

**“Carbohydrate Chemistry and Biochemistry”**

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**Description**

This course offers advanced undergraduate and graduate students the opportunity to learn about carbohydrate structure, characterization, synthesis, biosynthesis and biochemical function. The course will use a textbook (see below), readings from the literature, and lecture material. Problem sets will be regularly assigned to facilitate learning of the material. The minimal prerequisite for this course is organic chemistry (including some spectroscopy). Coursework in biochemistry would be helpful, but will not be required, since lecture material will bring students up to speed on essential aspects of biomolecular structure and enzyme function.

**Key topics:**

Saccharide structures and fundamental chemistry

Analytical carbohydrate chemistry; classical and instrumental methods

Protecting group chemistry and functional group interchanges

Mechanistic chemistry of the anomeric carbon

Glycoside syntheses, with emphasis on stereocontrol

Saccharides as key starting materials for total synthesis

Biosynthesis of saccharides: aldolases, transketolases, glycosyltransferases

Glycolysis, the universal energy pathway

Survey of glycoconjugate structure and biosynthesis (e.g. glycoproteins)

Glycobiology- “how carbohydrate recognition drives biological function”

**Textbook**

“Essentials of Carbohydrate Chemistry and Biochemistry” 3<sup>rd</sup> edition, by TK Lindhorst, Wiley.

**Expectations**

Students are expected to complete all homework assignments and you should anticipate being called on in class to participate in discussion and problem solving; group work will be part of our learning environment. Periodic reading assignments from reserve materials or the literature will be made; come to class prepared to discuss the material (or ask questions about it!)

**Course Grading**

The course will have three exams worth 25% of the course grade each, for a total of 75%. The final project, an oral presentation, will be worth 15% of the course grade. The final 10% of the course grade will be based on performance on homework problems and class participation.

**Office Hours:**

TBA