Days	Name	Durations	Category	Main Category
1	Introduction to National Center of Biotechnology Information (NCBI)	18:01	NCBI	Bioinformatics Databases
2	Sequence Analysis	17:59	NCBI	Bioinformatics Databases
3	Sequence Retrieval from NCBI	16:16	NCBI	Bioinformatics Databases
4	PubMed Central & ENTREZ	11:06	NCBI	Bioinformatics Databases
6	FASTA (Sequence Format)	6:13	Sequence Format	Bioinformatics File Formats
7	GenBank: Nucleotide Database on NCBI	6:50	NCBI	Bioinformatics Databases
8	GenBank (Sequence Annotation Format)	7:08	Sequence Format	Bioinformatics File Formats
9	FASTA vs. GenBank	18:26	NCBI	Bioinformatics Databases
10	Gene Database: A Comprehensive Gene Database	30:21:00	NCBI	Bioinformatics Databases
11	NCBI Genomes & NCBI Assembly: Retrieval of Genomes	36:14:00	NCBI	Bioinformatics Databases
12	FASTQ Format	18:01	Sequence Format	Bioinformatics File Formats
13	Gene File Format/Gene Transfer Format	11:06	Sequence Format	Bioinformatics File Formats
14	BED (Gene Structure Format)	4:26	Sequence Format	Bioinformatics File Formats
15	SAM	9:06	Sequence Format	Bioinformatics File Formats
16	BAM	9:06	Sequence Format	Bioinformatics File Formats
17	RefSeq Database: Retrieval of Single Reference Sequences	11:15	NCBI	Bioinformatics Databases
18	BLAST Database Searching	25:36:00	NCBI	Bioinformatics Databases
19	Introduction to Molecular Modeling Database (MMDB)	8:06	NCBI	Bioinformatics Databases
20	Database of Short Genetic Variations (dbSNP)	12:16	NCBI	Bioinformatics Databases
21	HomoloGene: Discovery of Gene and Protein Families	6:10	NCBI	Bioinformatics Databases
22	Taxonomy	9:56	NCBI	Bioinformatics Databases
23	Introduction to UCSC Genome Browser & SARS-CoV-2 Viral Genome	13:40	UCSC	Bioinformatics Databases
24	Retrieve an Entire Genome & Retrieval of SARS-CoV-2 Viral Genome	9:40	UCSC	Bioinformatics Databases
25	Retrieval of Genomic Data & Annotation of SARS-CoV-2 Viral Genome	5:29	UCSC	Bioinformatics Databases
26	Table Browser & SARS-CoV-2 Viral Genome	12:15	UCSC	Bioinformatics Databases

27	Visualization of Genomic Data on the Genome Browser & SARS-CoV-2 Genome	10:51	UCSC	Bioinformatics Databases
28	Introduction to UniProt	9:56	UniProt	Protein Databases & Analysis
29	UniProtKB & Protein Analysis	39:29:00	UniProt	Protein Databases & Analysis
30	UniProteome & Retreieval of an Entire Proteome	13:05	UniProt	Protein Databases & Analysis
31	UniProt BLAST - Database Searching	12:32	UniProt	Bioinformatics Databases
32	ID Mapping & Making Analysis Easier	7:17	UniProt	Protein Databases & Analysis
33	UniProt Peptide Search - Find Regions Within UniProt Database	3:15	UniProt	Bioinformatics Databases
34	Introduction to Protein Data Bank (PDB)	6:44	PDB	Protein Databases & Analysis
35	Accurately Searching for a Protein Structure on PDB & Protein Analysis	13:55	PDB	Protein Databases & Analysis
36	Biological Annotation and Protein Features View & Analysis	8:18	PDB	Protein Databases & Analysis
37	Browsing PDB According to Annotation	6:52	PDB	Protein Databases & Analysis
38	Digging Out Categorized & Specific Protein Structures from PDB Archives	6:23	PDB	Protein Databases & Analysis
39	Alignment Between Two PDB Sequences & Structures	6:07	PDB	Protein Databases & Analysis
40	3D Structure Visualization on PDB	10:49	PDB	Protein Databases & Analysis
41	Mapping Genomic Position to Protein Sequence and 3D Structure	4:34	PDB	Protein Databases & Analysis
42	Genomic Discovery of Protein Structure Through Gene	4:07	PDB	Protein Databases & Analysis
43	PDB - Protein Symmetry	2:34	PDB	Protein Databases & Analysis
44	Introduction to ENSEMBL	7:49	ENSEMBL	Bioinformatics Databases
45	Retrieval of a Gene-Protein-Chromosomal Region	18:01	ENSEMBL	Bioinformatics Databases
46	Genome Assembly Retrieval and Analysis	10:23	ENSEMBL	Bioinformatics Databases
47	Gene Analysis & Annotation	34:40:00	ENSEMBL	Bioinformatics Databases
48	Variation Analysis	24:36:00	ENSEMBL	Bioinformatics Databases
49	ENSEMBL BLAST/BLAT	15:08	ENSEMBL	Bioinformatics Databases
50	Regulation - Understand the Influence of Regulatory Elements on Genes	4:18	ENSEMBL	Bioinformatics Databases
51	Comparative Genomics Analysis	5:34	ENSEMBL	Bioinformatics Databases

