SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE
(AUTONOMOUS)
(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi)
UG ProgrammesCE,CSE,ECE,EEE,IT& ME are Accredited by NBA
CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

Estd:1980

Regulation: R20	

COMPUTER SCIENCE & ENGINEERING (Honors)

SCHEME OF INSTRUCTION & EXAMINATION **(With effect from 2020-21 admitted Batch onwards)**

Course Code	Course Name	Year/ Sem	Cr	L	T	P	Int. Marks	Ext. Marks	Total Marks
B20CSH101	Statistical Methods for Data Science	II-II	4	3	1	0	30	70	100
B20CSH201	Data Visualization Using Tableau	III-I	4	3	1	0	30	70	100
B20CSH301	Advanced Data Analytics	III-II	4	3	1	0	30	70	100
B20CSH401	Natural Language Processing	IV-I	4	3	1	0	30	70	100
B20CSH501	*MOOCS-I	II-II to IV-II	2	--	--	--	--	--	100
B20CSH601	*MOOCS-II	II-II to IV-II	2	--	--	--	--	--	100
	TOTAL		20	12	4	0	120	280	600

*Two MOOCS courses of any COMPUTER SCIENCE &ENGINEERING related Program Core Courses from NPTEL/SWAYAM with a minimum duration of 8 weeks (2 Credits) courses other than the courses offered need to be taken by prior information to the concern. These courses should be completed between II Year II Semester to IV Year II Semester

Code	Category	L	T	P	C	I.M	E.M	Exam
B20CSH101	Honors	3	1	--	4	30	70	3 Hrs.

STATISTICAL METHODS FOR DATA SCIENCE
(Honors Degree Course in CSE)

Course Objectives:

1.	To provide insights about the basic roles of various statistical methods in building computer applications
2.	To develop a greater understanding of the importance of Data Visualization techniques
3.	To develop problem-solving skills
4.	To make inferences about the population parameters using sample data
5.	To provide an understanding on the importance and techniques of predicting a relationship between the two sets of data and determine the goodness of fitted model

Course Outcomes: At the end of the course Students will be ableto

S.No	Outcome	KnowledgeLevel
1.	Analyze an extremely large data set and perform exploratory data analysis to extract meaningful insights	K3
2.	Develop various visualizations of the data in hand and communicate results of analysis effectively (visually and verbally)	K3
3.	Examine a real-world problem and solve the same with the knowledge gained from various distributions study	K3
4.	Use and fit a linear regression model to data and use it for prediction	K3
5.	Fit a polynomial regression model to data and use it for prediction	K3

SYLLABUS

UNIT-I (10 Hrs)	**Introduction to Statistics**: Definition of statistics, basic objectives, applications in various branches of science with examples, collection of data: internal and external data, primary and secondary data, population and sample, representative sample.
UNIT-II (10 Hrs)	**Descriptive Statistics**: Classification and tabulation of univariate data, graphical representation, frequency curves, descriptive measures - central tendency and dispersion, bivariate data, summarization, marginal and conditional frequency distribution. **Introduction to R:** Introduction, Installing R and data types in R, programming using R: operators, conditional statements, looping, scripts, function creation, creating list, list operations, recursive list, creating a data frame, operations on data frames.
UNIT-III (10 Hrs)	**Data Visualization using R:** Import - export of data, measures of central tendency and measures of dispersion, data visualization – scatter plot, pie chart, histogram, bar chart, box plot, absolute and relative

	frequencies, frequency distribution.
UNIT-IV **(10 Hrs)**	**Correlation & Linear Regression**: Correlation: Correlation, types of correlation, coefficient of correlation, rank correlation coefficient. Linear Regression: Introduction, regression model, interval estimation, estimation of parameters of β_0 and β_1, Estimation of σ_2.
UNIT-V **(10 Hrs)**	**Non-Linear Regression:** Regression of second-degree polynomial (non-linear least square method for polynomial function), power function, exponential, estimation of coefficients, linear and polynomial regressions in R.

