SVKM's NMIMS
Mukesh Patel School of Technology Management & Engineering

Program: B. Tech Data Science (Business Analytics)				Semester: V	
Course/Module: Business Economics				Module Code : BTDS05001	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -50)	Term End Examinations (TEE) (Marks -100 in Question Paper)
3	0	0	3	Marks Scaled to 50	Marks Scaled to 50

Prerequisite: Nil

Objectives:
- To combine elements of basic micro and macroeconomics.
- To understand issues dealing with small-scale economic phenomena and such things as prices and output of firms, industries and resource owners.
- To examine market impact of technological change.
- To understand broader aspects of the economy and its environment.

Course Outcomes:
After completion of the course, students would be able to:
- Understand the consumer behavior
- Learn pricing behavior of the different markets
- Learn the use of cost function
- Analyses and evaluate the impact of Economic Policies and its implication on the Business Environment
- Handle economic data and write economic report

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1	Introduction: Definition of Economics, Types of economic systems, Opportunity Cost and Production Possibility Frontier (PPF)	04
2	Market Structure and Competition: Circular flow of Economy, Types of Market Structures, Role of Government, Business Cycles.	04
3	Demand and Supply: Demand Curve and Supply Curve, Equilibrium of Demand and Supply, Shift in Demand and Supply.	04
4	Application of Demand and Supply: Price Elasticity of Demand, Price Elasticity of Supply, Factors which influence Elasticity.	04
5	Elasticity and Revenue. Demand and Consumer Behavior: Utility and Marginal Utility, types of goods.	04
6	Theory of Production: Law of Diminishing Returns, Returns to Scale, Productivity.	04
7	Analysis of Costs: Types of Costs – Total Cost, Fixed Cost, Variable Cost, Marginal Cost, Impact of Marginal Cost on Average Cost.	04

_____
Signature
(Prepared by Concerned Faculty/HOD)

8	National Income Accounting: Accounting Structure, Key Concepts in Accounting for both Closed and Open Economies, Circular Flow of Income, Method of Measurements, Determination of National Income: Keynes's Basic Two Sector Model. Aggregate Demand, Aggregate Supply, Determination of National Income in Open Economy with Government. Three Sector and Four Sector Models.	05
9	Macroeconomics: National Income – Gross Domestic Product (GDP), Gross National Product (GNP), Inflation – Cost Push and Demand Pull Inflation, Unemployment, Philips Curve.	04
10	Functions of Central Bank Money supply, RBI & Monetary Policy.(Current Credit Policy to be critiqued) Stabilization policy : Role of fiscal Policy.	04
11	Macro Economy: Open Economy Aspects. Market for Foreign Exchange, Devaluation and Depreciation Impact of External Capital Flows (FII, FDI, SWFs)	04
	Total	**45**

Prescribed Textbook:

1. Samuelson and Nordhaus, (2005), Economics - 19th edition, Tata Mc-Graw Hill Publication.
2. Datt and Sundharam, (2009), Indian Economy - 67th edition,
3. S. Chand Publication. Dornbusch, R., & Fischer, S. (2013). Macroeconomics. New York : McGraw Hill International

Reference Books:

1. Mankiw Gregory, (2008), Principles of Economics, Cengage Learning
2. Rakesh Singh, (2007), Analyzing Macro-Economics, Shroff Publishers

Any other information: NIL

Total Marks of Internal Continuous Assessment (ICA): 50 Marks
Distribution of ICA Marks:

Description of ICA	Marks
Test Marks	20
Term Work Marks	30
Total Marks :	**50**

Details of Term work:

Class Test/Assignments/ Case Studies / Projects / Presentations

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech Data Science (Business Analytics)				Semester: V	
Course/Module : Artificial Intelligence				Module Code: BTDS05002	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -50)	Term End Examinations (TEE) (Marks -100 in Question Paper)
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Students are required to have the following prerequisites:
- Linear algebra (vectors, matrices, derivatives)
- Basic probability theory
- Python programming

