

**DEPARTMENT OF PRODUCTION ENGINEERING**  
**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

COURSE PLAN – PART I			
Name of the programme and specialization	M.Tech – Industrial Engineering Management – I Semester		
Course Title	Data Analytics		
Course Code	PR651	No. of Credits	04
Course Code of Pre-requisite subject(s)	Please Refer Curriculum		
Session	July 2018	Section (if, applicable)	-
Name of Faculty	Mr.V.Murugabalaji	Department	Production Engineering
Email	murugabalaji@nitt.edu	Telephone No.	
Name of Course Coordinator(s) (if, applicable)	-		
E-mail	-	Telephone No.	-
Course Type	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		
<b>Syllabus (approved in BoS)</b>			
<p>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.</p> <p>Multiple Regression- Linear and Nonlinear techniques- Backward-Forward-Stepwise-Hierarchical regression-Testing interactions (2way interaction) - Analysis of Variance and Covariance (ANOVA &amp; ANCOVA) - Multivariate Analysis of Variance and Covariance (MANOVA &amp; MANCOVA).</p> <p>Logistic regression: Regression with binary dependent variable -Simple Discriminant Analysis-Multiple Discriminant analysis-Assessing classification accuracy- Conjoint analysis (Full profile method).</p> <p>Principal Component Analysis - Factor Analysis- Orthogonal and Oblique Rotation-Factor Score Estimation-Multidimensional Scaling-Perceptual Map-Cluster Analysis (Hierarchical Vs Nonhierarchical Clustering).</p> <p>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.</p>			

**References**

1. Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. "Multivariate data analysis", (7th edition). Pearson India. 2015
2. Tabachnick, B. G., & Fidell, L. S., "Using multivariate statistics", (5th edition). Pearson Prentice Hall, 2001
3. Gujarati, D. N., "Basic econometrics", Tata McGraw-Hill Education, 2012
4. Malhotra, N. K., "Marketing research: An applied orientation", 5/e. Pearson Education India, 2008
5. Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. " Applied multiple regression/correlation analysis for the behavioral sciences", Routledge., 2013
6. Han, J., Kamber, M., & Pei, J. "Data mining: concepts and techniques: concepts and techniques", Elsevier, 2011

**COURSE OUTCOMES (CO)**

Course Outcomes	Aligned Programme Outcomes (PO)
1. Recognize the importance of data analytics	PO1, PO2, PO3 and PO6
2. Exhibit competence on data analytics packages	PO1, PO2, PO3 and PO6
3. Apply solution methodologies for industrial problems	PO1, PO2, PO3 and PO6

**COURSE PLAN – PART II****COURSE OVERVIEW**

This course is to teach the concepts of data analytics and its importance and give them knowledge about the data analytics packages and exhibit their competence on the packages. This course also gives them knowledge to solve the industrial problems by applying appropriate solution methodologies.

**COURSE TEACHING AND LEARNING ACTIVITIES**

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1, 4 Hrs	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.	PPT/Chalk and Talk
2	Week 2, 4 Hrs		
3	Week 3, 4 Hrs		
4	Week 4, 4 Hrs	Multiple Regression - Linear and Nonlinear techniques - Backward - Forward - Stepwise	PPT/Chalk and Talk

5	Week 5, 4 Hrs	Hierarchical regression - Testing interactions (2way interaction) - Analysis of Variance and Covariance (ANOVA & ANCOVA) - Multivariate Analysis of Variance and Covariance (MANOVA & MANCOVA).	PPT/Chalk and Talk
6	Week 6, 4 Hrs		
7	Week 7, 4 Hrs	Logistic regression: Regression with binary dependent variable - Simple Discriminant Analysis - Multiple Discriminant analysis - Assessing classification accuracy - Conjoint analysis (Full profile method).	PPT/Chalk and Talk
8	Week 8, 4 Hrs		
9	Week 9, 4 Hrs		
10	Week 10, 4 Hrs	Principal Component Analysis - Factor Analysis - Orthogonal and Oblique Rotation - Factor Score Estimation- Multidimensional Scaling - Perceptual Map - Cluster Analysis (Hierarchical Vs Nonhierarchical Clustering).	PPT/Chalk and Talk
11	Week 11, 4 Hrs		
12	Week 12, 4 Hrs		
13	Week 13, 4 Hrs	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.	PPT/Chalk and Talk
14	Week 14, 4 Hrs		
15	Week 15	Final Exam	

**COURSE ASSESSMENT METHODS (shall range from 4 to 6)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assesment 1	End of 6 <sup>th</sup> Week	1Hr	20%
2	Assesment 2	End of 10 <sup>th</sup> Week	1Hr	20%
3	Assignment	Once in three weeks		10%
CPA	Compensation Assessment*	End of 13th Week	1Hr	20%
4	Final Exam	End of the semester	3 Hrs	50%

\*mandatory; refer to guidelines on page 4

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

Course exit survey will be collected after a few classes in the beginning of the semester and at the end of the semester through online. Students can login their MIS account to give their feedback. Mid-semester feedback shall be collected to improve teaching-learning process. Also, students may give their feedback during class committee meeting.

**COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)****MODE OF CORRESPONDENCE (email/phone etc.)**

The mode of correspondence may be through mobile or email.

Mobile No.: +91-9597675365  
Email: murugabalaji@nitt.edu

**COMPENSATION ASSESSMENT POLICY**

As per norms

**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.

### FOR APPROVAL

Course Faculty V. A. J. B. CC-Chairperson [Signature] HOD [Signature]  
4.9.2018

### Guidelines:

- a) The number of assessments for a course shall range from 4 to 6.
- b) Every 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. Details of compensation assessment to be specified by faculty.
- d) The passing minimum shall be as per the regulations.
- 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.