Francis Xavier Engineering College
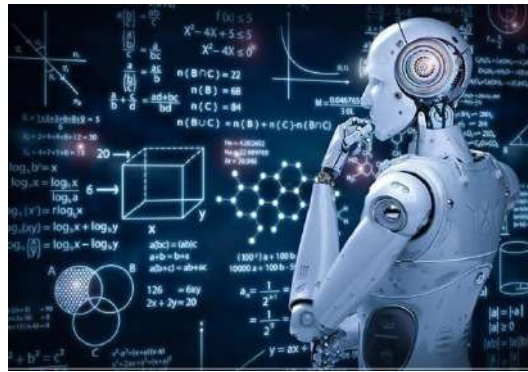
(An Autonomous Institution)

Tirunelveli 627003
Tamil Nadu India

Department of
Artificial Intelligence and Data Science

Curriculum and Syllabi–R2021-UG

CHOICE BASED CREDITSYSTEM AND OBE

Vision of the Department

To impart **quality education** and produce high quality, creative and **ethical engineers**,**in still professionalism**, enhance students' problem-solving skills in the domain of artificial intelligence and data science with a focus to prepare them for the industry, engage them inpotential research areas, to pursue and have continued professional growth to serve the **greater cause of society**.

Mission of the Department

To provide skill-based education to master the students in problem solving and analytical skills to enhance their niche expertise in the field Artificial Intelligence and Data Science.

To educate the students with latest technologies to update their knowledge in the field of AI and Data science.

To enable students to experience content-based learning with premier quality data science Education, research, industrial collaboration and to become an successful entrepreneur recognized globally. To guide students in research

Programme Educational Outcomes(PEOs)

PEO1 To Formulate, analyze and solve Engineering problems with strong foundation in Mathematical, Scientific, Engineering fundamentals and modern computing Practices through advanced curriculum.

PEO2 Analyze the requirements, realize the technical specification and design the Engineering solutions by applying Artificial Intelligence and Data Science theory and principles.

PEO3 Demonstrate technical skills, competency in AI and DS and promote collaborative learning and teamwork spirit through multi-disciplinary projects and diverse professional activities.

PEO4 Equip the graduates with strong knowledge, competence and soft skills that allows them to contribute ethically to the needs of society and accomplish sustainable progress in the emerging computing technologies through life-long learning.

Programme Specific Objectives(PSOs)

PSO$_1$ Implement Artificial Intelligence and datascience techniques such as search algorithms, neural networks, machinelearning and data analytics for solving a problem and designing novel algorithms for successful career.

PSO$_2$ Apply the skills in the areas of health care, education, agriculture, intelligent transport, environment, smart systems and in the multi-disciplinary area of Artificial Intelligence And Data Science.

PSO$_3$ Graduates will acquire practical competency with emerging technologies and open Source platforms related to areas of Artificial Intelligence and Data Science to become a successful Entrepreneur.

Programme Outcomes(POs)

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify,formulate,review research literature,andanalyze complex engineering problems reaching substantiated conclusions using first principles of mathematics,naturalsciences,and engineering sciences.

3. **Design/developmentofsolutions:**Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal,and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge andresearch methods including design of experiments, analysis and interpretation of data, andsynthesisoftheinformationtoprovidevalid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, andmodernengineeringandITtoolsincludingpredictionandmodelingtocomplexengineering activitieswithan understandingofthelimitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge toassess societal, health, safety, legal and cultural issues and the consequent responsibilitiesrelevant totheprofessional engineeringpractice.

7. **Environmentandsustainability:**Understand the impact of the professional engineering solutions in societal and environmental contexts,and demonstrate the knowledge of,and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member orleader in diverse teams,and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one‟s own work, as a membe rand leader in a team,to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping with PO Vs PEO, PSO

PO	PEO1	PEO2	PEO3	PEO4
1		3		
2		3		
3		1	3	3
4	3	1		
5				1
6			1	2
7				3
8	1			1
9	1			
10	2			
11	2			
12	1	2	3	
PSO1	3		2	
PSO2	3	3	2	2
PSO3		3	3	2

FRANCIS XAVIER ENGINEERING COLLEGE

B.TECH.–Artificial Intelligence and Data Science

REGULATIONS2021

Choice Based Credit System and Outcome Based Education

MINOR DEGREE- BUSINESS INTELLIGENCE

List of Minor Courses

Sl.No	Course code	Course Name	Sem	L	T	P	C	Offered By
1.	21AI4S01	Predictive Business Analytics	4	3	1	0	4	AI&DS
2.	21AI5S01	Business Intelligence Tools	5	3	0	2	4	AI&DS
3.	21AI6S01	Big Data Analytics For Business	6	3	0	0	3	AI&DS
4.	21AI7S01	Artificial Intelligence for Business	7	3	0	0	3	AI&DS
5.	21AI8S01	Project Work	8	0	0	0	4	AI&DS