Objectives:
- Understanding of learning agent
- Programming for breadth first and depth first search for visiting all possible solution and picking up the most optimum solution
- Information gathering from data for decision making

Course Outcomes:
After completion of the course, students would be able to:
- Acquire knowledge of the current theories, methods and techniques in the field of AI
- To understand data structure, search algorithm and predicate logic used in AI system
- To formulate and solve AI problems with the aid of abstraction and modeling using AI concepts

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	Introduction to AI, history of AI, course logistics, and roadmap, Intelligent agents: agents and environment, uninformed search	06
2.	Heuristic search technique: Heuristic technique, problems of heuristic technique with real world, different weak methods such as generate and test, hill climbing, simple hill climbing and steepest ascent hill climbing, problem with hill climbing such as local maxima, plateau, ridge, simulated annealing, best first search, OR graphs, A* algorithm, agenda driven search, AND-OR Graphs, AO* algorithm.	10
3.	Knowledge Representation logic and rules: prepositional logic and predicate logic, resolution in predicate logic , Constraint satisfaction problem.	08
4.	Game playing: Domain of a game, different ways to improve search strategies, plausible move generate, static evaluation function, different static evaluation functions, minimax search procedure, adding alpha-beta cutoff, search efficiency of alpha-beta procedure, futility cutoff, additional refinements such as waiting for	08

![signature]

_____

Signature
(Prepared by Concerned Faculty/HOD)

	quiescence, secondary search, using book move, iterative deepening, advantage of depth first iterative deepening.	
5.	Semantics and frames, different learning techniques, decision tree.	**08**
6.	Expert system and its types, AI applications	**05**
	Total	**45**

Text Books:
1. Artificial Intelligence A Modern Approach - Stuart J. Russell , Peter Norvig, Pearson Education, 2011
2. Nils Nilsson, Artificial Intelligence: A New Synthesis, Morgan Kaufmann, 1998.
3. David Poole, Alan Mackworth, Artificial Intelligence: Foundations for Computational Agents, Cambridge Univ. Press, 2010.

Reference Books:
1. Artificial Intelligence, Structures and Strategies for Complex Problem Solving, George F Luger, Pearson Education 2009
2. Ronald Brachman, Knowledge Representation and Reasoning, Morgan Kaufmann, 2004.
3. Frank van Harmelen, Vladimir Lifschitz, Bruce Porter (Eds), Handbook of Knowledge Representation, Elsevier, 2008.
4. Ivan Bratko, Prolog Programming for Artificial Intelligence, 4th Ed., Addison-Wesley, 2011.
5. Stephen Marsland, Machine Learning: An Algorithmic Perspective, Chapman and Hall, 2009.
6. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007

Any other information: NIL

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks:

Description of ICA	Marks
Test Marks	20
Term Work Marks	30
Total Marks :	**50**

Details of Term work:
- Minimum 5 practical experiments covering all the topics.
- Minimum two Assignments.
- Two class tests.

_____
Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech Data Science (Business Analytics)					Semester : V	
Course/Module: Machine Learning					Module Code : BTDS05003	
Teaching Scheme					Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit		Internal Continuous Assessment (ICA) (Marks -50)	Term End Examinations (TEE) (Marks -100 in Question Paper)
3	2	0	4		Scaled to 50 marks	Scaled to 50 Marks

Prerequisite: Statistical Methods I and II

Objectives:

- Learn about the most effective machine learning techniques, and gain practice implementing them and getting them to work.
- Understand the theoretical underpinnings of learning and gaining the practical know-how needed to quickly and powerfully apply these techniques to new problems.
- Develop a broad vision to machine learning, datamining, and statistical pattern recognition.
- Implement (i) Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks). (ii) Unsupervised learning (clustering, dimensionality reduction, recommender systems, deep learning). (iii) Best practices in machine learning (bias/variance theory; innovation process in machine learning and AI).
- Analyze numerous case studies and applications and know how to apply learning algorithms to building smart robots (perception, control), text understanding (web search, anti-spam), computer vision, medical informatics, audio, database mining, and other areas.