52	Introduction to InterPro	4:10	InterPro	Protein Databases & Analysis
53	InterPro - Protein Family Classifcation and Analysis	14:35	InterPro	Protein Databases & Analysis
54	InterPro - Protein & Protein Domain Analysis	9:29	InterPro	Protein Databases & Analysis
55	Introducton to Phytozome	9:38	Phytozome	Bioinformatics Databases
56	Interpret Plant Genome Records	9:06	Phytozome	Bioinformatics Databases
57	Download an Entire Plant Genome & Proteome	26:41:00	Phytozome	Bioinformatics Databases
58	Keyword or BLAST Search in a Plant Genome	15:58	Phytozome	Bioinformatics Databases
59	Visualize a Plant Genome Using JBrowse	17:38	Phytozome	Bioinformatics Databases
60	UniProt Align - Pairwise & Multiple Sequence Alignment and Annotation	3:47	UniProt	Bioinformatics Databases
61	EMBOSS NEEDLE: Global Alignment of Sequences	20:02	Pairwise Sequence Alignment & Analysis	Sequence Alignment & Analysis
62	EMBOSS Water	9:10	Pairwise Sequence Alignment & Analysis	Sequence Alignment & Analysis
63	Clustal Omega: Most Reliable Multiple Sequnce Alignment Tool	19:18	Multiple Sequence Alignment & Analysis	Sequence Alignment & Analysis
64	Clustal Omega Alignment Format	5:07	Alignment Format	Bioinformatics File Formats
65	Jalview	13:42	Multiple Sequence Alignment & Analysis	Sequence Alignment & Analysis
66	T-Coffee: Iterative Multiple Sequence Alignment Tool	8:37	Multiple Sequence Alignment & Analysis	Sequence Alignment & Analysis
67	MUSCLE: Accurate Multiple Sequence Alignment Tool	21:07	Multiple Sequence Alignment & Analysis	Sequence Alignment & Analysis
68	MEGA - Multiple Sequence Alignment	4:23	Multiple Sequence Alignment & Analysis	Sequence Alignment & Analysis
69	MEGA (Alignment Format)	5:32	Alignment Format	Bioinformatics File Formats
70	MAFFT - Fastest Multiple Sequence Alignment Tool	8:22	Multiple Sequence Alignment & Analysis	Sequence Alignment & Analysis
71	PHYLIP - Multiple Sequence Alignment Format	4:34	Alignment Format	Bioinformatics File Formats
72	Stockholm Alignment Format	3:10	Alignment Format	Bioinformatics File Formats
73	Aln2Plot	2:30	Sequence Analysis	Sequence Alignment & Analysis
74	MEGA	21:20	Phylogenetic Analysis	Phylogenetic Analysis

75	iTOL: Creating Publishable Phylogenetic Figures	13:42	Phylogenetic Tree Visualization & Analysis	Phylogenetic Analysis
76	FigTree	21:26	Phylogenetic Tree Visualization & Analysis	Phylogenetic Analysis
77	Quick2D	4:33	Secondary Structure Prediction	Secondary Structure Prediction
78	Ali2D	4:09	Secondary Structure Prediction	Secondary Structure Prediction
79	Jpred: Prediction Secondary Structure of the Proteins	4:54	Secondary Structure Prediction	Secondary Structure Prediction
80	HHrepID	5:15	Secondary Structure Prediction	Secondary Structure Prediction
81	DeepCoil	3:22	Secondary Structure Prediction	Secondary Structure Prediction
82	REPPER - Predict Gapless Repeats in Proteins	2:25	Secondary Structure Prediction	Secondary Structure Prediction
83	HMMER - Hidden Markov Model Based Protein Profiles Database	13:16	Protein Analysis	Protein Databases & Analysis
84	SignalP: Prediction of Signal Peptides	7:57	Protein Analysis	Protein Databases & Analysis
85	TargetP: Prediction of Protein Localization	9:21	Protein Analysis	Protein Databases & Analysis
86	Pfam - Understand the Relation of a Protein to its Family and Clan	15:55	Protein Family Database	Protein Databases & Analysis
87	PROSITE - A Database of Protein Domian, Families and Functional Sites	13:46	Protein Family Database	Protein Databases & Analysis
88	ScanProsite - Scanning Protein for Important Protein Sites Against PROSITE Database	7:36	Motif & Domain Analysis	Protein Databases & Analysis
89	Marcoil - Predict Coiled Coil Domains in Proteins	4:05	Motif & Domain Analysis	Protein Databases & Analysis
90	SMART	6:44	Motif & Domain Analysis	Protein Databases & Analysis
91	PDB - Ligands	5:23	PDB	Protein Databases & Analysis
92	MODELLER: Most Commonly Used Homology Modelling	36:13:00	3D Structure Prediction	3D Structure Prediction
93	SwissModel: Homology Modeling Through Web-server	12:52	3D Structure Prediction	3D Structure Prediction
94	HHPred	14:09	3D Structure Prediction	3D Structure Prediction
95	M4T	9:26	3D Structure Prediction	3D Structure Prediction
96	IntFold	8:41	3D Structure Prediction	3D Structure Prediction
97	ROBETTA: ab initio Protein Structure Prediciton	14:39	3D Structure Prediction	3D Structure Prediction