BUSINESS INTELLIGENCE
(Specialization/Minor)

List of Minor Courses

Sl.No	Course code	Course Name	Sem	L	T	P	C	Offered By
1.	21AI4S01	Predictive Business Analytics	4	3	1	0	4	AI&DS
2.	21AI5S01	Business Intelligence Tools	5	3	0	2	4	AI&DS
3.	21AI6S01	Big Data Analytics For Business	6	3	0	0	3	AI&DS
4.	21AI7S01	Artificial Intelligence for Business	7	3	0	0	3	AI&DS
5.	21AI8S01	Project Work	8	0	0	0	4	AI&DS

21A14S01	PREDICTIVE BUSINESS ANALYTICS	L	T	P	C
		3	1	0	4

Preamble

The key phrase to describe all of the initiatives to use data analysis to enhance business decision making is "predictive analytics." This idea serves as the foundation for this course's (also known as Data Mining's) primary focus, which is on machine learning tools, models, and software methodologies.

Prerequisite

- 21AI3602-Data Science Essentials
- 21AI4601-Data Analytics

Objectives

- To provide knowledge on business framework for predictive analytics
- To understand the principles behind predictive business analytics
- To comprehend the various business methods and techniques
- To provide basic knowledge in marginal expense calculation for business
- To know about various trends and challenges in business

UNIT I	INTRODUCTION TO BUSINESS ANALYTICS	9+3

Introduction to analytics- Business Intelligence vs. Analytics vs. Decision –predictive business analytics and decision management-Building the business case of predictive Business Analytics-selecting a desired target state-Adopting a PBA framework-developing the framework

SUGGESTED ACTIVITIES:

- Practical on Visualization of Business data
- Seminar on Business Data management and Indexing

SUGGESTED EVALUATION METHODS:

- Assignment Problem

- Quizzes

UNIT II	PRINCIPLES AND PRACTICES	9+3

Guiding principles in developing predictive business analytics-demonstrate a strong cause effect relationship- incorporate a balanced set of financial, non-financial, internal and external measure- ensure data integrity- integrate into the management process- developing a predictive business analytics function- deploying the business analytics function-case studies

SUGGESTED ACTIVITIES:

- Practical- Find Internal measure and developing a predictive business analytics

SUGGESTED EVALUATION METHODS:

- Assignment Problem

- Tutorial Problem

- Quizzes

UNIT III	BUSINESS METHODS AND TECHNIQUES	9+3

Integrating business methods and techniques- Irrational decision making-Increasing the return on investment from information assets- Emerging needs of analytics-Integration of business intelligence, business analytics, and Enterprise business management

SUGGESTED ACTIVITIES:

- Implementation of Enterprise business management

- Applications of Business data analysis techniques

SUGGESTED EVALUATION METHODS:

- Assignment Problem

- Quizzes

UNIT IV	PREDICTIVE ACCOUNT FORECASTS	9+3

Predictive accounting and marginal expense analytics- an accounting framework and taxonomy- coexisting accounting methods- predictive accounting involves marginal expense calculations- problem with budgeting- four types of budget spending

SUGGESTED ACTIVITIES:

- Practical- Data analytics for budget spending

SUGGESTED EVALUATION METHODS:

- Tutorial problems

- Assignment problems

- Quizzes

UNIT V	TRENDS AND CHALLENGES	9+3

CFO Trends- Resistance to change and presumption of Existing capabilities- Organizational challenges- Early adopters and laggards- two types of employees- inequality of decision rights- maximizing predictive business analytics: Top Down and Bottom up leadership

SUGGESTED ACTIVITIES:

- Implementation of Business data

SUGGESTED EVALUATION METHODS:

- Tutorial problems

- Project demonstration

- Assignment problems

- Quizzes

	Total Periods	45 + 30

Suggestive Assessment methods

Continuous Assessment Test (30Marks)	Formative Assessment Test (10 Marks)	End Semester Exams (60 Marks)
1.DESCRIPTION QUESTIONS	1. ASSIGNMENTS 2.ONLINE QUIZZES 3.PROBLEM SOLVING ACTIVITIES	1.DESCRIPTION QUESTIONS

Course Outcomes

Upon completion of the course, the students will be able to:
- Describe the basic knowledge of predictive analytics in business.
- Analyze various principles of analytics model for business prediction
- Integrate various business methods for business
- Apply marginal expense calculation to forecast budget for a business
- Analyze various trends and challenges in predictive business analytics

Text Books

1.Lawrence S Maisel, Gray Cokins "predictive business analytics", First edition, Willey, 2014

3. Conrad Carlberg, "Predictive Analytics: Microsoft Excel", 1st Edition, Que Publishing, 2012.

Reference

1. Alberto Cordoba, "Understanding the Predictive Analytics Lifecycle", Wiley, 2014
2. Anasse Bari, Mohammad Chaouchi, Tommy Jung, Predictive Analytics for Dummies, 2nd Edition, 2017.

