SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Computer Science and Engineering & IT

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 6thSemester
Subject Category	Engineering Science Course (PCC)
SubjectCode:**AI-2061**	Subject Name: **Data Visualization and Handling**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	100	3	--	2	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1.

Course Outcomes: After completion of this course students will be able to

CO1. Describe a flow process for data science problems (Remembering)

CO2. Classify data science problems into standard typology (Comprehension)

CO3. Develop R codes for data science solutions (Application)

CO4. Correlate results to the solution approach followed (Analysis)

CO5. Assess the solution approach (Evaluation).

UNITs	Descriptions	Hrs.	CO's
I	Introduction to data visualization and why it is important Basic principles of good data visualization design Common types of charts and graphs and when to use them Gathering and cleaning data	8	1
II	Exploratory data analysis and visualization Advanced data visualization techniques and tools, such as interactive charts and maps Creating effective dashboards and visual storytelling with data Data visualization ethics and avoiding common pitfalls.	8	2
III	Introduction to data handling techniques, such as filtering and sorting data, merging, and reshaping data sets, and working with missing data Introduction to programming concepts for data handling, such as loops and functions, and using tools such as Python or R for data analysis and visualization	8	3

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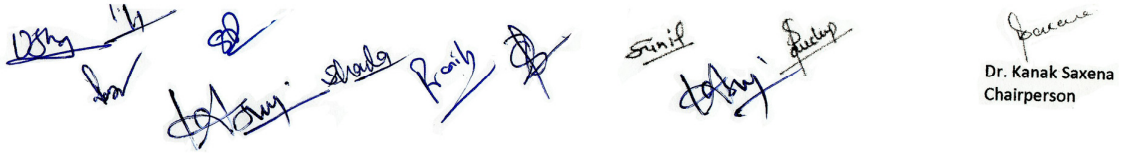
IV	Introduction to ELK and the Elastic Stack Installing and setting up ELK Gathering and parsing log data with Logstash Storing and indexing data in Elastic search Visualizing data with Kibana.	8	4
V	Creating and sharing dashboards in Kibana Advanced Kibana features, such as saved searches and visualizations, and the time lion visualization tool Integrating ELK with other tools and platforms Scaling and managing an ELK deployment Tips and best practices for using ELK effectively.	8	5
Guest Lectures (if any)		Nil	
Total Hours		40	

Suggestive list of experiments:
NO Lab
Text Book- 1. Data Visualization: A Practical Introduction" by Kieran Healy
Reference Books- 1. Mastering Kibana 6.x" by Pranav Shukla and Sharath Kumar M N 2. Elastic Stack 7.x: Up and Running" by Grant S. Sayer and Robert E. Beatty 3. Kibana Essentials" by Pranav Shukla 4. Data Wrangling with Python" by Jacqueline Kazil and David Beazley
List and Links of e-learning resources: 1.
Modes of Evaluation and Rubric
The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Rashi Kumar



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Computer Science & Information Technology

Semester/Year			Program		B.Tech. AIADS
Subject Category	DC	Subject Code:	AI-2062	Subject Name:	Business Intelligence Analytics

Maximum Marks Allotted							Contact Hours			Total Credits
Theory			Practical			Total Marks				
End Sem	Mid-Sem	Assignment/Quiz	End Sem	Lab-Work	Quiz		L	T	P	
70	20	10	30	20	10	150	3	-	2	4

Prerequisites:

Basic understanding of database systems and software engineering.

Course Objective:

The objective of this course is to understand the basic concepts of business intelligence, probability and statistics. To impart the knowledge of BI tools. To familiarize students with the Data Warehousing. The course will help student to understand the problems of current scenario and design of the business solutions.

Course Outcomes:

Upon completion of this course, the student will be able to:

- CO1: Familiarize the importance of business intelligence for organizations.
- CO2: Understand and apply basic concepts of Probability.
- CO3: Understand and analyse bayes theorem and its applications
- CO4: Develop data warehouse for a domain using Data warehouse tools. Operate data warehouse to meet business objectives.
- CO5: Understand the concept of designing data warehouse models using appropriate schemas.