98	Homology Modeling Using MOE	12:34	3D Structure Prediction	3D Structure Prediction
99	UCSF CHIMERA	25:23:00	3D Structure Visualization	3D Structure Visualization
100	PyMol	40:48:00	3D Structure Visualization	3D Structure Visualization
101	WhatCheck	8:40	3D Structure Evaluation	3D Structure Evaluation
102	ProCheck	12:40	3D Structure Evaluation	3D Structure Evaluation
103	ERRAT	6:44	3D Structure Evaluation	3D Structure Evaluation
104	Verify3D	8:31	3D Structure Evaluation	3D Structure Evaluation
105	RAMPAGE	3:29	3D Structure Evaluation	3D Structure Evaluation
106	SAVES	5:31	3D Structure Evaluation	3D Structure Evaluation
107	PROSA	10:05	3D Structure Evaluation	3D Structure Evaluation
108	MOE: Protein Ligand Docking	9:23	Molecular Docking	Molecular Docking
109	MOE: Protein Protein Docking	11:38	Molecular Docking	Molecular Docking
110	SwissDock Protein Ligand Docking	19:16	Molecular Docking	Molecular Docking
111	Autodock Vina Protein Ligand Docking	Not Yet Available	Molecular Docking	Molecular Docking
112	MOE: Structure Based Drug Desinging	16:19	Molecular Docking	Molecular Docking
113	MOE: Docking Library of Compounds	19:48	Molecular Docking	Molecular Docking
114	ClusPro Protein Protein Docking	21:44	Molecular Docking	Molecular Docking
115	Patchdock Protein Protein Docking	17:39	Molecular Docking	Molecular Docking
116	PEPFOLD 3 Peptide Structure Prediction	13:14	Molecular Docking	Molecular Docking
117	Zdock Protein Protein/Ligand docking	19:35	Molecular Docking	Molecular Docking
118	MDockPEP Protein Peptide Docking	10:06	Molecular Docking	Molecular Docking
119	Discovery Studio+	12:03	Molecular Docking	Molecular Docking
120	PDBsum Docking Complex Evaluation	18:49	Docking Complex Evaluation	Docking Complex Evaluation
121	Pdbepisa Docking Complex Evaluation	23:27	Docking Complex Evaluation	Docking Complex Evaluation
122	SwissADME	15:31	Docking Complex Evaluation	Docking Complex Evaluation
123	GeneMark: Gene Prediction from Eukaryotic Genomes	16:51	Gene Prediction	Gene Prediction
124	Prodigal: Gene Prediction from Microbial Genomes	25:46:00	Gene Prediction	Gene Prediction
125	GenScan - Prediction of Genes from Green Monkey and Finding a Novel Gene	10:40	Gene Prediction	Gene Prediction
126	AUGUSTUS - Prediction of Novel Genes in Star Fish or Any Genome	17:27	Gene Prediction	Gene Prediction

