# OC303 Aug. 3:0

# Carbohydrate Chemistry

## Instructor

N. Jayaraman
Email: jayaraman@iisc.ac.in

## Teaching Assistant

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Email: --

**Department: Department of Organic Chemistry**

Course Time: Mon., Wed., Fri. 11:00 AM - 12: Noon

Lecture venue: Lecture Room, Department of Organic Chemistry

Detailed Course Page: www.orgchem.iisc.ac.in/courses-offered-by-the-department/

## Announcements

## Brief description of the course

This is an advanced level course, focusing on the chemistry of carbohydrates, their structures, conformations and reactivities. Varied aspects of carbohydrates, their biological roles and chemistry are given as a course, covering lectures for about 43 h.  Carbohydrates and chiral synthons in organic synthesis, carbohydrates and their derivatives as drugs and more covered in detail.

## Prerequisites

Pre-requisites: Regular PhD students; Int PhD students: Completion of CD213 and CD223 courses; UG students: Completion of UC205, CD213 and CD223

## Syllabus

Structures and conformational itineraries of monosaccharides; Reactions of monosaccharides: reactivity profiles at each carbon center; ring expansions and contractions; reactions at anomeric carbon and epimeric carbons; deoxy sugars; anhydrosugars; protecting group methods; chemical and enzymatic glycosylations to oligosaccharides; glycosidic bond stabilities; naturally-occurring oligo- and polysaccharides and their conformations; chiral auxiliaries and modifications of sugars to carbocycles and heterocycles; aspects of

animal and plant polysaccharides, glycoproteins, proteoglycans and glycosaminoglycans; selected natural product synthesis originating from a sugar scaffold.

## Course outcomes

By gong through the course, the student will gain an understanding of immense chemistry constituting carbohydrates. Chemistry of carbohydrates is not taught in most of academic environments in the country at large, even when carbohydrates are ever pervasive in all walks chemistry, materials development and biologically driven technological advancements. The course aims to provide a sound understanding of the fundamentals of the chemistry of carbohydrates, that will enable the student to carry forward.

## Grading policy

The course will involve assignments, mid-term and final examinations, overall performance from these exercises will be used to grade the performance of the student.

## Assignments

Assignments will be chosen concurrently with the course.

## Resources

1. Monosaccharides: Their chemistry and their roles in natural products, P. Collins and R. Ferrier, John Wiley & Sons Ltd., Chichester, 1998
2. Carbohydrates: The essential molecules of life, R. V. Stick, S. J. Williams, Elsevier, Oxford, 2001
3. Organic synthesis with carbohydrates, G.-J. Boons, K. J. Hale, Blackwell Science, Inc., Malden, 2000
4. Chosen primary research publications