

Syllabus for MATH 667
Topics in Quantum Groups and Representation Theory
Spring 2018

1. ABOUT THE COURSE

This course will be an introduction to quantum groups, which are closely related to different branches in mathematics and mathematical physics.

Major topics to be covered:

- Coalgebras, bialgebras, Hopf algebras, modules and comodules
- Quantum plane, quantum $SL_q(2)$, quantum $U_q(\mathfrak{sl}_2)$
- The quantized enveloping algebra $U_q(\mathfrak{g})$ and its representations
- Center of $U_q(\mathfrak{g})$ and non-degenerate pairing
- Universal R -matrix and Drinfeld's double
- Tensor categories
- Braid group actions and PBW type bases
- Crystal bases

2. LECTURES

Location: LOM 202

Time: MW 1:00–2:30pm

Instructor's name: Sasha Tsymbaliuk

Email: oleksandr.tsymbaliuk@yale.edu

Office: LOM 219-C

Office hours: W 9:00–10:00am

3. HOMEWORK

A basic weekly homework will be due every Wednesday. In addition, extra homework with more interesting problems (designed to cover some of the topics which we don't have time to discuss in the class) will be assigned occasionally. There will be no exams in this course.