS 1
Can algebras and homomorphisms in a quasivariety be reduced to unary algebras?
Reinhard Pöschel, Germany

Section 2 – HS 2
About new examples of bilattices
Agata Pilitowska, Poland

Section 3 – HS 3
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Gerhardt Wendt, Austria

Saturday 11:30 – 12:00

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Norman Reilly, Canada

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Conjunctivity in distributive quantales
Jan Paseka, Czech Republic

Section 3 – HS 3
Spectra of dually residuated lattice-ordered monoids
Jan Kühr, Czech Republic

Saturday 12:00 – 12:30

Section 1 – HS 1
Finite posets in locally finite varieties
Laszlo Zadori, Hungary

Section 2 – HS 2
Congruences of concept algebras
Leonard Kwuida, Germany

Section 3 – HS 3
The Double-Semigroups Categories
Vitaliy M. Usenko, Ukraina

Saturday 14:00 – 14:45

HS 1: Plenary
The finite basis problem
Ross Willard, Canada

Saturday 15:00 – 15:30

Section 1 – HS 1
Diagonality and powers of general algebraic systems
Josef Slapal, Czech Republic

Section 4 – HS 2
***f*-prime radical in gamma near-rings**
Satyanarayana Bhavanari, India

Section 3 – HS 3
Poly-Grassmann Algebras and Polydeterminants
Armenak Gasparyan, Russia

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Serre's Conjecture and Bass's Perfectness in a Semiring Context
Yefim Katsov, USA

Section 3 – HS 3
Torsionfree precovers
Ladislav Bican, Czech Republic

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Universal transformations between Menger systems and between analytic monoids
Gabriele Ricci, Italy

Section 3 – HS 3
On Leavitt Algebras
Anh Ngoc Pham, Hungary

Saturday 17:00 – 17:30

Section 1 – HS 1
Equational theory of group conjugation
David Stanovsky, Czech Republic

Abstracts

Erhard Aichinger, Austria **Lower Bounds on the number of polynomial functions** Section 3 (Classical Algebra)	Friday 17:00 HS 3
We give a lower bound for the number of unary polynomial functions on certain subdirectly irreducible algebras. We will use these bounds to show that there is an algorithm that tells whether a given finite zero-symmetric near-ring is the near-ring of zero-preserving polynomial functions of some group.	

Dmitry Artamonov, Russia **Free cochains with locally constant coefficients** Section 4 (Applications of Algebra)	Friday 11:00 HS 4
The abstract is concerned with applications of algebraic methods in algebraic topology. The Massey's definition of a cochain group is generalized to locally constant coefficient systems. The Massey's cochain group of a locally compact topological space in a constant coefficient system is a subgroup of Alexander-Spanier cochains that can be represented by functions with finite images. If the group of coefficients is a group of integers the Massey's cochain group is a free abelian group. The same result can be proved for the group of Massey's cochains with compact support. Similar to Massey's cohain group one can introduce cochains for locally constant coefficient systems. It is proved that these groups are also free abelian groups. The idea of the proof is based on the fact that new groups are isomorphic to the groups of cochains for constant coefficient systems.	

Nikita Artamonov, Russia **Localization of spectrum for polynomials over C*-algebras** Section 4 (Applications of Algebra)	Friday 11:30 HS 4
The abstract is concerned with spectral theory for C*-algebras. Localization in half-plane of spectrum for some classes of second-order polynomials over a C*-algebra is established. It's a generalization of the Routh-Hurwitz conditions for roots of polynomial over C being in the left half-plane. There are given some applications of this result in the theory of partial differential equations.	

Viatcheslav Artamonov, Russia **Algebraic theory of quasicrystals** Section 4 (Applications of Algebra)	Friday 12:00 HS 4
A quasicrystal is a discrete subset in an Euclidean space of positions that could be occupied by atoms. It is assumed that the set satisfies some additional properties of symmetry. In my talk I will give a mathematical definition of quasicrystal which is related to a lattice (a free additive abelain subgroup) in the Euclidean space and show some properties of quasicrystals. A structure of the group and of inverse semigroup of symmetries will be discussed. It will be shown that the theory of quasicrystals is related to some problems in algebraic group theory, algebraic number theory, coding theory etc.	

Howard Bell, Canada **Some center-like subsets of rings** Section 3 (Classical Algebra)	Saturday 10:00 HS 3
Define the Freiman center *Fr(R)* of the ring *R* to be the set of all elements of *R* with the property that for each element *x* of *R*, the set {*aa, ax, xa, xx*} has at most three elements. We investigate properties of *Fr(R)* and provide sufficient conditions for *Fr(R)* to be the center of *R* . We also mention some related center-like subsets.	

Satyanarayana Bhavanari, India ***f*-prime radical in gamma near-rings** Section 4 (Applications of Algebra)	Saturday 15:00 HS 2

Ladislav Bican, Czech Republic **Torsionfree precovers** Section 3 (Classical Algebra)	Saturday 16:00 HS 3
It is well-known that injective and relatively injective modules play an important role in the theory of torsionfree precovers related to a given hereditary torsion theory for the category of (left) modules over an associative ring with the identity element. We are going to present some conditions concerning the existence of (relatively) torsionfree precovers of (relatively) injective modules which are equivalent to the existence of torsionfree precovers in general. Furthermore, we shall relate the existence of torsionfree precovers to the existence of precovers with respect to coproducts of relatively injective and relatively exact modules.	

Manuel Bodirsky, Germany **The Polymorphism Clones of omega-Categorical Structures** Section 4 (Applications of Algebra)	Friday 17:00 HS 4
Motivated by constraint satisfaction problems in theoretical computer science, we study the local clones of polymorphisms of relational structures whose first order theory has up to isomorphism only one countable model.	

Ivan Chajda, Czech Republic **Deductive systems in Universal Algebra** Section 1 (Universal Algebra)	Friday 11:00 HS 1
It is known that in a variety V which is permutable at 0, every congruence kernel in an algebra A of V can be characterized as the so-called ideal (introduced formerly by A. Ursini). If V is moreover weakly regular, this ideal can be characterized by a finite number of the so-called ideal terms. We will show that if the assumption of permutability at 0 is dropped, then it is still possible to characterize congruence kernels as the so-called deductive systems. Description of a deductive system and its properties will be treated in the talk.	

Klaus Denecke, Germany **Identities of Clones** Section 1 (Universal Algebra)	Friday 12:00 HS 1
There is a well-known connection between hyperidentities of an algebra and identities satisfied by the clone of the algebra. The clone of an algebra is a heterogeneous algebra, and the correspondence between hyperidentities and clone identities is rather complicated to work with. It is also of interest to study this correspondence in a restricted setting, that of hyperidentities of n-ary algebras (where all fundamental operations have the same arity n) and identities in the clone of its n –ary term operations. This clone is just an algebra of type *(n+1, 0, ..., 0)*, usually called the transition clone of the n-ary algebra. The correspondence is an important one in automata theory, since any finite algebra *A* can be regarded as a tree automaton. In this paper we study the correspondence between hyperidentities and clone identities in this special case of n-ary algebras and transition clones.	