Web Resources
1. https://www.predictiveanalyticstoday.com/what-is-predictive-analytics/
2. onlinecourses.swayam2.ac.in/imb20_mg19/preview

CO Vs PO Mapping and CO Vs PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3												3
2	3	3	3										3	3	3
3	3	3	3	3									3	3	3
4	2	2	3	3	3								3	3	3

5	2	3	3	3									3	3	3

BLOOMS LEVEL ASSESSMENT PATTERN

BLOOMS CATEGORY	CAT 1	CAT 2	FAT 1	FAT 2	END SEM EXAM
REMEMBER	10	10	10	10	10
UNDETSTAND	50	50	50	50	50
APPLY	40	40	40	40	40
ANALYZE					
EVALUATE					
CREATE					

COURSE LEVEL ASSESSMENT QUESTIONS

COURSE OUTCOME 1:
1. What is the difference between business analytics and predictive analytics? Find similarities and patterns, finds relationships among different dimensions or factors to assess the potential opportunities and risks? (remember)
2. Mention the example of predictive analytics in business early detection of allergic reactions? (understand)

COURSE OUTCOME 2:
1. Explain the cause effect relationship of business analytics and cause-and-effect relationship, one event leads to another event .(understand)
2. Implement likelihood of future outcomes based on historical data for business analytics(Apply)

COURSE OUTCOME 3:
1. Compare business intelligence, business analytics and enterprise businessmanagement(understand)
2. Implement the emerging need of analytics in business predicting model (analyze)

COURSE OUTCOME 4:
1. Create a business application plan for budget in predictive accounting?(analyze)
2. How do you calculate marginal expense for a business model?(understand)

COURSE OUTCOME 5:

1. Discuss about top down and bottom up leadership (understand)
2. Build a mathematical model that captures important trends that Predictive analytics useshistorical data to predict future events.(Analyze)

21AI5S01	BUSINESS INTELLIGENCE TOOLS	L	T	P	C
		3	0	2	4

Preamble

This course focuses on business intelligence tools used for storage, analysis and manipulation of data us. The student will learn about fundamentals of intelligence tools and have hand on training on the same It also help to develop projects and apply existing data analytics tools to gain comprehensive knowledge on Data analytics on business. This will enable the students to develop modular applications related to the field of engineering.

Prerequisites for the course

- Probability and statistics
- Data science essentials

Objectives

1. To Understand the methodology and technique of business intelligence
2. To understand the analytic modeling behind MS EXCEL
3. To understand the knowledge of using tableau tools for analytics

4. To generate reports for the data using data studio tools
5. To visualize the data modeling concepts using POWER BI.

UNIT I	INTRODUCTION TO BUSINESS INTELLIGENCE	9

Definition of Business intelligence- Business intelligence scenarios- perspectives in Business intelligence – Business intelligence views on business process- goals of business intelligence- business intelligence Tasks and analysis formats

SUGGESTED ACTIVITIES

- Discussion on case studies of business intelligence
- Basic introduction about various business intelligence user interface

SUGGESTED EVALUATION METHODS

- Quizzes on business intelligence tasks and analysis formats
- Assignment on business intelligence views on business process

UNIT II	MS EXCEL	9

Getting started with excel-working with data- working with charts-describing data- probability distribution-statistical interface- Tables-Regression and correlation-Multiple regression

SUGGESTED ACTIVITIES

- Demonstrate the use of concatenation and data validation
- Demonstrate the use of conditional formatting using various data set

SUGGESTED EVALUATION METHODS

- Demonstration of programs using sorting and filtering
- Demonstration on cleaning data with text functions

UNIT III	TABLEAU	9

Introduction to visualization and tableau- working with single and multiple data sources-simplifying and sorting data-measure names and measure values-table calculation-customizing data-statistics- chart forms-Dashboard

SUGGESTED ACTIVITIES

- Comparison study on the various types of data preparation techniques
- Demonstrate various join operation using tableau

SUGGESTED EVALUATION METHODS

- Demonstration of aggregated data using tableau builder tool
- Demonstration of various pivoting operations
- Quiz on basics of Tableau prep builder user interfaces

UNIT IV	R STUDIO	9

Introduction to R studio- creating variables and assigning data- using vectors and factors – using lists-using data classes-Looping statements- decision support statements-if/else- using function