UNITs	Descriptions	Hrs.	CO's
I	**Business Intelligence Introduction** - Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects –	7	CO1

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	Development of a business intelligence system – Ethics and business intelligence, Types of Data, The measure of Central Tendency, Measure of Spread, Standard Normal Distribution, Skewness, Measures of relationship, Central Limit Theorem.		
II	**Basic Probability** -- definition of probability, conditional probability, independent events, Bayes' rule, Bernoulli trials, Random variables, discrete random variable, probability mass function, continuous random variable, Probability Density Function, Cumulative Distributive Function, properties of cumulative distribution function, Two dimensional random variables and their distribution functions, Marginal probability function, Independent random variables.	6	CO2
III	**Bayesian Analysis** – Bayes Theorem, Applications of Bayes Theorem, Decision Theoretic framework and major concepts of Bayesian Analysis Likelihood, Prior and posterior, Loss function, Bayes Rule, One-parameter Bayesian models. Bayesian Machine Learning- Hierarchical Bayesian Model, Regression with Ridge prior, Classification with Bayesian Logistic Regression	8	CO3
IV	**Data Warehousing (DW)**- Introduction & Overview; Data Marts, DW architecture - DW components, Implementation options; Meta Data, Information delivery. ETL - Data Extraction, Data Transformation - Conditioning, Scrubbing, Merging, etc., Data Loading, Data Staging, Data Quality.	7	CO4
V	**Dimensional Modeling** - Facts, dimensions, measures, examples; Schema Design Star and Snowflake, Fact constellation, Slow changing Dimensions. OLAP - OLAP Vs OLTP, Multi-Dimensional Databases (MDD); OLAP MOLAP, HOLAP; ROLAP, Data Warehouse Project Management - Critical issues in planning, physical design process, deployment and ongoing maintenance.	7	CO5
Guest Lectures (if any)		May be arranged as required	
Total Hours		**35**	

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List of Experiments
• Case Study 1 • Case Study 2 • Case Study 3 • Case Study 4 • Case Study 5
Text Book- • **P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall.** • **D. C. Montgomery and G. C. Runger, Applied Statistics and Probability for Engineers, Wiley** • **David** Loshin, ***Business Intelligence*** *- The Savy Manager's Guide Getting Onboard* ***with*** *Emerging* ***IT***, **Morgan** Kaufmann Publishers**,** 2009. • Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.
Reference Books- • Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003. • Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009. • David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager"s Guide", Second Edition, 2012. • Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007. • Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Lifecycle Toolkit", Wiley Publication Inc.,2007.
Modes of Evaluation and Rubric
The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.
List/Links of e-learning resource

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	CS & IT
Subject handled by department	CS & IT

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SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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Department of Computer Science and Engineering IT

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 6thSemester
Subject Category	Professional Elective courses (PEC)
SubjectCode:**AI-2063**	Subject Name: **Natural Langugae Processing**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	100	3	--	2	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 Natural language processing deals with written text.
2 Learn how to process written text from basic of fundamental knowledge.
3 Regular expression and probabilistic model with n-grams.
4 Recognizing Speech and parsing with grammar

Course Outcomes: After completion of this course students will be able to

CO1: Understand comprehend the key concepts of NLP and identify the NLP challenges and issues.
CO2: Develop Language Modeling for various text corpora across the different languages
CO3: Illustrate computational methods to understand language phenomena of word sense disambiguation.
CO4 : Design and develop applications for text or information extraction/summarization/classification
CO5: Apply different Machine translation techniques for translating a source to target language(s).

UNITs	Descriptions	Hrs.	CO's
I	Introduction to NLP: History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP, Applications of NLP, build an NLP pipeline , Phases of NLP, NLP APIs, NLP Libraries.	8	1
II	Unigram Language Model, Bigram, Trigram, N-gram, Advanced smoothing for language modeling, Empirical Comparison of Smoothing Techniques, Applications of Language Modeling, Natural Language Generation, Parts of Speech Tagging, Morphology, Named Entity Recognition	8	2
III	Words and Word Forms: Bag of words, skip-gram, Continuous Bag-Of-Words, Embedding representations for words Lexical Semantics, Word Sense Disambiguation, Knowledge Based and Supervised Word Sense Disambiguation.	8	3

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IV	Text Analysis, Summarization and Extraction: Sentiment Mining, Text Classification, Text Summarization, Information Extraction, Named Entity Recognition, Relation Extraction, Question Answering in Multilingual Setting; NLP in Information Retrieval, Cross-Lingual IR	8	4
V	Need of MT, Problems of Machine Translation, MT Approaches, Direct Machine Translations, Rule-Based Machine Translation, Knowledge Based MT System, Statistical Machine Translation (SMT), Parameter learning in SMT (IBM models) using EM), Encoder-decoder architecture, Neural Machine Translation.	8	5
Guest Lectures (if any)		Nil	
Total Hours		40	