Outcomes:

After completion of the course, students would be able to:

- Learn a number of well-defined data mining tasks such as classification, estimation, prediction, affinity grouping and clustering, and data visualization are discussed

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1	**Introduction:** What is Machine Learning. Supervised Learning. Unsupervised Learning.	02
2	**Linear Model Selection and Regularization:** Linear regression. Hypothesis representation. Gradient descent. Cost function. Linear regression with multiple variables. Polynomial regression. Logistic regression. Hypothesis representation. Gradient descent. Cost function. Linear regression with multiple variables. Normal Equation. Polynomial regression. Regularization.	12
3	**Moving Beyond Linearity:** Neural networks. Hypothesis representation. Cost function. Back propagation. Activation function.	07
4	**Machine Learning System Design:** Evaluating hypothesis. Train - Validation - Test. Bias and variance curves. Error analysis. Error metrics for skewed classes. Precision and bias tradeoff.	04

_____

Signature

(Prepared by Concerned Faculty/HOD)

5	**Tree-Based Methods:** The Basics of Decision Trees, Regression Trees, Classification Trees, Trees Versus Linear Models, Advantages and Disadvantages of Trees, Bagging, Random Forests, Boosting	06
6	**Support Vector Machines:** Maximal Margin Classifier, Support Vector Classifiers, Support Vector Machines, SVMs with More than Two Classes, Relationship to Logistic Regression, ROC Curves, Application to Gene Expression Data	07
7	**Unsupervised Learning:** The Challenge of Unsupervised Learning, Principal Components Analysis, Clustering Methods, K-Means Clustering, Hierarchical Clustering, Anomaly detection and large scale machine learning.	07
Total		45

Text Books:
1. Introduction to Machine Learning with Python: A Guide for Data Scientists Book by Andreas C. Müller and Sarah Guido. 2016.
2. Python Machine Learning Book by Sebastian Raschka. 2015.

Reference Books:
1. Statistics for Management, Seventh Edition, by Richard I. Levin, David S. Rubin, Pearson
2. Pattern Recognition and Machine Learning Book by Christopher Bishop. 2006.
3. Machine Learning: A Probabilistic Perspective Textbook by Kevin Murphy. 2012.
4. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems Book by Geron Aurelien. 2017

Any other information: NIL

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks:

Description of ICA	Marks
Test Marks	**20**
Term Work Marks	**30**
Total Marks :	**50**

Details of Term work:
- Practical based on 10 Experiments
- Two class tests.
- Minimum two assignments

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech Data Science (Business Analytics)					Semester: V	
Course/Module: Image and Signal Processing					Module Code : BTDS05004	
Teaching Scheme				Evaluation Scheme		
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -50)	Term End Examinations (TEE) (Marks -100 in Question Paper)	
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50	

Prerequisite: Nil

Objectives:

- Data is rich and abundant. However, every data wrangler has come across most of the time this data, which is very noisy in nature. Processing noisy signals and removing unwanted part from an image has been a huge concern over the last few decades. Signal and image processing techniques developed today are very robust and effective models. The objective is to port some processing techniques from the audio and signal field and use them to process sensor data.
- To provide a few filter processing techniques and algorithms that can help eliminate the data signal noise and help user get the desired image.
- To provide insights on fundamentals of image processing.

