

COURSE SYLLABUS
(MA792-001: Quantum Groups and Crystal Bases)

Department of Mathematics
North Carolina State University
Spring, 2018

Instructor Information:

Dr. Kailash C. Misra
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Office Phone: (919)515-8784
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Class time and room: TTH 8:30-9:45, SAS 1218
Office Hour: TTH 10:00 - 11:00, or by appointment

Prerequisite: MA 720-725

Goal & Objective:

Quantum groups associated with symmetrizable Kac-Moody algebras and their representations is an area of current research interest with several applications in other areas of Mathematics, Mathematical Physics and Statistical Mechanics. This course is intended as an introduction to this important area of research. We will start with a complete study of the simplest quantum group $U_q(sl(2))$ associated with the simple Lie algebra $sl(2)$ of 2×2 trace zero matrices. We will discuss their representations and tensor product decompositions using crystal bases. Then we will move to the quantum groups associated with any symmetrizable Kac-Moody Lie algebras, and crystal bases for their integrable representations with a focus on the quantum group $U_q(sl(n))$ associated with the simple Lie algebra $sl(n)$ of $n \times n$ trace zero matrices and the quantum affine algebra $U_q(\widehat{sl}(2))$.

Reference Book:

1. Introduction to Quantum Groups and Crystal Bases,
Authors: Hong and Kang, Published by AMS, (GSM #42)

Grading Policy:

The course grade will be based on class attendance, participation and some independent work at the end of the semester.

Drop/Revision Deadline: March 12, Monday.

NCSU Academic Regulations can be found at
http://www2.ncsu.edu/unity/project/www/ncsu/provost/info/academic_policies/