Suggestive list of experiments:

NO LAB

Text Book-

1. Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition Jurafsky, David, and James H. Martin, PEARSON

Reference Books-

1.Foundations of Statistical Natural Language Processing, Manning, Christopher D., and Hinrich Schütze, Cambridge, MA: MIT Press

2. Natural Language Understanding, James Allen. The Benjamin/Cummings Publishing

3. Natural Language Processing with Python – Analyzing Text with the Natural Language ToolkitSteven Bird, Ewan Klein, and Edward Loper.

List and Links of e-learning resources:

1. https://www.kaggle.com/learn/natural-language-processing
2. https://www.javatpoint.com/nlp
3. https://nptel.ac.in/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

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SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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Department of Computer Science and Engineering IT

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 6thSemester
Subject Category	Engineering Science Course (PCC)
SubjectCode:**AI-2064-A**	Subject Name: **Robotics Process Automation**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	100	3	1	--	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 Understand the RPA and the ability to differentiate it from other types of automation.
2. Model the sequences and the nesting of activities.
3. Experiment with workflow in a manner to get the optimized output from a Bot

Course Outcomes: After completion of this course students will be able to

CO 1: Describe RPA, where it can be applied and how it's implemented.
CO 2: Shows the different types of variables, Control Flow and data manipulation techniques.
CO 3: Identify and understand Image, Text and Data Tables Automation.
CO 4: Describe how to handle the User Events and various types of Exceptions and strategies.
CO 5: Understand the Deployment of the Robot and to maintain the connection.

UNITs	Descriptions	Hrs.	CO's
I	Automation RPA vs Automation - Processes & Flowcharts - Programming Constructs Types of Bots Workloads automated RPA Advanced Concepts - Standardization of processes - RPA Development methodologies SDLC - Robotic control flow architecture - RPA business case - RPA Team - Process Design Document/Solution Design Document Risks & Challenges with RPA - RPA and emerging ecosystem.	8	1
II	User Interface - Variables - Managing Variables - Naming Best Practices - Variables Panel The Arguments Panel - Importing New Namespaces- Control Flow - Control Flow Introduction - Control Flow Activities - Data Manipulation - Data Manipulation Introduction - Scalar variables, collections and Tables - Text Manipulation - Data Manipulation - Gathering and Assembling Data	8	2
III	Basic and Desktop Recording , Web Recording , Input/Output Methods Screen Scraping - Data Scraping - Scraping advanced techniques - Selectors - Defining and Assessing Selectors - Customization - Debugging - Dynamic Selectors - Partial Selectors - RPA Challenge - Image, Text & Advanced Citrix Automation - Introduction to Image & Text Automation - Image based automation - Keyboard based automation - Information Retrieval	8	3

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IV	Monitoring system event triggers - Hotkey trigger - Mouse trigger - System trigger - Monitoring image and element triggers - An example of monitoring email - Example of monitoring a copying event and blocking it - Launching an assistant bot on a keyboard event, EXCEPTION HANDLING: Debugging and Exception Handling - Debugging Tools - Strategies for solving issues - Catching errors	8	4
V	DEPLOYING AND MAINTAINING THE BOT: Publishing using publish utility - Creation of Server - Using Server to control the bots - Creating a provision Robot from the Server - Connecting a Robot to Server - Deploy the Robot to Server - Publishing and managing updates - Managing packages - Uploading packages - Deleting packages.	8	5
Guest Lectures (if any)		Nil	
Total Hours		40	

Suggestive list of experiments:

NO Lab

TEXT BOOKS:

3. Alok Mani Tripathi, "Learning Robotic Process Automation", Packt Publishing, 2018.

Reference Books-

1. Frank Casale , Rebecca Dilla, Heidi Jaynes , Lauren Livingston, "Introduction to Robotic Process Automation: a Primer", Institute of Robotic Process Automation,1st Edition 2015.
4. Richard Murdoch, Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant", Independently Published, 1st Edition 2018.
5. Srikanth Merianda,"Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation", Consulting Opportunity Holdings LLC, 1st Edition 2018.
6. 4. Lim Mei Ying, "Robotic Process Automation with Blue Prism Quick Start Guide: Create software robots and automate business processes", Packt Publishing, 1st Edition 2018.