Course Outcomes:

After completion of the course, students would be able to :

- Identify and perform operations on discrete and continuous data
- Apply algorithm and remove the unwanted noise in the data signals using filtering and would be able to design efficiently working filter bands for defined intervals
- Apply the concepts of Convolution and Sampling for real time applications
- Learn various processes that an image goes through during its mechanism like segmentation and enhancement

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1	Data Communication Fundamentals, Data and signals, A simplified model of a data communication system, Defining Data and its types, Electrical representation of data, its characteristics, domain and spectrum concept, Distinguish between data and signal, basic parameters that are required for characterizing the signal, Various operations on Data and its graphical representation, folding, scaling, shifting operations on discrete data points and continuous data signals.	08
2	Data structure classification, Disjunct data, Continual data, plotting of various types convolution on different data types, energy of a given signal, periodic and non-periodic signals, Identifying the types of Input -	07

Borgay

_____
Signature
(Prepared by Concerned Faculty/HOD)

	output correlation and identifying the systems, convolution integral, circular convolution, single and double side representations.	
3	Discrete Fourier Transform of signal, Fast Fourier Transform, Butterfly Diagram, Fourier series for continuous data, Fourier Transforms and its properties, graphical exponential data points, one and two sided, time domain and frequency domain representations, increasing amplitude value of function by multiplying it with a constant.	09
4	Image Fundamentals, Vector Space Image Representation, Image probability Density Models, initial and final values from given equations, designing frequency response as flat as possible in the pass band for a maximally flat, Butterworth filter, various windowing methods, overlap add, overlap save method.	08
5	Sampling, Standardization of data, manipulation of discrete data sequences, discrete models solved with difference equations, state transition matrix for data science problems, noisy data and impulse response estimation, step response, transfer function calculations, constructing State variable equations from the given order difference equation of a system, difference equations with zero input, state and total response	06
6	Elements of Digital Image processing system, Basic relationship between pixels, spatial and tonal resolution, Image Enhancement, Performing Zooming on Image by replication and interpolation, Image segmentation, Point detection, Line detection, Edge detection, Find input image using inverse Hadamard, Global descriptor attributes based image retrieval	07
	Total	**45**

Prescribed Textbook:

1. Digital signal processing: principles algorithms and applications, 4th Edition by Proakis, John G.; Manolakis, Dimitris published by Pearson Education, Inc., publishing as Prentice Hall, Copyright © 2016 Pearson Education, Inc. Indian Subcontinent Adaptation Copyright © 2017 Dorling Kindersley (India) Pvt.

Reference Books:
 1. Digital Image Processing 3rd Edition, William Pratt, John Wiley and sons Inc. Digital signal processing, second edition, Mc Graw Hill Education(India) Private Limited

 2. Communication system engineering, John Proakis, Masoud salehi 2Ed. Prentice Hall, Pearson Education International

Any other information: NIL

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

_____
 Signature
 (Prepared by Concerned Faculty/HOD)

Distribution of ICA Marks:

Description of ICA	Marks
Test Marks	20
Term Work Marks	30
Total Marks :	**50**

Details of Term work:
- Practical based on 10 Experiments
- Two class tests.
- Minimum two assignments

_____

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech Data Science (Business Analytics)				Semester: V	
Course/Module : Applied Mathematics – IV				Module Code: BTDS05005	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -50)	Term End Examinations (TEE) (Marks -100 in Question Paper)
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Nil

Objectives:

- To provide an understanding of various Mathematical Concepts such as Vector Integration, Matrices, Analytic functions and Mapping which forms basics for data science to solve engineering problems.

- Impart knowledge of Laplace Transform and generalization for the fundamental theorem of calculus like Greens, Stokes and Gauss Diversion.

Outcomes:

After completion of the course, students would be able to:

- Solve problems using Matrices, Laplace and apply it to engineering problems.
- Solve and Apply applications of Greens Theorems to find relationship between a line integral around a simple closed curve C and a double integral over the plane region D bounded by C in real life engineering problems.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1	Analytic Function, Analytic Function Equations, Harmonic functions, Relation between Analytic and Harmonic functions, Milne Thompson method, function u given with another function v not given and derive function of w, Either addition or subtraction of two variables u and v given and derive function of w, Cauchy Reiman equations in Cartesian and polar coordinates, Mapping – Determining the image in the plane, bilinear transformation and fixed points of Bilinear transformations, cross ratio formula.	09
2	Integration solution for Equation along the path of unit circle, parabola, Cauchy Integral Theorem, Cauchy Integral Formula, Simple pole, Multiple Pole, Repeated Poles, Function of Single random variable, Taylors and Laurentz Series, Residues, Contour integration.	08
3	Vector Integration – Line Integral, Boundary over square, over straight line segments joining points, moving particle along circle, ellipse, conservative and irrational field, Scalar Potentials, Multivariable calculus Greens Theorem, Stokes Theorem, Gauss Diversion Theorem.	09

_____

Signature
(Prepared by Concerned Faculty/HOD)

4	Matrices – Eigen values, Eigen vectors, Quadratic form over real field, Reduction of Quadratic form to a diagonal canonical form, Rank, Index and Signature of quadratic form, Functions of square matrix, Derogatory and non-Derogatory Matrices, Cayley-Hamilton theorem (without proof), similar Matrices, Linear dependence and Independence using matrix equations, orthogonally similar Matrices, Single Vector Decomposition.	07
5	Laplace Transform – Introduction, Derivatives and Integrals, Definition, Linearity property, Laplace transform of standard functions, first shifting theorem, second shifting theorem, Effect of multiplication by t, Effect of division by t, Laplace Transform of Derivatives and Integrals, Inverse Laplace Transforms, Laplace Transform of special functions, Application of Laplace.	12
	Total	**45**

Text Books:
1. Michael Greenberg (2017), Advanced Mathematics, Pearson new International

Reference Books:
1. 1 - P.P.G. Dyke(2015), An introduction to Laplace Transform and Fourier series, Springer
2. 2 - Elements of the Differential, and Integral Calculus (Revised: Edition) (Classic Reprint) Paperback – 19 Apr 2018 by William Anthony Granville

Any other information: NIL

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks:

Description of ICA	Marks
Test Marks	**20**
Term Work Marks	**30**
Total Marks :	**50**

Details of Term work:
1. Two class tests.
2. Minimum two assignments
3. Any other assessment as per institute norms

_____
Signature
(Prepared by Concerned Faculty/HOD)

SVKM's NMIMS
Mukesh Patel School of Technology Management & Engineering

Program: B. Tech Data Science (Business Analytics)				Semester: V	
Course/Module: Data Science Ethics				Module Code: BTDS05006	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -50)	Term End Examinations (TEE) (Marks --)
2	0	0	2	Marks Scaled to 50	---

Pre-requisite: Nil

Objectives:

- This course provides knowledge about ethics applicable in an IT organization's context. It covers related laws, software development process, social networking, IT human resources

Outcomes:

After completion of the course, students would be able to:
- Understand copyrights, patents and laws needed in IT organizations
- Understand the quality software development process
- Analyze the impact of IT on productivity and quality of life
- Understand the concepts on online social networking, its applications and effective usage
- Illustrate the key ethical issues of an IT organization

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1	**Intellectual Property**: Intellectual property, copyrights, patents, trade secrets and its laws, employees and trade secret, key intellectual property issues, plagiarism, reverse engineering, open source code, competitive intelligence, trademark infringement, cybersquatting.	06
2	**Software Development:** Strategies for engineering quality software, importance of software quality, software product liability, software development process, capability maturity model integration, safety critical system, quality management standards.	06
3	**The Impact of Information Technology on Productivity and Quality of Life**: Impact of IT, IT investment and productivity, digital divide, impact of it on healthcare cost, electronic health records, use of mobile and wireless technology in healthcare industry, telemedicine, medical information websites.	06
4	**Social Networking**: Social networking website, business	06

_____

Signature
(Prepared by Concerned Faculty/HOD)

		Application of online social networking, social networking ethical issues: cyberbullying, cyber stalking, sexual predators, uploading inappropriate material. Online virtual world: crime in virtual world, educational and business uses.	
5		**Ethics of IT Organization**: Key ethical issues, non-traditional Workers, contingent workers, H-1 B workers, outsourcing, whistle blowing, green computing, ICT industry code of conduct.	**06**
		Total	**30**

Text Books:
   1. "Ethics in Information Technology", 4th Edition, George Reynolds Strayer University, 2012.