Gerhard Dorfer, Austria **Ordering convex directed subsets of a poset and congruences** Section 2 (Lattice Theory)	Friday 17:00 HS 2
In the paper [G. Dorfer, Lattice-extensions by means of convex sublattices, Contr. to General Algebra 9 (1995), 127-123] we described the congruences of a lattice L by means of some specific order on the convex sublattices of L. With appropriate modification this result can be adapted to semi-lattices. Moreover we generalize this to directed posets and characterize kernels of maps that preserve upper and lower bounds using that order on convex directed subsets. (Joint work with Radomir Halas)	

Dietmar Dorninger, Austria **Chebyshev polynomials related to molecular graphs** Section 4 (Applications of Algebra)	Friday 16:00 HS 4
Studying recursive procedures to find the characteristic polynomials of molecular graphs whose vertices and edges are both weighted by real numbers (corresponding to Coulomb and resonance integrals of the underlying chemical compounds) Chebyshev polynomials of the first and second kind occur. In order to describe the influence of atoms or atomic groups that are added to a given compound or substitute atoms of this compound factors of the characteristic polynomial of the arising compound are of interest that do not depend on the weights of the newly introduced atoms and their bonds. These factors turn out to be common divisors of the Chebyshev polynomials which contribute to the characteristic polynomial and are therefore investigated in detail. (Joint work with H. Länger)	

Jürgen Ecker, Austria **1-affine complete Frobenius groups** Section 3 (Classical Algebra)	Friday 17:30 HS 3
If every k-ary function on an algebra that respects all congruences of the algebra is polynomial, we call the algebra k-affine complete. We give a simple necessary and sufficient condition for a group with a distributive minimal normal subgroup to be 1-affine complete. As an application we describe the k-affine complete finite Frobenius groups.	

Günther Eigenthaler, Austria **Congruence classes in universal algebra** Section 1 (Universal Algebra)	Friday 11:30 HS 1
In the talk, a new book with the same title will be presented, written by the authors Ivan Chajda, Günther Eigenthaler and Helmut Länger, published by the Heldemann Verlag, Lemgo (Germany), 2003, as Volume 26 of the series.	

Sophie Frisch, Austria **Integral closure and minimal polynomials of matrices** Section 3 (Classical Algebra)	Friday 15:00 HS 3
We construct minimal polynomials of matrices with certain prescribed coefficients and obtain a characterization of integrally closed domains and of commutative rings that are integrally closed in their total ring of quotients.	

Jan Galuszka, Poland **Totally commutative idempotent groupoids** Section 3 (Classical Algebra)	Friday 16:00 HS 3
A groupoid is totally commutative if each its essentially binary term operation is commutative. Some aspects of the algebraic structure and some constructions of the idempotent totally commutative groupoids are presented.	

Armenak Gasparyan, Russia **Poly-Grassmann Algebras and Polydeterminants** Section 3 (Classical Algebra)	Saturday 15:00 HS 3
One of innovations in XIX century was introduction of exterior products by German Grassmann in its "Die Ausdehnungslehre". Grassmann introduced an algebra of multiple extensive quantities containing as particular cases the vectors, bivectors (oriented areas), trivectors (oriented volumes) etc. Later the Grassmann algebra played a fundamental role for many directions of mathematics and physics in their development. We focuse our attention on the fact that the Grassmann algebra gives an excellent background to the determinant theory, defining determinants as coordinates of decomposable polyvector. In our paper we represent a two-side development of both ideas one of which is the idea of exterior multiplications, and second one is the determining of corresponding determinants. We introduce the poly-Grassmann algebras as wide generalization of proper Grassmann algebra. In accordance with this we propose a new look on the determinants of arbitrary dimensionality and arbitrary signatures as coordinates of decomposable elements from corresponding algebras. This allows us to extend and unifying suitably the notion of determinant and to build at same time a general theory of (newly generalized) multidimensional determinants. We name they generally polydeterminants. Some space is devoted to relations of considered formal constructions with real objects in the study of which they may be playing a crucial role.	

Kazimierz Glazek, Poland **General independence notions** Section 3 (Classical Algebra)	Friday 16:30 HS 3
In 1958 E. Marczewski introduced a general notion of independence, which contained as special cases majority of independence notions used in various branches of mathematics. A non-empty set I of the carrier A of an algebra $A = (A;\mathrm{IF})$ is called *M-independent* if equality of two operations f and g of the considered algebra on any finite system of different elements of I implies $f=g$ in A. There are several interesting results on this notion of independence. However the important scheme of *M*-independence is not enough wide to cover the stochastic independence, the independence in projective spaces and some others. This is why some notions weaker than the *M*-independence were developed. The notion of independence with respect to family Q of mappings (defined on subsets of A) into A, *Q-independence* for short, is a common way of defining almost all known notions of independences. There exists an interesting Galois correspondence between families Q of mappings and families of Q-independent sets. In our talk after a brief survey of these topics we will mainly concentrate on a few easily formulated and interesting results.	

Martin Goldstern, Austria **The Galois connection between relations and automorphisms** Section 1 (Universal Algebra)	Saturday 10:00 HS 1
Consider the Galois connection induced by the relation "the permutation *p* is an automorphism for the relation *R"* (i.e., preserves *R* and its complement). The Galois-closed sets on the permutation side are easily described. On the relational side, it is clear that any Galois-closed set is closed under intersections, and is a Krasner algebra (closed under all logical operations). For finite or countable base sets, also the inverse holds. I will mainly discuss the case of uncountable sets. I will explain the background of the problem, given a plausible conjecture that attempts to characterize all Galois-closed sets, sketch a counterexample to the conjecture, and formulate the correct characterization. (Joint work with Ferdinand Börner and Saharon Shelah)	

Ewa Graczyñska, Poland **On P-compatible identities** Section 1 (Universal Algebra)	Friday 15:00 HS 1
We present a continuation of my AAA65 talk on externary compatible identities in lattices of type (2,2) presented on 21 of March 2003 at AAA65 and announced at: http://at.yorku.ca/cgi-bin/amca/cake-06 We presented there a simple syntactic proof of the following: THEOREM 1. Given a variety V of lattices of type (2,2). Then the lattice L(Ex(V)) is isomorphic to the direct product of the lattice L(V) and a three-element chain. The theorem generalizes corollary 4.2 of [1]. We improve Theorem 2.1 of [1] in the following way: THEOREM 2. The lattice L(Ex(t)) of all subvarieties of the variety defined by all externary compatible identities of a given type t is isomorphic to the direct product of the dual lattice to the lattice of all partitions of F with additional greatest element 1, where F is the set of fundamental operation symbols of a given type t. Theorem 2 is an important lemma for constructing the lattice L(Ex(K)) in case of idempotent varieties K. We apply it for an abelian group cases obtaining a generalization of theorem 4.1 of [1]. A similar method can be applied for some varieties of algebras with zeros. We present a syntactic proof of the fact above and formulate some further properties of P-compatible identities invented by J. Plonka. Among them is the generalization of corollary 4.1 of [1] (cf. [3]): THEOREM 3. If K is a variety of algebras of any type with only one operation symbol, satisfying a not-normal identity, then the lattice L(Ex(K)) is isomorphic to the direct product of the lattice L(K) and a two-element chain. Moreover, in that case Ex(K)=N(K). We show the role of externary compatible identities by the following: THEOREM 4. Given an idempotent variety K, defined by a base of identities. Then the word problem for K is solvable if and only if it solvable for Ex(K). References: [1] K. Halkowska, Lattices of equational theories of P-compatible varieties, in Logic at Work, pp. 587-595, ed.: E. Orlowska, Physica-Verlag, 1999. [2] E. Graczyñska, Universal algebra via tree operands, Oficyna Wydawnicza Politechniki Opolskiej, 2000.	