Text Books:	
1.	Introductory Statistics, Thomas H. Wonnacott& Ronald J. Wonnacot, John Wiley & Sons Inc., 1969
2.	Applied Statistics and Probability for Engineers, Douglas C. Montgomery, George C. Runger, 3rd Edition, John Wiley & Sons, Inc., 2003
3.	R for Beginners, Sandip Rakshit, 1st Edition, McGraw-Hill Education, 2017
Reference Books:	
1.	R-The Statistical Programming Language, Dr. Mark Gardner, Wiley India Pvt. Ltd, 2013
2.	Introduction to the Theory of Statistics, A. M. Mood, F. A. Graybill and D. C. Boes, 3rd Edition, McGraw Hill Education, 2017
3.	Introduction of Probability Models, S. M. Ross, 11th Edition, Academic Press, N.Y., 2014
4.	Statistical Methods, S. P. Gupta, 42nd Revised Edition, Sultan Chand & Sons, 2012

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II B.Tech II Semester MODEL QUESTION PAPER

STATISTICAL METHODS FOR DATA SCIENCE

(Honors Degree Course in CSE)

Time: 3Hrs.	Max. Marks:70

Answer any one Question from EACH UNIT.

All questions carry equal marks.

				CO	KL	M
			UNIT-I			
1	**a).**		Define Statistics? Discuss different objectives of it	1	2	7
	b).		Write about primary and secondary data with example	1	2	7
			OR			
2	**a).**		Write about population, sample and representative sample with example.	1	2	7
	b).		Discuss different applications of statistics in various branches of science with examples	1	2	7
			UNIT-II			
3	**a).**		What is central tendency and dispersion? Explain by applying these two for suitable data	2	3	7
	b).		Write a R program for MAX of three numbers with conditional statements	2	3	7
			OR			
4	**a).**		Discuss in detail about marginal, conditional and frequency distribution	2	2	7
	b).		Write a R program for factorial of a given number with looping statement	2	3	7
			UNIT-III			
5	**a).**		Write a R program for Import and export of data	3	3	7
	b).		Creating a box plot for 'mtcars' with R language	3	3	7
			OR			
6	**a).**			3	3	7
	b).		What is absolute and relative frequency and write a R program for them	3	3	7
			UNIT-IV			
7	**a).**		Define correlation? Illustrate correlation coefficient with suitable example	4	3	7
	b).		Let T be the time that is needed for a specific task in a factory to be completed. In order to estimate the mean and variance of T, we	4	3	7

		observe a random sample T1,T2,···,T6. Thus, We obtain the following values (in minutes): **18,21,17,16,24,20.** Find the value of the σ^2 for the observed sample.			
		OR			
8	**a).**	Define correlation? Illustrate Rank correlation with suitable example	4	3	7
	b).	Illustrate Linear Regression	4	3	7
		UNIT-V			
9	**a).**	R program to illustrate Linear regression	5	3	7
	b).	Discuss about power function, exponential, estimation of coefficients with suitable examples	5	2	7
		OR			
10	**a).**	Illustrate non-linear least square method for polynomial function	5	3	7
	b).	R program to illustrate Polynomial regression	5	3	7

Code	Category	L	T	P	C	I.M	E.M	Exam
B20CSH201	Honors	3	1	--	4	30	70	100

DATA VISUALIZATION USING TABLEAU

(Honors Degree Course in CSE)

Course Objectives: The students able to

1.	Understand basic concepts of Tableau
2.	Understand concepts of Tableau Filters, groups and sets
3.	Understand concepts of Tableau calculated fields and table calculations
4.	Understand and draw the Tableau charts
5.	Study and analyze the dashboards

Course Outcomes: At the end of the course Students will be able to

S.No	Outcome	Knowledge Level
1.	Outline the basic concepts of Tableau	K2
2.	Outline data organization in Tableau using Filters, groups and sets	K2
3.	Illustrate about different Tableau calculations to enhance data	K3
4.	Demonstrate about different Tableau charts and apply that knowledge to draw charts for various applications.	K3
5.	Explain about different Tableau dashboards and apply that knowledge to different applications.	K3

