St. Xavier's College (Autonomous), Mumbai
Department of Information Technology

Programme: M.Sc. Big Data Analytics

Programme Specific Outcomes (PSOs) **for M.Sc. Big Data Analytics**

Sr. No.	On completing M.Sc. Big Data Analytics, the student will be able to:
PSO 1	Acquire analytical and problem-solving skills, in order to solve real-world problems.
PSO 2	Acquire the skill of developing predicting and clustering model.
PSO 3	Understanding the concepts of statistics in order to develop predicting model.
PSO 4	Acquire the skill of data extraction, data cleansing and data transformation.
PSO 5	Acquire the skill of database management system.
PSO 6	Acquire the skill of big data analytics.
PSO 7	Acquire the skill of optimization.
PSO 8	Acquire the skill of developing business model.
PSO 9	Develop the skill of logical reasoning.
PSO 10	Gain an aptitude for programming and troubleshooting independently.
PSO 11	Develop the knack of understanding and analysing code snippets that are already available on public platforms.

Course Outcomes (COs): M.Sc. Big Data Analytics

Semester I

Course Title: Statistical Method
Course Code: SITS0701

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Understand different types of data and measurement scales.	1, 3, 4, 9	U, Ap, An, E
CO 2	Acquire skills of data cleaning and treatment of missing data.	1, 3, 4, 9	U, Ap, An, E
CO 3	Acquire skills of data visualization.	1, 3, 4, 9	U, Ap, An, E
CO 4	Apply different statistical methods including regression, correlation, fitting of distribution.	1, 3, 4, 9	U, Ap, An, E
CO 5	Acquire the knowledge to conceptualise the type and extent of relationship between various attributes in qualitative data.	1, 3, 4, 9	U, Ap, An, E

Course Title: Probability and Stochastic Process
Course Code: SITS0702

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Acquire an understanding of a random experiment.	1, 2, 3, 8, 9	U, An, Ap, C
CO 2	Acquire the knowledge to conceptualise the probabilities of events.	1, 2, 3, 8, 9	U, An, Ap, C
CO 3	Apply the notion of conditional probability including the concept of Bayes' Theorem.	1, 2, 3, 8, 9	U, An, Ap, C
CO 4	Understand concepts of discrete and continuous random variables and their probability distributions including expectation and moments.	1, 2, 3, 8, 9	U, An, Ap, C
CO 5	Understand Markov chain and solve real-world problems using the concept.	1, 2, 3, 8, 9	U, An, Ap, C
CO 6	Understand components of time series and its applications using R software.	1, 2, 3, 8, 9	U, An, Ap, C

Course Title: Linear Algebra and Linear Programming
Course Code: SITS0703

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Use the basic tools of matrices to understand their linkage to the real-world problems.	1, 7, 9	U, Ap, An, E
CO 2	Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix, using rank.	1, 7, 9	U, Ap, An, E
CO 3	Find eigenvalues and corresponding eigenvectors for a square matrix.	1, 7, 9	U, Ap, An, E
CO 4	Use computational techniques and algebraic skills essential for the study of systems of Linear equations, matrix algebra, vector spaces, eigenvalues and eigenvectors.	1, 7, 9	U, Ap, An, E
CO 5	Understand the ideas underlying the simplex method for linear programming problems.	1, 7, 9	U, Ap, An, E

Course Title: Computing for Data Sciences using R, Python and Java
Course Code: SITS0704

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Understand the various data structures.	2, 3, 4	U, An, Ap, C
CO 2	Get versed with R.	2, 3, 4	U, An, Ap, C
CO 3	Understand the concept of data science.	2, 3, 4	U, An, Ap, C

Course Title: Database Management – Relational and Non-Relational
Course Code: SITS0705

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Understand the basic concepts of database management systems.	5, 4, 1	U, Ap, An
CO 2	Acquire the skill of using structured query language.	5, 4, 1	U, Ap, An
CO 3	Acquire the skill of using PL/SQL.	5, 4, 1	U, Ap, An

Course Title: Linear Algebra, Linear Programming and Statistics
Course Code: SITS07PR1

Sr. No.	On completing the course, the student will be able to:	PSOs addressed
CO 1	Apply theoretical concepts and solve problems; possess skills of R programming.	1, 2
CO 2	Acquire the skills of linear programming and data visualization using R.	3, 6

Course Title: Database Management Systems and Computing for Data Science
Course Code: SITS07PR2

Sr. No.	On completing the course, the student will be able to:	PSOs addressed
CO 1	Use Oracle and of MS SQL server.	4, 5
CO 2	Carry out Mongodb and of Python programming.	4, 5

Course Title: Python Programming
Course Code: SITS07PR3

Sr. No.	On completing the course, the student will be able to:	PSOs addressed
CO 1	Understand why Python is a useful scripting language for developers; design and program Python applications, and know how to use lists, tuples, and dictionaries in Python programs.	1, 9
CO 2	Identify Python object types, and how to use indexing and slicing to access data in Python.	10, 11

Semester II

Course Title: Foundations of Data Science
Course Code: SITS0801

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Understand graph theory and various shortest path algorithms.	1, 2, 3	U, An, Ap
CO 2	Understand the use of SVD in details.	1, 2, 3	U, An, Ap
CO 3	Understand and analyse high dimensional space.	1, 2, 3	U, An, Ap
CO 4	Understand the application of random walk.	1, 2, 3	U, An, Ap