127	UniRef And Retrieve Protein Clusters	11:35	UniProt	Bioinformatics Databases
128	UniParc And Find the Non-Redundant Entries	4:38	UniProt	Bioinformatics Databases
129	Genome Reference Consortium (GRC)	7:48	NCBI	Bioinformatics Databases
130	BioProject	6:39	NCBI	Bioinformatics Databases
131	BioSystems	4:16	NCBI	Bioinformatics Databases
132	BioSample	2:56	NCBI	Bioinformatics Databases
133	Sequence Read Archive (SRA)	7:14	NCBI	Bioinformatics Databases
134	Introduction to Gene Expression Omnibus Database	9:15	NCBI	Bioinformatics Databases
135	Gene Expression Omnibus - Platforms	5:42	NCBI	Bioinformatics Databases
136	Gene Expression Omnibus - Samples	4:15	NCBI	Bioinformatics Databases
137	Gene Expression Omnibus - Series	4:00	NCBI	Bioinformatics Databases
138	Gene Expression Omnibus - Datasets	4:44	NCBI	Bioinformatics Databases
139	STRING: Comprehensive Protein-Protein Interaction Database	13:16	PPI Database	PPI Database
140	Gene Structure Display Server 2.0	8:35	Genomics Tools	Genomics Tools
141	Getting Started With Molecular Dyanmics Simulation - Pre-processing of Protein Structure and Removal of Unncessary Structural Features	12:33	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
142	pdb2gmx - Construction of Topology File for Simulation	9:00	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
143	Defining a Solvant Box for Simulation	4:14	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
144	Solvation - Adding Water Molecules in Solvant Box	5:30	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
145	Generating Input Run File Replacement of Water Molecues With Ions	6:55	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
146	genion - Replacement of Water Molecules With Ions	4:18	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
147	Energy Minimization - Relaxing and Fixing the Structure for Simulation	11:25	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
148	GRACE - Visualization and Analysis of Minimized Structure	4:11	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
149	Equibiliration of Protein Structure NVT ENSEMBLE Phase 1	8:37	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation

150	Equibiliration of Protein Structure NPT ENSEMBLE Phase 2	8:09	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
151	mdrun - Executing Simulation Analysis	3:46	Molecular Dynamics Simulations: GROMACS	Molecular Dynamics Simulation
152	Virulence Factor Database		Vaccine Development	Drug Designing & Discovery
153	Database of Essential Genes		Vaccine Development	Drug Designing & Discovery
154	Drug Databank		Vaccine Development	Drug Designing & Discovery
155	Sortaller		Vaccine Development	Drug Designing & Discovery
156	Algpred		Vaccine Development	Drug Designing & Discovery
157	Allertop		Vaccine Development	Drug Designing & Discovery
158	Vaxijen		Vaccine Development	Drug Designing & Discovery
159	Antigenpro		Vaccine Development	Drug Designing & Discovery
160	CD-HIT		Vaccine Development	Drug Designing & Discovery
161	Netctl1.2		Vaccine Development	Drug Designing & Discovery
162	MHC I		Vaccine Development	Drug Designing & Discovery
163	MHC II		Vaccine Development	Drug Designing & Discovery
164	Netmhc II		Vaccine Development	Drug Designing & Discovery
165	Galaxy Refine		Vaccine Development	Drug Designing & Discovery
166	Modrefiner		Vaccine Development	Drug Designing & Discovery
167	IEDB Conservancy		Vaccine Development	Drug Designing & Discovery
168	IEDB Immunogenicity		Vaccine Development	Drug Designing & Discovery
169	Toxinpred		Vaccine Development	Drug Designing & Discovery
170	Elliprosuite		Vaccine Development	Drug Designing & Discovery
171	Doscotope2.0		Vaccine Development	Drug Designing & Discovery
172	BCpreds		Vaccine Development	Drug Designing & Discovery
173	Bepipred		Vaccine Development	Drug Designing & Discovery
174	ABCpred		Vaccine Development	Drug Designing & Discovery
175	Cofactor		Vaccine Development	Drug Designing & Discovery
176	Castp		Vaccine Development	Drug Designing & Discovery
177	C-Immsim		Vaccine Development	Drug Designing & Discovery
178	Jcat		Vaccine Development	Drug Designing & Discovery
179	IFNepitope		Vaccine Development	Drug Designing & Discovery

180	Maestro		Vaccine Development	Drug Designing & Discovery
181	SnapGene		Vaccine Development	Drug Designing & Discovery
182	DNAstar		Vaccine Development	Drug Designing & Discovery
183	CLC Sequence Viewer		Vaccine Development	Drug Designing & Discovery
184	Why Python in Bioinformatics	9:16	Introduction	Python
185	Introduction to Python and it's Intallation	8:25	Introduction	Python
186	Comments	5:42	Introduction	Python
187	Basic Input and output	15:37	Introduction	Python
188	Mathematical Operations	7:20	Introduction	Python
189	Strings	21:51	Iterable Objects	Python
190	Dictionaries	10:57	Iterable Objects	Python
191	Lists	28:47:00	Iterable Objects	Python
192	Lists(pt 2) and Tuples	10:37:00	Iterable Objects	Python
193	Sets	7:35	Iterable Objects	Python
194	If-Else	9:19	Control Flow	Python
195	For Loop and calc of Mol. weight	10:56	Control Flow	Python
196	While Loop	9:37	Control Flow	Python
197	Reading Files	13:45	File Handling	Python
198	CSV	8:41	File Handling	Python
199	Writing Files	7:17	File Handling	Python
200	Consolidate(merge) multiple DNA and Protein Sequences into one FASTA file	9:24	File Handling	Python
201	OS	31:47:00	File Handling	Python
202	Function	26:41:00	Functions & Modules	Python
203	With	8:50	Functions & Modules	Python
204	Error Handling	15:31	Error Handling	Python
205	Introduction to BioPython & Installation	10:18	Introduction	BioPython
206	Bio.Seq Create a Seq Object	7:38	Sequence Analysis	BioPython
207	Bio.Seq Seq Object Behaves Like a String	9:54	Sequence Analysis	BioPython
208	Bio.Seq Central Dogma in Play Through Python	8:41	Sequence Analysis	BioPython
209	Bio.Seq Unkown & Mutable Sequences	6:53	Sequence Analysis	BioPython
210	Bio.Alphabet Understanding the Alphabets of Biology	7:37	Sequence Analysis	BioPython