SUGGESTED ACTIVITIES

- Discussion and comparison of various business intelligence tools with R studio
- Demonstrate various programs for looping statements

SUGGESTED EVALUATION METHODS

- Demonstration of vectors and factors using R studio
- Quizzes on how to use decision support statements

UNIT V	POWER BI	9

Power BI introduction- power BI Architecture-Compare with other BI tools-Data Modeling-Dash board options-Visualization-Excel Integration-DAX basics in power BI-sharing power BI dash boards-Administration Role

SUGGESTED ACTIVITIES

- Assignment on Power BI architecture
- Comparisons of power BI with other BI tools
- Demonstrate how to create Dash boards

SUGGESTED EVALUATION METHODS

- Demonstration of programs for creating dash board
- Demonstration of various visualization option in power BI

	Total Periods	45
S.NO	**LIST OF EXPERIMENTS**	**CO**
1	Web scraping using MS Excel from job portals	**CO1,CO2**
2	Data scrubbing using MS Excel for Data. World datasets	**CO1,CO2**
3	Exploratory data analysis using Tableau for US Census data	**CO3**
4	Exploratory data analysis using data studio for latest Netflix data	**CO4**
5	Amazon product reviews using power BI	**CO5**
6	Twitter sentimental analysis	**CO5**
	Total Periods	**45 Theory+30 lab**

Suggestive Assessment Methods

Continuous Assessment Test **(30 Marks)**	**Lab Components Assessments** **(20 Marks)**	**End Semester Exams** **(50 Marks)**
1. DESCRIPTIVE QUESTIONS	1. LAB EXPERIMENTS 2. MODEL EXAMINATION	1.DESCRIPTIVE QUESTIONS

Course Outcomes

Upon completion of the course, the students will be able to:

CO1 Introduce the concept and components of business intelligence tools(Understand)
CO2 Applying data analytics using Ms-Excel(Apply)
CO3 Define how BI tools will help to analyse and organize data using tableau(Apply)
CO4 Link business intelligence with data analytics using data studio   (Apply)
CO5 applying the visualization concept using power BI (Apply)

Text Books

1. Wilfred Grossmann , Stefanie Rinderle-Ma, "Fundamentals of business intelligence", springer 2015
2. Kenneth N. Berk ,Patrick Carey ,"Data analysis with Microsoft excel", Brooks/COLE cencage learning, 2007
3. Seema Acharya, subhashini chellapan, "Pro tableau"- step by step guide A press, 2017
4. Eric pimple, "Data visualization and exploration with R" A practical guide to R, R studio, for data visualization, exploration and data science application, Geo spatial service, 2017
5. 'Rob collie' & 'Avi singh', "power pivot and power BI"- The Excel user's guide to DAX, power query, power BI and power pivot in Excel 2010-2016. : Holy Macro! Books, PO Box 541731 Merritt Island FL 32954 USA 2016

Reference Books

1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2011
2. "Business Intelligence – Grundlagen und praktische Anwendungen: Eine Einführung in die IT" by Hans-Georg Kemper and Henning Bars.

Web Resources

- https://www.google.com/search?q=tableau+tutorial+point+pdf+free+download
- https://www.tutorialspoint.com/msexcel/index.htm
- https://www.tutorialspoint.com/powerbi/index.htm
- .https://www.tutorialspoint.com/googledatastudio/index.htm

CO Vs PO Mapping and CO Vs PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3			2							1		
2	3	3	3			2							1		
3	3	3	3			2							2		
4	3	3	3			2							2		
5	3	3	3			2							3		

BLOOMS LEVEL ASSESSMENT PATTERN

BLOOMS CATEGORY	CAT 1	CAT 2	FAT 1	FAT 2	END SEM EXAM
REMEMBER	20	10	5	5	10
UNDERSTAND	40	20	10	10	20
APPLY	40	50	5	5	50
ANALYZE		20	5	5	20
EVALUATE					
CREATE					

COURSE LEVEL ASSESSMENT QUESTIONS
Course Outcome 1 (CO1):

1. How business intelligence BI systems are used for reporting and data analytics?(understand)
2. What are the five stages of BI?(Remember)

Course Outcome 2 (CO2):
1. Data on soft drink sales shown in Table have been saved in a text fi le. The file has five variables and ten cases. The first variable is the name of the soft drink brand; the next three variables are company sales in millions of 192-ounce cases for the years 2000, 2001, and 2002. (Source: http://www.bevnet.com/ news/2002/03-01-2002-softdrink.asp,

Beverage Marketing Corporation.) The final column indicates the year of origin for each brand

