

University of Illinois  
Department of Mathematics  
273 Altgeld Hall  
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## COURSE DESCRIPTION

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Spring 2021

MATH 595

LOCAL COHOMOLOGY

Prof. S. P. Dutta  
9:30-10:50 Tu-Th

This course will be a study of Local Cohomology, introduced by Grothendieck, with various applications. The main topics will include: Cohen-Macaulay Rings and Modules, Injective Modules over Noetherian rings, Gorenstein rings, local Cohomology -- connection with dimension and depth, local duality theorem of Grothendieck, Cohomology of quasi-coherent and coherent sheaves, Serre's Theorem on coherent sheaves on projective spaces, classification of Line-bundles on  $P^n$ , Hartshorne - Lichtenbaum Theorem and Faltings Connectedness Theorem.

Prerequisite: Math 502

Recommended Text: 1. Local Cohomology by R. Hartshorne; 2. Local Cohomology by Brodmann and Sharp, Cambridge University Press.