Radomir Halas, Czech Republic **Distributive lattices with sectionally antitone involutions** Section 2 (Lattice Theory)	Friday 16:00 HS 2
We characterize distributive lattices with sectionally antitone involutions.	

Gejza Jenca, Slovakia **Orthocomplete homogeneous effect algebras** Section 2 (Lattice Theory)	Friday 17:30 HS 2
An effect algebra is a positive cancellative unital partial abelian monoid. We examine certain class of effect algebras, called homogeneous effect algebras. Every homogeneous effect algebra is a union of maximal sub-effect algebras satisfying Riesz decomposition property, called blocks. We prove, that for every orthocomplete homogeneous effect algebra, blocks are closed with respect to certain special infinite sums. We apply this result to show that every orthocomplete homogeneous effect algebra is sharply dominating.	

Anna Kartashova, Russia **Lattices of topologies of unary algebras** Section 2 (Lattice Theory)	Friday 12:00 HS 2
We describe lattices of topologies of algebra. We show that the analog of McKenzie's theorem for congruence lattices of unary algebras is true for the class of lattices of topologies of unary algebras.	

Yefim Katsov, USA **Toward Homological Characterization of Semirings:** **Serre's Conjecture and Bass's Perfectness in a Semiring Context** Section 1 (Universal Algebra)	Saturday 16:00 HS 1
In the modern homological theory of modules over rings, the results characterizing rings by properties of modules and/or suitable categories of modules over them are of great importance and sustained interest. Inspired by this, quite a few results related to this genre have been obtained in different non-additive settings during the last three decades. Just to mention some of these settings, we note that a very valuable collection of numerous interesting results on characterizations of monoids by properties and/or by categories of acts over them, i.e. on so-called homological classification of monoids, can be found in a recent handbook by M. Kilp, U. Knauer and A. V. Mikhalev, Monoids, Acts and Categories (Walter de Gruyter, Berlin, New York, 2000); and, for the results on homological classification of distributive lattice, one may consult the survey by T. S. Fofanova, Polygons over distributive lattices, in B. Csakany et al (eds.): Universal Algebra, Colloq. Math. Soc. Janos Bolyai # 29 (North Holland, Amsterdam, 1982). This talk will deal with homological characterization in a semiring setting, or, more precisely, with homological characterization of additively regular semirings. Our special interest in additively regular semirings is motivated, among other things, by the following observations. The class of additively regular semirings – semirings whose additive reducts are semilattices of abelian groups – constitutes a very interesting and natural class of semirings that includes rings, additively idempotent semirings, and, therefore, bounded distributive lattices as well. Moreover, as it has been shown in [Y. Katsov, Tensor products and injective envelopes of semimodules over additively regular semirings. Algebra Colloquium 4:2 (1997) 121-131], categories of semimodules over additively regular semirings are injectively complete and all these semimodules have injective envelopes; and therefore, they form a very promising non-additive setting in which to further homological algebra, that may give a new perspective on "classical" homological algebra in the additive environment. In the talk, among other results on homological characterization of semirings, we will present a wide class of additively regular semirings, containing all commutative "proper" (i.e., not rings) semirings, over which free semimodules constitute a proper subclass of the class of projective semimodules. As a consequence of this result, we establish that in the general context of additively regular semirings, Serre's conjecture on coincidence of the classes of free and projective semimodules over polynomial semirings is true only when the polynomial semirings are, in fact, polynomial rings over fields. Then,	

we will show that for the same class of additively regular semirings, the projective semimodules constitute a proper subclass of the class of flat semimodules; and as a consequence of this, we conclude that among commutative additively regular semirings only rings are perfect in Bass's sense. Also, in the talk, there will be demonstrated some quite interesting (and even unexpected) applications of homological theory of semimodules over additively regular semirings, as well as formulated some open problems and directions for further investigations.

Hermann Kautschitsch, Austria **Polynomialrings and the Feed-Back-Cyclization Property** Section 4 (Applications of Algebra)	Friday 16:30 HS 4
The Feed-back-cyclization property is a stronger form of the pole-assignability property in commutative rings. Still up today it is not known, if the polynomials over the complex numbers have this property. In the talk some new necessary and also sufficient conditions are given, but unfortunately they still do not work in the case of complex numbers.	

Gerhard Kowol, Austria **Polynomial Functions on Groups – a Survey** Plenary talk	Friday 14:00 HS 1
As is well known, polynomials and polynomial functions in arbitrarily many indeterminates can be defined over algebras of any variety. First problems concerning these objects for the variety of groups have been raised and investigated in the 50s of the last century; the solvability of polynomial equations over groups, a key-word being algebraically closed groups (W. R. Scott, B. H. Neumann), and the structure of the near-ring generated by the inner automorphism (A. Fröhlich). Whereas the first problem evidently is simply an analogue of the corresponding one in the classical theory of polynomials over commutative rings and can be considered also for arbitrary varieties, the second one makes sense for the variety of groups only. This duality runs through the whole theory and will also be reflected in the lecture, where among others the following topics will be presented: various notices of polynomial completeness; interpolation and approximation; the group of invertible polynomial functions over a group G and its structural interplay with G itself; polynomial automorphisms; endomorphism near-rings; n-abelian and semi-n-abelian groups, equations over groups.	

Jan Kühr, Czech Republic **Spectra of dually residuated lattice-ordered monoids** Section 3 (Classical Algebra)	Saturday 11:30 HS 3
Dually residuated lattice-ordered monoids (DRI-monoids, for short) generalize lattice-ordered groups and include also some algebras closely related to fuzzy logic. For instance, GMV-algebras can be viewed as a particular kind of bounded DRI-monoids. We define the notion of a prime ideal of a DRI-monoid and study the set of all proper prime ideals endowed with the spectral topology.	

Leonard Kwuida, Germany **Congruences of concept algebras** Section 2 (Lattice Theory)	Saturday 12:00 HS 2

Helmut Länger, Austria **Determined congruence classes** Section 1 (Universal Algebra)	Friday 16:00 HS 1
General dependences between congruence classes are investigated by considering suitable generalizations of the notions of regularity, n-permutability, congruence modularity and coherence of algebras and varieties. The obtained results include many "classical" results as special cases.	

László Márki, Hungary **To be announced** Section 1 (Universal Algebra)	Friday 16:30 HS 1

Péter P. Pálfy, Hungary **Prime divisors of character degrees** Section 3 (Classical Algebra)	Friday 11:00 HS 3
It is a classical result in the representation theory of finite groups that the degree (dimension) of every irreducible representation is a divisor of the order of the group. Conversely, a prime p divides the degree of some irreducible representation of the group, unless the Sylow p-subgroup is normal and abelian. We study which pairs of primes can divide a character (representation) degree simultaneously. We express the results using the concept of the character degree graph introduced by Manz, Willems, and Wolf. For example, for solvable groups any three vertices of the character degree graph span at least one edge.	

Jan Paseka, Czech Republic **Conjunctivity in distributive quantales** Section 2 (Lattice Theory)	Saturday 11:30 HS 2
This work is intended as a step towards the development of the non-commutative topology using the approach of the theory of (involutive) quantales developed by C. J. Mulvey, J. W. Pelletier and J. Rosick and others. Quantales are certain partially ordered algebraic structures which generalize frames (pointless topologies) as well as various lattices of multiplicative ideals from ring theory and functional analysis (C*-algebras, von Neumann algebras). The relations on a set, under the operation of relational composition, also form an involutive quantale. In this lecture we shall study the conjunctivity condition in the settings of distribute quantales. The main motivation for the research is the fact that the quantale of closed left (right) ideals of a unital C*-algebra is a compact conjunctive distributive quantale such that any its element is a meet of dual atoms.	