211	Bio.Alphabet IUPAC and Types of Sequence Representations	10:34	Sequence Analysis	BioPython
212	Bio.Alphabet Concatenation of Multiple Seq Records Using Generic Alphabets	9:47	Sequence Analysis	BioPython
213	SeqRecord Creating Seq Records	12:27	Sequence Analysis	BioPython
214	SeqRecords & FASTA	4:35	Sequence Analysis	BioPython
215	SeqRecords & GenBank	3:28	Sequence Analysis	BioPython
216	SeqRecord Formatting Records	3:47	Sequence Analysis	BioPython
217	SeqRecord Comparison & Reading Multiple FASTA Files from Directory	5:47	Sequence Analysis	BioPython
218	SeqIO Reading a Sequence File	10:32	Sequence Data Parsing	BioPython
219	SeqIO Parsing a Sequence File	7:16	Sequence Data Parsing	BioPython
220	SeqIO Parsing a Compressed Sequence File & Creating a Dictionary of Sequences	6:10	Sequence Data Parsing	BioPython
221	SeqIO - Write Sequences and SeqRecords Into Files	11:42	Sequence Data Parsing	BioPython
222	SeqIO Extracting Annotations and Pattern-wise Sequence Data Extraction	10:35	Sequence Data Extraction	BioPython
223	AlignIO - Reading and Parsing a Multiple Sequence Alignment File	8:19	Alignment Parsing and Analysis	BioPython
224	AlignIO - Writing Alignments and Multiple Sequence Alignment Records	5:28	Alignment Parsing and Analysis	BioPython
225	AlignIO - Conversion of Alignment Formats	4:01	Alignment Parsing and Analysis	BioPython
226	AlignIO - Manipulating Alignments	2:57	Alignment Parsing and Analysis	BioPython
227	AlignIO - ClustalW Python Wrapper - Align Multiple Sequences	7:47	Alignment Parsing and Analysis	BioPython
228	AlignIO - Pairwise2 - Align Two Sequences	7:31	Alignment Parsing and Analysis	BioPython
229	AlignIO - Information Mapping of Alignments	2:33	Alignment Parsing and Analysis	BioPython
230	AlignIO - Format Alignments	3:55	Alignment Parsing and Analysis	BioPython
231	AlignIO - Slicing Alignments	6:05	Alignment Parsing and Analysis	BioPython
232	Bio.Blast - Querying NCBI BLAST Through Python	11:41	BLAST Database Searching	BioPython
233	Bio.Blast - Parsing BLAST Results	14:51	Parsing BLAST results	BioPython
234	Bio.Entrez - Accessing ENTREZ Using Python	9:32	Biological Data Retrieval	BioPython
235	Bio Entrez Use Esummary To Get Summary Of Your Accessions	8:59	Biological Data Retrieval	BioPython
236	Bio.Entrez - Use EFetch to Download Complete Records	13:56	Biological Data Retrieval	BioPython
237	Bio.Entrez - Use EGQuery to Do Global Quries for Search Counts	7:24	Biological Data Retrieval	BioPython