Brand	Cases2000	Cases2001	Cases2002	Origin
Coca-Cola	3198.0	3189.6	3288.9	1886
Pepsi	2188.0	2163.9	2156.4	1898
Mountain Dew	810.3	853.7	862.7	1946
Dr Pepper	747.4	740.0	737.4	1885
Sprite	713.9	703.3	687.9	1961
Gatorade	355.8	375.0	422.8	1965
7 Up	276.0	261.6	243.4	1929
Tropicana	301.2	307.7	292.9	1954
Minute Maid	218.0	226.5	285.3	1946
Aquafina	105.0	151.4	203.0	1994

    i.   Create range names for each of the five data columns in the workbook.
    ii.   Create two new columns displaying the change in sales from 2000 to 2002 and the ratio of the 2000 sales to the 2002 sales. Assign range names to these two new columns. Sort the list in descending order of the difference in sales (analyze)

2. A data distribution has a median value of 22, a first-quartile value of 20, and a third-quartile value of 30. Five observations lie outside the interval from the first to the third quartile, with values of 17, 18, 40, 50, and 75. a. Draw the boxplot for this distribution. b. Is the skewness positive, negative, or zero? Excel (apply)

Course Outcome 3 (CO3):
1. For any health care, do extraction , transformation and finally visualizing the output using Tableau.(apply)
2. Perform market basket analysis to determine the product that together garnered the maximum sales of a company data (apply)

Course Outcome 4 (CO4):
1. Generate a visualizing report by performing the following operations Creating a scatterplot Adding a regression line to a scatterplot ,Plotting categories , Labelling the graph , Legend layouts, Creating a facet, Theming , Creating bar charts , Creating violin plots , Creating density plots for the following data using R

1	Country Name	Country Code	2010	2011	2012	2013	2014	2015	2016	2017
2	Aruba	ABW	101669	102053	102577	103187	103795	104341	104822	105264
3	Afghanistan	AFG	28803167	29708599	30696958	31731688	32758020	33736494	34656032	35530081
4	Angola	AGO	23369131	24218565	25096150	25998340	26920466	27859305	28813463	29784193
5	Albania	ALB	2913021	2905195	2900401	2895092	2889104	2880703	2876101	2873457
6	Andorra	AND	84449	83751	82431	80788	79223	78014	77281	76965
7	Arab World	ARB	356508908	364895878	373306993	381702086	390043028	398304960	406452690	414491886
8	United Arab Emirates	ARE	8270684	8672475	8900453	9006263	9070867	9154302	9269612	9400145
9	Argentina	ARG	41223889	41656879	42096739	42539925	42981515	43417765	43847430	44271041
10	Armenia	ARM	2877311	2875581	2881922	2893509	2906220	2916950	2924816	2930450

2. How do connect R studio with Google ads?(understand)

Course Outcome 5 (CO5):
1. Create a stacked column chart using power BI (apply)
2. Create a calendar heat map using power BI

21AI6S01	BIG DATA ANALYTICS FOR BUSINESS	L	T	P	C
		3	0	0	3

Preamble

This course focuses on big data technologies used for analysis and manipulation of data using for business. The student will learn about fundamentals of Predictive analytics and have hand on training on the same It also help to develop projects and apply existing data analytics tools to gain comprehensive knowledge on Data analytics on business. This will enable the students to develop modular applications related to the field of engineering.

Prerequisites for the course

- MS Excel
- Probability and statistics

Objectives

1. To know the fundamentals of business analytics and big data.
2. To explore big data analytics pattern
3. To perform batch analysis for various applications
4. To know the fundamentals of data bases and framework for business
5. To provide an overview about text and multimedia analytics

UNIT I	INTRODUCTION TO SMARTER WORLD	9

Smarter business- who is using big data- how companies are using big data-focus to reap the rewards-the smart strategy board- the pear tree metaphor-smart analytics and Google- measure and metrics of data- types of data- the new forms of data- anatomy of big data

SUGGESTED ACTIVITIES

- Discussion on smarter world
- Comparison of various big data approaches used for business

SUGGESTED EVALUATION METHODS

- Quizzes on big data approaches
- Assignment on various case studies of big data used for business

UNIT II	BIG DATA ANALYTICS PATTERN	9

Characteristics of big data –Domain specific example of big data-analytics flow for big data-Big data stack-mapping analytics flow to big data stack- case study: weather data analysis- analytics patterns

SUGGESTED ACTIVITIES

- Demonstrate the analytics flow of big data
- Discussion about how to map analytics flow to big data stack

SUGGESTED EVALUATION METHODS

- Demonstration of weather data analysis
- Quiz on analytics pattern

UNIT III	BATCH ANALYSIS	9

Hadoop and map reduce- map reduce programming model- Hadoop YARN -Hadoop Schedulers-Hadoop map reduce example- Batch analysis for sensor data- Batch analysis for N-Gram data set- Find top N words with map reduce-PIG- loading data- data types in pig- data filtering and analysis- storing results- debugging operators- pig examples- case study: batch analysis of new articles

SUGGESTED ACTIVITIES

- Implementation of Hadoop and map reduce for N-Gram data set
- Demonstrate data filtering and analysis using pig

SUGGESTED EVALUATION METHODS

- Demonstration of program for processing a large data set using pig
- Demonstration of batch analysis for stock data.