List and Links of e-learning resources:

1. https://www.uipath.com/rpa/robotic-process-automation
2. https://www.academy.uipath.com

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

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Chairperson

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Computer Science and Engineering IT

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 6thSemester
Subject Category	Professional Elective courses (PEC)
SubjectCode:**AI-2064-B**	Subject Name: **Computer Vision**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	100	3	--	2	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

CO1: Identify basic concepts, terminology, theories, models and methods of computer vision.
CO2: Describe basic methods of computer vision related to multi-scale representation.
CO3: Understanding edge detection of primitives, stereo, motion and object recognition.
CO4: Developed the practical skills necessary to build computer vision applications.
CO5:To have gained exposure to object and scene recognition..

Course Outcomes: After completion of this course students will be able to

UNITs	Descriptions	Hrs.	CO's
I	Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis.	8	1
II	Edge detection, Edge detection performance, Hough transform, corner detection Segmentation, Morphological filtering, Fourier transform	8	2
III	Feature extraction, shape, histogram, color, spectral, texture, using CV IP tools, Feature analysis, feature vectors, distance /similarity measures, data pre-processing .	8	3
IV	Pattern Analysis: Clustering: K-Means, K-Medoids, Mixture of Gaussians Classification: Discriminant Function, Supervised, Un-supervised, Semi-supervised .	8	4
V	Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA, and Non-parametric methods. Recent trends in Activity Recognition, computational photography, Biometrics.	8	5

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Guest Lectures (if any)	Nil	
Total Hours	40	

Suggestive list of experiments:

NO LAB

1. Text Book- Computer Vision – A modern approach, by D.Forsyth and J.Ponce, Prentice Hall Robot Vision, by B. K. P. Horn, McGraw-Hill.

Reference Books-

2. Computer Vision: Algorithms and Applications by Richard Szeliski.
3. Deep Learning, by Goodfellow, Bengio, and Courville.
4. Dictionary of Computer Vision and Image Processing, by Fisher et al.
5. Three-Dimensional Computer Vision, by Olivier Faugeras, The MIT Press

List and Links of e-learning resources:

1. https://www.opengl.org/
2. https://learnopengl.com/Getting-started/OpenGL
3. https://developer.nvidia.com/opengl

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

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SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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Department of Computer Science and Engineering IT

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 6thSemester
Subject Category	Professional Elective courses (PEC)
SubjectCode:**AI-2064-C**	Subject Name: **Data Compression**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	100	3	--	2	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1

Course Outcomes: After completion of this course students will be able to

CO1: Identify the important issues in data compression.
CO2: Differentiate and compare variety of data compression techniques.
CO3:Apply techniques for compression of binary programmes,data,sound and image.
CO4: Learn techniques for modelling data and the issues relating to modelling.
CO5: Analyze and implement DCT for compression.

UNITs	Descriptions	Hrs.	CO's
I	Introduction To Data Compression, Lexicon, Data Compression Modeling,Coding, Coding An improvement Modeling, Statistical Modeling, Ziv & Lempel LZ77 LZ78, Lossy Compression, Minimum Redundancy Coding Sahnnon-Fano Algorithm.	8	1
II	Huffman Algorithm, Prototypes, Huffman Code, Counting Symbols, Saving the Counts, Building the Tree, ,Adaptive Huffman Coding Adaptive Coding, Updating Huffman Tree, swapping, Enhancement, Escape Code, Overflow Bonus, Rescaling Bonus, Initialization of the Array, Compress Main Program, Expand Main Program, Encoding Symbol, Decoding Symbol .	8	2
III	Arithmetic Coding Difficulties, Arithmetic Coding:, Practical Matters, Complication, Decoding, Beef Dictionary-Based Compression An Example, Static vs. Adaptive, Adaptive Methods, A Representative Example, Israeli Roots, History, ARC: MS-DOS Dictionary, Dictionary Compression, Danger Ahead-Patents.	8	3

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IV	Sliding Window Compression, An Encoding Problem, balancing Act Greedy vs. Best Possible. expansion routine, Improvements. Speech Compression, Digital Audio Concepts, Fundamentals, Sampling Variables, PC-Based sound, Lossless Compression of Sound, Problems and Results, Loss compression, Silence Compression, Other Techniques.	8	4
V	Lossy Graphics Compression, Enter Compression, Statistical And Dictionary Compression Methods Lossy Compression Differential Modulation Adaptive Coding, A Standard that Works: JPEG, JPEG Compression Discrete Cosine Transform, DCT Specifics, Implementing DCT. Matrix Multiplication,DCT, Quantization.	8	5
Guest Lectures (if any)		Nil	
Total Hours		40	