238	Bio.Entrez - Use Elink To Search For Database Links Of Records	3:41	Biological Data Retrieval	BioPython
239	Bio.Entrez - Use ESearch to Search the Entrez Databases	8:20	Biological Data Retrieval	BioPython
240	Bio.Entrez - Use Espell To Get Correct Spellings For Your Search Terms	5:21	Biological Data Retrieval	BioPython
241	Bio.Entrez - Download GenBank and Entrez Records	14:17	Biological Data Retrieval	BioPython
242	Bio.Entrez - Taxonomy Database Searching	7:05	Biological Data Retrieval	BioPython
243	Bio.Entrez - Download PubMed Articles	8:28	Biological Data Retrieval	BioPython
244	Bio.Entrez - Use EFetch to Download Complete Records	13:56	Biological Data Retrieval	BioPython
245	Bio.PDB - Reading a PDB (3D Structure) File	11:59	Parsing a PDB Structure file	BioPython
246	Bio.Phylo - Calculating Distance Matrix Between Sequences For Phylogenetic Analysis	4:18	Phylogenetic Analysis	BioPython
247	Bio.Phylo - Converting Phylogenetic Tree Data Formats	3:28	Phylogenetic Analysis	BioPython
248	Bio.Phylo - Printing Out Phylogenetic Tree In Ascii	2:17	Phylogenetic Analysis	BioPython
249	Bio.Phylo - Reading Phylogenetic Trees	6:28	Phylogenetic Analysis	BioPython
250	Bio.Phylo - Visualization And Manipulation Of Phylogenetic Trees	9:36	Phylogenetic Analysis	BioPython
251	Bio.Phylo - Writing Out Phylogenetic Data	4:04	Phylogenetic Analysis	BioPython
252	Bio.motifs - Creating a WebLogo of Motifs		Protein Sequence Analysis	BioPython
253	Bio.motifs - MEME Analysis		Protein Sequence Analysis	BioPython
254	Introduction to R in Bioinformatics & R Installation	9:47	Introduction	R
255	The R User Interface	6:23	Introduction	R
256	Comments	4:16	Introduction	R
257	Variable Declaration and Objects	5:24	Variables & Functions	R
258	Built-in Functions & ARGS	4:31	Variables & Functions	R
259	Sample & Replacement	9:09	Variables & Functions	R
260	Write Your Own Functions And Arguments	5:39	Variables & Functions	R
261	Scripts	7:36	Variables & Functions	R
262	Packages	4:00	Packages	R
263	Install Packages	5:25	Packages	R
264	Library & Initialize Packages	2:27	Packages	R
265	Getting Help with Help Packages	3:42	Packages	R

266	Atomic Vectors	2:42	Vectors & Data Types	R
267	Doubles	3:30	Vectors & Data Types	R
268	Integers	3:23	Vectors & Data Types	R
269	Characters	4:43	Vectors & Data Types	R
270	Logicals	2:27	Vectors & Data Types	R
271	Attributes and Names	4:46	Vectors & Data Types	R
272	Dim & Dimensions	5:46	Vectors & Data Types	R
273	Matrix & Matrices	4:42	Vectors & Data Types	R
274	Arrays	3:42	Vectors & Data Types	R
275	Class	3:12	Vectors & Data Types	R
276	Factors	6:40	Vectors & Data Types	R
277	Coercion	4:27	Vectors & Data Types	R
278	Lists	6:41	Vectors & Data Types	R
279	Data Frames	6:30	Biological Data Analysis	R
280	Loading Biological Data	7:55	Biological Data Analysis	R
281	Saving Biological Data	5:26	Biological Data Analysis	R
282	R Notation & Selecting Values from Biological Dataset	4:09	Biological Data Analysis	R
283	Positive Integers for subsetting Biological Dataset(DataFrame)	5:25	Biological Data Analysis	R
284	Negative Integers for subsetting Biological Dataset(DataFrame)	5:28	Biological Data Analysis	R
285	Zero Notation for subsetting Biological Datasets (DataFrames)	1:09	Biological Data Analysis	R
286	Blank Spaces For Biological Data Subsetting	3:20	Biological Data Analysis	R
287	Dollar Signs for Biological Dataset Subsetting	2:58	Biological Data Analysis	R
288	Modifying Values in Existing DataFrames/Datasets	7:06	Biological Data Analysis	R
289	NA Values in Biological Dataset	5:24	Biological Data Analysis	R
290	Figuring out NA Values in Biological Dataset	2:06	Biological Data Analysis	R
291	Logical Subsetting in Biological Datasets	9:45	Biological Data Analysis	R
292	If Else Statement	4:15	Control Flow	R
293	Comments	4:16	Introduction	R

