

Course	Thing	Explanation	Date	Important	Index
CS1231S	De Morgan	$\sim(p \wedge q) = \sim p \vee \sim q$	15/08/2021	Important	14
CS1231S	Implication law	$P \rightarrow Q = \sim P \vee Q$	15/08/2021	Important	16
CS1231S	Negation	$p \wedge \sim p;$ $p \vee \sim p;$	15/08/2021	Important	22
CS1231S	Absorption	$p \vee (p \wedge q) = p \wedge (p \vee q) = p$	15/08/2021	Important	25
CS1231S	Elimination	$p \vee q$ so $\sim q \rightarrow p$	19/08/2021	Important	53
CS1231S	Critical row	In a truth table, critical rows have all T for the premises (or those involved in the hypothesis)	19/08/2021	Important	56
CS1231S	Universal Conditional Statement	For all x, $P(x) \rightarrow Q(x)$	20/08/2021	Important	69
CS1231S	$\exists!$	There exists only one	20/08/2021	Important	70
CS1231S	Disprove logical equivalence	Just find one contradiction case, so that $T \rightarrow F$	25/08/2021	Important	83
CS1231S	Critical row	Can be used to prove validity; left side of arrow is true; valid means right side true, invalid means right side false	25/08/2021	Important	84
CS1231S	Universal Modus Ponens	If $p \rightarrow q$ for all, then $p \rightarrow q$ for any	26/08/2021	Important	88
CS1231S	Universal Instantiation	For all x, then any x	26/08/2021	Important	89
CS1231S	Universal Generalisation	If true for arbitrary, then true for all	26/08/2021	Important	90
CS1231S	Set difference law	$A \setminus B = A \cap \bar{B}$	06/09/2021	Important	160
CS1231S	Roster notation vs Set builder notation	Roster notation: $\{1,2,3\};$ Set builder notation: $\{x \in \mathbb{R}   x > 0\}$	06/09/2021	Important	161
CS1231S	$P(\varnothing) = \{\varnothing\}$	Power set of an empty set is just the set containing the empty set	08/09/2021	Important	174
CS1231S	$x R y$	A relation from A to B is a subset of $A \times B$ ; Relations are symmetric (reversible), reflexive (with itself), transitive (chain)	09/09/2021	Important	176
CS1231S	Division Theorem	$\forall n \in \mathbb{Z}$ and $d \in \mathbb{Z}^+, \exists q, r \in \mathbb{Z}$ such that $n = dq + r, 0 \leq r < d$	13/09/2021	Important	185
CS1231S	Definition of partition	Partitions are sets of sets that contain no common elements; $\forall x \in A \exists! S \in \mathcal{C} (x \in S).$	15/09/2021	Important	192
CS1231S	Definition of quotient ( $A/\sim$ )	$A/\sim = \{[x]_{\sim} : x \in A\};$ Quotients are the underlying set, when partitioned based on an equivalence relation	16/09/2021	Important	194
CS1231S	Total order	All pairs x and y are connected by exactly 1 arrow	16/09/2021	Important	200
CS1231S	Well-ordering principle	Every nonempty subset has a smallest element	30/09/2021	Important	214
CS1231S	Theorem 5.3.13 (Inclusion-exclusion)	$ A \cup B  =  A  +  B  -  A \cap B $	05/10/2021	Important	256
CS1231S	Definition 6.1.1 (Partition)	$\mathcal{C}$ is a set of which all elements are nonempty subsets of A, and every element of A is in exactly one element of $\mathcal{C}$ ; Elements of a partition are the components of the partition	05/10/2021	Important	257
CS1231S	Definition 6.1.5 (Relation)	Relation from A to B is a subset of $A \times B$	05/10/2021	Important	258
CS1231S	Definition 7.4.8 (Linearization)	Let A be a set and $\leq$ be a partial order on A; A linearization of $\leq$ is a total order $\leq^*$ on A such that $\forall x, y \in A (x \leq y \Rightarrow x \leq^* y)$	06/10/2021	Important	272
CS1231S	Definition 7.3.1 (Antisymmetry)	$x R y \wedge y R x \Rightarrow x = y$	07/10/2021	Important	273
CS1231S	Definition 7.3.1 (Partial Order)	R is reflexive, antisymmetric, transitive	07/10/2021	Important	274
CS1231S	Definition 7.3.1 (Total Order)	$x R y \vee y R x \quad \forall x, y$	07/10/2021	Important	275
CS1231S	Definition 5.2.1 (Power Set)	The set of all subsets whose size is $2^{ A }$	07/10/2021	Important	279
CS1231S	Theorem 5.3.5 (Identity Law)	$A \cup \varnothing = A;$ $A \cap U = A;$	07/10/2021	Important	284
CS1231S	Theorem 5.3.5 (Universal Bound Law)	$A \cup U = U;$ $A \cap \varnothing = \varnothing;$	07/10/2021	Important	285
CS1231S	Theorem 5.3.5 (Idempotent Law)	$A \cup A = A;$ $A \cap A = A;$	07/10/2021	Important	286
CS1231S	Theorem 5.3.5 (Double Complement Law)	$A \text{ double bar} = A$	07/10/2021	Important	287