Christian Pech, Germany **Algebraic Moore-Machines (an interplay between algebraic- and coalgebric automata theory)** Section 4 (Applications of Algebra)	Friday 17:30 HS 4
We introduce algebraic Moore-machines as a common tool to model many types of automata like deterministic, non-deterministic, alternating, or weighted automata in a unified way – as some kind of coalgebras. We describe their behaviour and give some hints how methods from algebraic automata theory may be used to examine algebraic Moore-machines.	

Anh Ngoc Pham, Hungary **On Leavitt Algebras** Section 3 (Classical Algebra)	Saturday 16:30 HS 3
A representation of inverse limits of Leavitt algebras as direct limits of ultramatricial algebras is given.	

Agata Pilitowska, Poland **About new examples of bilattices** Section 2 (Lattice Theory)	Saturday 11:00 HS 2
J. Jakubik and M. Kolibiar have shown that there is a 1-1 correspondence between semilattice operation o in a lattice (L, $\vee$, $\wedge$) such that o is distributive with $\vee$ and $\wedge$, and pairs of certain congruence relations in (L, $\vee$, $\wedge$). Similar methods can be used to show that there is certain correspondence between some pairs of congruence relations of a lattice (L, $\vee$, $\wedge$) and a semilattice operation o, such that (L, $\wedge$, o) is a quasi-lattice with additional properties. (A bisemilattice (L, $\wedge$, o) is a quasilattice if the natural partial order relation determined by $\wedge$ is compatible with o and vice versa.) The result is then used to provide new examples of bilattices (algebras with two bounded lattice structures). Moreover, a new class of bilattices which originate from complex semilattices is presented.	

Michael Pinsker, Austria/Germany **Clones on the natural numbers** Section 1 (Universal Algebra)	Friday 17:00 HS 1
We consider clones on a countably infinite set X. If we take X to be equipped with the order of the natural numbers, then we can define so-called median functions of all odd arities. It turns out that a clone contains either all median functions or none, that is, the median functions generate each other. Next we show that one of the two maximal clones containing all unary functions is generated by a median function plus a single binary function over the unary functions. This provides an explicit description.	

Maja Ponjavic, Serbia and Montenegro (at present Germany) **On long chains in the partially ordered set of traces of maximal clones** Section 2 (Lattice Theory)	Saturday 10:00 HS 2
This talk is an initial step in the investigation of the structure of the partially ordered set of traces (= unary parts) of maximal clones on a finite set. By considering endomorphisms of central relations in comparison to endomorphisms of other Rosenberg relations we show that the width of this poset is at least 2^n-2 and that there exist unrefinable chains of length n-1, where n is the cardinality of the underlying set.	

Reinhard Pöschel, Germany **Can algebras and homomorphisms in a quasivariety be reduced to unary algebras?** Section 1 (Univeral Algebra)	Saturday 11:00 HS 1
We consider algebras A belonging to a quasivariety ISP(M) generated by a fixed algebra M and homomorphisms f from A to M (motivated by natural dualities). It will be shown how such A and f can be characterized via unary algebras.	

Sándor Radeleczki, Hungary **Linear orders on general algebras** Section 2 (Lattice Theory)	Friday 16:30 HS 2
We answer the question, when a partial order in a partially ordered algebraic structure has a compatible linear extension. The finite extension property enables us to show, that if there is no such extension, then it is caused by a certain finite subset in the direct square of the base set. As a consequence, we prove that a partial order can be linearly extended if and only if it can be linearly extended on every finitely generated subalgebra. Using a special equivalence relation on the above direct square, we obtain a further property of linearly extendible partial orders. Imposing conditions on the lattice of compatible quasi orders, the number of linear orders can be determined. Our general approach yields new results even in the case of semigroups and groups.	

Norman Reilly, Canada **Varieties generated by completely 0-simple semigroups** Section 1 (Universal Algebra)	Saturday 11:30 HS 1
Completely 0-simple semigroups are one of the basic building blocks for semigroups and their structure was completely determined in the 1930s by Rees and Sushkevich. They are easily constructed from any group together with two nonempty sets. With such a simple structure, it was not surprising that basic features such as congruences and homomorphisms were quickly characterized and it was natural to assume that all questions regarding completely 0-simple semigroups would be easily answered by resorting to the Rees matrix representation. However, recent results have shown that these semigroups have some quite remarkable properties in regard to certain decidability questions and in regard to the lattice of varieties that they generate.	

Gabriele Ricci, Italy **Universal transformations between** **Menger systems and between analytic monoids** Section 1 (Universal Algebra)	Saturday 16:30 HS 1
Given any two bases, possibly with different cardinalities, within the same (universal) algebra or of two algebras, one can transform the universal matrices and the elements of the algebra(s) in much the same way as of Linear Algebra. Hence, both the computational advantages of changing reference frames and the theoretical ones of exploiting Klein's groups might carry over the universal case. This finding comes from a triple characterization theorem. It concerns three notions of a transformation that naturally rise, when one considers three facets coming from the choice of a base: the determinations of the corresponding *Menger system*, *analystic monoid* and *endomorphism representation.* The Menger system of a based algebra generalizes the product of a vector times a (square) matrix. As in based vector spaces, it is an algebra where each element indexes an operation taking the matrix columns.	

Zdenka Riecanova, Slovakia **Topological effect algebras** Section 2 (Lattice Theory)	Friday 15:00 HS 2
A model for an Effect Algebra is the standard effect algebra of positive self-adjoint operators dominated by the identity on the Hilbert space. In general effect algebras are partial algebras satisfying very simple axioms. Effect algebras, or equivalent in some sense D-posets, were introduced as carriers of states or probability measures in the quantum, or fuzzy, probability theory. Thus elements of these algebraic structures represent quantum effects or fuzzy events which have yes-no character that may be unsharp or imprecise. As in the probability theory on these structures the convergence of nets of their elements has an important task, the questions about the order convergence and topological	

convergence of nets are interesting. We show conditions under which the order convergence of nets of elements of some effect algebras (including MV-algebras) is topological or compact topological. Moreover algebraic properties of such effect algebras are shown.

Anna Romanowska, Poland
Friday 15:00
HS 4

Feasible sets of finite posets

Section 4 (Applications of Algebra)

The feasible set of a finite poset is the set of probability distributions on the elements of the poset whose weights satisfy the order relationships specified by the poset. The feasible sets of the order structures on a given underlying set are precisely the convex unions of the primary simplices, the facets of the first barycentric subdivision of the simplex spanned by the elements of the set. The feasible sets will be described using both geometric tools (the first geometric subdivision of simplices) and algebraic tools (the theory of barycentric algebras). Some applications will be provided.

Ivo G. Rosenberg, Canada
Friday 9:30
HS 1

Uniformly delayed algebras; theory and the completeness problem

Plenary talk

The output of a real gate, with the input and output finite alphabet A, reacts to changes on the gate's inputs with a certain delay d . Assuming that d is input independent, the behaviour of the gate can be modelled by a pair (f , d) where f is an operation over A. The tree-shaped circuits made up from such gates lead to the surprisingly rich theory of uniformly delayed structures situated between universal algebra and automata theory. Its composition-closed sets can be described by sets of countable sequences of the same arity relations on A . Under a very mild completeness concept, a general completeness criterion in terms of all maximal closed sets was given in 1962 for $|A| = 2$ and in 1978 for $|A| = 3$. We report on the rather complex general case. Using previous results we managed to reduce the search to a certain elimination problem among the periodic sequences of (i) equalence relations and (ii) binary central relations (joint work with T. Hikita, Meiji U.)

