



VEL TECH HIGH TECH

Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

An Autonomous Institution

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai



REPORT ON EVENT-4

HANDS-ON MACHINE LEARNING AND DEEP LEARNING WITH TENSOR FLOW FOR ENGINEERING INNOVATION (01.12.2025 - 06.12.2025)



VEL TECH HIGH TECH - AICTE-IDEA LAB

VEL TECH HIGH TECH

Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

#60,Avadi - Vel Tech Road, Vel Nagar,
Avadi, Chennai,
Tamil Nadu, India. Pincode:600062.

Prof. Dr. E. KAMALANABAN

AICTE IDEA LAB – CHIEF MENTOR

Prof. Dr. V.R. RAVI

AICTE IDEA LAB – COORDINATOR

Prof. Dr. R. SURESH

AICTE IDEA LAB – CO-COORDINATOR

Dr. S .SIVASARAVANA BABU

Tech Guru

Dr. S. RAJAMANICKAM

Tech Guru


Dr. G. MAHALAKSHMI

Tech Guru

Mr. M. PARTHIBAN

Tech Guru







EVENT APPROVAL

 VEL TECH HIGH TECH Dr.RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE An Autonomous Institution Approved by AICTE, New Delhi Affiliated to Anna University, Chennai AICTE IDEA LAB																																																															
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Supportive document-NBA-2.2 & 2.7

To be deducted from AICTE IDEA LAB Account


WORKSHOP BROCHURE

Vel Tech High Tech
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An Autonomous Institution

6 Days FDP on


Hands-on Machine Learning and Deep Learning with TensorFlow for Engineering Innovation









December 01st - 06th, 2025
Venue : Computer Lab

Organized by
VEL TECH HIGH TECH
AICTE IDEA LAB

P.No: 04
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ABOUT INSTITUTION

Vel Tech High Tech Dr. Rangarajan Dr. Sakunthala Engineering College (An Autonomous Institution) was established in 2002 by Col. Prof. Vel. Dr. R. Rangarajan and Dr. Sagunthala Rangarajan, who have been devoted to the field of education for over three decades. The institution is approved by AICTE, New Delhi, and affiliated with Anna University, Chennai, Tamil Nadu. The college has been accredited with an 'A' Grade and a CGPA of 3.27 by NAAC and by NBA for its Biotechnology, Chemical, ECE, and IT programs. The college boasts state-of-the-art infrastructure that provides students with practical, hands-on learning experiences, enabling them to develop essential employability skills and secure placements in top MNCs. The institution has been sanctioned an AICTE IDEA Lab with a grant of ₹90 lakhs under the AICTE's national initiative to promote Innovation, Design Thinking, and Entrepreneurship among students and faculty members. Vel Tech High Tech offers nine undergraduate programs (B.E./B.Tech) — AIDS, CSE (AIML), CSE, ECE, IT, Chemical, Biotechnology, Mechanical, and Civil Engineering — along with postgraduate programs in M.E. Structural Engineering and MBA.

02 | ABOUT FDP

This Faculty Development Programme on Hands-on Machine Learning and Deep Learning with TensorFlow for Engineering Innovation is designed to equip faculty members with practical skills and industry-relevant knowledge in modern AI technologies. This programme focuses on bridging theory and real-world application through immersive sessions, coding demonstrations, and hands-on experimentation using TensorFlow. By combining foundational concepts with applied learning, the FDP empowers educators to incorporate advanced AI techniques into teaching, research, and engineering problem-solving.

03 | FDP HIGHLIGHTS

- Expert-led sessions by industry and academic AI professionals
- Fully hands-on training with TensorFlow coding exercises
- Real-time experimentation using sample engineering datasets
- Step-by-step model building: from data loading to deployment
- Exposure to AI tools, frameworks, and interactive notebooks
- Guidance for research publications and project development
- Certificate of participation for all registered faculty members

04 | WHO CAN PARTICIPATE

- Faculty Member of Engineering and Technology
- Innovators and Enthusiasts passionate about IoT, Automation, and Smart Systems

05 | OBJECTIVES

- To introduce participants to the fundamentals of Machine Learning and Deep Learning.
- To enable hands-on practice in building ML/DL models using TensorFlow.
- To strengthen understanding of neural networks and their engineering applications.
- To familiarise participants with real-world datasets and model deployment workflows.
- To enhance research capabilities and promote AI-driven innovation among faculty.