294	For Loops & Biological Data Binding	16:30	Control Flow	R
295	While Loops & Reading Multiple Biological Datasetswhile Loops & Reading Multiple Biological Datasets	16:16	Control Flow	R
296	Introduction to ggplot2 for Biological Datasets	10:46	Data Visualization: ggplot2	R
297	ggplot2: Key components	8:25	Data Visualization: ggplot2	R
298	ggplot2: Human Mitochondrial Proteome & Aesthetics (Size, Shape, Color)	26:02:00	Data Visualization: ggplot2	R
299	ggplot2: Facetting of Human Genome	22:25	Data Visualization: ggplot2	R
300	ggplot2: Smooth Out the Biological Data	8:43	Data Visualization: ggplot2	R
301	ggplot2: Boxplots for Human Mitochondrial Proteome	7:55	Data Visualization: ggplot2	R
302	ggplot2 :Histograms for Human Mitochondrial Pattern Finding	6:02	Data Visualization: ggplot2	R
303	ggplot2: Frequency Plots for Human Mitochondrial Information Frequency Mining	6:12	Data Visualization: ggplot2	R
304	ggplot2: Bar Charts Human Mitochondrial Knowledge Mining	10:43	Data Visualization: ggplot2	R
305	ggplot2 - Scaling and Limiting Data Visualization	3:53	Data Visualization: ggplot2	R
306	ggplot2 - Changing Labels and Finalizing Visualization	8:41	Data Visualization: ggplot2	R
307	ggtree - Phylogenetic Tree Visualization	5:41	Data Visualization: ggplot2	R
308	ggplot2 - Saving the Visualizations in High Resolution	4:44	Data Visualization: ggplot2	R
309	Introduction to Linux for Bioinformatics	22:31	Getting Familiar With Linux	Linux
310	PWD - Print Working Directory	1:26	Getting Familiar With Linux	Linux
311	CD - Changing Directories	5:03	Getting Familiar With Linux	Linux
312	MKDIR - Making Directories	8:12	Getting Familiar With Linux	Linux
313	MV - Moving Files, Directories and Data	5:10	Getting Familiar With Linux	Linux
314	RM - Deleting Files and Directories	1:23	Getting Familiar With Linux	Linux
315	Which & Whereis - Find Programs You Installed	3:43	Getting Familiar With Linux	Linux
316	Find - Finding User Created Files	3:38	Getting Familiar With Linux	Linux
317	LS - Lisiting Files and Directories on Linux	6:45	Getting Familiar With Linux	Linux
318	Piping and Redirection of Data	3:34	Piping and Control Data Flow	Linux
319	Cat - Visualization and Inspection of Text Data	3:55	Pre-processing Biological Datasets	Linux
320	Head - Reading Specified Number of Lines from Top	3:49	Pre-processing Biological Datasets	Linux
321	Tail- Reading Specified Number of Lines from Bottom	2:22	Pre-processing Biological Datasets	Linux
322	Touch - Modifying File Statistics and Creating Files	7:03	Pre-processing Biological Datasets	Linux

323	Stat - Statistics of File & Directories	2:46	Pre-processing Biological Datasets	Linux
324	Wget - Retrieval of Genome Assemblies	6:48	Pre-processing Biological Datasets	Linux
325	Curl - Retrieval of Bioinformatics Files	2:25	Pre-processing Biological Datasets	Linux
326	Vim - Create and Edit Text Files	5:58	Pre-processing Biological Datasets	Linux
327	Diff - Find Sequence Differences in Files	2:34	Pre-processing Biological Datasets	Linux
328	GZIP - Compress and Archive Files Efficiently	6:05	Processing and Analysis of Biological Datasets	Linux
329	GUNZIP - Extract Compressed Content	2:14	Processing and Analysis of Biological Datasets	Linux
330	Tar - Create Archives of Genome Data	4:18	Processing and Analysis of Biological Datasets	Linux
331	Grep - Finding Uncharacterized Proteins in Human Genome	8:55	Processing and Analysis of Biological Datasets	Linux
332	Cut - Subsetting Required Textual Data from Text Files	5:48	Processing and Analysis of Biological Datasets	Linux
333	Sort - Sorting Data	4:22	Processing and Analysis of Biological Datasets	Linux
333	Uniq - Finding Unique Data Items	10:32	Processing and Analysis of Biological Datasets	Linux
334	WC - Statistcs of the Data Within File	2:45	Processing and Analysis of Biological Datasets	Linux
335	CP - Copying Files and Files Contents	3:43	Processing and Analysis of Biological Datasets	Linux
336	Column - Proper Visualiation of Delimited Datasets	4:38	Processing and Analysis of Biological Datasets	Linux
337	Introduction to BioConductor		BioConductor	R
338	Installing Packages from BioConductor		BioConductor	R
339	Retrieving Biological Sequence in R		Sequence Retrieval	R
340	Reading and Writing the FASTA File		Bioinformatics File Parsing and Writing	R
341	Getting the Detail of a Sequence Composition		Sequence Analysis	R
342	Pairwise Sequence Alignment		Sequence Alignment	R
343	Multiple Sequence Alignment		Sequence Alignment	R
345	Phylogenetic Analysis and Tree Plotting		Phylogenetics Analysis	R
346	Handling BLAST Results		Database Searching	R
347	Pattern Finding in a Sequence		Sequence Analysis	R
348	Performing ID Conversions		BioConductor	R