Suggestive list of experiments:
Text Book- 7. The Data Compression Book – Mark Nelson.
Reference Books- 8. Data Compression: The Complete Reference – David Salomon. 9. Data Compression : The Complete Reference", David Saloman, Springer
List and Links of e-learning resources: 1.
Modes of Evaluation and Rubric
The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

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SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Computer Science and Engineering IT

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 6thSemester
Subject Category	Open Elective Course(OEC)
SubjectCode:**AI-2065(A)**	Subject Name: **Soft Computing**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	--	--	100	3	--	--	3

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 To facilitate students to understand android SDK
2. To help students to gain a basic understanding of Android application development
3. To inculcate working knowledge of Android Studio development tool

Course Outcomes: After completion of this course students will be able to

CO-1: Identify and describe soft computing techniques and their roles in building intelligent machines.

CO-2: Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.

CO-3: Apply genetic algorithms to combinatorial optimization problems.

CO-4: Evaluate and compare solutions by various soft computing approaches for a given problem.

UNITs	Descriptions	Hrs.	CO's
I	Soft Computing: Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing. Neural Network : Structure and Function of a single neuron: Biological neuron, artificial neuron, Difference and characteristics and applications of ANN, Evolution of Neural Networks, Basic Models of Artificial Neural Network, Important Terminologies of ANNs, McCulloch-Pitts Neuron model. Widrow&Hebb;s learning rule/Delta rule	8	1
II	Supervised Learning Network Introduction, Perception Networks, Back-Propagation Network, Radial Basis	8	2

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	Function Network, Time Delay Neural Network Single layer network, Perceptron training algorithm, Linear separability, , ADALINE, MADALINE. Introduction of MLP, Error back propagation algorithm, derivation of BBPA, momentum, limitation, characteristics and application of EBPA. Hybrid Systems: Neuro fuzzy hybrid systems, Adaptive neurofuzzy inference systems.		
III	Unsupervised Learning Networks Introduction, Fixed Weight Competitive Nets, Kohonen Self- Organizing Motor Maps, Adaptive Resonance Theory (ART l,ART 2): Architecture, classifications, Implementation and training Counter propagation network, architecture, functioning & characteristics of counter Propagation network, Hopfie1d/ Recurrent network, configuration, stability constraints, associative memory, and characteristics, limitations and applications. Hopfield v/s Boltzman machine. Associative Memory.	8	3
IV	Fuzzy Logic: Fuzzy set theory, Fuzzy set versus crisp set, Crisp & fuzzy relations, Fuzzy systems: crisp logic, fuzzy logic, , Predicate Logic, introduction & features of membership functions, Fuzzy rule base system: Defuzzification Methods,Fuzzification ,fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic.	8	4
V	Genetic algorithm : Fundamentals of Genetic Algorithms History, Basic Concepts, Creation of Offsprings, Working Principle, working principle, encoding, fitness function, reproduction, Genetic 'modelling: Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, Generational Cycle, Convergence of GA, Applications & advances in GA, Differences & similarities between GA& other traditional method.	8	2,4
Guest Lectures (if any)		Nil	
Total Hours		40	
Suggestive list of experiments:			
NO Practical			

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Text Book-

1. Neural Network, Fuzzy 1ogic,and Genetic Algorithms Synthesis and Applications, S.Rajsekaran ,G.A VijayalakshmiPai

Reference Books-

2. Neural Networks: A Comprehensive Foundation (2nd Edition), Simon Haykin, Prentice Hall.
3. Elements of artificial neural networks by Kishan Mehrotra, Chilukuri K. Mohan and Sanjay Ranka.
4. Neural networks and fuzzy systems by Bart Kosko, Prentice Hall of India.

5.S. Fundam tats of artificial neural networks by Mohammad H. I-lassoun, Prentice Hall of India.