SYLLABUS

UNIT-I (10 Hrs)	**Basics:** What Is Tableau, Uses Of Tableau, Tableau Versions, Tableau Architecture, Tableau New Features, How To Install Tableau, Connecting to text files, Connecting to Excel files, Connecting to Access databases, Connecting to a SQL Server, Pasting from a clipboard, Connecting to other databases, Understanding dimensions and measures, Changing data types, Applying filters, Merging multiple data sources
UNIT-II (10 Hrs)	**Simplifying and Sorting Data:** Sorting data in Tableau, Enhancing View with Filters, Sets, Groups, and Hierarchies, How tableau uses date fields
UNIT-III (12 Hrs)	**Creating Calculations to enhance data:** **What is aggregation?:** Dimension versus Attribute **What are calculated fields and Table calculations?:** How Do Calculated Fields Work, Creating Calculated Fields with the Calculation Editor, Performing Ad Hoc Calculations, How Do Table Calculations Work? A Word on Calculations and Cubes, Using the Calculation Editor to Build Calculated Fields, Ad Hoc Calculated Fields, Building Formulas Using Table Calculations, Adding Flexibility to Calculations with Parameters, Why You Should Learn Level of Detail Expressions.

UNIT-IV **(12 Hrs)**	**Tableau Charts:** **Creating Univariate Charts:** Introduction, Creating tables, Creating bar graphs, Creating pie charts, Sorting the graphs, Creating histograms, Creating line charts, Using the Show Me toolbar, Creating stacked bar graphs, Creating box plots, Showing aggregate measures **Creating Bivariate Charts:** Introduction, Creating tables, Creating scatter plots, Swapping rows and columns, Adding trend lines, Selecting color palettes, Using dates **Creating Multivariate Charts:** Introduction, Creating facets, Creating area charts, Creating bullet graphs, Creating dual axes charts, Creating Gantt charts, Creating heat maps
UNIT-V **(8 Hrs)**	**Dashboards:** Dashboards in Tableau, Types of Dashboards, Building an Exploratory Dashboard, Building an Explanatory Dashboard

Text Books:	
1.	Tableau Data Visualization Cookbook, Ashutosh Nandeshwar, Packt Publishing Ltd, First Edition, 2013 [CHAPTER 1&4]
2.	Tableau Your Data!, Daniel G. Murray, John Wiley & Sons, Inc., Second edition, 2016 [CHAPTER 2&3]
3.	Communicating Data with Tableau, Ben Jones, O'Reilly Media, Inc., First Edition, 2014 [CHAPTER 5]

Reference Books:	
1.	Ryan Sleeper, Practical Tableau: 100 Tips, Tutorials, and Strategies from a Tableau Zen Master 1st Edition, Kindle Edition
2.	Molly Monsey and Paul Sochan, Tableau for Dummies (For Dummies (Computer/Tech)), Publisher: For Dummies
3.	Joshua N. Milligan, Learning Tableau 10, Packt Publishing
4.	Shweta Sankhe-Savale, Tableau Cookbook – Recipes for Data Visualization

e-Resources	
1.	https://www.educba.com/tableau-visualization/
2.	https://www.tableau.com/learn/articles/data-visualization
3.	https://towardsdatascience.com/tableau-visualizations-dc9e544dc9a8
4.	https://wmich.edu/sites/default/files/attachments/u1158/2019/Tableau%20WMU_2.pdf
5.	https://programmer-books.com/wp-content/uploads/2019/10/Creating-Data-Stories-with-Tableau-Public.pdf

			Course Code:B20CSH201		

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III B.Tech I Semester MODEL QUESTION PAPER
DATA VISUALIZATION USING TABLEAU
(Honors Degree Course in CSE)