Arsham Borumand Saeid, Iran
Friday 17:30
HS 1

Quotient of Hyper BCK-algebras

Section 1 (Universal Algebra)

First by considering a reflexive hyper BCK-ideal I of a hyper BCK-algebra H, we define an equivalence relation sim_I on H. Then we construct the quotient hyper BCK-algebra H/I on H via the equivalence classes. After that we give some examples of this algebra and also obtain some properties of it, in particular we give some relationships between H and H/I. Finally we state and prove some isomorphism theorems, also we give an open problem.

Dietmar Schweigert, Germany
Friday 11:30
HS 2

On distributive semi near lattice

Section 2 (Lattice Theory)

The aim of this note is to describe partially ordered sets by a two binary operations which are similar to lattices. We like to classify near lattices in the way of homomorphisms, subalgebras and direct products. We study the lower part of the lattice of varieties of near lattices. The atoms of this lattice are the variety of distributive lattice generated by the two-element-lattice and a subvariety of distributive near lattices generated by a two-element-near-lattice with incomparable elements. We analyse the near lattice with 3 and 4 elements and give the simple distributive near lattices. The variety of the distributive semi near lattice is congruence distributive. This paper is the continuation of the results in Math. Slovaca 32 (1982) no 3 313 u 317 and in Math. Slovaca 35 (1985) no 4 313 u 317.

Josef Slapal, Czech Republic **Diagonality and powers of general algebraic systems** Section 1 (Universal Algebra)	Saturday 15:00 HS 1
We study the diagonality of relational systems with respect to powers of these systems. As particular cases, the diagonalities of partial algebras, hyperalgebras and total algebras are discussed. The categorical meaning and possible applications of the results are mentioned.	

David Stanovsky, Czech Republic **Equational theory of group conjugation** Section 1 (Universal Algebra)	Saturday 17:00 HS 1
Given a group, there is a natural operation of conjugation, defined by $x*y=xyx^{-1}$. We study the variety generated by all G(*), G a group. In particular, we are concerned about the question, whether this variety has finitely based equations.	

Vitaliy M. Usenko, Ukraina **The Double-Semigroups Categories** Section 3 (Classical Algebra)	Saturday 12:00 HS 3
The categories of double-semigroups are determined. The universal and the free objects of the double-semigroups categories are described.	

Gerhardt Wendt, Austria **A result on planar rings and matrix rings and generalisations to near-rings** Section 3 (Classical Algebra)	Saturday 11:00 HS 3
We show that the minimal left ideals of matrix rings over skew fields are planar rings and we show that every planar ring is isomorphic to some minimal left ideal of a matrix ring over a skew field. We generalize this result in order to get a description of all planar near-rings as subnear-rings of certain centralizer near-rings.	

Richárd Wiegandt, Hungary **Radical theory and its interpretation in various categories** Plenary talk	Saturday 9:00 HS 1
Radical theory stems from ring theory (1930), its primary aim was to prove decomposition theorems by introducing concrete radicals. Based on common properties of concrete radicals, the notion of general (Kurosh-Amitsur) radicals were introduced (1952-1954). The study of general radical properties provides a context for studying and comparing algebraic properties via closure operations. To distinguish distinct properties, the construction of certain “pathological” rings is required which serves the better understanding of the structure of rings. Radical theory has interpretations in various algebraic and non-algebraic categories. A unified universal algebraic theory of radicals was developed in 1988. The infiltration in other branches of algebra has enriched the arsenal of investigations. Attention will be focused to near-rings, modules, acts, group automata, semigroups, semirings, semifields, lattice ordered groups, linearly ordered groups and idempotent algebras. Radical theory has a link also with coding theory.	

Johann Wiesenbauer, Austria **Über Probleme der Vertauschbarkeit in Kompositionshalbgruppen** Section 3 (Classical Algebra)	Friday 11:30 HS 3
In dem Vortrag wird zunächst ein einfacher Algorithmus zur effizienten Bestimmung des Zentralisators Z(f) eines Elements f:{1,...,n}->{1,...,n} einer symmetrischen Halbgruppe n-ten Grades und dessen Implementierung in DERIVE angegeben. Daran anschließend werden für gewisse Typen von Kompositionshalbgruppen jene Elemente a charakterisiert, für die der Zentralisator Z(a) in dem Sinn kleinstmöglich ist, als er bereits von a erzeugt wird.	

Ross Willard, Canada **The finite basis problem** Plenary talk	Saturday 14:00 HS 1
A finite algebra of finite type (i.e., having just finitely many fundamental operations) is *finitely based* if the variety it generates can be axiomatized by just finitely many equations. The *finite basis problem* asks for an explicit characterization of the finite algebras of finite type which are finitely based. This is a ridiculously impossible problem, but an intriguing subproblem is the task of proving a conjecture of R. Park from 1976. Park's conjecture, motivated by K. Baker's celebrated finite basis theorem (for finite algebras in congruence distributive varieties) states that if a finite algebra of finite type generates a variety in which all subdirectly irreducible members are finite and of bounded size, then the algebra is finitely based. In this lecture I survey the current state of knowledge of Park's conjecture and related problems, and describe some extensions of Baker's theorem I wish I could prove.	

Rudolf Wille, Germany **An Order-theoretic Mathematization of Linear Continuum Structures** Section 2 (Lattice Theory)	Friday 11:00 HS 2
Aristotle's understanding that continua do not consists of points are order-theoretically mathematized in the linear case. The role of points as boundaries of continua are analysed via concept lattices of general ordinal scales based on the mathematized linear continuum structures. Ideas for an order-theoretic theory of continua in general will be sketched.	

Reinhard Winkler, Austria **Maximal abelian subgroups of Aut(R,<)** Section 3 (Classical Algebra)	Friday 12:00 HS 3
There is a traditional interest in commuting mappings and therefore in maximal sets of pairwise commuting transformations of a set. Transformations which preserve some structure are of particular interest. In this talk we give a classification (up to conjugacy) of all maximal abelian subgroups of the automorphism group of the real line, considered as an ordered set.	

Laszlo Zadori, Hungary **Finite posets in locally finite varieties** Section 1 (Universal Algebra)	Saturday 12:00 HS 1
The talk is a presentation of results obtained in a joint work with Benoit Larose. We prove that if a finite connected poset admits an order-preserving Taylor operation, then all of its homotopy groups are trivial. We use this to give new characterisations of locally finite varieties omitting type 1 in terms of the finite posets (or equivalently, finite topological spaces) in the variety. Similar variants of other omitting-type theorems are presented.	

Publication policy

1. Notice to all authors

The volume is planned to be published by Verlag Johannes Heyn, Klagenfurt, in 2003/2004.
Deadline for the manuscripts: July 19, 2003.

All submitted papers will be refereed.

The editors only accept electronically submitted manuscripts in LaTeX2e using the AMS document class “amsart” meeting our layout guidelines given below. We refer to "Contributions to General Algebra 10" for the page layout.

Papers not meeting the given guidelines will be rejected.

Submit your paper by e-mail to: aaa66@uni-klu.ac.at with the subject: [aaa66paper] Name, where “Name” is the author responsible for correspondence.

