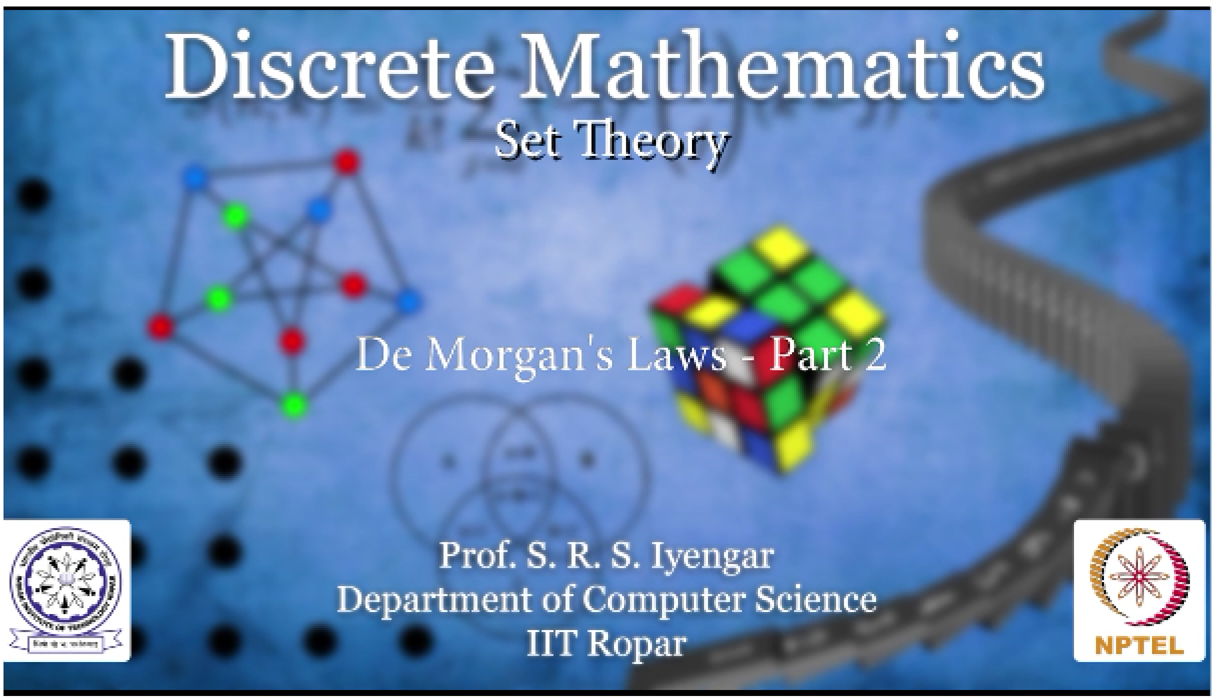
NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Set Theory

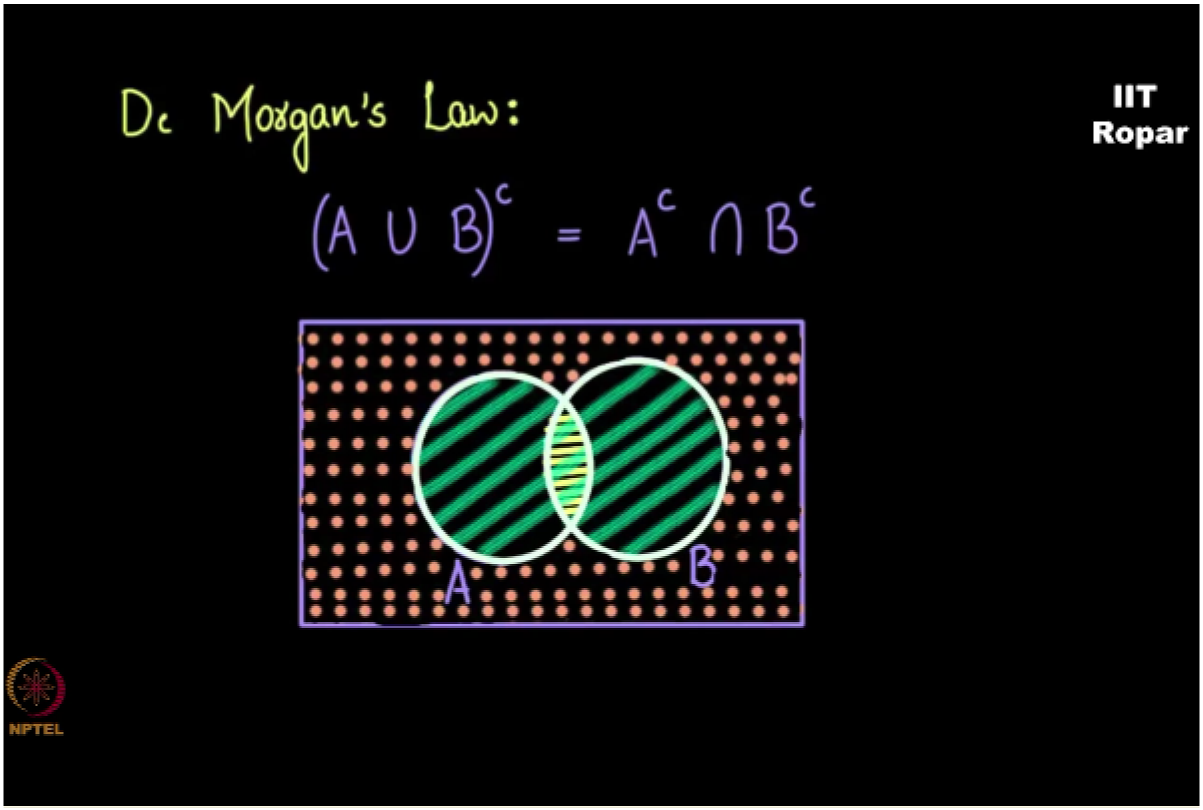
De Morgan’s Laws – Part 2

With
Prof. S.R.S. Iyengar
Department of Computer Science
IIT Ropar



De Morgan's law states that whenever you take two sets A and B and its union, if you take its complement that'll always be equal to A complement intersection B complement.

So I'm going to give you 2 proofs for this, Venn diagram proof is pretty straightforward what you do is you write down A, you write down B, A and B are always going to be like this intersection might have some elements it may not have any elements but still we'll write that down, so what is A union B? A union B is the entire thing, its complement will be what is outside the two ovals. So now A union B complement is basically all the dots outside the circle, now is that equal to A complement intersection B complement, now isn't that obvious all the dots outside this circle will also include some elements of A, okay, and then I take all the dots outside the circle A, and all the dots outside the circle B and it's intersection, what will that be? Any dot that is outside A as well as outside B are the dots precisely here, so combinatorially you see that this result is actually true, but let's prove it very rigorously.



IIT MADRAS PRODUCTION

Founded by
Department of Higher Education
Ministry of Human Resource Development
Government of India

www.nptel.iitm.ac.in

IIT MADRAS PRODUCTION

Founded by
Department of Higher Education
Ministry of Human Resource Development
Government of India

www.nptel.iitm.ac.in