Time: 3 Hrs	Max. Marks:70

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1	a).	Discuss different uses of Tableau	1	2	7
	b).	Explain how to merge different data sources in Tableau	1	2	7
		OR			
2	a).	Illustrate the architecture of Tableau	1	2	7
	b).	Explain how to establish connection to SQL server from Tableau	1	2	7
		UNIT-II			
3	a).	Demonstrate how to sort the data in Tableau	2	2	7
	b).	Demonstrate Groups in Tableau	2	2	7
		OR			
4	a).	Explain How tableau uses date fields	2	2	7
	b).	Demonstrate sets in Tableau	2	2	7
		UNIT-III			
5	a).	Explain Dimension versus attribute	3	2	7
	b).	How to perform Ad Hoc calculations in Tableau? Explain	3	3	7
		OR			
6	a).	Explain the process of Creating Calculated Fields with the Calculation Editor	3	2	7
	b).	Demonstrate the process of Building Formulas Using Table Calculations	3	3	7
		UNIT-IV			
7	a).	Illustrate the process of histogram creation in tableau	4	3	7
	b).	Explain the step-by-step process of bi-variate chart creation	4	3	7
		OR			
8	a).	Explain the step-by-step process of multi-variate chart creation	4	3	7
	b).	Illustrate the process of pie chart creation in tableau	4	3	7

		UNIT-V			
9	a).	Demonstrate each component in tiled dashboard	5	2	7
	b).	Explain each component in explanatory dashboard showing the best and worst NYC recyclers	5	2	7
		OR			
10	a).	Illustrate each step of Building an Exploratory Dashboard	5	3	7
	b).	Explain each component in exploratory dashboard of basketball player stats	5	2	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

Code	Category	L	T	P	C	I.M	E.M	Exam
B20CSH301	**Honors**	**3**	**1**	**--**	**4**	**30**	**70**	**100**

ADVANCED DATA ANALYTICS

(Honors Degree Course in CSE)

Course Objectives:

1.	To introduce the fundamental concepts of image processing and acquisition
2.	To introduce image analytics techniques like image segmentation and image classification
3.	To impart fundamental time series analysis techniques like smoothing, finding trend, seasonality and forecasting
4.	To equip students with knowledge required for analyzing social media platforms like Twitter and Facebook

Course Outcomes: At the end of the course Students will be ableto

S.No	Outcome	Knowledge Level
1.	Explain different Image processing and acquisition methods	K2
2.	Apply digital image analysis techniques like image segmentation and image classification	K3
3.	Formulate different time series analysis techniques like smoothin, finding trend, seasonality and forecasting	K2
4.	Analyze Twitter Data using R	K4
5.	Analyze Facebook Data using R	K4

SYLLABUS

UNIT-I (6Hrs)	What is computer vision? **Image and its properties**, Image types, Reading, Writing and Displaying Images **Spatial Filters**: Filtering, Edge Detection using Derivatives, Shape detecting filter **Image Enhancement**: Pixel Transformation, Image inverse, Power law transformation, Log transformation, Histogram Equalization, Contrast Stretching, Sigmoid Correction, Local Contrast Normalization **Affine Transformation**: Translation, Rotation, Scaling, Interpolation
UNIT-II (10Hrs)	**Segmentation**: Histogram Based Segmentation, Region-Based Segmentation, Contour-Based Segmentation, Segmentation Algorithm for Various Modalities **Image Classification** using Naïve Bayes Classifier (Text Book 4)
UNIT-III (06Hrs)	**Time Series Analysis** **Time Series Data**: Data Collection, Time Series Components, Visualizing Time Series, Interactive Visualization, Data Pre-Processing **Smooting Methods**: Introduction, Moving Average, Differencing, Simple Exponential Smoothing