List and Links of e-learning resources:

1.https://mrcet.com/pdf/Lab%20Manuals/MOBILE%20APPLICATION%20DEV ELO PMENT%20LAB.pdf

2.www.nptel.ac.in

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

Dr. Kanak Saxena
Chairperson

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Computer Science and Engineering IT

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 6thSemester
Subject Category	Open Elective Course(OEC)
SubjectCode:**AI-2065(B)**	Subject Name: **Information Retrieval**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	--	--	100	3	--	--	3

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 To facilitate students to understand android SDK
2. To help students to gain a basic understanding of Android application development
3. To inculcate working knowledge of Android Studio development tool

Course Outcomes: After completion of this course students will be able to

CO-1: Identify and design the various components of an Information Retrieval system.
CO-2: Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval.
CO-3: Analyze the Web content structure.
CO-4: Design an efficient search engine.
CO-5: Build an Information Retrieval system using the available tools.

UNITs	Descriptions	Hrs.	CO's
I	Introduction - Goals and history of IR - The impact of the web on IR - The role of artificial intelligence (AI) in IR – Basic IR Models Boolean and vector space retrieval models – Ranked Retrieval – Text similarity metrics –TF IDF (term frequency/inverse document frequency) weighting - Cosine Similarity.	8	1
II	Basic Tokenizing - Indexing and Implementation of Vector Space Retrieval - Simple tokenizing – stop word removal and stemming – Inverted Indices –Efficient processing with sparse vectors – Query Operations and Languages - Relevance feedback – Query expansion – Query languages.	8	2
III	Experimental Evaluation of IR Performance metrics Recall, Precision and F measure – Evaluations on benchmark text collections - Text Representation - Word statistics – Zipf's law – Porter stemmer - Morphology – Index term Selection using thesauri -Metadata and markup languages- Web Search engines – spidering – metacrawlers – Directed spidering – Link analysis shopping agents.	8	3

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Chairperson

IV	Text Categorization and Clustering - Categorization algorithms - Naive Bayes – Decision trees and nearest neighbor- Clustering algorithms - Agglomerative clustering – k Means – Expectation Maximization (EM) - Applications to information filtering – Organization and relevance feedback.	8	4
V	Recommender Systems - Collaborative filtering - Content based recommendation of documents and products - Information Extraction and Integration - Extracting data from text – XML – semantic web – Collecting and integrating specialized information on the web.	8	5
Guest Lectures (if any)		Nil	
Total Hours		40	

Suggestive list of experiments:

NO Practical

Text Book-

1. Neural Network, Fuzzy 1ogic,and Genetic Algorithms Synthesis and Applications, S.Rajsekaran ,G.A VijayalakshmiPai

Reference Books-

2. Neural Networks: A Comprehensive Foundation (2nd Edition), Simon Haykin, Prentice Hall.
3. Elements of artificial neural networks by Kishan Mehrotra, Chilukuri K. Mohan and Sanjay Ranka.
4. Neural networks and fuzzy systems by Bart Kosko, Prentice Hall of India.
5. S. Fundam tats of artificial neural networks by Mohammad H. I-lassoun, Prentice Hall of India.

List and Links of e-learning resources:

1.https://mrcet.com/pdf/Lab%20Manuals/MOBILE%20APPLICATION%20DEV ELO PMENT%20LAB.pdf

2.www.nptel.ac.in

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

Dr. Kanak Saxena
Chairperson

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Computer Science and Engineering IT

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 6thSemester
Subject Category	Open Elective Course(OEC)
SubjectCode:**AI-2065(C)**	Subject Name: **Information Retrieval**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	--	--	100	3	--	--	3

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 To facilitate students to understand android SDK
2. To help students to gain a basic understanding of Android application development
3. To inculcate working knowledge of Android Studio development tool

Course Outcomes: After completion of this course students will be able to

CO-1: Identify and design the various components of an Information Retrieval system.
CO-2: Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval.
CO-3: Analyze the Web content structure.
CO-4: Design an efficient search engine.
CO-5: Build an Information Retrieval system using the available tools.

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Guest Lectures (if any)		Nil	
Total Hours		40	

Suggestive list of experiments:

NO Practical

Text Book-

5. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze," Introduction to Information Retrieval" , Cambridge University Press, 2008.

Reference Books-

6. Ricci, F. Roach, L. Shapira, B. Kantor, P.B. "Recommender Systems Handbook" 1st Edition, 2011.
7. Brusilovsky, Peter, "The Adaptive Web Methods and Strategies of Web Personalization", Springer, 2007.

List and Links of e-learning resources:

1. www.nptel.ac.in

Modes of Evaluation and Rubric

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Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	

Dr. Kanak Saxena
Chairperson