NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF PRODUCTION ENGINEERING

COURSE PLAN – PART I			
Name of the Programme and specialization	**M. Tech. & Industrial Engineering & Management**		
Course Title	**Data Analytics**		
Course Code	**PR651**	**No. of Credits**	**04**
Course Code of Pre-requisite subject(s)	**---**	**---**	**---**
Session	**July 2023**	**Section (if, applicable)**	**-**
Name of Faculty	**Dr.Vimal K E K**	**Department**	**Production Engineering**
Email	**vimal@nitt.edu**	**Telephone No.**	**+91 7708539715**
Name of Course Coordinator(s) (if, applicable)	**-**		
E-mail	**-**	**Telephone No.**	**-**
Course Type	☑ **Core course** ☐ **Elective course**		

Syllabus (approved in BoS)

PR651 Data Analytics

Introduction to Multivariate Statistics-Degree of Relationship among Variables-Review of Univariate and Bivariate Statistics-Screening Data Prior to Analysis-Missing Data, Outliers, Normality, Linearity, and Homoscedasticity.

Multiple Regression- Linear and Nonlinear techniques- Backward-Forward-Stepwise Hierarchical regression-Testing interactions (2way interaction) - Analysis of Variance and Covariance (ANOVA & ANCOVA) - Multivariate Analysis of Variance and Covariance (MANOVA & MANCOVA).

Logistic regression: Regression with binary dependent variable -Simple Discriminant Analysis-Multiple Discriminant analysis-Assessing classification accuracy- Conjoint analysis (Full profile method).

Principal Component Analysis -Factor Analysis- Orthogonal and Oblique Rotation Factor Score Estimation-Multidimensional Scaling-Perceptual Map-Cluster Analysis (Hierarchical Vs Nonhierarchical Clustering).

Latent Variable Models an Introduction to Factor, Path, and Structural Equation Analysis- Time series data analysis (ARIMA model) – Decision tree analysis (CHAID, CART) - Introduction to Big Data Management.
COURSE OBJECTIVES
o To realize the importance of data analytics. o To gain competence on data analytics packages. o To explore industrial applications of data analytics methodologies.
COURSE OUTCOMES (CO)

Course Outcomes	**Aligned Programme Outcomes (PO)**
1. To recognize the importance of data analytics. To exhibit competence on data analytics packages.	P01, P02, P03
2. To apply solution methodologies for industrial problems.	P05, P06

COURSE PLAN – PART II

COURSE OVERVIEW

The aim of this course is to recognize the importance of data analytics and to Exhibit competence on data analytics packages and also to apply solution methodologies for industrial problems.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	**Week/Contact Hours**	**Topic**	**Mode of Delivery**
1	Week-1,2	Introduction to Multivariate Statistics	Chalk and talk with slides
		Degree of Relationship among Variables	
		Review of Univariate	
		Bivariate Statistics	
2	Week-3	Screening Data Prior to Analysis	Chalk and talk with slides
		Missing Data	
		Outliers	
3	Week-4	Normality	Chalk and talk with slides
		Linearity	
		Homoscedasticity	
4	Week-5	Multiple Regression	Blackboard
		Linear and Nonlinear techniques	
		Backward-Forward-Stepwise	
5	Week-6	Hierarchical regression	PPT slides
		Testing interactions (2way interaction)	
		Analysis of Variance and Covariance (ANOVA & ANCOVA)	
6	Week-7	Multivariate Analysis of Variance and Covariance (MANOVA & MANCOVA)	PPT slides

		Logistic regression	
		Regression with binary dependent variable	
7	Week-8,9	Simple Discriminant Analysis	Chalk and talk with slides
		Multiple Discriminant analysis	
		Assessing classification accuracy	
8	Week-10,11	Conjoint analysis (Full profile method).	Chalk and talk with slides
		Principal Component Analysis	
		Factor Analysis	
9	Week-12	Orthogonal and Oblique Rotation	Chalk and talk with slides
		Factor Score Estimation	
		Multidimensional Scaling	
10	Week-13	Perceptual Map	PPT slides
		Cluster Analysis (Hierarchical Vs Nonhierarchical Clustering)	
		Latent Variable Models an Introduction to Factor	
11	Week-14,15	Path, and Structural Equation Analysis	Chalk and talk with slides
		Time series data analysis (ARIMA model)	
		Decision tree analysis	
12	Week-16	CHAID	Chalk and talk with slides
		CART	
		Introduction to Big Data Management.	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment	Week-7,12	---	10
2	Cycle test -1	Week-8	60 Minutes	20
3	Cycle test -2	Week-13	60 Minutes	20
CPA	Compensation Assessment*	Week-16	60 Minutes	20
4	Final Assessment *	Week-17	180 Minutes	50
	Final Assessment for grading			100

***mandatory; refer to guidelines on page 5**

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COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

Apart from analyzing the performance of students through continuous assessments, Class committee meetings, periodical interaction with students and the Class Representative enable evaluation of students' opinion and makes possible to react upon outcome of analysis made in reasonable time. The exit survey impacts on design and delivery of the course in ensuing years.

COURSE POLICY (including compensation assessment to be specified**)**

Students are expected to adhere to the code of conduct as prescribed in the Institute Regulations which pertains to the Course policy too, for successful course completion.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

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, IF ANY

Queries may also be emailed to the Course Coordinator directly at @nitt.edu and discussion outside the classroom is very much welcome and appreciated.

FOR APPROVAL

Course Faculty _____ **CC- Chairperson** _____ **HOD** _____

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Guidelines

a) The number of assessments for any theory course shall range from 4 to 6.

b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.

c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.

d) The passing minimum shall be as per the regulations.

<table>
<tr><th colspan="4">B.Tech. Admitted in</th><th rowspan="2">P.G.</th></tr>
<tr><th>2018</th><th>2017</th><th>2016</th><th>2015</th></tr>
<tr><td colspan="2">35% or (Class average/2) whichever is greater.</td><td colspan="2">(Peak/3) or (Class Average/2) whichever is lower</td><td>40%</td></tr>
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e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.

f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.

g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.