

CSI-SPARK Preparatory Workshop - Session Dates - AY2022-2023

Sessions run 2:15 to 3:15 pm (60 minutes) on Mondays

Date	Topics	Source Code File
10/3/2022	Session 01 - Python Fundamentals	
	variables, data types, print	age_converter.py
	for loops, range, functional Equation	gaussian_sum.py
10/17/2022	Session 02 - Arrays and Algorithms	
	numpy arrays, vectorized operations	basel_series.py
	random numbers	coprime_probability.py
10/24/2022	Session 03 - 2D Graphics	
	Plotting (matplotlib)	plot_parabola.py
	Polar Coordinates	plot_circle.py
11/7/2022	Session 04 - Computational Mathematics	
	Precision, Rate of Convergence	herons_method.py
	Mean, Natural Logarithm	random_straws.py
11/21/2022	Session 05 - Data Structures and Files	
	Lists & Tuples, CSV Files	ideal_gas_law.py
	Dictionaries, JSON Files	manage_fruits.py
12/5/2022	Session 06 - Strings and Histograms	
	Encodings, ASCII, UTF-8	reverse_string.py
	Reading Text Files	freq_histogram.py
12/19/2022	Session 07 - Probability and Statistics	
	Mean, Variance, Std Deviation	hero_abilities.py
	Moment of Distribution	uniform_variance.py
1/23/2023	Session 08 - Vectors and Matrices	
	2D Matrix Addition and Multiplication	matrix_algebra.py
	Solving Systems of Linear Equations	cramers_rule.py
	Affine Transformations	barnsley_fern.py

1/30/2023	Session 09 - Curve Fitting	
	Linear Regression	ohms_law.py
	Quadratic Regression	breaking_distance.py
	Spline Interpolation	cubic_splines.py
2/6/2023	Session 10 - 3D Graphics	
	3D Cartesian Coordinates	plot3d_monolith.py
	Oblique Projection, Vertices, Facets	plot3d_pyramid.py
	Spherical Coordinates	plot3d_sphere.py
	Volume of Revolution	plot3d_torus.py
2/27/2023	Session 11 - Symbolic Computing	
	Sympy, Algebraic Symbols	factor_quadratic.py
	Analytic Solutions	equation_solver.py
	Squeeze Theorem	find_limits.py
3/6/2023	Session 12 - Monte Carlo Methods	
	Fixed Grid vs. Random Sampling	mc_circle_prng.py
	Quasi-Random Numbers	mc_circle_qrng.py
	Pythagorean Theorem	mc_sphere_qrng.py
	Halton QRNG - Four Dimensions	mc_hypersphere.py
	High Dimensional Hyperspheres	mc_high_dimensions.py
3/20/2023	Session 13 - Pandas Data Science	
	Pandas Dataframes	sunspot_frequency.py
	Analyzing Data	auto_mpg.py
	Plotting Data	pulse_activity.py
4/3/2023	Session 14 - Waves and Animation	
	Sampling Theorem, Aliasing	nyquist_sampling.py
	Superposition, Standing Waves	travelling_waves.py
4/17/2023	Session 15 - Machine Learning	
	Outlier Identification	k_means.py
	Image Classification and Prediction	image_classification.py
5/1/2023	Session 16 - Computational Biology and Chemistry	
	Genotypes, Punnett Squares	mendelian_inheritance.py
	Balancing Ionic Equations	stoichiometry.py
5/15/2023	Session 17 - Computational Physics	
	Equation of Motion, Kinematics	projectile_motion.py
	Exponential Decay, Euler's Method	nuclear_decay.py