Up-to-date information will be available during the conference and/or from
http://www.uni-klu.ac.at/AAA66/proceedings.html

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http://www.uni-klu.ac.at/AAA66/aaa66.sty
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[continued on next page]

2. Mandatory paper structure:

```
\documentclass[11pt]{amsart}

% your optional definitions
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Do not use margin notes.
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Use logical formatting as

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All non standard packages – if any – must be included in your submission. Please avoid them!
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Social activities

Entrance to social activities is free to conference participants and accompanying persons. Food and beverages at informal welcome and conference dinner are included.

Informal welcome
Venue: Main hall, university – Thursday (June, 19th), 18:15

After registration conference organizers offer beverages and small snacks as an opportunity to get accustomed to the venue and to people.

Farewell
HS 1 – Saturday (June, 21st), 17:45

Conference dinner
Mensa building, close to the university – Saturday (June, 21st), 19:30 to 23:00

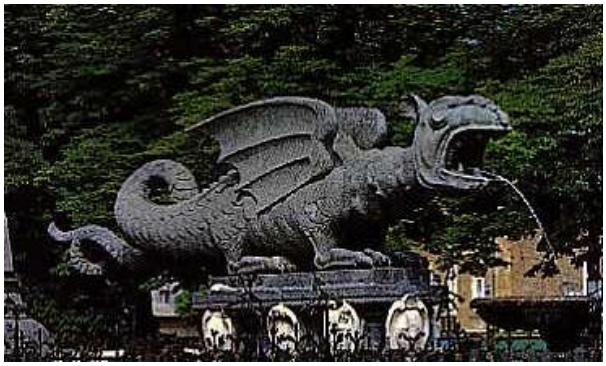
Local information

Bus lines
There is a central bus station in the city, the Heiligengeistplatz, from where buses circulate to all directions. Line no 12 is next to the university, lines 10, 11, 20, 21 stop at Minimundus and Hotel Wörther See, close to university. Enclosed please find a map for the buses and a time schedule for lines 10, 11 and 12 which stop near university. There are time schedule for all buses in Klagenfurt in the registration office.

Food and beverages
During official coffee breaks, conference organizers offer coffee and refreshing drinks in main building. At other occasions you can find food at your cost at the following places:

Student's mensa (open Friday between 11.30 and 2.30 p.m.)
Uniwirt, Nautilusweg at campus
Uni Pizzeria, Universitätsstraße, opposite to mensa building
Chinesischer Garten, Villacher Straße 221, chinese food
Restaurant Lido, Friedelstrand 1, fine restaurant, close to Klagenfurt harbour
Maria Loretto, Lorettoweg 54, fine restaurant, next to the beach
Minimundus, Restaurant Cafe, Villacher Straße, at Minimundus
Strandbad Restaurant Tischler, Metnitzstrand, at the Strandbad

The Klagenfurt Lindwurm

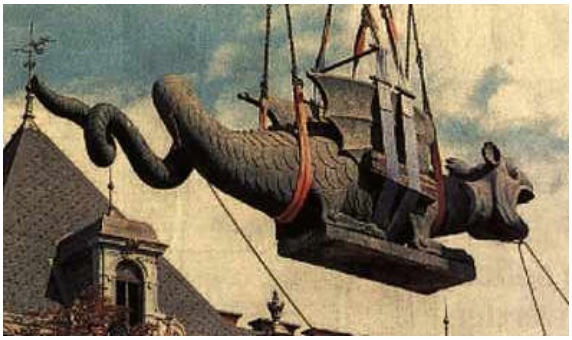


