Pusat Sains Matematik UNIVERSITI MALAYSIA PAHANG AL-SULTAN ABDULLAH	**SUBJECT: BSD3513** **INTRODUCTION TO ARTIFICIAL INTELLIGENCE** **TOPIC:** Chapter 4: Neural Networks **LAB REPORT 5**	**MARKS**: 25(5%)

CLO	Description	PLO Mapping	Percentage	Marks
CLO1	Acquire the artificial intelligence concepts and methodologies in data science.	PLO1: Knowledge and Understanding C3: Application	1%	5
CLO2	Demonstrate critical thinking ideas of artificial intelligence knowledge in problem-solving situation.	PLO2: Cognitive Skills and Functional work skills with focus on Numeracy skills CLO3: Application	1%	5
CLO3	Develop an artificial intelligence system prototype using appropriate software.	PLO3: Functional work skills with focus on Practical, and Digital skills P4: Mechanism	3%	15

Laboratory Report Objectives

By the end of this lab, students should be able to:

1. articulate AI capability types and their relevance to real deployments;
2. develop neural network model in dealing with data related problems.
3. implement a minimal, reliable web app (Streamlit or similar) that neural network, explains their complexity, and is reproducible from a GitHub repository (with a live deployment link).

CASE STUDY:

A neural network, inspired by the human brain, uses layers of interconnected "neurones" to learn complex patterns from data and map inputs to outputs without explicit programming. It can perform tasks like image recognition, language translation, and predictions.

An activation function in a neural network is a mathematical operation applied to a neuron's output. It incorporates non-linearity, allowing the model to acquire and depict intricate data patterns. In its absence, even a deep neural network would function akin to a basic linear regression model. Activation functions determine the activation of a neurone based on the weighted sum of inputs and a bias term. They facilitate backpropagation by supplying gradients for weight adjustments.

Question 1
General Knowledge

Describe the component in networks that are built in one neural network.

(5 Marks)
(CO1 PO1)

Question 2
Python: Neural Network

Create three separate web applications to visualise the following activation functions:

1) Rectified Linear Unit (ReLU),
2) Sigmoid,
3) Hyperbolic Tangent (Tanh)

(5 Marks)
(CO2PO2)
(15 Marks)
(CO3PO3)

Save your work in both .py and PDF formats. Name your files using the following format: StudentID_LabX. Submit both files through the Kalam platform by 5th January 2026, 11:59 PM. In addition, deploy your Streamlit application and include the public URL to your deployed app and GitHub repository link inside your report. Late submissions will only be considered with prior approval.

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	TOPIC: Chapter 4: Neural Networks	
	LAB REPORT 4	

NAME: SARA KHADIJA BINTI SAIDIN **STUDENT ID:** SD2306 **SECTION:** 01G

Mark for CO1: /5

Rubric for CO2.

Instruction: For CO2, assess each item using the given scales.

Demonstrate critical thinking ideas of artificial intelligence knowledge in problem-solving situation.								
Item Assessed (Cognitive)	**Very Poor 0**	**Poor 1**	**Fair 2**	**Good 3**	**Very Good 4**	**Excellent 5**	**Weightage**	**Score**
Apply and analyse relevant artificial intelligence knowledge.	The work has not done.	Poorly applied and analysed relevant artificial intelligence knowledge and results.	Applied and analysed relevant artificial intelligence knowledge but failed to achieve successful results.	Applied and analysed relevant artificial intelligence knowledge but arrive at satisfactory results.	Applied and analysed relevant artificial intelligence knowledge to arrive at successful results.	Applied and analysed relevant artificial intelligence knowledge to arrive at excellent results.	0.5	
Using logical, rational or problem-solving appropriate to the artificial intelligence problems.	The work has not done.	The work needs to demonstrate logical, rational or problem-solving understanding appropriate to the artificial intelligence problems.	The work has demonstrated some logical, rational or problem-solving understanding appropriate to the artificial intelligence problems.	The work has demonstrated logical, rational or problem-solving understanding appropriate to artificial intelligence problems.	The work has demonstrated a thorough logical, rational or problem-solving understanding appropriate to artificial intelligence problems.	The work has demonstrated a thorough and classy logical, rational or problem-solving understanding appropriate to artificial intelligence problems.	0.5	
						Total Score	**1**	**/5**

Rubric for CO3.

Instruction: For CO3, assess each item using the given scales.

CO3: Develop an artificial intelligence system prototype using appropriate software.							
Item Assessed (Cognitive)	**Very Poor 0**	**Poor 1**	**Fair 2**	**Good 3**	**Very Good 4**	**Excellent 5**	**Score**
Utilizing the appropriate tools / software effectively	No relevant tool used.	Tools used but did not enhance solution or information clarity.	Tools used but with limited enhancement; minimal functionality demonstrated.	Tools used appropriately to produce a functional solution with clear output.	Tools used effectively to enhance clarity, performance, and solution quality.	Tools used optimally with advanced features, clear design, and effective interaction to display the solution.	
Code functionality, clarity & structure	No code constructed.	Code incomplete or mostly non-functional; unclear and poorly structured.	Partially functional code; errors present; structure somewhat difficult to follow.	Mostly functional code with minor errors; clear structure and readable.	Fully functional and well-structured code; clearly commented and readable.	Fully functional, optimized, modular, and well-documented code; demonstrates best practices.	
Deployment & Version Control (GitHub + Streamlit or etc)	No deployment and no GitHub repository.	GitHub repo exists but incomplete OR app deploy attempt failed.	GitHub repo available with basic files; deployment page exists but app not functioning correctly.	Working deployment provided; GitHub repo contains main code files.	Working deployment with complete repository (README, code, requirements); clearly accessible.	Fully deployed app with professional GitHub repo (README, screenshots, instructions, modules, tags); live Streamlit app runs smoothly and reliably.	
						Total Score	**/15**