

Summer School & Conference Schedule

Valuation Theory and Integral Closures in Commutative Algebra

JULY 3–22, 2006

UNIVERSITY OF OTTAWA

(Lectures on Valuation Theory) Lecturers: F.V. Kuhlmann, D. Cutkosky, H. Knaf, B. Teissier, M. Vaquié.

(Lectures on Integral Closures) Lecturers: I. Swanson, W. Bruns, A. Taylor.

Chapter and section numbers refer to the book *Integral closure of ideals, rings, and modules* by Irena Swanson and Craig Huneke. Relevant chapters will be distributed during the summer school by permission of the publisher.

Lectures will be held in **SITE C0136** at the south end of campus for the first two weeks, and in **SITE B0138** during the third week.

Week 1 (Summer School)

	Monday	Tuesday	Wednesday	Thursday	Friday
9:30–10:30	Lecture 1	Lecture 1	Lecture 1	Lecture 1	Lecture 1
11 –12	Lecture 2	Lecture 2	Lecture 2	Lecture 2	Lecture 2
12–2	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>
2 – 3	Lecture 3	Lecture 3	Lecture 3	Lecture 3	Lecture 3
3:30 – 4:30	Lecture 4	Lecture 4	Lecture 4	Lecture 4	Lecture 4
Evening	Discussions/ Problems	Discussions/ Problems	Discussions/ Problems	Discussions/ Problems	Discussions/ Problems

Monday July 3

Lecture 1 (Kuhlmann & Knaf): *Valuations, value groups and valuation rings* (6.1, 6.2)

Lecture 2 (Kuhlmann & Knaf): *Properties of valuation rings* (6.4)

Lecture 3 (Swanson): *What is integral closure of ideals* (1.1 (lightly), 1.2)

Lecture 4 (Swanson): *Integral closure of rings* (2.1, 2.2 lightly)

Tuesday July 4

Lecture 1 (Kuhlmann & Knaf): *Existence of valuation rings; completions*, (6.3, 6.5)

Lecture 2 (Kuhlmann & Knaf): *Valuation theoretical invariants* (6.6)

Lecture 3 (Swanson): *Noetherian questions* (4.3.4, 4.6)

Lecture 4 (Swanson): *Valuative criterion* (6.8)

Wednesday July 5

Lecture 1 (Kuhlmann & Knaf): *Examples of valuations* (6.7)

Lecture 2 (Kuhlmann & Knaf): *Extensions of valuations, fundamental inequality*

Lectures 3 and 4 (Swanson): *Rees valuations* (10.1, 10.2, 10.4)

Thursday July 6

Lecture 1 (Kuhlmann & Knaf): *Defect, with examples, and defectless valuations*

Lecture 2 (Kuhlmann & Knaf): *Ramification theory, I*

Lecture 3 (Swanson): *Monomial ideals (integral closure, Newton polyhedra, Rees valuations)*

Lecture 4 (Swanson): *Two-dimensional regular local rings: Zariski's theory and Rees valuations*

Friday July 7

Lecture 1 (Kuhlmann & Knaf): *Ramification theory, II*

Lecture 2 (Kuhlmann & Knaf): *Hensel's Lemma and Implicit Function Theorem*

Lecture 3 (Swanson): *Divisorial valuations* (9.3)

Lecture 4 (Swanson): *Reductions and Rees valuations* (10.5)

Saturday July 8

Catch-up

Week 2 (Summer School)

	Monday	Tuesday	Wednesday	Thursday	Friday
8:30–9:30	Lecture 1	Lecture 1	Lecture 1	Lecture 1	Lecture 1
10–11	Lecture 2	Lecture 2	Lecture 2	Lecture 2	Lecture 2
11–12:45	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>
12:45–1:45	Lecture 3	Lecture 3	Lecture 3	Lecture 3	Lecture 3
2–3:30	Lab	Lab	Lab	Lab	Lab
4–5	Lecture 4	Lecture 4	Lecture 4		Lecture 4
Evening	Discussions/ Problems	Discussions/ Problems	Discussions/ Problems		Discussions/ Problems

Monday July 10

Lecture 1 (Kuhlmann): *Elimination of ramification I: the generalized stability theorem*

Lecture 2 (Swanson): *Jacobian criteria, Serre's criteria*

Lecture 3 (Amelia Taylor): *General normalization algorithms*

Lab (Amelia Taylor): *Introduction to some symbolic computer algebra packages*

Lecture 4 (Knaf) *Local uniformization of Abhyankar places in arbitrary characteristic*

