BCA (Artificial Intelligence and Data Science)

ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION
(Implemented from Academic Year 2023-24)
PROGRAMME: BCA (Honours) ARTIFICIAL INTELLIGENCE

Semester	Paper	Title	Credits	Hours
I	1.	Fundamental of Commerce (2y Common)	4	3+2
	2.	Business Organisation	4	3+2
II	3.	Fundamentals of Computers & Basics of Artificial Intelligence	4	3+2
	4.	~~Problem Solving Using C~~ Introduction to Data Science and 'R' Programming	4	3+2
III	5.	Artificial Intelligence	4	3+2
	6.	Database Management Systems	4	3+2
	7.	Object Oriented Programming with Java	4	3+2
	8.	Mathematical Foundations	4	3+2
IV	9.	Artificial Intelligence for Games	4	3+2
	10	Python Programming	4	3+2
	11.	Statistical Foundations	4	3+2
V	12	Machine Learning using R	4	3+2
	13	Tableau for Data Visualization	4	3+2
	14	Data Structures using Python	4	3+2
	15	Software Engineering	4	3+2
VI	**INTERNSHIP**			
VII	7.1	Prolog Programming	4	3+2
	7.2	Natural Language Processing	4	3+2
	7.3	Programming & Problem-Solving Using MATLAB	4	3+2
VIII	8.1	Deep Learning	4	3+2
	8.2	Robotics and Intelligent Systems	4	3+2
	8.3	Digital Image Processing	4	3+2

3. Fundamentals of Computers & Basics of Artificial Intelligence

Learning Outcomes: Upon successful completion of the course, a student will be able to:

1. Understand the evolution and functionality of a Digital Computer.
2. Understand hardware and software components
3. Have exposure to Excel software package
4. Understand various functions & formulae used in data analysis, preparing charts etc.
5. Apply data analysis tools like pivot table, goal seek, scenarios etc.

UNIT I

Introduction to Computers: Characteristics and limitations of computer, Block diagram of computer, types of computers, uses of computers, computer generations, **Types of Hardware:** Input devices and output devices

UNIT II

Memories: Primary memory, Secondary Memory, and cache memory

Software: Definition, types of Software: System software, Application software, Differences between System software and Application software

UNIT III

Basics of Operating System: Operating Systems Objectives and functions, Evolution of Operating Systems (Simple Batch, Multi programmed, Distributed Systems, Real-Time Systems)

MS Windows: Features of Windows OS, Desktop, Recycle Bin, My Computer

UNIT IV

What is Artificial Intelligence: The AI Problems, The Underlying Assumption, What is an AI Technique, The Level of the Model, Criteria for Success.

Problems, Problem Spaces and Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs.

UNIT V

Heuristic Search Techniques: Generate – and – Test, Hill Climbing, Best – first Search, Problem Reduction, Constraint Satisfaction, Means – ends Analysis.

Solving Problems by searching: Problem Solving Agents, Example problems: Toy problem and Real world problem, Search Strategies: Breadth first search, Uniform cost Search, Depth First search, Depth Limited Search.

I. **Reference Text Books:**

Fundamentals Of Computers by Reema Thareja from Oxford University Press

1. Stuart J.Russell, Peter Norvig, "Artificial Intelligence A Modern Approach", 3rd Edition, Pearson Education, 2019.

Reference Books

1. Rajaraman, Introduction to Information Technology, PHI
2. Peter Norton, Introduction to Computers, Sixth edition, Tata McGraw Hill (2007).
3. Operating systems - Internals and Design Principles, W. Stallings, Pearson.
4. PC Software under Windows by Puneet Kumar And Sushil Bhardwaj From Kalyani Publishers

IV. **Recommended Co-Curricular Activities:**

1. Expert lectures by related industrial experts.
2. Assignments, Seminars, Group discussions, Quiz, Debates etc. (on related topics).

3. Preparation of videos on tools and techniques in related field.
4. Collection of material / videos on various applications of AI

V. **Fundamentals of Computers & Basics of Artificial Intelligence Lab**

1. Demonstrating physical components of computer system
2. Demonstrating connecting peripherals to the computer system
3. Demonstrating the components of Windows Desktop
4. Demonstrating Recycle Bin
5. Demonstrating My Computer or Windows Explorer in Windows
6. State space search
7. Heauristic search
8. Toy problem

Follow for II Sem (ARTIFICIAL INTELLIGENCE & DATA SCIENCE)

V. Sruthi
Lecturer in Computer Science
DSCW(W), Nagole

SEMESTER-II

COURSE 3: INTRODUCTION TO DATA SCIENCE AND R PROGRAMMING

Practical | Credits: 1 | 2 hrs/week

Lab/Practical/Experiments/Tutorials syllabus:

1. Installing R and R studio, with proper notes on version management, cosmetic settings and different libraries.
2. Basic operations in r with arithmetic and statistics.
3. Getting data into R, Basic data manipulation, Loading Data into R
4. Basic plotting
5. Loops and functions
6. Create Vectors, Lists, Arrays, Matrices, Data frames and operations on them.
7. Demonstrate the visualization and graphics using visualization packages like ggplot2.
8. Implement Loop functions with lapply(), sapply(), tapply(), apply(), mapply().
9. Explore data using Single Variables: Unimodal, Bimodal, Histograms, Density Plots, Barcharts
10. Explore data using two Variables: Line plots, Scatter Plots, smoothing cures, Bar charts
11. Explore and implement commands using dplyr package
12. Download a dataset and work on basic data manipulation followed by inferential statistics.

RECOMMENDED TEXT BOOKS:

1. Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley &Sons, Inc., 2012.
2. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.

Recommended Reference books:

3. The art of R Programming: A tour of Statistical Software design. Norman Matloff.KindleEdition
4. The book of R : The first course in Programming and Statistics by Tilman M. Davies.

Recommended Co-curricular activities: (Co-curricular Activities should not promote copyingfromtext book or from others' work and shall encourage self/independent and grouplearning)

A. Measurable:
1. Assignments on:
2. Student seminars (Individual presentation of papers) on topics relating to:
3. Quiz Programmes on:
4. Individual Field Studies/projects:
5. Group discussion on:
6. Group/Team Projects on:

Follow for Tisem (Statistical Intelligence & Data Science)

Gopal
Lecturer in Computer Science
DSCOEW133, Ongole.

B. General

1. Collection of news reports and maintaining a record of paper-cuttings relatingtotopics covered in syllabus
2. Group Discussions on:
3. Watching TV discussions and preparing summary points recording personalobservations etc., under guidance from the Lecturers
4. Any similar activities with imaginative thinking.
5. Recommended Continuous Assessment methods:

1) Fundamentals of Computers & Basics of Artificial Intelligence

2) Introduction to Data Science & 'R' Programming

ANDHRA KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT

Major ~~Minor~~ Programme from the Year 2023-24 Onwards

Programme-~~B.Sc~~. Honours Data Science -Question Paper model,

BCA Second Year-Semester-III & IV

Time: 3 Hours Total Marks: 75

PART –A

Answer any Five of the following

5X5=25 Marks

1.
2.
3.
4.
5.
6.
7.
8.

PART –B

Answer the following **5x10=50 Marks**

9a.

Or

9b.

10a.

Or

10b

11a.

Or

11b.

12a.

Or

12b.

13a.

Or

13b.

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V. Patel