



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

UG PROGRAM (4 Years Honors)
CBCS - 2020-21

B Sc
ARTIFICIAL INTELLIGENCE &ROBOTICS



Syllabus and Model Question Papers



TABLE OF CONTENTS

S. No.	Particulars	Page No.
1	Resolutions of the BOS	03
2	Details of Course titles & Credits	04
	a. Proposed combination subjects:	-
	b. Student eligibility for joining in the course:	-
	c. Faculty eligibility for teaching the course	-
	d. List of Proposed Skill enhancement courses with syllabus, if any	-
	e. Any newly proposed Skill development/Life skill courses with draft syllabus and required resources	-
	f. Required instruments/software/ computers for the course	-
	g. List of Suitable levels of positions eligible in the Govt/Pvt organizations	-
	h. List of Govt. organizations / Pvt companies for employment opportunities or internships or projects	-
	i. Any specific instructions to the teacher /Course setters/Exam-Chief Superintendent	-
3	Program objectives, outcomes, co-curricular and assessment methods	-
4	Details of course-wise syllabus for Theory and Lab	05
5	Model Question Courses for Theory and Lab	15
6	Details of Syllabus on Skill Enhancement courses and Model Question Courses for Theory and Lab	



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

1.RESOLUTIONS OF THE BOARD OF STUDIES

Meeting held on: 22.01.2021,Time:10 A.M at Adikavi Nannaya University,RJY

Agenda: B.Sc(Artificial Intelligence &Robotics) syllabus finalization.

Minutes of the UG-Board of Studies meeting for B.Sc(Artificial Intelligence &Robotics)held on 22/01/2021 at 10:00 A.M at Adikavi Nannaya University Convention Centre, Rajamahendravaram.

Members:

Dr. V. Persis	Chair man, Dept. of CSE, ANUR
Dr. P.Venkateshwara Rao	Member, Dept. of CSE,ANUR
Mr. VSN Kumar	Member, Dept. of Computer Science Aditya Degree College, Kakinada.
Mr. T. Ashok	Coordinator, Dept. of CSE, ANUR.

Resolutions:

1. The following Computer Science Subjects will be part of the curriculum. Syllabus and Model question Courses are prepared and submitted for the below 5 Courses.
2. Course Setters and Evaluators lists are submitted.

Semester-I:

Course1:Web
Technologies Web
Technologies Lab

Semester-II:

CourseII:Artificial
Intelligence AI Using
PROLOG Lab

Semester-III:

CourseIII:Expert Systems
Expert Systems Using LISP Lab

Semester-IV:

Course IV:Fundamentals of IoT and
Robotics IoT and Robotics Lab
Course V :Machine
Learning ML using
Python Lab

Members Present:

1. Dr.V.Persis , Dept.of CSE,ANUR
2. Dr.P.Venkateswara Rao, Dept.of CSE,ANUR
3. Mr.V.S.N Kumar, Dept.of CS,Aditya Degree College, Kakinada
4. Mr.T.Ashok, Dept.of CSE,ANUR.



DETAILS OF COURSES AND CREDITS

Sem	Course No	Course Name	Course Type (L/T/P)	Hrs/Week	Credits	Max. Marks	Max. Marks	
				Sciences:4+2	Sciences: 4+1	Internal/ Conti./ Mid Assessment	Sem- End Exam	
I	1	Web Technologies	T	4	4	25	75	
	2	Web Technologies Lab	L	2	1		50	
II	3	Artificial Intelligence	T	4	4	25	75	
	4	AI Using PROLOG Lab	L	2	1		50	
III	5	Expert System	T	4	4	25	75	
	6	Expert System using LISP Lab	L	2	1		50	
IV	7	Fundamentals of IoT and Robotics	T	4	4	25	75	
	8	IoT and Robotics Lab	L	2	1		50	
	9	Machine learning	T	4	4	25	75	
	10	ML Using Python lab	L	2	1		50	
V	6A	Artificial Neural Network	T	4	4	25	75	
		Linux Lab	L	2	1		50	
	7A	Neural Network And Fuzzy Logic	T	4	4	25	75	
		Advanced Python Lab	L	2	1		50	
	OR							
	6B	Cryptography And Network Security	T	4	4	25	75	
		Cryptography and Network Security Lab	L	2	1		50	
	7B	Cyber Security	T	4	4	25	75	
		Cyber Security Lab	L	2	1		50	
	OR							
	6C	Data Analytics Using R	T	4	4	25	75	
		R Lab	L	2	1		50	
	7C	Data Warehousing And Mining	T	4	4	25	75	
		Data Ware Housing and Mining Lab	L	2	1		50	
VI		Project Work						

Note : *Course type code: T: Theory, L: Lab, P: Problem solving.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

Note 1: For Semester–V, for the domain subject **ARTIFICIAL INTELLIGENCE &ROBOTICS**, any one of the three pairs of SECs shall be chosen as courses 6 and 7, i.e., 6A & 7A or 6B & 7B or 6C & 7C. The pair shall not be broken (ABC allotment is random, not on any priority basis).

Note 2: One of the main objectives of Skill Enhancement Courses (SEC) is to inculcate field skills related to the domain subject in students. The syllabus of SEC will be partially skill oriented. Hence, teachers shall also impart practical training to students on the field skills embedded in the syllabus citing related real field situations.

Note 3: To insert assessment methodology for Internship/ on the Job Training/Apprenticeship under the revised CBCS as per APSCHE Guidelines.

- **First internship (After 1st Year Examinations):** Community Service Project. To inculcate social responsibility and compassionate commitment among the students, the summer vacation in the intervening 1st and 2nd years of study shall be for Community Service Project (the detailed guidelines are enclosed).
- **Credit For Course: 04**
- **Second Internship (After 2nd Year Examinations):** Apprenticeship / Internship / on the job training / In-house Project / Off-site Project. To make the students employable, this shall be undertaken by the students in the intervening summer vacation between the 2nd and 3rd years (the detailed guidelines are enclosed).
- **Credit For Course: 04**
- **Third internship/Project work (6th Semester Period):**
During the entire 6th Semester, the student shall undergo Apprenticeship / Internship / On the Job Training. This is to ensure that the students develop hands on technical skills which will be of great help in facing the world of work (the detailed guidelines are enclosed).
- **Credit For Course:12**



DETAILS OF COURSE-WISE SYLLABUS

B Sc	Semester: I	Credits: 04
Course: 1	WEB TECHNOLOGIES	Hrs/Wk:04

COURSE OBJECTIVES:

This subject enables the student to create flexible, attractive, user-friendly web sites comprised of both static and dynamic web pages.. Along with that students will also learn about interactions with web pages through JavaScript and host own web site on internet.

LEARNING OUTCOMES:

After Studying this subject students would have capability to make their own web site and host on internet. Also students would have enough knowledge about the technologies used in internet.

UNIT I :

HTML: Basic HTML Tags and Attributes, Document body, Text, Hyper links, Adding more Formatting, Lists, Tables, Grouping, Images. More HTML: Multimedia Objects, Frames, Forms, Headers.

UNIT II :

Cascading Style Sheets: Introduction, Syntax, Selectors, Background Cursors, Text Fonts, Lists, Tables, Box Model, Using Styles, Simple Examples, Creation of Own Styles, Properties And Values In Styles, Formatting Blocks of Information, Layers.

UNIT III :

Introduction to JavaScript: What is DHTML, JavaScript Basics, Variables, String Manipulations, Mathematical Functions, Statements, Operators, Arrays and Functions.

UNIT IV :

DHTML with JavaScript: Data Validation, Opening A New Window, Messages and Confirmations, Status Bar, Different Frames, Rollover Buttons, Moving Images.

UNIT V :

XML: Defining Data for Web Applications, Basic XML, Document Type Definition, Presenting XML, Document Object Model, Web Services

TEXT BOOKS:

1. Harvey M. Deitel and Paul J. Deitel, “Internet & World Wide Web How to Program”, 4/e, Pearson Education.
2. Uttam Kumar Roy, WebTechnologies from Oxford University Press Student Activities.

Co-curricular Activities:

- We for Web – Students with right mix of skills are formed as groups to develop websites.
- Web Ninja- A platform to showcase creative websites developed by students to their peers.

Assessment Methods:

- Formal Examinations .
- Lab Practical Examination .
- Presentations .
- Simple Project.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B Sc	Semester: I	Credits: 01
Course: 1	WEB TECHNOLOGIES LAB	Hrs/Wk:02

1. Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.
2. Create your class timetable using table tag.
3. Create a feedback form for your curriculum. Use textbox, text area, checkbox, radio button etc
4. Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and content page on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right hand side.
5. Write html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background colour.
6. Create your resume using HTML tags. Experiment with colours, text, link, size and also other tags you studied.
7. Design a web page of your College Day Celebrations with an attractive background colour, text colour, images, font etc. Use CSS.
8. Use Inline CSS to format your resume that you created.
9. Use External CSS to format your class timetable as you created.
10. Use External, Internal, and Inline CSS to format web page of your start up.
11. Develop a JavaScript to display your admission details in the college.
12. Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript.
13. Create HTML page with JavaScript which takes integer number as input and tells whether the number is odd or even.
14. Create HTML page that contains form for registration of your participation in a hackathon. Use relevant fields for input data. Write a JavaScript code to combine and display the input information when the button is clicked.
15. Create a login form with id and password. Perform input validation.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B Sc	Semester: II	Credits: 04
Course: 2	ARTIFICIAL INTELLIGENCE	Hrs/Wk:04

COURSE OBJECTIVES:

The objective of the course is to present an overview of artificial intelligence (AI) principles and approaches. Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents: Search, Knowledge representation, inference, logic, and learning.

LEARNING OUTCOMES:

Students will acquire a fundamental understanding of the principles of artificial intelligence and its foundations and apply those basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.

UNIT I :

Introduction to Artificial Intelligence : Introduction, Brief History, Intelligent Systems, Categorization of Intelligent Systems, Components of AI Program, Foundations of AI, Sub-areas of AI, Applications, Development of AI Languages, Current Trends in AI, Future of AI

UNIT II :

Intelligent Agents: Rational Agents, Mapping from Sequences to Actions, Properties of Environments, Structure of Intelligent Agents, Types of Agents: Simple Reflex Agents, Goal Based Agents, Utility Based Agents.

UNIT III :

Prolog Programming language: Introduction, Prolog Program, Control Strategy of Prolog, Programming Techniques in Prolog, List Manipulation in Prolog, System Predicate, Cut, Effect of Rule and Goal Orders, Structuring of Data in Prolog, Recursive Data Types in Prolog, System-Defined Predicates.

UNIT IV :

Uninformed Search Strategies: Breadth-First Search, Uniform Cost Search, Depth-First Search, Analysis of Search Methods

UNIT V :

Informed Search Strategies: Heuristic Functions, Best-First Search, Greedy Search, A* Algorithm, Optimal Solution by A* Algorithm.

TEXT BOOKS:

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI, Pearson Education.
2. Artificial Intelligence – Structures and Strategies for Complex Problem Solving , George FLuger, Addison Wesley, Fifth Edition .
3. Prolog Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education.
4. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition.

Co-curricular Activities:

- AI News Board where students can stick upto date innovations happening in the field of AI.
- AiTube channel where students can publish their accomplishments in the field of AI.

Assessment Methods:

- Formal Examinations.
- Lab Practical Examination .
- Presentations.
- Simple Project .



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B Sc	Semester: II	Credits: 01
Course: 2	AI USING PROLOG LAB	Hrs/Wk:02

Students should practice a minimum of 10 programs from the list using Prolog.

1. Program to add two numbers.
2. Program to categorize animal characteristics.
3. Program to read address of a person using compound variable.
4. Program to show concept of cut operator.
5. Program to count number of elements in a list .
6. Program to reverse the list.
7. Program to append an integer into the list.
8. Program to replace an integer from the list.
9. Program to delete an integer from the list.
10. Program to show concept of list.
11. Program to demonstrate family relationship.
12. Program to show how Prolog is used in medical diagnosis. .



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B Sc	Semester: III	Credits: 04
Course: 3	EXPERT SYSTEM	Hrs/Wk:04

LEARNING OBJECTIVES:

Students will be able to explain and describe the concepts central to the creation of knowledge bases and expert systems. Students will be knowledgeable about the tools and the processes used for the creation of an expert system. Student will know methods used to evaluate the performance of an expert system.

LEARNING OUTCOMES:

At the end students will be able to get an understanding of how to transform human knowledge into an expert system and design a knowledge base. A basic understanding of natural language processing and pattern recognition is acquired.

UNIT I :

Introduction: Introduction to Expert System, Definitions, Importance of Expert System, Characteristic features of Expert System, Applications of Expert System, Different Categories of Expert Systems.

UNIT-II

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

UNIT – III

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems versus Traditional Systems, Rule Based Expert Systems, Blackboard Systems, Truth Maintenance Systems.

UNIT – IV

Introduction to Natural Language: Overview of Linguistics, Grammars and Languages, Basic Parsing Techniques, Semantic Analysis and Representation Structures, Natural Language Generation, Natural Language Systems

UNIT-V

Pattern Recognition: Introduction, The Recognition and Classification Process, Learning Classification Patterns, Recognizing and Understanding Speech.

TEXT BOOKS:

1. Expert System principles and Programming-Giarratano.Rilev.2003 .
2. Introduction to Expert Systems, V James P.Iginizo.Mc.Graw-Hill.inc .
3. Natural Language Processing: A Paninian Perspective, Akshar Bharti, Vineet Chaitanya and Rajeev sangal.

Co-curricular Activities:

- Quiz Competitions.
- Expert Lectures.
- Seminars

Assessment Methods:

- Formal Examinations.
- Lab Practical Examination .
- Presentations.
- Simple Project .



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B Sc	Semester: III	Credits: 01
Course: 3	Expert System using LISP Lab	Hrs/Wk:02

List of programs using LISP. A minimum of 10 programs should be executed.

1. Write a “Hello World” program in LISP.
2. Write a LISP program to demonstrate the process of assigning the value in variable and showing them in console.
3. Write a LISP program to demonstrate the macros.
4. Write a LISP program to demonstrate the global and local variable and constant.
5. Write a LISP program to demonstrate the arithmetic expression.
6. Write a LISP program to demonstrate the comparison and logical operator.
7. Write a LISP program to demonstrate the decision making.
8. Write a LISP program to demonstrate the looping operations.
9. Write a LISP program to demonstrate the function.
10. Write a LISP program to calculate factorial by using function.
11. Write a LISP program to find maximum of three numbers.
12. Write a LISP program to find GCD of two numbers.
13. Write a lisp program to implement Fibonacci Series.
14. Write a program in LISP to demonstrate the concept of array.
15. Write a LISP program to demonstrate the string processing.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B Sc	Semester: IV	Credits: 04
Course: 4	FUNDAMENTALS OF IOT AND ROBOTICS	Hrs/Wk:04

COURSE OBJECTIVES:

The goal of the course is to familiarize the students with the fundamental concepts and techniques in robotic engineering and computer systems for their control and information processing.

LEARNING OUTCOMES:

Students will be exposed to fundamentals of IoT and a broad range of topics in robotics with emphasis on basics of manipulators, coordinate transformation and kinematics, trajectory planning and control techniques

UNIT I :

Introduction to IoT: Definition and Characteristics of IoT, IoT Enabling Technologies, IoT Levels and Deployment Templates. M2M and IoT, IoT Use cases: Home, Government, Cities, Environment, Energy Systems, Agriculture, Health and Lifestyle.

UNIT II:

Introduction to Robotics: Classification, Components, Characteristics, Applications. Robotics Kinematics, Position Analysis, Robots as Mechanisms, Matrix Representation, Transformation Matrices, Forward and Inverse Kinematics.

UNIT III :

Actuators: Characteristics of Actuating Systems, Actuating Devices and Control, Use of Reduction Gears, Comparison Of Hydraulic, Electric, Pneumatic Actuators, Hydraulic Actuators.

UNIT IV :

Sensors: Sensor Characteristics, Description of Different Sensors, Vision Sensors, Force Sensors, Proximity Sensors, Tilt Sensors.

UNIT V:

Robot Controls: Point to Point Control, Continuous Path Control, Intelligent Robot, Control System for Robot Joint, Control Actions, Feedback Devices.

TEXT BOOKS:

1. Saeed B. Niku, Introduction to Robotics Analysis, Application, Pearson Education Asia, 2001.
2. Vijay Madiseti and Arshdeep Bahga, Internet of Things - A Hands-on Approach, First Edition, University Press, 2015..

Co-curricular Activities:

- Take up IoT Projects of societal relevance.
- Adopt a school from rural area and educate children in simple IoT projects .

Assessment Methods:

- Formal Examinations.
- Lab Practical Examination.
- Presentations.
- Simple Project .



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B Sc	Semester: IV	Credits: 01
Course: 4	IOT AND ROBOTICS LAB	Hrs/Wk:02

IoT LAB EXPERIMENTS. A minimum of 4 experiments should be done.

1. Familiarization with Arduino/Raspberry Pi and perform necessary software installation .
2. To interface LED/Buzzer with Arduino/Raspberry Pi and write a program to turn ON LED for 1 sec after every 2 seconds .
3. To interface Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi and write a program to turn ON LED when push button is pressed or at sensor detection.
4. To interface DHT11 sensor with Arduina/Raspberry Pi and write a program to print temperature and humidity readings.
5. To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ON motor when push button is pressed.
6. Students are encouraged to explore the surrounding problems and design Solutions based on IoT for any 3 of the following.
 - i. Health Monitoring System.
 - ii. Smart Irrigation System using Cloud.
 - iii. Smart Waste Management System.
 - iv. Smart Street Lights System.
 - v. Fire and Smoke Detection System.
 - vi. Gas Leakage Detection System.
 - vii. Water level Monitoring and Controlling System in Tanks.
 - viii. Air and Sound Pollution Monitoring System
 - ix. Intruder (Human/Animal) Detection in Agriculture Field.
 - x. Girl Child Safety System using GPS and GSM

Robotics Lab Experiments.

A minimum of 3 experiments should be done.

1. Programming a simple Robot on Wheels.
2. Programming a Walking Robot.
3. Experiments based on Bipedal Robot.
4. Experiments based on Humanoid Robot.
5. Spy Robot using RF Communication System.
6. Study of robotic arm and its configuration.
7. Study the robotic end effectors.
8. Study of sensor integration.
9. Setting robot for any one industrial application after industrial visit.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B Sc	Semester: IV	Credits: 04
Course: 5	MACHINE LEARNING	Hrs/Wk:04

COURSE OBJECTIVES:

To introduce students to the basic concepts and techniques of Machine Learning. To develop skills of using recent machine learning software for solving practical problems. To gain experience of doing independent study and research.

LEARNING OUTCOMES:

On completion of the course students will be expected to have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc. And also gain an understanding of the strengths and weaknesses of many popular machine learning approaches.

UNIT I :

Introduction: Well Posed Learning Problems, Choices in Designing a Learning System – Choosing the Training Experience, Choosing the Target Function, Choosing the Representation for Target Function, Choosing a Function Approximation Algorithm, The Final Design.

UNIT II :

Concept Learning: Introduction, Concept Learning Task- Notation, Concept Learning Search, FIND-S, The-List-Then Algorithm, Candidate Elimination Algorithm with an Illustrative Example, Inductive Bias.

UNIT III :

Decision Tree Learning: Decision Tree Representation, Appropriate Problems for Decision Tree Learning, Basic Decision tree Learning Algorithm with an Illustrative Example, Issues in Decision Tree Learning.

UNIT IV :

Neural Network Learning: Neural Network Representations, Problems for Neural Network Learning, Multi Layer Network and Back propagation Algorithm, Illustrative Example of Back Propagation Algorithm.

UNIT V :

Instance Based Learning: K Nearest Neighbour Learning Algorithm, Locally Weighted Regression, Case-Based Reasoning.

TEXT BOOKS:

1. Machine Learning, Tom Mitchell , McGraw Hill, 1997.
2. Practical Machine Learning with Python, Dipanjan Sarkar, Raghav Bali, Tushar Sharma, A Press, 2018.

Co-curricular Activities:

- Special Interest Group in Machine Learning .
- Machine Learning News Club.

Assessment Methods:

- Formal Examinations.
- Lab Practical Examination.
- Presentations.
- Simple Project.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B Sc	Semester: IV	Credits: 01
Course: 5	ML USING PYTHON LAB	Hrs/Wk:02

Implement a minimum of 2 programs using each of the following Python Libraries that are popularly used in Machine Learning.

1. Numpy for basic mathematical operations.
2. Scipy for image manipulation .
3. Scikit- learn for decision tree classifier.
4. Theano for computing logistic functions.
5. Keras to build neural networks.
6. Tensorflow for deep learning functions.
7. Pytorch for computer vision and NLP.
8. Pandas for data analysis.
9. Matplotlib for data visualisation.
10. Opencv for face recognition and identifying objects.



B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course:6A	Artificial Neural Network	Hrs/Wk:4

Goal: This course will disseminate the student with the most fundamental knowledge for understanding AI and some basic search algorithms for problem solving; knowledge representation and reasoning; pattern recognition; fuzzy logic; and neural networks.

Course Objective: By the end of this course, a student will.

- To introduce the student's fundamentals concepts of Neural network and its various
- Application in computer science. To perform cognitive functions as problem solving and machine learning.

Teaching Learning Methodology:

Lectures, Class discussions, Demonstrations using various tools, Practical and Simulation Student Presentation, Problem solving or case studies. Use of flip chart board by instructor as aid in teaching.

UNIT I: Artificial Neural Networks (ANN) and biological neural networks, supervised and unsupervised learning rules, neural network applications.

UNIT II: Unsupervised learning: - Hebbian learning and competitive learning. Supervised learning:- Back propagation algorithms, Learning rule:- Delta learning rule, Widrow-Hoff learning rule, Winner Take-All learning rule.

UNIT III: Feed forward neural network, feed backward neural network, Perception and its learning law, single layer perception, multi-layer perception.

UNIT IV: Self-organizing networks: Kohonen algorithm, Hopfield Networks: Hopfield network algorithm, Adaptive resonance theory: Network and learning rules.

UNIT V: Associative memory, auto-associative memory, bi-directional associative memory

TEXT BOOKS:

1. Hill, T., Marquez, L., O'Connor, M., & Remus, W. (1994). Artificial neural network models for forecasting and decision making. *International journal of forecasting*, 10(1), 5-15.
2. Suzuki, K. (Ed.). (2013). *Artificial neural networks: architectures and applications*. BoD–Books on Demand. Ermentrout, G. B., Beverlin, B., Troyer, T., & Netoff, T. I. (2011). The variance of phaseresetting curves. *Journal of computational neuroscience*, 31(2), 185-197.



B.Sc	Semester – V (Skill Enhancement Course-Elective)	Credits:1
Course:6A	Linux Lab	Hrs/Wk:2

LIST OF EXPERIMENTS:

1. Study and Practice on various commands like man, passwd, tty, script, clear, date, cal, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who.
2. Study and Practice on various commands like cat, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, tar, cpio.
3. a) Write a Shell Program to print all .txt files and .c files.
b) Write a Shell program to move a set of files to a specified directory.
c) Write a Shell program to display all the users who are currently logged in after a specified time.
d) Write a Shell Program to wish the user based on the login time.
4. a) Simulate cat command.
b) Simulate cp command.
5. a) Simulate head command.
b) Simulate tail command.
6. a) Simulate mv command.
b) Simulate nl command.
7. Write a program to handle the signals like SIGINT, SIGQUIT, SIGFPE.
8. Implement the following IPC forms
a) FIFO
b) PIPE.
9. Implement message queue form of IPC.
10. Implement shared memory form of IPC.
11. Write a Socket program to print system date and time (Using TCP/IP).



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course:7A	Neural Network and Fuzzy Logic	Hrs/Wk:4

Course Objective:

Fuzzy sets and fuzzy logic find many applications in the areas of stability theory, pattern recognition, controls etc. Neural Networks offer fundamentally alternative approaches to procedural programming. These systems proved their applicability to the problems where there are missing data or information or the problems which could not be defined in an algorithm. The integration of fuzzy systems and neural networks gives a tremendous potential which can be applied to many complicated problems of Artificial Intelligence and other applications in Real World Computing. This course provides a comprehensive treatment of neural network architectures and learning algorithms, with an in-depth look at problems in data mining and in knowledge discovery.

UNIT-I:

Basic neural computation models: Network and node properties. Inference and learning algorithms. Unsupervised learning: Signal hebbian learning and competitive learning. Supervised learning: Back propagation algorithms.

UNIT-II:

Self organizing networks: Kohonen algorithm, bi-directional associative memories. Hopfield Networks: Hopfield network algorithm. Adaptive resonance theory: Network and learning rules. Neural network applications.

UNIT-III:

Fuzzy Sets: Operations and properties.
Fuzzy Relations: Cardinality, Operations and properties.
Value Assignments: Cosine amplitude and max-min method.
Fuzzy classification: Cluster analysis and validity, Fuzzy e-means clustering, hardening the Fuzzy partition.

UNIT-IV:

Fuzzification, Membership value assignments: Inference, rank ordering and angular Fuzzy sets, defuzzification methods, fuzzy logic, approximate reasoning.
Fuzzy –based systems: Canonical rule forms, decomposition of compound rules, likelihood and truth qualification, aggregation of Fuzzy rules, graphical techniques of inference.

UNIT-V:

Non linear simulation using Fuzzy rule-based systems, Fuzzy associative memories. Decision making under Fuzzy states and Fuzzy actions. Fuzzy grammar and syntactic recognition. General Fuzzy logic controllers, special forms of Fuzzy logic control system models, examples of Fuzzy control system design and control problems, industrial applications.

TEXT BOOKS & REFERENCES:

1. Limin Fu. “Neural Networks in Computer Intelligence” McGraw Hill, 1995.
2. Freeman J. A., and Skapura D. Mu. “Neural Networks Algorithms applications and Programming Techniques”, Addison Wesley New York, 1991.
3. Timoty J. Ross, “Fuzzy Logic with Engineering Applications”, McGraw Hill 1997.
4. Bart Kosho “Neural Network and Fuzzy Systems”, Prentice Hall of India, 1994.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:1
Course:7A	Advanced Python Lab	Hrs/Wk:2

DICTIONARY:

- a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
- b) Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.

NESTED LISTS:

- a) Write a program to read a 3 X 3 matrix and find the transpose.
- b) Write a program to perform addition, subtraction of two 3 X 3 matrices.

USER DEFINED FUNCTIONS:

- a) Write a function ball collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.

Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius If (distance between two balls centers) \leq (sum of their radii) then (they are colliding).

- b) Write a function to find mean, median, mode for the given set of numbers in a list.

MODULES:

- a) Install packages requests, flask and explore using (pip).
- b) Write a Python program that imports requests and fetch content from wiki page.

DATE AND TIME:

- a) Demonstrate Basic date and time classes, Different time formats, Converting between formats, Formatting dates and times, Parsing date/time information.
- b) Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.

CLASS AND OBJECTS:

- a) Create a class ATM and define ATM operations to create account, deposit, check balance, withdraw and delete account. Use constructor to initialize members.
- b) Make a class Employee with a name and salary. Make a class Manager inherit from Employee. Add an instance variable, named department. Write a method that prints manager's name, department and salary. Make a class Executive inherit from Manager. Write a method that prints the string "Executive" followed by the information stored in the Manager super class object.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course:6B	Cryptography and Network Security	Hrs/Wk:4

Course Objective:

The objective here is to acquaint the students with the application of networking. Detail description of the various TCP/IP protocols and the working of ATM and its performance, Network security and authentication, and various algorithms related to it has been dealt, to get a practical approach.

Course Contents:

UNIT – I:

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security.

Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key length and key size, possible types of attacks.

UNIT – II:

Symmetric key Ciphers: Block Cipher principles & Algorithms (DES, AES, Blowfish), Differential and Linear Crypt analysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution.

Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms (RSA, Diffie-Hellman, ECC), Key Distribution.

UNIT – III:

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm.

Authentication Applications: Kerberos, X.509 Authentication Service, Public – Key Infrastructure, Biometric Authentication.

UNIT – IV:

E-Mail Security: Pretty Good Privacy, S/MIME

IP Security: IP security overview, IP Security architecture, Authentication Header, Encapsulating security payload, combining security associations, key management.

UNIT – V:

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction.

Intruders, virus and Firewalls: Intruders, Intrusion detection, password management, virus and related threats, Countermeasures, Firewall design principles, types of firewalls.

TEXT BOOKS:

1. Cryptography and Network Security : William Stallings, Pearson Education, 4th Edition
2. Cryptography and Network Security : Atul Kahate, McGraw Hill Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st
2. Cryptography and Network Security : Forouzan Mukhopadhyay, McGraw Hill, 2nd Edition.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:1
Course:6B	Cryptography and Network Security Lab	Hrs/Wk:2

LIST OF EXPERIMENTS:

Lab 1: Implementation of Caesar Cipher technique

Lab 2: Implement the Play fair Cipher

Lab 3: Implement the Pure Transposition Cipher

Lab 4: Implement DES Encryption and Decryption

Lab 5: Implement the AES Encryption and decryption

Lab 6: Implement RSA Encryption Algorithm

Lab 7: Implementation of Hash Functions



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course:7B	Cyber Security	Hrs/Wk:4

Objectives:

- The Cyber security course will provide the students with foundational Cyber Security principles, Security architecture, risk management, attacks, incidents and emerging IT and IS technologies.
- Students will gain insight into the importance of Cyber Security and the integral role of Cyber Security professionals.

Outcomes:

- Cyber Security architecture principles
- Identifying System and application security threats and vulnerabilities
- Identifying different classes of attacks
- Cyber Security incidents to apply appropriate response
- Describing risk management processes and practices
- Evaluation of decision making outcomes of Cyber Security scenarios

UNIT-I: Introduction to Cybercrime:

Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals?, Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.

UNIT-II: Cyber offenses:

How Criminals Plan them – Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The fuel for Cybercrime, Attack Vector Cloud computing.

UNIT-III: Cybercrime mobile and Wireless Devices:

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones.

Mobile Devices : Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile computing Era, Laptops.

UNIT-IV: Tools and Methods used in Cybercrime:

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Stegnography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (IDTheft)

UNIT-V: Cybercrimes and Cyber security:

Why do we need cyber laws: The Indian context, the Indian IT Act, challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Blueprint, Security education, Training and awareness program, Continuing Strategies.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

TEXT BOOKS:

1. Cyber Security: understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, sunitBelapure, Wiley
2. Principles of information security, Micheal E. Whitman and Herbert J. Mattord, Cengage Learning.
3. Information Security, Mark Rhodes, Ousley, MGH



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:1
Course:7B	Cyber Security Lab	Hrs/Wk:2

LIST OF EXPERIMENTS:

1. Study of steps to protect your personal computer system by creating User Accounts with Passwords and types of User Accounts for safety and security.
2. Study the steps to protect a Microsoft Word Document of different version with different operating system.
3. Study the steps to remove Passwords from Microsoft Word.
4. Study various methods of protecting and securing databases.
5. Study “How to make strong passwords” and “passwords cracking techniques”.
6. Study the steps to hack a strong password.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course:6C	Data Analytics with R	Hrs/Wk:4

Learning Objectives: In this course students will learn R. Programming language, data analytics, data visualisation and statistical model for data analytics. By completion of this course, students will be able to become data analyst.

UNIT I: Introduction to Data Analysis: Overview of Data Analytics, Need of Data Analytics, Nature of Data, Classification of Data: Structured, Semi-Structured, Unstructured, Characteristics of Data, Applications of Data Analytics.

UNIT II: R Programming Basics : Overview of R programming, Environment setup with R Studio, R Commands, Variables and Data Types, Control Structures, Array, Matrix, Vectors, Factors, Functions, R packages.

UNIT III: Data Visualization using R: Reading and getting data into R (External Data): Using CSV files, XML files, Web Data, JSON files, Databases, Excel files. Working with R Charts and Graphs: Histograms, Boxplots, Bar Charts, Line Graphs, Scatter plots, Pie Charts.

UNIT IV: Statistics with R : Random Forest, Decision Tree, Normal and Binomial distributions, Time Series Analysis, Linear and Multiple Regression, Logistic Regression, Survival Analysis.

UNIT V: Prescriptive Analytics: Creating data for analytics through designed experiments, Creating data for analytics through active learning, Creating data for analytics through reinforcement learning.

TEXT BOOKS:

1. An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team. Version 3.0.1 (2013-05-16). URL: <https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf>

REFERENCE BOOKS:

1. Jared P Lander, R for everyone: advanced analytics and graphics, Pearson Education, 2013
2. Dunlop, Dorothy D., and Ajit C. Tamhane. Statistics and data analysis: from elementary to intermediate. Prentice Hall, 2000.
3. G Casella and R.L. Berger, Statistical Inference, Thomson Learning 2002
4. P. Dalgaard. Introductory Statistics with R, 2nd Edition. (Springer 2008)
5. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:1
Course:6C	R Lab	Hrs/Wk:2

LIST OF PROGRAMS:

1. Download and install R-Programming environment and install basic packages using install. Packages () command in R.
2. Learn all the basics of R-Programming (Data types, Variables, Operators etc.)
3. Implement R-Loops with different examples.
4. Learn the basics of functions in R and implement with examples.
5. Implement data frames in R. Write a program to join columns and rows in a data frame using cbind() and rbind() in R.
6. Implement different String Manipulation functions in R.
7. Implement different data structures in R (Vectors, Lists, Data Frames)
8. Write a program to read a csv file and analyze the data in the file in R
9. Create pie charts and bar charts using R.
10. Create a data set and do statistical analysis on the data using R



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:4
Course:7C	Data Ware Housing and Mining	Hrs/Wk:4

Objectives:

- Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.
- They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply
- They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

Outcomes:

- Understand stages in building a Data Warehouse
- Understand the need and importance of preprocessing techniques.
- Understand the need and importance of Similarity and dissimilarity techniques
- Analyze and evaluate performance of algorithms for Association Rules
- Analyze Classification and Clustering algorithms.

UNIT-I:

Introduction: Why Data Mining? What is Data mining? What kinds of data can be mined? – What kinds of patterns can be mind? Which Technologies are used? Which kinds of Applications are targeted? Major Issues in Data Mining. Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity.

UNIT-II:

Data Pre-processing: Data Preprocessing : An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

UNIT-III:

Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction.

UNIT-IV:

Classification: Alternative Techniques, Bayes Theorem, Naive Bayesian Classification, Bayesian Belief Networks.

UNIT-V:

Association Analysis: Basic Concepts and Algorithms : Problem Defecation, Frequent Item Set generation, Rule generation, compact representation of frequent item sets.

TEXT BOOKS:

1. Introduction to Data Mining : Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson
2. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

B.Sc	Semester – V (Skill Enhancement Course- Elective)	Credits:1
Course:7C	Data Ware Housing and Mining Lab	Hrs/Wk:2

SQL LAB:

A. Consider the following schema for a LibraryDatabase:

BOOK (Book_id, Title, Publisher_Name, Pub_Year)

BOOK_AUTHORS (Book_id, Author_Name)

PUBLISHER (Name, Address, Phone) BOOK_COPIES
(Book_id, Branch_id, No-of_Copies)

BOOK_LENDING (Book_id, Branch_id, Card_No, Date_Out, Due_Date)

LIBRARY_BRANCH (Branch_id, Branch_Name, Address)

Write SQL queries to:

1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each branch, etc.
2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan2017 to Jun2017
3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.
4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.
5. Create a view of all books and its number of copies that are currently available in the Library.

B. Consider the following schema for OrderDatabase:

SALESMAN (Salesman_id, Name, City, Commission)

CUSTOMER (Customer_id, Cust_Name, City, Grade, Salesman_id)

ORDERS (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id)

Write SQL queries to:

1. Count the customers with grades above Bangalore's average.
2. Find the name and numbers of all salesmen who had more than one customer.
3. List all salesmen and indicate those who have and don't have customers in their cities (Use UNION operation.)
4. Create a view that finds the salesman who has the customer with the highest order of a day.
5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted

WEKA LAB:

1. Create data-set in arff file format. Demonstration of preprocessing on WEKA data-set.
2. Demonstration of Association rule process on data-set contact lenses.arff /supermarket using apriori algorithm.
3. Demonstration of classification rule process on WEKA data-set using j48 algorithm.
4. Demonstration of classification rule process on WEKA data-set using naive bayes algorithm.
5. Demonstration of clustering rule process on data-set iris.arff using simple k-means.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION COURSE

B. Sc DEGREE EXAMINATION
SEMESTER: I
ARTIFICIAL INTELLIGENCE & ROBOTICS
Course 1: WEB TECHNOLOGIES

Time: 3Hrs.

Max. Marks: 75

SECTION – A

Answer any **FIVE** questions. Each question carries 5 marks

5 X 5M = 25M

1. Explain the features of a HTML page
2. How javascript is useful to validate your data in a webpage? Explain
3. What is javascript
4. What is DHTML
5. Explain steps to create own styles
6. How to open a new window
7. Explain formatting tags in HTML
8. Explain Web Services

SECTION – B

Answer **All** the questions. Each question carries 10 marks

5 X 10M = 50M

9. a) What is table? Explain how to create them and their attributes in HTML.

(OR)

- b) Why forms are useful in HTML. How to create them in HTML. Explain.

10. a) What is CSS? Write different types of CSS.

(OR)

- b) Explain about layers in CSS in detail with an example program.

11. a) Explain different Built-in object in Javascript.

(OR)

- b) What are the operators in javascript .

12. a) Write exception handling in javascript.

(OR)

- b) Write regular expressions in java script.

13. a) Why XML? Explain XML elements.

- b) Explain with an example XML Schema.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION COURSE

B. Sc DEGREE EXAMINATION
SEMESTER: II
ARTIFICIAL INTELLIGENCE & ROBOTICS
Course 2: ARTIFICIAL INTELLIGENCE

Time: 3Hrs.

Max. Marks: 75

SECTION – A

Answer any **FIVE** questions. Each question carries 5 marks

5 X 5M = 25M

1. Explain the applications of AI
2. Explain characteristics of intelligent agent.
3. What is recursive data types in prolog
4. What is a uniform cost search algorithm
5. Explain Greedy Search
6. What is Informed search Algorithm
7. What are the components of AI
8. What is Rational agents

SECTION – B

Answer **All** the questions. Each question carries 10 marks

5 X 10M = 50M

9. a) Explain the characteristics of an AI technique
(OR)
b) Explain different categories of Intelligence Systems
10. a) Explain structure of Intelligent agents
(OR)
b) Explain list manipulations in prolog
11. a) Explain System defined predicates
(OR)
b) Explain Breath first search
12. a) Explain Analysis of search methods
(OR)
b) Explain Heuristic Functions
13. a) Explain A* Algorithm
(OR)
b) Explain with an example XML Schema



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION COURSE

B. Sc DEGREE EXAMINATION
SEMESTER: III
ARTIFICIAL INTELLIGENCE & ROBOTICS

Course 3: EXPERT SYSTEMS

Time: 3Hrs.

Max. Marks: 75

SECTION – A

Answer any **FIVE** questions. Each question carries 5 marks

5 X 5M = 25M

1. What are the main components of a rule-based system
2. Explain Knowledge acquisition
3. What is Extended Semantic Network
4. Explain parsing Technique
5. Explain steps to create own style
6. Explain Approaches to Knowledge Representation
7. What is Logical Representation
8. Explain knowledge base agent

SECTION – B

Answer **All** the questions. Each question carries 10 marks

5 X 10M = 50M

9. a) What are the applications of Expert Systems
(OR)
b) Explain different categories of Expert systems
10. a) Explain Approaches to Knowledge Representation
(OR)
b) Explain Frame Representation
11. a) Explain Phases in Building Expert System
(OR)
b) Explain truth maintenance system
12. a) Explain Elements of Semantic Analysis
(OR)
b) Explain natural language generation
13. a) Explain Pattern Recognition
(OR)
b) Explain Learning Classification Pattern



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION COURSE

B. Sc DEGREE EXAMINATION
SEMESTER: IV
ARTIFICIAL INTELLIGENCE & ROBOTICS
Course 4: FUNDAMENTALS OF IoT AND ROBOTICS

Time: 3Hrs.

Max. Marks: 75

SECTION – A

Answer any **FIVE** questions. Each question carries 5 marks

5 X 5M = 25M

1. Explain the role of IoT in agriculture
2. Explain IoT enabling technologies
3. How are matrices used in Robotics
4. What are the characteristics of Robotics
5. What is Hydraulic Actuators
6. What is Actuators
7. Explain force sensors
8. Explain point to point control

SECTION – B

Answer **All** the questions. Each question carries 10 marks

5 X 10M = 50M

9. a) Explain different characteristics of IoT
(OR)
b) Explain difference between M2M and IoT
10. a) Explain the applications of Robotics
(OR)
b) Explain Forward and Inverse Kinematics
11. a) Explain the Characteristics of Actuating Systems
(OR)
b) Explain the Use of Reduction Gears.
12. a) Explain the Characteristics of Sensors.
(OR)
b) Explain Different Types of Sensors.
13. a) Explain about Intelligent Robots.
(OR)
b) Explain Control system for Robot Joint.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION COURSE

B. Sc DEGREE EXAMINATION
SEMESTER: IV
ARTIFICIAL INTELLIGENCE & ROBOTICS
Course 5: MACHINE LEARNING

Time: 3Hrs.

Max. Marks: 75

SECTION – A

Answer any **FIVE** questions. Each question carries 5 marks

5 X 5M = 25M

1. What is Decision Tree.
2. Explain well-posed learning problems .
3. What is function approximation in machine learning .
4. What is machine learning explain types of machine learning.
5. How decision tree is used for classification.
6. Explain the concept of Neural Network.
7. Explain multilayer network.
8. Explain case based reasoning.

SECTION – B

Answer **All** the questions. Each question carries 10 marks

5 X 10M = 50M

9. a) Explain the steps involved in designing a Learning System
(OR)
b) What is the target function in machine learning
10. a) What is concept learning explain with example
(OR)
b) Explain candidate elimination algorithm?
11. a) Explain Decision Tree classification Algorithm
(OR)
b) What are different issues in decision tree learning
12. a) Explain Neural Network Representation
(OR)
b) What is back propagation algorithm in neural network
13. a) What is the use of K nearest neighbors algorithm explain
(OR)
c) Explain instance based learning.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODELQUESTIONPAPER(Sem-end.Exam)
B. Sc DEGREE EXAMINATION
SEMESTER –V (Skill Enhancement Course-Elective)
Course 6A: Artificial Neural Network

Time: 3Hrs

Max.marks:75

Section - A

Answer any FIVE from the following

5x5 = 25M

1. Explain Application of neural network?
2. What is Supervised learning?
3. Explain Delta learning?
4. What is Perception?
5. Explain difference between Single layer perception and Multi-layer perception?
6. Explain Kohonen algorithm?
7. Explain learning rules?
8. Explain Associative memory?

Section -B

Answer ALL the following

5x10 = 50M

1. A) Explain the biological prototype of neuron. Also explain the characteristics of neuron.
(OR)
B) Explain how neural network principles are useful in control applications.
2. A) Explain the Widrow-Hoff learning rule for supervised learning in neural networks with help of an example?
(OR)
B) Explain Back propagation with algorithm?
3. A) Explain Feed forward neural network?
(OR)
B) Explain Feed backward neural network?
4. A) Discuss algorithm for storage of conformation in Hopfield network.
(OR)
B) Explain the architectures of popular self-organizing maps?
5. A) Explain Bi-directional associative memory?
(OR)
B) Explain auto-associative memory with example?



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION PAPER(Sem-end.Exam)
B. Sc DEGREE EXAMINATION
SEMESTER –V (Skill Enhancement Course-Elective)
Course 6B: Cryptography and Network Security

Time: 3Hrs

Max.marks:75

Section – A

Answer any FIVE from the following

5x5 = 25M

1. Explain Security Service?
2. Explain need for security?
3. Explain stenography?
4. Explain Stream ciphers?
5. Explain Asymmetrix key Ciphers?
6. Explain Knapsack Algorithm?
7. Explain Security payload?
8. Explain securty socket layer?

Section – B

Answer ALL the following

5x10=50M

1. A) Explain principles of Security?
(OR)
B) Explain Symmetric and e asymmetric key Cryptography?
2. A) Explain Block Cipher along with an Algorithm?
(OR)
B) Explain Principles of Public Key Cryptography?
3. A) Explain Hash Function?
(OR)
B) Explain Authentication Applications?
4. A) Explain E-Mail Security?
(OR)
B) Explain IP security architecture?
5. A) Explain Web Security?
(OR)
B) Explain types of Firewalls?



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION PAPER(Sem-end.Exam)
B. Sc DEGREE EXAMINATION
SEMESTER –V (Skill Enhancement Course-Elective)
Course 7B: Cyber Security

Time: 3Hrs

Max.marks:75

Section - A

Answer any FIVE from the following

5x5 = 25M

1. What is Cyber Crime? List the types of cybercriminals.
2. Define the public key certificate
3. How to prevent SQL Injection Attacks?
4. How to prevent SQL Injection Attacks?
5. Explain about Phishing Attacks?
6. Explain information Blue Print?
7. Explain Information Security Policy Standards?
8. Explain Stenography?

Section - B

Answer ALL the following

5x10=50M

1. A) What is Cybercrime and explain Information security?
(OR)
B) Discuss the global perspective on cybercrimes?
2. A) What is Cyber Stalking? Explain various types of Stalkers with a case study?
(OR)
B) Define Social Engineering? Describe the classification of Social Engineering with Examples?
3. A) Explain the trends in mobile credit card frauds in wireless computing
(OR)
B) Explain Organizational Measures for Handling Mobiles?
4. A) Explain about Trojan Horses and Backdoors in detail with examples.
(OR)
B) Differentiate between computer Virus and Worms with two examples each?
5. A) Explain about Digital Signatures?
(OR)
B) Explain Challenges to Indian Law and Cyber crimes Scenario?



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION PAPER (Sem-end.Exam)
B. Sc DEGREE EXAMINATION
SEMESTER –V (Skill Enhancement Course-Elective)
Course – 6C Data Analytics Using R

Time: 3Hrs

Max.marks:75

Section – A

Answer any FIVE from the following

5x5 = 25M

1. Explain Characteristics of Data?
2. What is Data Analytics?
3. Explain Data types of R?
4. Explain Boxplots, Bar Charts?
5. Explain Survival Analysis?
6. Explain Prescriptive Analytics ?
7. Explain Random Forest?
8. Explain Normal and Binomial distributions?

Section - B

Answer ALL the following

5x10 = 50M

1. A) Explain Applications of Data Analytics?
(OR)
B) Explain Classifications of Data?
2. A) Explain the environment of R Language?
(OR)
B) Explain control statements of R Language?
3. A) Explain Reading and Getting Data from R Language?
(OR)
B) Explain Working with R charts and Graphs?
4. A) Explain Decision Tree with Example?
(OR)
B) Explain different types of Regression Models?
5. A) Explain briefly reinforcement learning
(OR)
B) Explain Creating data for analytics through active learning?



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc - Artificial Intelligence & Robotics Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION PAPER (Sem-end.Exam)
B. Sc DEGREE EXAMINATION
SEMESTER –V (Skill Enhancement Course-Elective)
Course – 7C Data Ware Housing and Mining

Time: 3Hrs

Max.marks:75

Section - A

Answer any FIVE from the following

5x5=25M

1. What is Data Visualization?
2. Explain Data Cleaning?
3. Explain Data integration?
4. Explain Working of Decision Tree?
5. Explain Naive Bayesian Classification?
6. Explain Rule Generation?
7. Explain Market Basket Analysis?
8. Explain Applications of Data Mining?

Section - B

Answer ALL the following

5x10=50M

1. A) Explain briefly about Data Mining?
(OR)
B) Explain Major Issues in Data Mining?
2. A) Explain Data Preprocessing?
(OR)
B) Explain briefly Data Transformation and Data Discretization?
3. A) Explain Decision Tree Induction?
(OR)
B) Explain about Data Classification?
4. A) Explain Bayes Theorem?
(OR)
B) Explain Bayesian Belief Networks?
5. A) what is Association and Explain Association Analysis?
(OR)
B) Explain compact representation of frequent item sets?