Reference Books:
   1. "Ethics and Technology: Controversies, Questions, and Strategies for Ethical Computing", 3rd Edition, Herman T. Tavani, John Wiley & Sons, 2011.

   2. "Information Technology Ethics: Cultural Perspectives", Soraj Hon ladarom, Charles Ess, Idea Group Inc (IGI), 2007.

Any other information: NIL

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks:

Description of ICA	Marks
Test Marks	--
Term Work Marks	**50**
Total Marks :	**50**

Details of Term work:
As per Department and Institute norms for term work.

Signature

_____
Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech Data Science (Business Analytics)				Semester: V	
Course/Module : Research Methodology				Module Code: BTDS05007	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -50)	Term End Examinations (TEE) (Marks --)
2	0	0	2	Marks Scaled to 50	---

Pre-requisite:
- Contemporary Practices of Management
- Statistical Methods

Objectives:

To familiarize students on the following:
- Provide research techniques and tools required to conduct business research projects.
- Highlight significance of research frameworks and literature review.

Outcomes:

After completion of the course, students would be able to:
- Ability to work on independent research projects
- Students will acquire the skill to write business research reports.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1	**Introduction and Defining Research Problem** - The research process, Formulation of a research problem, Objectives of research, identification and types of variables, hypotheses, concept and types, Research design - meaning and significance, types of research designs, exploratory, descriptive, (survey and case study methods), explanatory (ex-post facto and experimental) Student Presentation – Research Problem	04
2	**Related Literature** - Significance and sources of related literature, reviewing of literature, references and referencing systems, bibliography, research paradigms	03
3	**Theoretical framework and hypothesis development -** Constructs and Variables, Theoretical framework, Hypothesis development. Research design for qualitative research	03
4	**Sampling** - Sampling process, sample size confidence interval and determination of sample size. Sampling design for qualitative research	02
5	**Data Collection -**	04

_____

Signature

(Prepared by Concerned Faculty/HOD)

	Data - Sources of data, Primary sources of data, Focus groups, Panels, Unobtrusive measures, Secondary sources of data, Methods of data collection, Interviewing, Unstructured and structured interviews, Participant and non-participant observation **Questionnaires** - Types of questionnaire, Guidelines for questionnaire design, Issues in data collection.	
6	**Quantitative Data Analysis –** **Data Refinement:** • Data Pre-processing • Reliability and Validity testing of data collection tool (Based on Procedure) • Normality check for variables (Based on Procedure)	02
7	**Quantitative Data Analysis –** **Data Analysis:** • Descriptive Statistics (Based on Procedure) • Correlation Analysis (Based on Procedure) • Multiple Regression Analysis (Based on Procedure) • F-Test and t-Test (Based on Procedure) • ANOVA (Based on Procedure) • Chi-Square Test (Based on Procedure) • Cluster Analysis (Based on Procedure)	04
	• Factor Analysis and Principle Component Analysis (Based on Procedure)	02
8	**Qualitative Data Analysis**: Reliability and validity in qualitative research, Content analysis, Narrative analysis, Analytic induction. Techniques - Grounded Theory, Case Study Analysis, Phenomenology	04
9	**Research Report**: Purpose, Contents, Executive summary or abstract, Introductory section, Main body of the report, Final part of the report, References	02
	Total	**30**

Text Books:

1. Sekaran, U. & Bougie, R. (2012). Research Methods for Business - A Skill Building Approach. John Wiley and Sons.

2. Tathnum, H. & Anderson. (2008). Multi Variate Data Analysis. Pearson.
3. Gujarati, D. (2002). Basic Econometrics. McGraw Hill.