	Regression Models: **Trend and Seasonality**: Model with Trend, Model with Seasonality, Model with Trend and Seasonality
	Regression Models: **Autocorrelation**: Autocorrelation, AR and ARIMA Models
UNIT-IV (10Hrs)	**Getting Started with Social Media Analytics: Social media analytics:** A typical social media analytics workflow, Opportunities, Challenges **Twitter – What's Happening with 140 Characters: Understanding Twitter:** APIs, Registering an application, Connecting to Twitter using R, Extracting sample Tweets **Revisiting analytics workflow, Trend analysis, Sentiment analysis:** Key concepts of sentiment analysis, Subjectivity, Sentiment polarity, Opinion summarization, Features, Sentiment analysis in R, **Follower graph analysis:** Challenges
UNIT-V (08Hrs)	**Analyzing Social Networks and Brand Engagements with Facebook** **Accessing Facebook:** Understanding the Graph API, Understanding Rfacebook, Understanding Netvizz, Data access challenges, **Analyzing your personal social network:** Basic descriptive statistics, Analyzing mutual interests, Build your friend network graph, Visualizing your friend network graph, Analyzing node properties, Degree, Closeness, Betweenness, Analyzing network Commmunities: Cliques, Communities **Analyzing an English football social network:** Basic descriptive statistics, Visualizing the network, Analyzing network properties: Diamete, Page distances, Density, Transitivity, Coreness Analyzing node properties : Degree, Closeness, Betweenness, Visualizing correlation among centrality measures, Eigenvector centrality, PageRank, HITS authority score, Page neighbours, Analyzing network communities: Cliques, Communities

Text Books:

1.	"Image Processing and Acquisition using Python", Ravishankar Chityala, Sridevi Pudipeddi, 2nd Edition, CRC Press (Unit 1 & Unit 2)
2.	Practical Time Series Forecasting with R- A Hands-on Guide", GalitShmueli, Kenneth C. Lichtendahl Jr., second edition, Axelrod Schnall Publishers, 2016. (Unit 3)
3.	"Learning Social Media Analytics with R: Transform data from social media platforms into actionable insights", Raghav Bali, Dipanjan Sarkar, Tushar Sharma, Packt Publishers, 2017 (Unit 4 & Unit 5)
4.	"Fundamentals of Image Data Mining": Analysis, Features, Classification and Retrieval", Dengsheng Zhang, 2nd Edition, Springer,2019 (Unit 2)

Reference Books:

1.	"The analysis of Time Series: An Introduction with R", Chris Chatfield, Haipeng Xing, CRC Press, 7th edition, 2019.
2.	"Python Image Processing: Cookbook", Sandipan Dey, Packt Publishing, 2020

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III B.Tech II Semester MODEL QUESTION PAPER

ADVANCED DATA ANALYTICS

(Honors Degree Course in CSE)

Time: 3 Hrs			Max. Marks:70

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1	a).	Write a program to read and write an image using Python	1	3	7
	b).	Explain the different edge detection filters	1	2	7
		OR			
2	a).	Summarize the different image enhancement techniques	1	2	7
	b).	Illustrate the significance of different Affine transformation techniques with suitable examples	1	2	7
		UNIT-II			
3	a).	Classify image segmentation methods	2	2	6
	b).	Write a program to implement Histogram-Based Segmentation	2	3	8
		OR			
4		Illustrate image classification using Naïve Bayes Algorithm	2	2	14
		UNIT-III			
5	a).	Outline the different preprocessing techniques that can be applied on timeseries	3	2	6
	b).	Explain the different types of trends that can be present in a time series and	3	2	8
		OR			
6	a).	Explain the significance of different smoothing techniques. Write an R program to capture linear trend in Amtrak ridershipdata.	3	2	7
	b).	Illustrate Auto Regression and ARIMA Models	3	2	7
		UNIT-IV			
7	a).	Write a program for extracting data from Twitter using R	4	3	6
	b).	Write an R program for sentiment analysis on Twitter data	4	3	8
		OR			
8		Demonstrate the process for identifying trending topics on Twitter	4	2	14

		UNIT-V			
9	**a).**	Write a program to extract basic descriptive statistics of our Facebook account using R	**5**	**3**	**7**
	b).	Illustrate the process to analyze Facebook communities	**5**	**2**	**7**
		OR			
10	**a).**	Write a program to find page rank and HITS authority score of different pages in 'English Premier League football' social network	**5**	**3**	**7**
	b).	Write an R program to find mutual interested pages of two people on Facebook	**5**	**3**	**7**

