NPTEL
NPTEL ONLINE COURSE
Discrete Mathematics
Logic
Converse, Inverse and Contrapositive
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We saw what is double implication right. It has two parts; P implies Q and Q implies P. Now given P implies Q, Q implies P is called the converse of P implies Q. Let me illustrate this with an example. If P stands for it rained and Q stands for the weather is good, P implies Q means when it rains the weather becomes good. And the converse of this is when the weather is good it implies that it has rained. You obviously see that these two are different right. We have seen this example already. So I'm just trying to tell you that there is a terminology used to describe this; wherever P implies Q is given, Q implies P stands for the converse of P implies Q. Generally we use this name in the proofs of theorems involving double implications. You will see that very soon in the forthcoming talks. Now if we are given P implies Q, a compound statement then not P implies not Q is called the inverse of P implies Q. More interesting is the combination of these two. By that I mean not Q implies not P this is called contraposition statement of P implies Q. What is interesting about this? Let us try writing the truthtable of not Q implies not P. See the entries. As you observe the truthtable of this matches with the truthtable of P implies Q. We will soon see what exactly this means and what is its importance. For the time being just get familiar with these names namely converse, inverse and contraposition.

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