Whenever you come to Austria, visit Klagenfurt, the capital of Carinthia. There you will find the famous Lindwurm monument, which was erected by Ulrich Vogelsang in 1590. Although it represents a dragon, it can be regarded as the first palaeontologic reconstruction. In 1335 the cranium of a woolly rhinoceros from the ice-age was found in a gravel pit near Klagenfurt. It was instantly interpreted as the skull of a dragon or Lindwurm. This fossil, which is still at exhibition at the Landesmuseum für Kärnten, served as a model for the head of the Lindwurm.

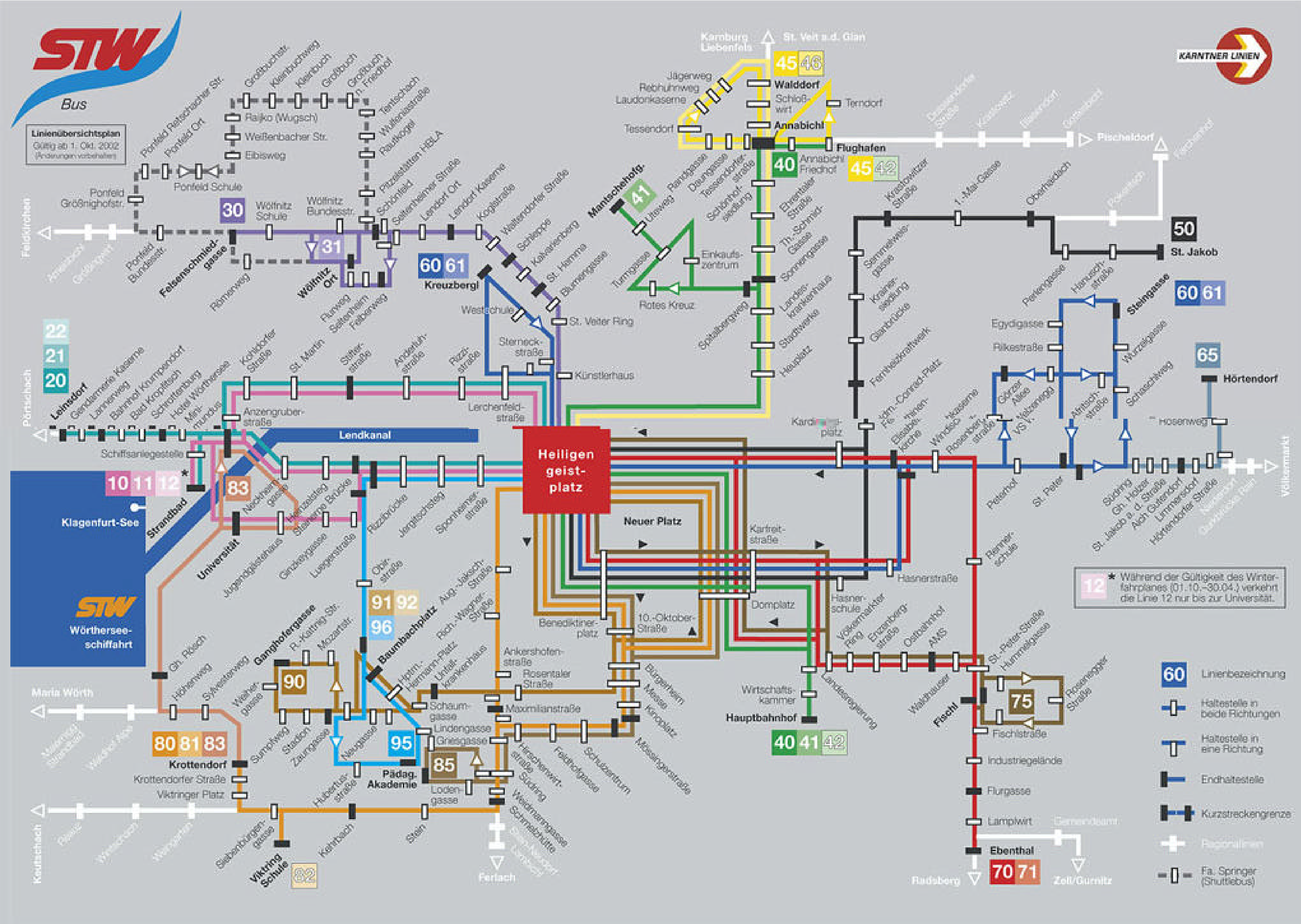
However, the legend of a dragon haunting the surroundings of Klagenfurt is much older:
The name of the town can be read as "ford of lament". Floods repeatedly destroyed the crossings over the river Glan and many persons lost their lives. Thus the idea arose that a water dragon was responsible for all the lethal accidents at the ford and in the swamps near the river Glan. There he hid in eternal mists. During rain and thunderstorm people could hear him roar. To relieve the peasants from this creature, the Duke of Carinthia built a huge, strong tower at the limits of the swamps. Fearless knights hid there, and a stout bull tied to a chain with barbs was presented as a bait. Soon the winged Lindwurm appeared and devoured the bull - and hung wriggling on the chain like a fish on the hook. At once he was slain by the knights. Later the swamps were drained, and the tower was replaced by a castle. Thus the town Klagenfurt was founded. The city-arms still show tower and dragon to remind us of this heroic deed.

But also the Lindwurm itself underwent a metamorphoses: The oldest city seal shows a two-legged, winged dragon in front of a tower (which is thus similar to that of Laibach = Ljubljana). This image was used at least until 1609. But towards the end of the 16th century the idea of what a dragon should look like changed. From then on dragons used to have four legs, and the city-arms of 1669 show that type of Lindwurm. However, the Lindwurm of Klagenfurt was never depicted without wings. From September 1996 to July 1997 the Lindwurm was removed for restoration.

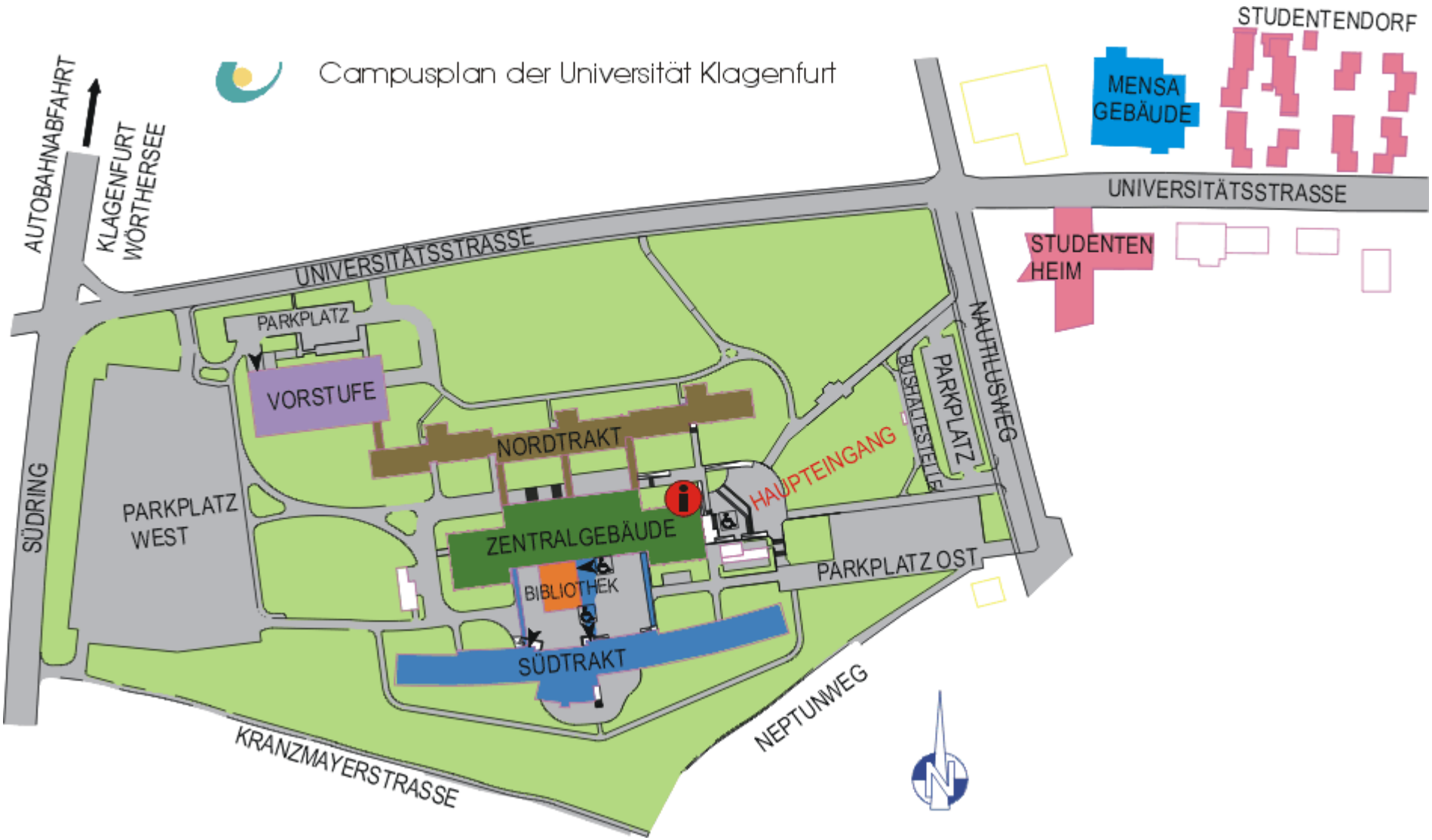
Ein Lindwurm gantz ungeheuer
Wellicher verprent durchs Feuer
Im Zollfelt sollicher da lag
Drob menschen und auch vich vertzag
In Wappen fierdt Clagenfurdt statt
Davon sie iren namen hatt.
[anonymus, 1608]

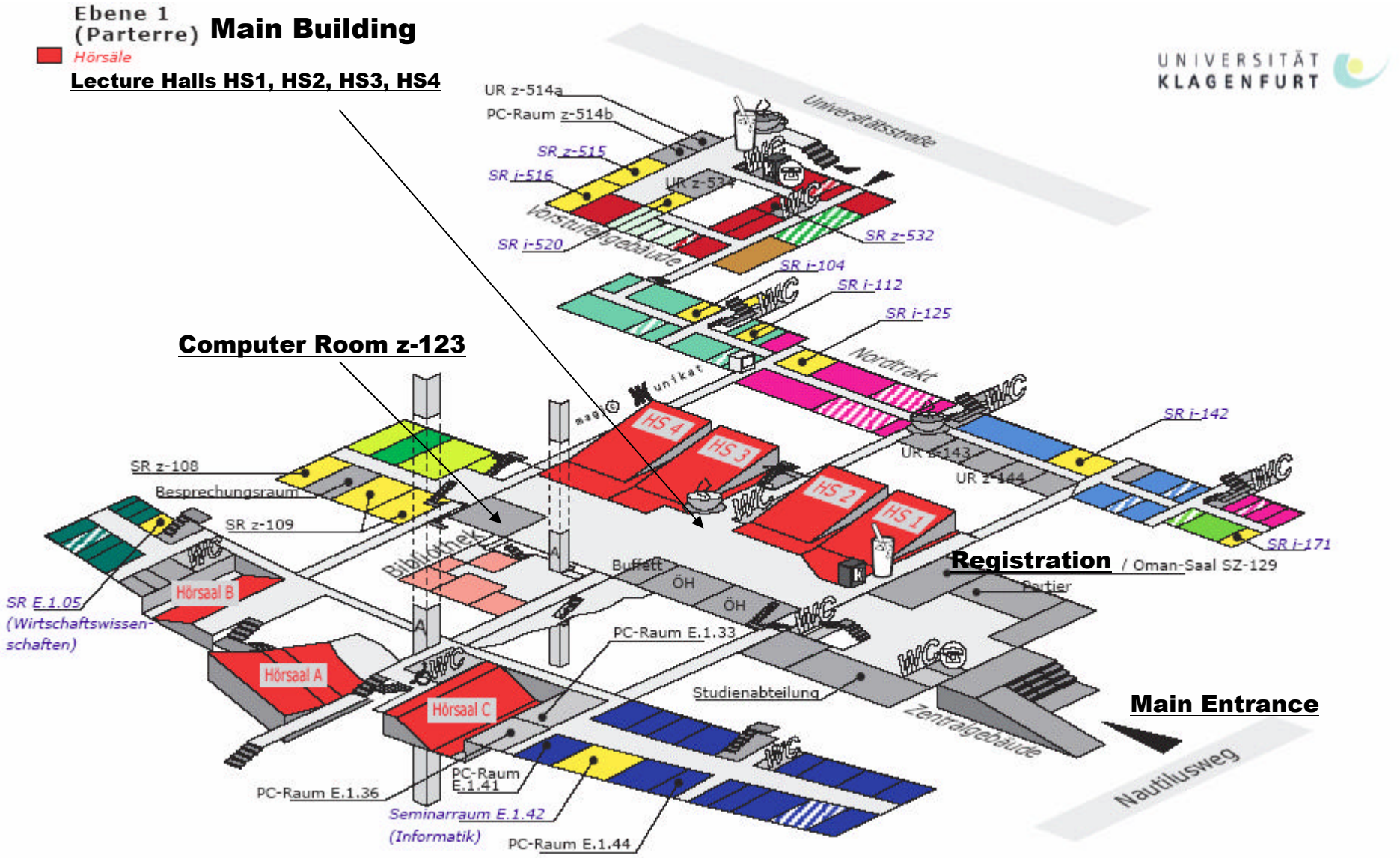


[Bus Time Table, 3 pages]



STW
Bus
Linienübersichtsplan
Gültig ab 1. Okt. 2002
(Änderungen vorbehalten)
KÄRNTNER LINIEN
Heiligen geist-platz
Lendkanal
Neuer Platz
Klagenfurt-See
Strandbad
Wörthersee-schiffahrt
Universität
Kreuzbergl
Annabichl
Walddorf
Flughafen
St. Jakob
Steingasse
Hörtendorf
Völkermarkt
Ebenthal
Radsberg
Zell/Gurnitz
Ferlach
Keutschach
Maria Wörth