349	Handling Annotation Databases in R		BioConductor	R
350	Performing ID Conversions		BioConductor	R
351	The KEGG Annotation of Genes		Gene Enrichment Analysis	R
352	The GO Annotation of Genes		Gene Enrichment Analysis	R
353	The GO Enrichment of Genes		Gene Enrichment Analysis	R
354	The KEGG Enrichment of Genes		Gene Enrichment Analysis	R
355	BioConductor in the Cloud		BioConductor	R
356	Introduction to dplyr		Data Transformation with dplyr	R
357	Filter Rows with filter()		Data Transformation with dplyr	R
358	Select Columns with select()		Data Transformation with dplyr	R
359	Add New Variables with mutate()		Data Transformation with dplyr	R
360	Grouped Summaries with summerize()		Data Transformation with dplyr	R
361	Grouped Mutates (and Filters)		Data Transformation with dplyr	R
362	Introduction to tidyr		Tidy Data with tidyr	R
363	Data Tidying		Tidy Data with tidyr	R
364	Data Spreading & Gathering		Tidy Data with tidyr	R
365	Data Separating & Pull		Tidy Data with tidyr	R
366	Missing Values		Tidy Data with tidyr	R
367	Case Study with tidyr		Tidy Data with tidyr	R
368	Nontidy Data		Tidy Data with tidyr	R
369	Introduction to ArrayExpress - Getting Started With MicroArray Analysis	9:55	MicroArray Analysis: BioConductor	R
370	Introduction to BioConductor - Installating MicroArray Packages	5:05	MicroArray Analysis: BioConductor	R
371	Getting Started with R Studio Project for MicroArray Analysis	4:50	MicroArray Analysis: BioConductor	R

372	Downloading MicroArray Raw Data from ArrayExpress	4:19	MicroArray Analysis: BioConductor	R
373	Creating Raw Intensities MicroArray Data Structure and Log2 Transformation	14:40	MicroArray Analysis: BioConductor	R
374	Principle Component Analysis of Raw Expression Dataset	15:44	MicroArray Analysis: BioConductor	R
375	Box Plot Visualization of Raw Intesnity Data to Interpret the Median Intensities of the Samples		MicroArray Analysis: BioConductor	R
376	ArrayQualityMetrics - Automated Quality Control for Microarray Datasets		MicroArray Analysis: BioConductor	R
377	Annotating the Probe IDs with Gene Symbols and Names		MicroArray Analysis: BioConductor	R
378	Excluding Probe IDs with Multiple Mappings from the ExpressionSet		MicroArray Analysis: BioConductor	R
379	Filtering out the Genes that are Above Threshold		MicroArray Analysis: BioConductor	R
380	Heatmap Visualization of the Normalized Gene Expression Values	11:51	MicroArray Analysis: BioConductor	R
381	Intensity-based Filteration of Low-Intesnity Transcripts		MicroArray Analysis: BioConductor	R
382	Normalization of Raw Intesnities Values		MicroArray Analysis: BioConductor	R
383	Relative Log Expression Analysis and Visualization		MicroArray Analysis: BioConductor	R
384	Removal of the Probe IDs that Match to Multiple Genes		MicroArray Analysis: BioConductor	R
385	Robust Multi-Array Summarization and Background Correction of the Raw MicroArray Data		MicroArray Analysis: BioConductor	R
386	LIMMA - Data Preparation for Linear Modelling		MicroArray Analysis: BioConductor	R
387	Factors Prepartion		MicroArray Analysis: BioConductor	R
389	Analysis of Gene Expression Levels of a Single Gene Among Different Conditions		MicroArray Analysis: BioConductor	R

390	LIMMA - Applying Linear Model on a Single Gene Expression Data		MicroArray Analysis: BioConductor	R
391	Data Visualization of the Gene Expression of a Single Gene		MicroArray Analysis: BioConductor	R
392	Applying t-test to Find if Genes are Diffentially Expression		MicroArray Analysis: BioConductor	R
393	LIMMA - Applying Linear Model for Differential Gene Expression Analysis		MicroArray Analysis: BioConductor	R
394	Extraction of Differentially Expressed Genes from the Fitted Linear Model		MicroArray Analysis: BioConductor	R
395	Setting a Threshold for Differentially Expressed Genes		MicroArray Analysis: BioConductor	R
396	Volcano Plot - Visualization of the Genes that are Diffentially Expressed	8:36	MicroArray Analysis: BioConductor	R
397	Matching the DEGs with Background Genes to Find Overlap		MicroArray Analysis: BioConductor	R
398	topGO - Gene Enrichment & Ontology Analysis		MicroArray Analysis: BioConductor	R
400	topGO - KEGG & REACTOME Pathway Analysis		MicroArray Analysis: BioConductor	R