Programme	Computer Science & Engineering	Semester	V
Course	Artificial Intelligence & Machine Learning	Max Marks	30
Course Code	20CS51I	Duration	4 hours
Name of the course coordinator	Mrs.Bhuvaneshwari		

Note: Answer one full question from each section.

<table>
<tr><th>Qn.No</th><th>Question</th><th>CL
L3/L4</th><th>CO</th><th>PO</th><th>Marks</th></tr>
<tr><td colspan="6">Section-1 (Theory) – 10 marks</td></tr>
<tr><td>1. a)</td><td>Create two series as shown using pd.series() function.
Series_A = [10,20,30,40,50] Series_B = [40,50,60,70,80]. Get the items common to both.</td><td>L3</td><td>2</td><td>1</td><td>5</td></tr>
<tr><td>b)</td><td>Describe the different types of machine learning algorithms with examples.</td><td>L4</td><td>1</td><td>4</td><td>5</td></tr>
<tr><td>2. a)</td><td>What are the goals of artificial intelligence?</td><td>L4</td><td>1</td><td>2</td><td>4</td></tr>
<tr><td>b)</td><td>Create a data frame with following data
<table>
<tr><td>Ename</td><td>Type</td><td>Dname</td><td>exp</td><td>salary</td></tr>
<tr><td>Roshan</td><td>regular</td><td>cs</td><td>10</td><td>50000</td></tr>
<tr><td>Amar</td><td>adhoc</td><td>cs</td><td>20</td><td>15000</td></tr>
<tr><td>Ashwini</td><td>regular</td><td>ec</td><td>5</td><td>30000</td></tr>
<tr><td>Lohith</td><td>adhoc</td><td>ec</td><td>14</td><td>15000</td></tr>
<tr><td>Mohan</td><td>contract</td><td>cs</td><td>9</td><td>10000</td></tr>
<tr><td>Pramod</td><td>regular</td><td>ec</td><td>8</td><td>40000</td></tr>
</table>
1. Make a pivot table that shows the average salary of each employee for each department.
2. Make a pivot table that shows the sum and mean of the salaries of each type of employee and the number of employees of each type.</td><td>L3</td><td>2</td><td>4</td><td>6</td></tr>
<tr><td colspan="6">Section-2 (Practical) - 20 marks</td></tr>
</table>

<table>
<tr>
<td>3) a</td>
<td>Use 'Cars93' dataset to answer the above questions.

The information that the columns of this dataset contain is given below:

<table>
<tr><th>Manufacturer</th><th>Model</th><th>Type</th><th>Price</th><th>MPG.city</th><th>MPG.highway</th><th>Horsepower</th><th>Rear.seat.room</th><th>Passengers</th></tr>
<tr><td>Manufacturer.</td><td>Model.</td><td>Type: a factor with levels "Small", "Sporty", " Compact", "Midsize", "Large" and "Van".</td><td>Midrange Price (in \$1,000).</td><td>City MPG (miles per US gallon by EPA rating).</td><td>Highway MPG.</td><td>Horsepower (maximum).</td><td>Rear seat room (inches) (missing for 2-seater vehicles).</td><td>Passenger capacity (persons)</td></tr>
</table>

Create the following plots to visualize/summarize the data and customize it appropriately.

• Use a box plot to determine the price range of all different cars available in the market? And interpret the five-number summary
• Histogram to check the frequency distribution of the variable ‘Mpg.city’ (Miles per gallon) and note down the interval having the highest frequency.
• Use a scatter plot to determine whether a car with higher horsepower gives lower mileage?
• Use a line chart to observe the variations in ‘Engine Size', against 'Horsepower'.
• Create a git repository and push source code to the repo.</td>
<td>L3,L4</td>
<td>1,2</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>b</td>
<td>1. find a list of squares of the first five odd numbers using lambda and map function.

2. find the odd numbers from a given list using a filter

3. compute a sum of the first five integers using reduce function.</td>
<td>L3</td>
<td>1</td>
<td></td>
<td>2+1+2</td>
</tr>
</table>

4) a)	Use the 'matcars.csv' dataset to answer the above questions. Create the following plots to visualize/summarize the data and customize it appropriately. • histogram to check the frequency distribution of the variable 'mpg' (Miles per gallon) and note down the interval having the highest frequency. • scatter plot to determine the relationship between the weight of the car and the mpg • bar plot to check the frequency distribution of transmission type of cars. • Box and Whisker plot of mpg and interpret the five-number summary. • Create a git repository and push source code to the repo.	L3, L4	1,2	4	15
b)	Write a Pandas program to split a given dataframe into groups and create a new column with count from GroupBy. **Test Data:** book_name book_type book_id 0 Book1 Math 1 1 Book2 Physics 2 2 Book3 Computer 3 3 Book4 Science 4 4 Book1 Math 1 5 Book2 Physics 2 6 Book3 Computer 3 7 Book5 English 5	L3	1	4	5