Hopf Algebras

Course: MATH 6329

Semester: Winter 2020

Instructor: Yorck Sommerhäuser

Office: HH-3007

Telephone: 864-8097

E-Mail: sommerh@mun.ca

Class meetings: Tuesday 12:00 m–12:50 pm, Thursday 12:00 m–12:50 pm, Friday 1:00 pm–1:50 pm, HH 3015

Office hours: Tuesday, Thursday 5:00 pm–6:00 pm, Friday 2:15 pm–4:15 pm and by appointment.

Textbook: Y. Sommerhäuser: MATH 6329 Course Manual, Memorial University, St. John's, 2020

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.

Examinations: There will be a midterm examination and a comprehensive final examination. The midterm examination takes place on Thursday, February 27, during class time in our usual classroom. The final examination takes place during the examination period from April 8 to April 18 at a time and place determined by the registrar's office.

Homework: On Tuesday, a weekly exercise sheet will be handed out, containing three or four problems. The completion of this exercise sheet is voluntary; it will not be collected or marked.

Marking weights:

Midterm examination:	30 %
Final examination:	70 %