Course Title: Advanced Statistical Methods
Course Code: SITS0802

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Understand the problem of statistical inference.	1, 3, 8, 9	U, An, Ap, C, E
CO 2	Understand the properties of point estimator such as consistency, unbiasedness and obtain minimum variance unbiased estimator.	1, 3, 8, 9	U, An, Ap, C, E
CO 3	Obtain estimator using maximum likelihood estimation methods.	1, 3, 8, 9	U, An, Ap, C, E
CO 4	Understand problem of testing of hypothesis.	1, 3, 8, 9	U, An, Ap, C, E
CO 5	Understand critical regions, test functions, two kinds of errors, level of significance and power function.	1, 3, 8, 9	U, An, Ap, C, E
CO 6	Understand the concepts and solve problems based on large sample tests and exact sample tests.	1, 3, 8, 9	U, An, Ap, C, E
CO 7	Understand the application of Gauss Markov Theorem, least square estimator concept and basic ANOVA technique.	1, 3, 8, 9	U, An, Ap, C, E
CO 8	Build multiple linear regression and logistic regression models.	1, 3, 8, 9	U, An, Ap, C, E
CO 9	Apply variable selection methods (forward, backward and stepwise regression).	1, 3, 8, 9	U, An, Ap, C, E

Course Title: Machine Learning – I
Course Code: SITS0803

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Understand how machine learning differs from traditional programming.	1, 2, 3, 4	U, An, Ap, C, E
CO 2	Understand the categories of machine learning.	1, 2, 3, 4	U, An, Ap, C, E
CO 3	Understand various algorithms used in machine learning.	1, 2, 3, 4	U, An, Ap, C, E
CO 4	Apply Python for machine learning.	1, 2, 3, 4	U, An, Ap, C, E

Course Title: Value Thinking
Course Code: SITS0804

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Develop critical thinking skills.	1, 9	R, U, An, C
CO 2	Learn to overcome biases and prejudices.	1, 9	R, U, An, C
CO 3	Understand subjectivities and perspectives.	1, 9	R, U, An, C
CO 4	Challenge incredulities and absolute grand narratives.	1, 9	R, U, An, C
CO 5	Be aware of socio-cultural and political contexts.	1, 9	R, U, An, C
CO 6	Deduce conclusions based on the factual evidence provided.	1, 9	R, U, An, C

Course Title: Enabling Technologies for Data Science – I
Course Code: SITS0805

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Understand the basic concepts of data warehousing.	1, 2, 3, 4	U, Ap, An, E, C
CO 2	Understand the basic concepts of data mining.	1, 2, 3, 4	U, Ap, An, E, C
CO 3	Develop predictive model using classification algorithms.	1, 2, 3, 4	U, Ap, An, E, C
CO 4	Acquire the skill of clustering using standard algorithms.	1, 2, 3, 4	U, Ap, An, E, C
CO 5	Understand the advance concept of data mining through spatial data mining.	1, 2, 3, 4	U, Ap, An, E, C
CO 6	Learn Python extensions for spatial data mining.	1, 2, 3, 4	U, Ap, An, E, C
CO 7	Understand the basic concepts of Cloud computing.	1, 2, 3, 4	U, Ap, An, E, C
CO 8	Understand the basic concepts of neural network.	1, 2, 3, 4	U, Ap, An, E, C
CO 9	Use Python programming language to see implementation of deep learning.	1, 2, 3, 4	U, Ap, An, E, C

Course Title: Operation Research
Course Code: SITS0806

Sr. No.	On completing the course, the student will be able to:	PSOs addressed	Cognitive levels
CO 1	Analyse and solve linear programming models of real-life situations.	1, 7, 9	U, Ap, An, E
CO 2	Find the relationships between the primal and dual problems and their solutions with applications.	1, 7, 9	U, Ap, An, E
CO 3	Understand and apply the concept of optimality criteria for various types of optimization problems.	1, 7, 9	U, Ap, An, E
CO 4	Solve various constrained and unconstrained nonlinear programming problems in single variable as well as multivariable.	1, 7, 9	U, Ap, An, E
CO 5	Understand the concept of queuing theory and see its applications in real-life problems.	1, 7, 9	U, Ap, An, E
CO 6	Understand and apply the concept of transportation and assignment problems to real life-situations, and solve problems with R.	1, 7, 9	U, Ap, An, E

Course Title: Foundations of Data Science and Advanced Statistical Methods
Course Code: SITS08PR1

Sr. No.	On completing the course, the student will be able to:	PSOs addressed
CO 1	Acquire R software skills for estimation, for fitting of multiple linear regression and logistic regression, and ANOVA technique.	1, 3
CO 2	Create data structure for graph problems; acquire Python programming skill.	8, 9

Course Title: Machine Learning – I and Enabling Technologies for Data Science – I
Course Code: SITS08PR2

Sr. No.	On completing the course, the student will be able to:	PSOs addressed
CO 1	Develop predictive model and clustering model.	1, 2
CO 2	Develop the skill of ML modelling.	3, 9