Pörtschach
Feldkirchen
Karnburg Liebenfels
St. Veit a.d. Glan
Pischeldorf
Krottendorf
Viktring Schule
Pädag. Akademie
Baumbachplatz
Ganghofergasse
Hauptbahnhof
Fischl
Mantschehofg.
Felsenschmiedgasse
Wölfnitz Ort
Leinsdorf
Jägerweg
Rebhuhnweg
Laudonkaserne
Tessendorf
Schloßwirt
Terndorf
Annabichl Friedhof
Rotes Kreuz
Einkaufszentrum
Turmgasse
Westschule
Sterneckstraße
St. Veiter Ring
Künstlerhaus
Lerchenfeldstraße
Anzengruberstraße
Schiffsanlegestelle
Ponfeld Schule
Ponfeld Größnighofstr.
Raiko (Wugsch)
Weißenbacher Str.
Eibisweg
Wölfnitz Schule
Wölfnitz Bundesstr.
Egydigasse
Rilkestraße
Hosenweg
Kardinalsplatz
Karfreitstraße
Domplatz
Hasnerstraße
Hasnerschule
Benediktinerplatz
10.-Oktober-Straße
Ankershofenstraße
Rosentaler Straße
Maximilianstraße
Schaumgasse
Lindengasse
Griesgasse
Lodengasse
Wirtschaftskammer
Industriegelände
Flurgasse
Lampiwirt
Fischlstraße
Krottendorfer Straße
Viktringer Platz
Gh. Rösch
Höhenweg
Sylvesterweg
Sumpfweg
Stadion
Zaungasse
Neugasse
Siebenbürgengasse
Kohlbach
Stein
Obirstraße
Rizzibrücke
Peterhof
St. Peter
Rennerschule
Landesregierung
AMS
Ostbahnhof
Waidmannsdorf
Lendorf Kaserne
Kalvarienberg
St. Hemma
Blumengasse
Spitalbergweg
Stadtwerke
Heuplatz
Landeskrankenhaus
Sonnengasse
Krassnitzer Straße
1.-Mai-Gasse
Oberhaidach
Perlengasse
Hanuschstraße
Wurzelgasse
Schaschlweg
St. Peter-Straße
Hummelgasse
Rosenegger Straße
* Während der Gültigkeit des Winterfahrplanes (01.10.–30.04.) verkehrt die Linie 12 nur bis zur Universität.
60 Linienbezeichnung
Haltestelle in beide Richtungen
Haltestelle in eine Richtung
Endhaltestelle
Kurzstreckengrenze
Regionallinien
Fa. Springer (Shuttlebus)
10 11 12 20 21 22 30 31 40 41 42 45 46 50 60 61 65 70 71 75 80 81 82 83 85 90 91 92 95 96


Campusplan der Universität Klagenfurt
AUTOBAHNABFAHRT
KLAGENFURT
WÖRTHERSEE
UNIVERSITÄTSSTRASSE
STUDENTENDORF
MENSA GEBÄUDE
STUDENTEN HEIM
PARKPLATZ
VORSTUFE
NORDTRAKT
HAUPTEINGANG
BUSHALTESTELLE
PARKPLATZ
NAUTILUSWEG
SÜDRING
PARKPLATZ WEST
ZENTRALGEBÄUDE
BIBLIOTHEK
PARKPLATZ OST
SÜDTRAKT
KRANZMAYERSTRASSE
NEPTUNWEG
N


Ebene 1
(Parterre)
Main Building
Hörsäle
Lecture Halls HS1, HS2, HS3, HS4
UNIVERSITÄT KLAGENFURT
Computer Room z-123
Registration / Oman-Saal SZ-129
Main Entrance
UR z-514a
PC-Raum z-514b
SR z-515
SR i-516
UR z-531
SR z-532
SR i-520
SR i-104
SR i-112
SR i-125
SR i-142
UR z-143
UR z-144
SR i-171
Universitätsstraße
Vorstufengebäude
Nordtrakt
Zentralgebäude
Nautilusweg
HS 4
HS 3
HS 2
HS 1
SR z-108
Besprechungsraum
SR z-109
SR E.1.05
(Wirtschaftswissen-
schaften)
Hörsaal B
Hörsaal A
Hörsaal C
Bibliothek
Buffett
ÖH
ÖH
Portier
PC-Raum E.1.33
Studienabteilung
PC-Raum E.1.36
PC-Raum
E.1.41
Seminarraum E.1.42
(Informatik)
PC-Raum E.1.44