Tuesday July 11

Lecture 1 (Kuhlmann): *Elimination of ramification II: henselian rationality*

Lecture 2 (Knaf) *Ideas towards general local uniformization*

Lecture 3 (Swanson): *Computing Rees valuations*

Lab (Amelia Taylor): *Computing Rees valuations*

Lecture 4 (Winfried Bruns): *Polyhedral geometry*

Wednesday July 12

Lecture 1 (Vaquié): *Extension of a valuation: key-polynomial and augmented valuation*

Lecture 2 (Cutkosky): *geometric theory of local rings, I*

Lecture 3 and Lab (Amelia Taylor): *Vasconcelos's algorithms*

Lecture 4 (Winfried Bruns): *Affine monoid rings and their normalizations*

Thursday July 13

Lecture 1 (Vaquié): *Extension of a valuation: admissible family and defect*

Lecture 2 (Teissier): *Local uniformization in characteristic p , I*

Lecture 3 (Winfried Bruns): *Algorithms for normalizations of affine monoid rings*

Lab (Winfried Bruns): *Normaliz*

Friday July 14

Lecture 1 (Vaquié): *Graded algebra associated to a valuation of $K[x]$*

Lecture 2 (Teissier): *Local uniformization in characteristic p , II*

Lecture 3 (Swanson): *Noether normalizations*

Lab (Taylor):

Lecture 4 (Swanson): *Ad hoc methods for computing integral closure*

Saturday July 15

Catch-up

Week 3 (Conference)

	Monday July 17	Tuesday July 18	Wednesday July 19	Thursday July 20	Friday July 21	Saturday July 22
9–9:45	Cutkosky I	Brenner	Goto	Gaffney	Vasconcelos	
10–10:45	Cutkosky II	Ghezzi	Hübl	Campillo	Huneke	
11–11:30	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>	
11:30–12	Kashcheyeva	Naghipour	Järvilehto	Bivià-Ausina	Rond	
12–2	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	
2–2:45	Knaf		Villarreal	Abhyankar	Spivakovsky	
3–3:45	Kuhlmann		Vituli	Schoutens	Vaquié	
4–4:30	<i>Coffee Break</i>		<i>Coffee Break</i>		<i>Coffee Break</i>	
4:30–5:15	Teissier I		Brennan		Teissier II	
7			Conference Dinner			

Titles:

1. Shreeram Abhyankar: *Some Thoughts on the Jacobian Conjecture*
2. Carles Bivià-Ausina: *Mixed multiplicities of ideals and the Milnor number of an isolated complete intersection singularity*
3. Joseph P. Brennan: *Sequences that preserve homological degree*
4. Holger Brenner: *Grothendieck topologies and ideal closure operations - The integral closure and the submersive topology*
5. Antonio Campillo: *Complete ideals and Poincaré series*
6. Cutkosky (I): *Geometric theory of local rings, II*
7. Cutkosky (II): *Geometric theory of local rings, III*
8. Terence Gaffney: *Pairs of modules, equisingularity, and the multiplicity-polar theorem*

9. Laura Ghezzi: *Monomialization of generating sequences of valuations in two dimensional function fields*
10. Shiro Goto: *The Cohen-Macaulayness in the graded rings $G(I) =_{n \geq 0} I^n / I^{n+1}$ associated to ideals $I = Q : m^2$*
11. Reinhold Hübl: *Adjoints of Ideals and Rees Valuations*
12. Craig Huneke: *Absolute Integral Closure*
13. Tarmo Järvilehto: *Jumping numbers of a simple complete ideal in a two dimensional regular local ring*
14. Olga Kashcheyeva: *Jumping polynomials in 2-dimensional regular local rings*
15. Hagen Knaf: *Local uniformization after finite extension of the function field*
16. F.-V. Kuhlmann: *Classification of Artin-Schreier defect extensions*
17. Reza Naghipour: *Local cohomology and quintasymptotic primes of ideals with respect to modules*
18. Guillaume Rond: *Artin strong approximation theorem*
19. Hans Schoutens: *Valuations on Noetherian rings via Grassmanian paths*
20. Mark Spivakovsky: *Kaplansky's theorem on generalized power series and local uniformization in arbitrary characteristic*
21. Bernard Teissier (I): *Local uniformization in characteristic p , III*
22. Bernard Teissier (II): *TBA*
23. Michel Vaquié: *Extension of a valuation, Newton polygon*
24. Wolmer V. Vasconcelos: *Complexity Topics in the Normalization of Algebras*
25. Rafael H. Villarreal: *Blowup algebras and subrings associated to monomial ideals*
26. Marie A. Vitulli: *Weak subintegral closure of ideals and connections with reductions and valuations*