UNIT IV	SERVING DATA BASES AND WEB FRAMEWORK FOR BUSINESS	9

Relational databases- MySQL- Non relational databases- Cassandra- Mango DB- python web application frame work Django architecture- starting development with Django- Case study: Django application for viewing customer churn analysis

SUGGESTED ACTIVITIES

- Discussion about relational and non-relational data base
- Demonstrate various programs using Mango DB

SUGGESTED EVALUATION METHODS

- Demonstration of Django application for weather data set
- Demonstration of Django application for social network analysis

UNIT V	ADVANCED ANALYTICS FOR BUSINESS	9

Text categorization- Text clustering- concept extraction- Sentimental analysis-E-Governance- document summarization-customer feedback analysis- speech and video analytics- face recognition- visual analytics- combined analytics

SUGGESTED ACTIVITIES

- Demonstrate program for sentimental analysis
- Assignment on various text categorization methods

SUGGESTED EVALUATION METHODS

- Demonstration of programs for face recognition
- Demonstration of programs for speech analytics

	Total Periods	45

Suggestive Assessment Methods

Continuous Assessment Test (30 Marks)	Formative Assessment Test (10 Marks)	End Semester Exams (60 Marks)
1. DESCRIPTIVE QUESTIONS	1.ASSIGNMENT 2. ONLINE QUIZZES 3.PROBLEM-SOLVING ACTIVITIES	1.DESCRIPTIVE QUESTIONS

Course Outcomes
Upon completion of the course, the students will be able to:
CO1: To acquire the Basics terms and concepts of smarter business in big data **CO2:** To attain a pattern for big data analytics **CO3**: Able to perform batch analysis using Hadoop and map reduce **CO4:** Implementation of data bases and frameworks for business applications **CO5:** To know the basic knowledge about various text and multimedia analytics approaches
Text Books
1. Bernard Marr, "Big data using smart big data- analytics and metrics to make better decision and improve performance", Willey, First edition, 2015 2. Majid Nabavi, David L.Olson, Introduction to Business Analytics, Business Expert Press, 2018 3. Umesh R Hodeghatta and Umesha Nayak, Business Analytics Using python - A Practical ApproachApress, 2017.
Reference Books
1. Jeffery D.Camm, James J. Cochran, Michael J. Fry, Jeffrey W. Ohlmann, David R. Anderson, Essentials of Business Analytics, Cengage Learning, 2015 2. Sandhya Kuruganti, Business Analytics: Applications To Consumer Marketing, McGraw Hill, 2015
Web Resources
• https://www.liverpool.ac.uk/study/postgraduate-taught/taught/business-analytics-and-big-data-msc/overview/ • https://www.selecthub.com/big-data-analytics/big-data-business-analytics/ • https://www.techtarget.com/searchbusinessanalytics/definition/big-data-analytics

CO Vs PO Mapping and CO Vs PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2			2							1		
2	3	2	2			2							1		
3	3	2	2			2							2		
4	3	2	2			2							2		
5	3	2	2			2							3		

BLOOMS LEVEL ASSESSMENT PATTERN

BLOOMS CATEGORY	CAT 1	CAT 2	FAT 1	FAT 2	END SEM EXAM

REMEMBER	20	10	5	5	10
UNDERSTAND	40	20	10	10	20
APPLY	40	50	5	5	50
ANALYZE		20	5	5	20
EVALUATE					
CREATE					

COURSE LEVEL ASSESSMENT QUESTIONS

COURSE OUTCOME 1:

1. Fill up the smart strategy board for your own business ideas (apply)

2. Assume any three types of dataset and complete filling the details to answer the smart question for business plans (apply)
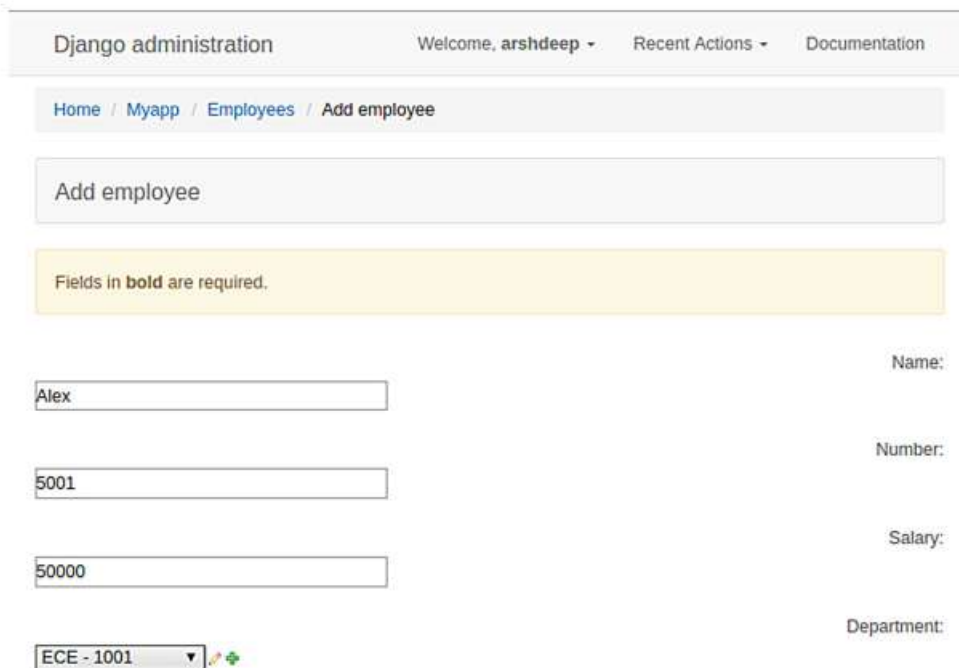

COURSE OUTCOME 2:

1. Elaborate the big data analytics flow for real time fleet tracking in logistics and transportation domain (analyze)

2. Build a regression model for predicting drug response using big data stack and data analytics flow (apply)

COURSE OUTCOME 3:

 1. Perform batch analysis for sensor data using Hadoop and map reduce (apply)

 2. Perform batch analysis for news articles using pig (apply)

COURSE OUTCOME 4:

1. Demonstrate a Django application for book recommendation system

2. Create the Django template for employee web page like the example below

COURSE OUTCOME 5:

1. In the below example, positive and negative sentiment are associated with words. Perform text summarization and elaborate how to classify the polarity of the text.

2. Perform the steps in text analytics for new articles recommendation (apply)

21AI7S01	ARTIFICIAL INTELLIGENCE FOR BUSINESS	L	T	P	C
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Preamble					

This course aims to provide the students with a foundation of upcoming technology using their business. The focus is to develop the skills in students, and to improve their proficiency in applying the knowledge of artificial intelligence to solve business analytics problems. This will enable the students to develop modular applications related to the field of engineering.

Prerequisites for the course

- ARTIFICIAL INTELLIGENCE

Objectives

1. To learn the business innovation with AI.
2. To develop critical thinking in business process modelling.
3. To analyse a business use case using AI.
4. To learn recommendation techniques are used in business.
5. To learn embedding AI in to business processes.

UNIT I	INTRODUCTION TO BUSSINESS INNOVATION	9

Introduction to business innovation with AI-Benefits of AI- Ethics and Privacy issues-AI and predictive analytics- Application areas-Clustering or Segmentations-Psychographic Personas-Business process modelling-Change management processes-Business process agility-Data analytics business agility-Decentralized decision making-Finer granularity in business response

SUGGESTED ACTIVITIES

- Discussion on Artificial intelligence for business
- Demonstrate how artificial intelligence works for business

SUGGESTED EVALUATION METHODS

- Demonstrate real time artificial intelligence business applications

UNIT II	INTELLIGENT BUSINESS PROCESS	9

Business analysis and requirements modelling-Critical thinking in BPM -Strategizing for business optimization-Digital business strategy for AI –Business agility in decision making-Leadership in business optimization-Business Optimization initiatives-Developing a business case for AI-imposed disruptions to business-Business disruption prediction framework

SUGGESTED ACTIVITIES

- Discussion on Business process
- Group -Discussion on business response

SUGGESTED EVALUATION METHODS

- Demonstration of data analytics using business agility
- Demonstration of Covid -19 pandemic and digital business

UNIT III	DIGITAL BUSINESS PROCESSES	9

Collaborative digital business- Complexities of collaborative digital business-visualization and business processes-Leadership and culture change in Business- HR management- Training business people- Business compliance and quality-Cyber security in BO- Cyber security as a business decisions-Cyber security analysis using business analysis

SUGGESTED ACTIVITIES

- Discussion on digital business
- Comparison study on the business optimization and digital business
- Discussion on cyber security analysis