Reference Books:

1. Prahlad, M. (2015). Business Research methods. Oxford Publishing.

2. Creswell, J.W. (2007). Qualitative Inquiry and Research Design. Sage Publication.

_____

Signature
(Prepared by Concerned Faculty/HOD)

3. Zikmund, W.G. (2012). Business Research Methods. India Binding House.

4. Malhotra, N. (2007) Marketing Research: Applied Orientation. Pearson Education.

5. Greene, W. H. (2008). Advanced Statistical Analysis, Econometric Analysis. Pearson/ Prentice Hall.

- **Internet References**

http: / /qrj.saeepub.com and as suggested by faculty from time to time

Any other information: NIL

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks:

Description of ICA	Marks
Test Marks	--
Term Work Marks	50
Total Marks :	**50**

Details of Term work:
 Class Test/ Assignment/Case Studies/ Projects/ Presentations

_____

Signature
(Prepared by Concerned Faculty/HOD)

Program: B. Tech Data Science (Business Analytics)					Semester: V	
Course/Module: Statistical Method – II					Module Code: BTDS05008	
Teaching Scheme				Evaluation Scheme		
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -50)	Term End Examinations (TEE) (Marks -100 in Question Paper)	
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50	

Pre-requisite: Statistical Method-I

Objectives:

To introduce and provide some core and necessary data mining techniques so that students understand how to work with large data sets and apply the appropriate data mining technique to answer business questions

Outcomes:

After completion of the course, students would be able to:

1. Students will able to learn a number of well-defined data mining tasks such as classification, estimation, prediction, affinity grouping and clustering, and data visualization are discussed

Detailed Syllabus:

Unit	Description	Duration
1	**Classification:** a) Using Bayes' Theorem for Classification, Procedure of Discriminant Analysis, Linear Discriminant Analysis, Estimating Misclassification Probabilities, Quadratic Discriminant Analysis	6
	b) Cluster Analysis: Measures of Association for Continuous Variables, Measures of Association for Binary Variables, Agglomerative Hierarchical Clustering, Ward's Method, K-Means Procedure, K-Nearest-Neighbours	6
	c) Principal Components Analysis (PCA) and Factor Model: Procedure Principal Component Analysis (PCA), Maximum Likelihood Estimation Method, Factor Rotations, Varimax Rotation, Estimation of Factor Scores.	6
2	Resampling Methods	6

_____

Signature

(Prepared by Concerned Faculty/HOD)

3	Tree-Based Methods: The Basics of Decision Trees, Bagging, Random Forests, Boosting	**8**
	Support Vector Machines: MaximalMargin Classifier, Support Vector Classifiers, SVMs with More than Two Classes	**7**
4	Conjoint analysis	6
Total		**45**

Text Books:
1. An Introduction to Statistical learning with application in R . Hastie T, Robert T. (2014). Springer Science Business Media: New York
2. Hair, Black, Babin, Anderson and Tatham (2009). Multivariate Data Analysis, Pearson

Reference Books:
1. Statistics for Management, Seventh Edition, by Richard I. Levin, David S. Rubin, Pearson
2. An Introduction to Categorical Data Analysis. Agresti, A. (2012). John Wiley & sons
3. The Element of Statistical Learning, Data mining, Inference and Prediction. Hastie, T, Tibshirani, R, & Friedman, J. (2011). New York: Springer Series in Statistics.
4. Gujarati, Damodar N, and Dawn C. Porter. Basic Econometrics. Boston, Mass: McGraw-Hill, 2009

Any other information: NIL

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks:

Description of ICA	Marks
Test Marks	**20**
Term Work Marks	**30**
Total Marks :	**50**

Term Work:
1. Practical based on 10 Experiments
2. Two class tests.
3. Minimum two assignments

![signature]

_____

Signature
(Prepared by Concerned Faculty/HOD)