Course	Thing	Explanation	Date	Important	Index
CS1231S	**Contradiction Method**	Definition ><MA (~p→false)→p MA> Proof ::Prove a statement is false > Find a case where predicate is true, but outcome is false	19/08/2021		69
CS1231S	**Partition (Equivalence)**	Definition > 𝒞 is a set of which all elements are nonempty subsets of A > Every element of A is in exactly one element of 𝒞 > Elements of a partition are the components of the partition > x ~𝒞 y ⟺ x is in the same component of 𝒞 as y Proof ::Show every x ∈ A is in at least one S ∈ 𝒞 > Let S ∈ 𝒞 > Prove x ∈ S > x ∈ S ∈ 𝒞 ::Show every x ∈ A is in at most one S ∈ 𝒞 > Let x ∈ S_1 and x ∈ S_2 > Prove $S_1 \subseteq S_2$ > Prove $S_2 \subseteq S_1$ > $S_1 = S_2$	10/09/2021		190
CS1231S	**Equivalence Relation**	Definition > The same-component /Relation with respect to a partition is an equivalence relation > Reflexive, symmetric, transitive Proof ::Show that a relation is an equivalence relation > Prove reflexive, symmetric, transitive	16/09/2021		202
CS1231S	**Antisymmetric Relation**	Definition > For x and y, there can be either 1 arrow or 0 arrows Proof ::Show antisymmetric > $x_1 R x_2 \wedge x_2 R x_1 \Longrightarrow x_1 = x_2$	16/09/2021		206
CS1231S	**Invertible (Function)**	Definition > Let f : A → B. Then $\boldsymbol{g}$: B → A is an inverse of f > ∀x ∈ A ∀y ∈ B ⟹ y = f(x) ⟺ x = $\boldsymbol{g}$(y) Proof ::Prove function is invertible > Prove /Bijective	13/10/2021	Important	307
CS1231S	**Surjective**	Definition ><MA ∀y ∈ B ∃x ∈ A (y = f(x)) MA> > Nobody in B is alone Proof ::Prove function is surjective > Prove ∀y ∈ B → ∃x ∈ A	13/10/2021	Important	308
CS1231S	**Injective**	Definition ><MA $\forall x_1, x_2 \in A\ (f(x_1) = f(x_2) \Rightarrow x_1 = x_2)$ MA> > Nobody in B is F-boy Proof ::Prove function is injective > Prove $f(x_1) = f(x_2) \Longrightarrow x_1 = x_2$	13/10/2021	Important	309
CS1231S	**Bijective**	Definition > ∀y ∈ B ∃!x ∈ A (y = f(x)) > Everyone in B has one partner Proof ::Prove function is bijective > Prove /Surjective and /Injective	13/10/2021	Important	310
CS1231S	**Function Equality**	Definition > f = $\boldsymbol{g}$ iff domains and codomains are the same and f(x) = $\boldsymbol{g}$(x) Proof ::Prove functions are equal > Prove domain, range and values of f and $\boldsymbol{g}$ are the same	13/10/2021	Important	311
CS1231S	**Cardinality**	Topics ?> Pigeonhole_Principle ?> Bijection ?> Countably_Infinite ?> Subsets Of_Infinite_Sets ?> Uncountable_₱ Proof ::Prove countability of A and B if A ⊆ B > B countable ⟹ A countable > A uncountable ⟹ B uncountable	13/10/2021		316
CS1231S	**Bijection**	Definition > A → B is bijective ⟺ |A| = |B| Proof ::Prove a mapping is a bijection > Prove the mapping function is well defined, injective, surjective	14/10/2021		319
CS1231S	**Uncountable ₱**	Definition > A countable infinite ⟹ ₱(A) uncountable (use the ℝ proof of uncountability)	15/10/2021	Important	334
CS1231S	**Cardinality Of Tuples**	Definition > Countable infinite × countable infinite = countable infinite Proof ::Prove the set of ℚ is countable > Convert into 2D coordinate system, and enumerate using $\mathbb{Z}_{\geq 0}$	15/10/2021		335
CS1231S	**Well Defined (Function)**	Proof ::Prove that a function is well defined > Some outputs are out of range, or some inputs don't have exactly one output	20/10/2021		353
CS1231S	**Subset**	Proof ::Prove A is a subset of B > ∀x ∈ A (x ∈ B) ⟹ A ⊆ B	20/10/2021		354
CS1231S	**Pre Order Traversal**	Process > Get Root, then Left, then Right	19/11/2021		438
CS1231S	**In Order Traversal**	Process > Get Left, then Root, then Right	19/11/2021		439
CS1231S	**Post Order Traversal**	Process > Get Left, then Right, then Root	19/11/2021		440

Course	Thing	Explanation	Date	Important	Index
CS1231S	**Minimum Spanning Tree**	Definition > Least number of edges to cover all vertices Process ?> Kruskal_Algorithm ?> Prim_Algorithm	21/11/2021		442
CS1231S	**Kruskal Algorithm**	Process > Choose the lightest edge from current point > If edge doesn't end up in circuit, add the edge	21/11/2021	Important	443
CS1231S	**Prim Algorithm**	Process > Choose the lightest edge from any point in the current tree	21/11/2021	Important	444