SUGGESTED EVALUATION METHODS		
• Demonstration of digital business framework		
• Demonstration of business agility of decision making		
UNIT IV	**RECOMMENDATION ENGINES**	**9**

Recommendation techniques: Content based recommendations, collaborative recommendations-Applications of recommendation Engines in Business-Collection of data –storing the data-Analysing the data-Business use case- Embedding AI in to Business processes- Artificial intelligence for growth-AI for Customer service-Applying AI for Marketing

SUGGESTED ACTIVITIES
• Discussion on collection of data, storing and analysing the data
• Solve problems by using business case of recommendation engines
SUGGESTED EVALUATION METHODS
• Demonstration of collaborative and content based recommendations

UNIT V	**AI IN BUSINESS**	**9**

Embedding analytics in business process – Preparing the data- data analytics types and relevance in BO-Descriptive analysis- Predictive analysis-Collaborative digital business process- Complexities of collaborative digital business - Applications for NLP in business: Customer service, Reputation monitoring, Market Intelligence-Sentiment technology in business

SUGGESTED ACTIVITIES
• Assignment on AI in business for marketing
• Discussion on Marketing intelligence
SUGGESTED EVALUATION METHODS
• Demonstration of applications for NLP in business
• Demonstration of sentiment technology in business

	Total Periods	**45**

Suggestive Assessment Methods

Continuous Assessment Test (30 Marks)	Formative Assessment Test (10 Marks)	End Semester Exams (60 Marks)
1. DESCRIPTIVE QUESTIONS 2. PROBLEM SOLVING QUESTIONS	1.ASSIGNMENT 2. ONLINE QUIZZES 3.PROBLEM-SOLVING ACTIVITIES	1.DESCRIPTIVE QUESTIONS 2. PROBLEM SOLVING QUESTIONS

Course Outcomes

Upon completion of the course, the students will be able to:

CO1 Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning. (Apply)

CO2 Apply structured thinking to unstructured problems (Apply)

CO3 Implement data analytics for business optimization. (Analyse)

CO4 Implement recommendation systems for business optimization(Apply)

CO5 Apply NLP in business (Apply)

Text Books

1. Artificial intelligence for business , Rajendar Akerkar ,2019
2. Artificial intelligence and Machine learning for business ,Steven Finlay,2018
3. Artificial intelligence for business Optimization ,Bhuvan unhelkar,2021

Reference Books
1.   Artificial intelligence business: Commercial uses of Artificial intelligence Patrick henry Winston, Karen.A.Predergast,2019

Web Resources
1. https://www.coursera.org/lecture/wharton-ai-fundamentals-non-data-scientists/ai-for-business-introduction-nOPzM
2. https://www.techtarget.com/searchenterpriseai/definition/machine-learning-ML
3. https://www.coursera.org/lecture/deep-learning-business/1-0-introduction-to-deep-learning-for-business-gPIRl
4. https://emerj.com/ai-sector-overviews/use-cases-recommendation-systems/
5. https://www.youtube.com/watch?v=N_eHmaRf9T4

CO Vs PO Mapping and CO Vs PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3			2							1		
2	3	3	3			2							1		
3	3	3	3			2							2		
4	3	3	3			2							2		
5	3	3	3			2							3		

BLOOMS LEVEL ASSESSMENT PATTERN

BLOOMS CATEGORY	CAT 1	CAT 2	FAT 1	FAT 2	END SEM EXAM
REMEMBER	20	10	5	5	10
UNDERSTAND	40	20	10	10	20
APPLY	40	50	5	5	50
ANALYZE		20	5	5	20
EVALUATE					
CREATE					

COURSE LEVEL ASSESSMENT QUESTIONS
Course Outcome 1 (CO1): (Apply)
1. Why do we need Artificial Intelligence?
2.Give some real-world applications of AI using business.
Course Outcome 2 (CO2): (Apply)

1. How is KNN different from k-means clustering?

2. How would you handle an imbalanced dataset?

Course Outcome 3 (CO3): (Apply)

1. How do you ensure you're not overfitting with a model?

2. What evaluation approaches would you work to gauge the effectiveness of a machine learning model?

3. Given two strings, A and B, of the same length n, find whether it is possible to cut both strings at a common point such that the first part of A and the second part of B form a palindrome.

Course Outcome 4 (CO4): (Apply)

1. Does the data model use predictive analytics and machine learning to produce the recommendations?

2. Does the Recommendation Engine work in real-time?
   3. A data set is given to you and it has missing values which spread along 1 standard deviation from the mean. How much of the data would remain untouched?

Course Outcome 5 (CO5): (Apply)
1. What is the problem you plan to solve with AI?

2. What is overfitting? How can it be overcome in Machine Learning?