NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF <u>COMPUTER APPLICATIONS</u>

COURSE PLAN – PART I			
Name of the programme and specialization	Bachelor of Technology		
Course Title	Data Analytics		
Course Code	CAMI16	No. of Credits	3
Course Code of Pre-requisite subject(s)	-		
Session	July 2023	Section (if, applicable)	
Name of Faculty	Dr.S.Saroja	Department	Computer Applications
Email	saroja@nitt.edu	Telephone No.	8903482613
Name of PAC Chairman	Dr. Michael Arock		
E-mail	michael@nitt.edu	Telephone No.	9842378952
Course Type	Minor Course		

Syllabus (approved in BoS)

Introduction: Data Analytics – Data Collection – Integration – Management – Modelling – Analysis – Visualization – Prediction and Informed decision making. General Linear Regression Model, Estimation for BETA, Error Estimation, Residual Analysis.

Test of significance – ANOVA, 't' test, Forward, Backward, Sequential, Stepwise, and all possible subsets, Dummy Regression, Logistic Regression, and Multi-collinearity.

Discriminant Analysis –Two group problem, Variable contribution, Violation of assumptions, Discrete and Logistic Discrimination, The k-group problem, multiple groups, Interpretation of Multiple group Discriminant Analysis solutions.

Principal Component Analysis – Extracting Principal Components, Graphing of Principal Components, some sampling Distribution results, Component scores, large sample Inferences, Monitoring Quality with principal Components.

Factor Analysis – Orthogonal Factor Model, Communalities, Factor Solutions, and rotation.

Machine Learning - Supervised learning (rules, trees, forests, nearest neighbor, regression) – optimization (gradient descent and variants) – unsupervised learning

REFERENCES:

1. Richard A. Johnson and Dean W. Wichern, "Applied Multivariate Statistical Analysis", fifth edition, Pearson Education, 2002.
2. Hastie, Trevour, et al. "The element of statistical learning", Springer, 2009.
3. Montgomery, Douglas C., and George C. Runger, "Applied Statistics and probability for engineers", John Wiley & sons, 2010

COURSE OBJECTIVE(S)
To understand the data analytics approaches and apply them for decision making problems.

MAPPING OF COs with Pos

Course Outcomes	Programme Outcomes (PO)
1. Understand the basics of statistical modeling for data analytics	PO I, II, III
2. Understand the use of machine learning in data analytics.	PO I, II, IV
3. Solve real-world decision-making problems using various data analytics techniques	PO IV, V

COURSE PLAN – PART II

COURSE OVERVIEW
This course introduces concepts of data analytics, statistical techniques, and their practical applications using machine learning algorithms. It also equip the students with the necessary skills to work with data, draw insights, and apply analytical methods to solve real-world problems in diverse domains.

COURSE TEACHING AND LEARNING ACTIVITIES

S. No.	Week/ Contact Hours	Topic	Mode of Delivery
1	Week 1 (3 Classes)	Introduction to Data, Data Analytics, and steps involved	*Power point presentation Chalk and Talk*
2	Week 2 (3 Classes)	Basic Statistical Description of Data, General Linear Regression Model, Parameter Estimation, Residual Analysis	*Power point presentation Chalk and Talk*
3	Week 3 (3 Classes)	Test of Significance, ANOVA, 't' test	*Power point presentation Chalk and Talk*
4	Week 4 (3 Classes)	Linear Regression Analysis and Variants, Logistic Regression and Multi-Colinearity	*Power point presentation Chalk and Talk*
5	Week 5 (3 Classes)	Introduction to Data Analytic tool	*Power point presentation Chalk and Talk*

6	Week 6 (3 Classes)	Discriminant Analysis – Two Group Problem, Variable Contribution, Violation of Assumptions	*Power point presentation Chalk and Talk*
7	Week 7 (3 Classes)	Discrete and Logistic Discrimination, K-group Problem, Multiple Groups, Interpretation	*Power point presentation Chalk and Talk*
8	Week 8 (3 Classes)	Principal Component Analysis – Extracting Principal Components, Graphing of Principal Components	*Power point presentation Chalk and Talk*
9	Week 9 (3 Classes)	Sampling Distribution Results, Component Scores, Large Sample Inferences, Monitoring Quality with Principal Components	*Chalk and Talk*
10	Week 10 (3 Classes)	Factor Analysis	*Power point presentation Chalk and Talk*
11	Week 11 (3 Classes)	Supervised Learning (Rules, Nearest Neighbors)	*Power point presentation Chalk and Talk*
12	Week 12 (3 Classes)	Supervised Learning (Trees, Forests, Regression)	*Power point presentation Chalk and Talk*
13	Week 13 (3 Classes)	Optimization: Gradient Descent and Variants	*Power point presentation Chalk and Talk*
14	Week 14 (3 Classes)	Unsupervised Learning	*Power point presentation Chalk and Talk*

COURSE ASSESSMENT METHODS

S. No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	First Assessment	As per academic schedule	60 Minutes	20
2	Second Assessment	As per academic schedule	60 Minutes	20
3	Assignment	9th week	-	10
*	Compensation Assessment	-	60 Minutes	20
4	Final Assessment	As per academic schedule	180Minutes	50
Total Marks				100

COURSE EXIT SURVEY

1. Students' feedback through class committee meetings
2. Feedbacks are collected before final examination through MIS or any other standard format followed by the institute.
3. Students, through their Class Representatives, may give their feedback at any time to thecourse faculty which will be duly addressed.

COURSE POLICY (including compensation assessment to be specified)

MODE OF CORRESPONDENCE: By Email: saroja@nitt.edu / in-person : Lyceum Room No:110

COMPENSATION ASSESSMENT POLICY :
One compensation assessment will be conducted for absentees in assessments (other than final assessment) only after the submission of medical or On-Duty certificates signed by competent authority.

ATTENDANCE POLICY

➤ At least 75% attendance in each course is mandatory.
➤ A maximum of 10% shall be allowed under On Duty (OD) category.

ACADEMIC DISHONESTY & PLAGIARISM

➤ Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.

➤ Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.

➤ The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION - NIL

FOR APPROVAL

Course Faculty_____   **CC-Chairperson**_____   **HOD**_____