Topics in Algebra—Hopf Algebras

Course: MTH 819

Semester: Spring 2014

Instructor: Yorck Sommerhäuser

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Class meetings: Tuesday, Thursday 12:30 pm–1:50 pm, Math 235

Office hours: Monday 12:00 pm–1:00 pm, Tuesday, 4:00 pm–5:00 pm, Thursday 4:00 pm–5:00 pm and by appointment.

Textbook: S. Montgomery: Hopf algebras and their actions on rings, 2nd revised printing, Reg. Conf. Ser. Math., Vol. 82, Am. Math. Soc., Providence, 1997, ISBN-10: 0821807382.

Course description: We discuss the fundamental properties of Hopf algebras with a view toward the Kaplansky conjectures.

Objectives: The objective of the course is both to discuss the basic properties of Hopf algebras and to introduce the student to basic open questions that are the subject of current research.

Coverage: We discuss Hopf algebras and Hopf modules, integrals, Frobenius algebras, Maschke's theorem for Hopf algebras, modular functions and elements, Radford's formula for the fourth power of the antipode, trace formulas for integrals, the Larson-Radford theorem on the involutivity of semisimple Hopf algebras over fields of characteristic zero, the Nichols-Zoeller freeness theorem, the class equation for Hopf algebras, the Drinfel'd double, the exponent of a Hopf algebra, and Cauchy's theorem for Hopf algebras.

Homework: On Tuesday, a weekly exercise sheet will be handed out, containing three or four problems. This has to be completed until the next Tuesday. While it is allowed to collaborate on the problems, every student is required to write up his solution in his own words.

Grading scale:

A:	90%	A-:	88%		
B+:	86%	B:	80%	B-:	78%
C+:	76%	C:	70%	C-:	68%
D+:	66%	D:	60%		

Disabled students: If you have a diagnosed physical, learning, or psychological disability which will make it difficult for you to carry out the course work as outlined, or requires accommodations such as recruiting note takers, readers or extended time on exams or assignments, please advise me during the first two weeks of the course so that we may review arrangements for accommodations.