Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NHSD525	Psychological Data Science	3	0	0	3

Course Objective
To enable students develop theoretical and practical skills for behavioral data analysis
Learning Outcomes
Upon successful completion of this course, students will be able to: • Understanding of the replication crisis and some ways of addressing it. • Implement various data analysis using software • Critically examine psychological research using predictive and explanatory techniques

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	*Introduction* What is data science? Replication crisis. Issues of measurement of psychological data	6	Understand what data science is and its need especially in the context of psychological research. Understand how psychological data is different.
2	*Python Programming* Introduction to python for data science. Common Packages used for data science and scientific programming	6	Introduce Python for data science, covering common packages like NumPy, Pandas, Matplotlib, and SciPy for analysis and scientific programming
3	*Exploratory Data Analysis:* Data Visualization: Univariate and bivariate plotting EDA: Central tendency, dispersion, skewness, kurtosis	9	Develop proficiency in univariate and bivariate plotting for effective data visualization. Apply EDA measures, including central tendency, dispersion, skewness, and kurtosis, to analyze and interpret datasets accurately
4	Statistical Inference Approaches: Classical, Bayesian Model Evaluation methods: Log-likelihood ratio, Cross-validation, AIC	6	Understand Classical and Bayesian approaches in Statistical Inference. Learn model evaluation methods including Log-likelihood ratio, Cross-validation, and AIC for robust analysis techniques
5	*Linear Models* Normal Linear Models, Logistic Regression, Generalized Linear Models	9	Understand the Normal Linear Models for continuous outcomes, Logistic Regression for binary outcomes, and Generalized Linear Models for various outcome types in diverse research applications
6	Advanced Models Multilevel models: Random Effects, Mixed Effects Non-Linear Regression: Parametric, Polynomial	6	Implement multilevel models, encompassing random and mixed effects, and in non-linear regression, covering both parametric and polynomial models for advanced data analysis techniques
Total Lecture Hours		42	

Text books:

1. Andrews, M. (2021). *Doing Data Science in R*. SAGE
2. Cohen, M.X. (2023). *Modern Statistics: Intuition, Math, Python, R.* Sinc Xpress.

References:

1. Morling, B. (2021). *Research Methods in Psychology*. Norton
2. James, G., Witten, D., Hastie, T., Tibshirani, R., & Taylor, J. (2023). *An Introduction to Statistical Learning: with Applications in Python*. Springer