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

Code	Category	L	T	P	C	I.M	E.M	Exam
B20CSH401	**Honors**	**3**	**1**	**0**	**4**	**30**	**70**	**100**

Natural Language Processing

(Honors Degree Course in CSE)

Pre-requisites: Data Structures, Finite Automata and Probability Theory

Course Objectives:

1.	To introduce the fundamental concepts and ideas in Natural Language Processing (NLP)
2.	To introduce some of the problems and solutions of NLP and their relation to linguistics and statistics
3.	To provide an understanding of the algorithms available for the processing of linguistic information and the underlying computational properties of natural languages
4.	To study and compare various NLP algorithms and design modelling techniques

Course Outcomes: At the end of the course Students will be able to

S. No	Outcome	Knowledge Level
1.	Describe the underlying concepts of Natural Language, Language Model Evaluation, Morphological Models and Issues and Challenges in finding the structure of a word and documents.	K2
2.	Explain about Parsing Natural Language and Multilingual Issues in Syntax Analysis	K3
3.	Explain about syntactic structure and language-specific modelling problems	K3
4.	Formulate various predicate techniques and analyze discourse processing	K4
5.	Analyze various language modeling techniques	K4

SYLLABUS

UNIT-I (6 Hrs)	**Finding the Structure of Words**: Words and Their Components, Issues and Challenges, Morphological Models Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches.

UNIT-II (12 Hrs)	**Syntax Analysis**: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues.

UNIT-III (8 Hrs)	**Semantic Parsing**: Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems, Software.

UNIT-IV (10 Hrs)	**Predicate**-Argument Structure, Meaning Representation Systems, Software. **Discourse Processing**: Cohesion, Reference Resolution, Discourse Cohesion and structure.

UNIT-V **(10 Hrs)**	**Language Modeling**: Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Cross lingual Language Modeling.

Text Books:	
1.	Multilingual Natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication
2.	Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U. S. Tiwary
Reference Books:	
1.	Speech and Natural Language Processing - Daniel Jurafsky & James H. Martin, Pearson Publications

			CO	KL	M
		Course Code: B20CSH401			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		IV B.Tech I Semester MODEL QUESTION PAPER			
		NATURAL LANGUAGE PROCESSING			
		(Honors Degree Course in CSE)			
		Time: 3 Hrs. Max. Marks:70			
		Answer **ONE Question** from **EACH UNIT**			
		All questions carry equal marks			
		Assume suitable data if necessary			
			CO	KL	M
		UNIT-I			
1	a).	Explain about Words and Their Components	1	2	7
	b).	Explain about Issues and Challenges in Finding the Structure of Words	1	2	7
		OR			
2	a).	Analyze Complexity of the Approaches in Morphological Models.	1	2	7
	b).	Analyze Performances of the Approaches in Morphological Models.	1	2	7
		UNIT-II			
3	a).	Explain about Parsing Natural Language	2	3	7
	b).	Explain about Multilingual Issues in Syntax Analysis	2	3	7
		OR			
4		Analyze various parsing algorithms in Syntax Analysis	2	3	14
		UNIT-III			
5	a).	Explain about Semantic parsing	3	3	7
	b).	Explain about Semantic Interpretation	3	3	7
		OR			
6	a).	Explain about Word Sense Systems	3	3	7
	b).	Explain about System Paradigms	3	3	7
		UNIT-IV			
7	a).	Explain about Argument Structure	4	2	7
	b).	Explain about Meaning Representation Systems	4	2	7
		OR			
8	a).	Explain about Discourse Cohesion	4	2	7
	b).	Explain about Reference Resolution	4	2	7
		UNIT-V			
9	a).	Explain about N-Gram Models	5	2	7
	b).	Explain about Parameter Estimation	5	3	7
		OR			
10	a).	Explain about Types of Language Models	5	2	14

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks