



### MEMORANDUM OF UNDERSTANDING

### BETWEEN

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING OF SHRI MADHWA VADIRAJA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

### AND

### VISOLUTIONS

This Agreement made and entered into on this 1st March, 2022 between Department of Electronics and Communication Engineering of Shri Madhwa Vadiraja Institute of Technology and Management, Bantakal, Udupi-574115 (hereinafter called "SMVITM") and V I SOLUTIONS (hereinafter called "V I Solutions" which expression shall include its successors and permitted assignees) with its registered office at Bengaluru-560094.

### 1. OBJECTIVES OF THE MOU

The objective of this Memorandum of Understanding is:

- a. To promote interaction between SMVITM and VI Solutions in mutually beneficial areas.
- b. To provide a formal basis for initiating interaction between SMVITM and VI Solutions.

## 2. PROPOSED MODES OF COLLABORATION

SMVITM and V I SOLUTIONS propose to collaborate through

- a. Supporting R&D projects, this may be carried out wholly at SMVITM.
- Any other appropriate mode of interaction agreed upon between SMVITM and V I SOLUTIONS.

## 3. FORMS OF RESEARCH AND DEVELOPMENT PROGRAMS

The form of any of the said Research and Development Program (hereinafter referred to as "Research Program") will be subject to a separate Research Agreement entered into by the Parties but may also include the following:

- a. In their own existing facilities The performance of research individually by each Party or concurrently by both Parties in mixed groups at their own facilities with regular exchanges of results.
- b. In a separate research and development facility The performance of research by the technical personnel of both Parties working together in the facilities of one Party or in mixed groups at the facilities supported/sponsored by either Party.

C. Third parties - The performance of research by the Parties together with one or more third parties.

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## 4. TECHNICAL AREAS OF COLLABORATION

The principle technical areas of collaboration between SMVITM and V I SOLUTIONS will be as Internet of Things – IIoT, Machine Learning, Artificial Intelligence, Embedded System Design.

## 5. AGREEMENTS FOR RESEARCH COLLABORATION

Research undertaken by the SMVITM, the treatment of intellectual property and data rights, including patents, industrial design registration, copyrights and all other proprietary information (including innovations not patented, designs not registered etc.) will be remains to the original inventors and in the college name.

#### 6. CONFIDENTIALITY

a. During and for a period of one year from the date of disclosure, each party agrees to consider as confidential all information disclosed by the other party in written or tangible form or, if orally disclosed confirmed in writing within thirty days of disclosure and identified as confidential by the disclosing party.

b. The obligations above shall not extend to any confidential information for which the receiving

party can prove that this information:

is in the public domain at the time of disclosure or comes within the public domain without fault of the receiving party.

is already known or become known to the receiving party

is received from a third party having no obligations of confidentiality to the disclosing party,

is independently developed by the receiving party; or

is required to be disclosed by law or court order.

### 7. NON-EXCLUSIVITY

The relationship of the parties under this MOU shall be nonexclusive and both parties, including their affiliates, subsidiaries and divisions, are free to pursue other agreements or collaborations of any kind. However, when entering into a particular research agreement, the participants may agree to limit each party's right to collaborate with others on that subject.

## 8. TERMS AND TERMINATION

This MOU, unless extended by mutual written agreement of the parties, shall expire 1 year after the effective date specified in the opening paragraph. This MOU may be amended or terminated earlier by mutual written agreement of the parties at any time. Either party shall have the right to unilaterally terminate this MOU upon 60 days' prior written notice to the other party. However, no such early termination of this MOU, whether mutual or unilateral, shall affect the obligations of the participants under any Research Agreement, Confidentiality clause as referenced in clause 6 above, or any other agreement entered into pursuant to this MOU, which obligations shall survive any such termination.

## 9. RELATIONSHIP

Nothing in this MOU shall be construed to make party a partner, an agent or legal representative of the other for any purpose.

(a) Hands-on-Workshop / SDP: VI Solutions will organize at least one hands-on-workshop on latest technologies like Industrial Internet of Things – IIoT, Machine Learning, Artificial Intelligence, Embedded System Design etc., for students as agreed terms and conditions every year. The College will provide the

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BANTAKAL - 574 115





infrastructure facility for conducting such workshop in the campus, VI Solutions will provide certificates for the participants for workshops authorized by National Instruments.

- (b) FDP: VI Solutions will organize at least one Faculty Development Program on latest technologies like Industrial Internet of Things - IIoT, Machine Learning, Artificial Intelligence, Embedded System Design etc., as agreed terms and conditions every year. The College will provide the infrastructure facility for conducting such workshop in the campus. VI Solutions will provide certificates for the participants for workshops authorized by National Instruments.
- (c) Internship: VI Solutions will short list candidates for internships after workshop based on their performance and willingness.
- Workshops/Events: If the College wishes to organize a national event in the area of IoT, Machine Learning, Artificial Intelligence, Signal processing & Image Processing, VI Solutions will provide speakers.

#### 10. ASSIGNMENT

It is understood by the Parties herein this MOU is based on the professional competence and expertise of each party and hence neither Party shall transfer or assign this Agreement, or rights or obligations arising hereunder, either wholly or in part, to any third party.

### 11. SIGNED IN DUPLICATE

This MOU is executed in duplicate with each copy being an official version of the Agreement and having equal legal validity.

BY SIGNING BELOW, the parties, acting by their duly authorized officers, have caused this Memorandum of Understanding to be executed, effective as of the day and year first above written.

On behalf of

on behalf of

SHRI MADHWA VADIRAJA INSTITUTE OF TECHNOLOGY AND MANAGEMENT BANTAKAL, UDUPI

By

: Dr. Sachin Bhat Dept of E&C

Name

Title

: Assoc.Prof & Head – Dept. of ECE

Date

: 01-03-2022

Witness:

BENGALURU

By

Name

Title

: Managing Director

Date

: 01-03-2022

Witnes:

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Vishwothama Nagar, Bantakal - 574115, Udupi District, Karnataka.



## **ACTIVITY REPORT**

Academic Year	2022-23
Name of the Program	Industrial Internship Program on IOT & Machine Learning using Lab View
Date	1 Sep to 30 Sep 2022 ( 4 Weeks )
Target Audience	Final Year Students
Resource Person	Satyanarayan R
	VI Solutions Bengaluru
Number of Participants	35

## Photos



Latitude :13.254615 Longitude :74.785077

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Latitude : 13.254751 Longitude: 74.785518



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## Detailed Report of the Activity

Electronics & Communication Engineering Department in association with VI Solutions Bengaluru had conducted 4 Weeks Industrial Internship Program on IOT & Machine Learning using Lab View from 1 Sep to 30 Sep 2022. Mr. Sathyanarayan R, Senior Technical Trainer, VI Solution, Bengaluru was the resource person and 35 final year students benefited from the

This Course has given the chance to explore the LabVIEW environment, dataflow programming, and common LabVIEW development techniques in a hands-on format. In this course, the participants had learnt to develop offline data-logging and measurement analysis applications. At the end of the course, participants had to create the applications using state machine design pattern, store offline data and also performed various analyses to the stored data. Topics covered were programmatic control of the user interface, techniques to optimize reuse of existing code, use of file I/O functions, and tools to create executable files and installers. This course helped directly to link Lab VIEW functionality to user's application needs and provided a jump-start for application development.

Dr. Sachin Bhat, HOD, ECE Dept. and Mr. Chetan R, Internship Coordinator have made the necessary arrangements for this program. Dr. Raghavendra Rao, Associate Professor supported this event.

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# **Data Acquisition and Hardware Programming**

Using LabVIEW, data acquisition devices, and signal conditioning hardware, the Data Acquisition and Signal Course Outline: Conditioning course teaches you the fundamentals of PC-based data acquisition and signal conditioning. During the course, you get hands-on experience installing and configuring data acquisition hardware and you learn to use data acquisition software functions to build your application.

This topic introduces the basics of data acquisition (DAQ). You learn the purpose of each component in a data acquisition system. Topics include:

- Components of a typical data acquisition system
- Overview of sensors
- Overview of types of signals and signal information
- Overview of DAQ hardware, signal conditioning, and DAQ software

In this part, you learn about DAQ hardware components, choosing an appropriate DAQ device, and DAQ software. Topics include:

Components of a DAQ device

- Bus, signal, and accuracy considerations when choosing DAQ hardware
- Configuring the Measurement & Automation Explorer (MAX)
- Overview of DAQ Assistant

Analog Input

In this part, you develop LabVIEW applications that perform analog input.

- Acquiring voltage signals using analog input
- Single sample software-timed acquisition and continuous buffered acquisition

In this lesson, you learn different methods of generating voltage levels and waveforms on a DAQ device. Topics include:

Single sample and Continuous buffered generation

This module describes digital signals and how to develop digital input and digital output applications using software timing and hardware timing. Topics include:

- Digital Signals
- Digital I/O

This part focuses on the counter functionality of a DAQ device. It begins with an overview of counters, including counter signals. The lesson also describes how to develop applications for various counter operations. Topics include:

- Pulse Generation
- Pulse Measurements

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## **Digital Image Processing**

The field of imaging or image processing has a very broad scope in today's digital era. This course covers a very large application of image processing called machine vision. Machine vision focuses on using a machine (an electronic camera connected to a computer) to replace the marvelous human vision system to process digital representations of actual scenes or objects.

The course reviews many important fundamentals such as CCD cameras, image acquisition, lighting techniques, and many basic IMAQ Vision and image processing basic programming concepts. Topics include:

Image Acquisition

- Machine Vision Fundamentals
- Cameras
- Image Acquisition Board

The IMAQ Vision libraries greatly simplify image processing. When working with images, you must allocate and manage your computer's memory resources. IMAQ Vision makes this task extremely simple, taking away the complicated syntax by using Image VIs. Topics include:

Managing IMAQ Library and Image Resources

Read & Write Image Files

Memory Consideration

When dealing with images, 256 grayscales often make for too much complexity, and you would like to simplify the image to be only black and white. Thresholding is the act of defining which values will constitute the objects (white), and which values will constitute the background (black). Histographs give important information about the image's pixel values, which you can use to help decide on your threshold values. Topics include:

Using Image Histogram and Threshold

Performing Blob analysis and Morphology

In this lesson, you will learn a new set of algorithms (distinct from morphological functions) that allow you to filter and enhance grayscale images. Topics include:

Performing Linear and Boolean arithmetic operations on Images

Using Linear Spatial Filters or Convolution Filters

Using Non-Linear Filters

This module gives an overview of color images and how to process them using IMAQ Vision. Topics include:

Color Representation and Color Space Models

Color Byte Encoding

Histogram and Equalization of Color Images

Thresholding a Color Image

Matching Patterns and Shapes in Images In this lesson, you will learn the differences between binary shape matching and pattern matching. You will also learn how to develop an application for binary shape matching and grayscale pattern matching. Topics include:

o Binary shape matching

o Grayscale Pattern Matching

o Applications od Pattern Matching

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# **Training on Graphical Programming**

This course gives the chance to explore the LabVIEW environment, dataflow programming, and common LabVIEW development techniques in a hands-on format. In this course, the participants will learn to develop offline data-logging and measurement analysis applications. At the end of the course, participants will be able to create applications using the state machine design pattern to simulate, process, display, store offline data and also perform various analysis to the stored data. It also thoroughly teaches to use common design patterns to successfully implement and distribute LabVIEW applications for research, engineering, and testing environments. Topics to be covered include programmatic control of the user interface, techniques to optimize reuse of existing code, use of file I/O functions, and tools to create executable files and installers. This course directly links LabVIEW functionality to user's application needs and provides a jump-start for application development.

This lesson introduces the LabVIEW environment. In this lesson, you will build a LabVIEW application that enables Navigating LabVIEW you to fully explore the environment and that acquires, analyzes and presents data. Topics include:

- The LabVIEW environment including windows, menus, and tools
- The LabVIEW front panel and block diagram
- Creating and using LabVIEW projects
- Understanding the dataflow programming model of LabVIEW
- Searching for Controls, VIs, and functions

This lesson teaches various debugging and error-checking techniques in LabVIEW to identify problems with block Trouble Shooting and Debugging Vis diagram organization or with data passing between different points in the block diagram. Topics include:

- Using the LabVIEW help features include the Context Help, the LabVIEW Help
- Correcting broken Vis
- Using common debugging techniques
- Addressing undefined or unexpected data
- Implementing error checking and error handling

This lesson teaches how to implement code in LabVIEW to meet project requirements. Topics include:

- Designing a user interface (LabVIEW front panel)
- Choosing data types and displaying data as a plot
- Using structures like the While loops and For loops
- Adding software timing to your code
- Making decisions in your code using case structures
- Documenting your code

This lesson teaches how to store data, implement a basic using the File IO APIs, and performing File IO operation on Managing Resources ASCII and Binary file formats. Topics include:

- An introduction to different file formats
- File I/O functions available in LabVIEW
- Implementing ASCII File I/O functions to read and write data to files
- Programming with Binary File IO's

This lesson introduces modular programming in LabVIEW. In LabVIEW, when a VI is used within another VI, it is **Developing Modular Applications** called a SubVI. You will learn how to build the icon and connector pane of a VI so that it can be used as a SubVI. Topics include:

- Basics of modular programming
- Creating an icon and connector pane
- Using a VI as a SubVI
- Creating SubVI from an existing VI

This lesson introduces common LabVIEW design techniques and the state machine design pattern. Topics include: Common Design Techniques and Patterns

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- Sequential programming
- State programming
- State machine design pattern

## **Using Variables**

This lesson explains how to use variables to transfer data among multiple loops and Vis. You will also learn about the programming uses involved when using variables and how to overcome these challenges. Topics include:

- Using local, global and single process shared variables
- Implementing functional global variables
- Identifying and controlling race conditions semaphores

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## Instructions to Install NI LabVIEW 2018

Step 01: Download LabVIEW 2018 setup file using the below link.

ftp://ftp.ni.com/evaluation/labview/ekit/other/downloader/2018LV-WinEng.exe

Step 02: Open the downloaded 2018LV-WinEng.exe file.

Step 03: Run the setup.exe

l Bin	08-03-2020 16:20	File folder	
Licenses	08-03-2020 16:20	File folder	
Products	08-03-2020 16:20	File folder	
	02-04-2018 09:58	Application	2,093 KB
autorun.exe	02-04-2018 09:58	Setup Information	1 KB
E10.3	09-03-2018 04:04	Text Document	1 KB
buildInfo.txt	02-04-2018 09:59	ID File	1 KB
nidist.id	05-10-2017 17:48	Text Document	24 KB
patents.txt	24-02-2018 03:36	HTML File	34 KB
readme.html	02-04-2018 09:04	Application	1,445 KB
setup.exe	02-04-2018 09:59	Configuration sett	72 KB

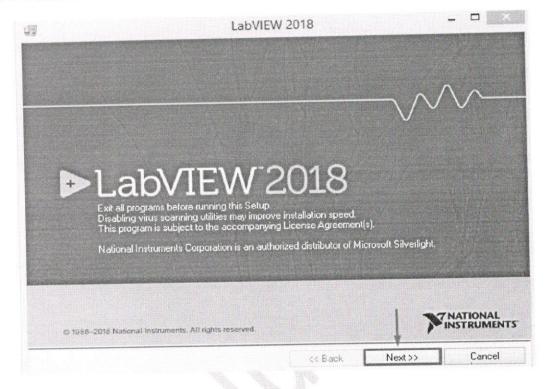
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Step 04: Click Next Button when it is available.



Step 05: Enter your name & Organization details and click Next.

	LabVIEW 2018	
User Informat Enter the follo	ion wing information	NATIONAL
Full Name:		
Organization:		

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Step 06: Leave the serial number empty to use LabVIEW 2018 in evaluation mode.

Serial Numbers		TNATIONAL
Enter Serial Numbers for the following	ng Products	INSTRUMENTS
	Serial Number:	
LabVIEW 2018 (Base/Full/Professional) **		and the second control of the second control
Application Builder for LabVIEW 2018 - leave blank if activating LabVIEW Professional. **		
Report Generation Toolkit for LabVIEW 2018 leave blank if activating LabVIEW Professional. ***		
Database Toolkit for LabVIEW 2018 - leave blank if activating LabVIEW Professional. **	Vicination and other more experience and more in security and an experience of the control of th	
		1
**Leave serial number field empty to use prod	uct in evaluation mode.	

Step 07: Select the folder to install NI LabVIEW 2018 & click Next.

LabVIEW 2018	×
Destination Directory Select the installation directories.	NATIONAL
Select the folder to install NI Software	
C:\Program Files (x86)\National Instruments\	Browse
Select the folder to install NI LabVIEW 2018	
Select the folder to install NI LabVIEW 2018  C:\Program Files (x86)\National Instruments\LabVIEW 2018\	Browse
	Browse
	Browse
	Browse
	Browse

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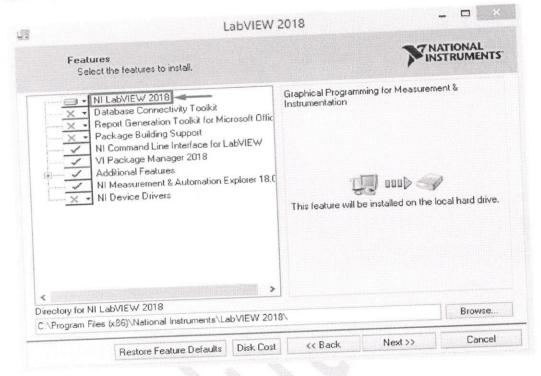
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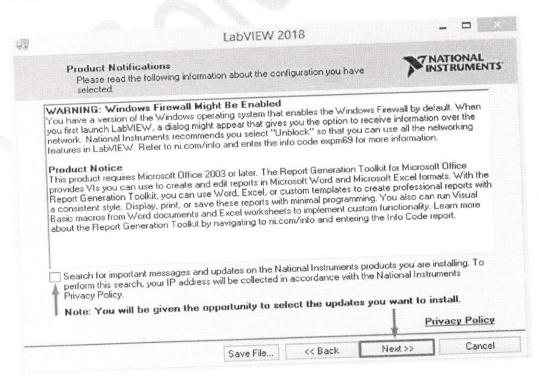
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Step 08: Select the required features to Install



Step 09: Uncheck the "search for important messages & updates" & click Next.



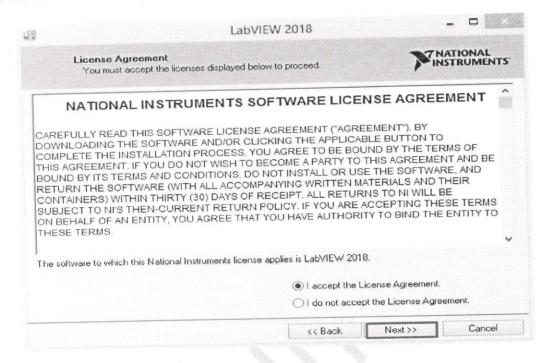
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Phone: 91-80-40948484 <u>www.visolutions.org</u> Email: <u>support@visolutions.org</u>

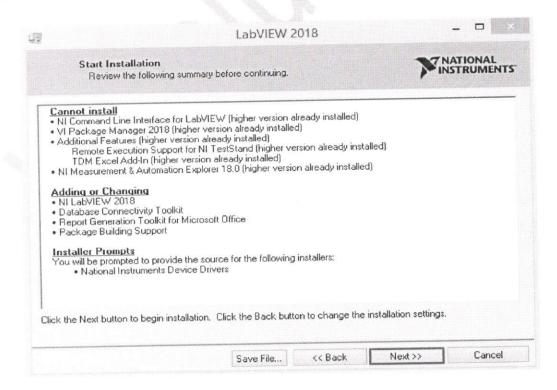
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Step 10: Select the "I accept the License Agreement" & click Next.

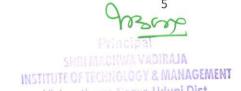


Step 11: Review the summary & click the Next button to begin Installation.



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Step 12: The LabVIEW Installation will be started and the progress is displayed.

	LabVIEW 2018		_
		77 N	STRUMENTS
Overall Progress: 0% Complete			
	<< Back	Next >> T	Cancel

Step 13: Once after the Installation gets completed, restart the system.

Step 14: Search for LabVIEW 2018 in Applications & Launch the Application.

(Once the Application is opened, you will be asked to select any one of the below options)

1. Evaluate

2. Activate

3. Purchase

Select Evaluate and the click "No" to get the getting started splash screen of LabVIEW.

Step 15: Now your LabVIEW software is ready to be programmed.

**Note:** The software is in evaluation mode and it will be last for 7 days from the day of Installation.

Please refer the "Instructions to extend the LabVIEW evaluation period" document to extend it for another 45 days.

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## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

## **EVALUATION OF INTERNSBY SUPERVISOR**

Supervisor's Name: SATYANARAYAN R

**Designation:** Senior Applications Engineer

Company Name: VI SOLUTIONS

Address: # 22, 2nd Floor, Akai Plaza, D Rajagopal Road, opp. to Axis Bank, Sanjaynagar, Bengaluru,

Karnataka 560094

Internship dates:

From 1st Sep 2022 to 30rd Sep 2022

Please evaluate each intern by entering numbers from 1 to 4 for each parameter.

1 = Needs improvement.

2 = Satisfactory

3 = Good

4 = Excellent

SN	Name of the intern	Behavior of intern	Punctuality	Interest in work	Ability to analyze problems	Initiative in work	Creativity/originality	Acceptance of responsibility	Use of technical knowledge and expertise	Professional attitude	Cooperation with supervisor & co-workers	Overall Performance
1	ADITYA BHAT	4	4	3	3	3	3	4	3	4	4	4
2	CHAITHRA KULAL	4	4	4	3	3	3	4	3	4	4	4
3	CHAYA NAIK	4	4	3	3	3	3	4	3	4	4	3
4	DEEPA NAYAK	4	3	3	3	3	4	4	3	4	4	3
5	DHEEKSHA A SUVARNA	4	4	3	3	3	3	3	3	4	4	3
6	DHEERAJ	4	4	4	4	4	4	4	4	4	4	4
7	DIVYASHREE	4	4	3	3	3	3	4	3	4	4	3
8	MANTHANA K	3	2	2	2	3	3	3	2	3	2	2
9	MEGHANA BAPAT K	4	4	4	3	3	3	4	3	4	4	4
10	MEGHANA R BHAT	4	4	4	3	3	3	4	3	4	4	4
11	NEEMA B SHETTY	4	4	4	3	3	3	4	3	4	4	4
12	PRATHEEKSHA	4	4	3	3	3	3	4	3	4	4	3
13	RACHANA	4	4	3	3	3	3	4	4	4	4	4
14	RASHMITHA BHAT	4	3	3	3	3	4	4	4	4	4	4
15	RUHAIMA	4	3	3	3	3	4	4	3	4	3	3
16	SAMEEKSHA	4	3	3	3	3	4	4	3	4	3	3
17	SAMEEKSHA P U	4	4	4	4	4	4	4	4	4	4	4



18	SHARANYA (U UDAYA)	4	4	4	3	4	4	4	4	4	4	4
19	SHARANYA (SANTOSH)	4	4	3	3	3	3	4	3	4	4	3
20	SHETTY NITHIN VIJAY	3	2	2	2	3	3	3	2	3	2	2
21	SHRAVAN S	3	2	2	2	3	3	3	2	3	2	2
22	SHREESHA S AITHAL	3	2	2	2	3	3	3	2	3	2	2
23	SHREYA	4	4	3	3	3	3	4	3	4	4	3
24	SHREYA DEVADIGA	4	4	3	3	3	3	4	3	4	4	3
25	SHREYAS ACHARYA	4	4	3	3	3	3	4	3	4	4	3
26	SHRIKRISHNA BHAT	4	4	3	3	3	3	4	3	4	4	3
27	SHRINIKETH	4	4	3	3	3	3	4	3	4	4	3
28	SINCHANA	4	4	3	3	3	3	4	3	4	4	3
29	SOUJANYA S	4	4	3	3	4	4	4	4	3	4	4
30	SRIJANYA	4	4	3	3	3	4	4	4	4	4	4
31	SUDEEP	4	4	4	4	4	4	4	4	4	4	4
32	VARALAKSHMI	4	4	4	4	4	4	4	4	4	4	4
33	VARSHINI ACHARYA	4	4	4	4	4	4	4	4	4	4	4
34	SUJAN	4	4	4	4	4	4	4	4	4	4	4
35	KARTHIK N	4	4	3	3	3	4	4	4	4	4	4

Additional comments, if any: Keep Practicing to get hold on tool.

Place: Bengaluru

Date: 30/09/2022

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Signature of Internship Supervisor

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		CEM	MAIL ID	CONTACT#
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2	CHAITHRA KULAL	7	chaithra.19ec010@sode-edu.in	9632096817
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## CERTIFICATE OF COMPLETION

On

Industrial Internship Program on IoT, Machine Learning Using LabVIEW

We present this certificate to

## **SHRIKRISHNA BHAT**

From Shri Madhwa Vadiraja Institute of Technology & Management, Bantakal

In appreciation for your successful work as intern at VI Solutions, Bangalore, From 1st September 2022 to 30th September 2022

Principal

Mr. Sunil Kumar V Managing Director

VI Solutions, Bangalore

Vishwothama Nagar, Udupi Disi BANTAKAL - 574115



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Mr. Sunil Kumar V Managing Director

VI Solutions, Bangalore

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