06 | KEY TOPICS COVERED

- Introduction to ML, DL & TensorFlow ecosystem
- Data preprocessing and feature engineering
- Artificial Neural Networks (ANN) basics
- Convolutional Neural Networks (CNN) for image processing
- Recurrent Neural Networks (RNN) & LSTM for sequence modelling
- TensorFlow Model Deployment basics (TFLite, web edge deployment)
- Case studies and real-world engineering applications
- Model optimization, tuning & evaluation techniques

07 | Expected Outcomes

Participants will be able to:

- Understand ML and DL concepts and their engineering relevance.
- Build and train models using TensorFlow and Keras.
- Preprocess datasets and evaluate model performance effectively.
- Apply neural networks for classification, regression, and prediction tasks.
- Integrate TensorFlow workflows into academic teaching and research projects.

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CHIEF PATRONS

Col. Prof. Vel. Shri. Dr. R. Rangarajan
Founder President & Chairman

Dr. Sakunthala Rangarajan
Foundress President & Vice Chairman

AICTE-IDEALAB COORDINATOR

Prof. Dr. V. R. Ravi Dean Academics

AICTE-IDEALAB CO-COORDINATOR

Prof. Dr. R. Suresh Dean SOMC

AICTE-IDEALAB CHIEF MENTOR

Prof. Dr. E. Kamalanaban
Principal

AICTE-IDEALAB TECH GURU'S

Dr. S. Sivasaravana Babu +91-96003 63708
Mr. M. Parthiban +91-96597 41118
vtht-idealab@velhightech.com

VEL TECH HIGH TECH -AICTE IDEA LAB

08 | OBJECTIVE

The AICTE-IDEA Lab is dedicated to fostering a dynamic ecosystem that promotes innovation, nurtures creativity, and advances technological progress in both education and society. Recently, VTHT has been sanctioned with fund of ₹90 lakhs by AICTE, New Delhi, to establish this state-of-the-art facility. The primary objective of the IDEA Lab is to transform innovative ideas into functional prototypes, which can subsequently be developed into market-ready products through startup ventures.

09 | KEY FEATURES

- Common Facility:** IDEA Lab is designed as common facility within our institute, accessible to all students, faculty, and nearby Industries.
- 24/7 Availability:** The IDEA lab is intended to be available 24/7 for students to use.
- Equipped with Resources:** IDEA Lab provides a range of sophisticated equipment and tools, including 3D printers, 3D scanners, Drones, AR/VR equipments, Embedded Edge devices with varieties of sensors, AI Edge devices, IoT kits, CNC laser cutters, and computer workstations.
- Industry Collaboration:** IDEA Lab collaborates with nearby industries to leverage their resources and expertise, fostering a symbiotic relationship between academia and industry.








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STATE-OF-THE-ART LABORATORIES

Internet of Things (IoT) Lab	Arduino Lab
Artificial Intelligence Lab	Advance Manufacturing Lab
Additive Manufacturing Lab	Design Thinking Lab
Reverse Engineering Lab	AR and VR Lab
Laser Technology Lab	Robotics Lab
PCB Design Lab	Drone Lab

STATE-OF-THE-ART EQUIPMENT

WIPRO 3D PRINTER 	WEGSTR PCB MILLING MACHINE 
LASER CUTTING MACHINE 	Industrial 3D Scanner 
DRONE 	ROBOT 



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HANDS-ON MACHINE LEARNING AND DEEP LEARNING WITH TENSOR FLOW FOR ENGINEERING INNOVATION

PARTICIPANTS LIST

S.No	HTS Number	Name of the Faculty	Department
1	1821	Dr.SATHISH KUMAR S	AI & DS
2	1863	Dr. SARAVANAN.S	IT
3	1602	ELAVARASI.J	AI & DS
4	1725	TAMILSELVI.B	AI & DS
5	1603	GOWTHAMI.K	AI & DS
6	1616	RAMYA M	IT
7	1527	M.J.T.VASANTHA PRIYA	AI & DS
8	1488	VEERASUNDARI. R	AI & DS
9	1850	JENO JASMINE.J	CSE(AI ML)
10	1655	GEETHA.L	AI & DS
11	1829	FARZHANA.I	CSE
12	1791	UMANATH R K	AI & DS
13	1705	SANTHI K	CSE
14	1661	J MARY HANNA PRIYADHARSHINI	CSE(AI ML)
15	1797	LAKSHMI PRIYA M	CSE(AI ML)
16	1775	HARINI P	AI & DS
17	1664	PRIYA R V	AI & DS
18	1866	DURAI VASANTH R	CSE
19	1787	SHARMILA BANU N	CSE(AI ML)
20	1814	SANTHOSH KUMAR J	CSE
21	1753	SUGATHI.G	IT

22	1594	SOUNDHARYA.K	CSE
23	1836	GOWRI SUBADRA.K	IT
24	1741	SUMATHI B	IT
25	1830	SATHIYA PRIYA S	IT
26	1849	NANDHINI S N	IT
27	1855	JENO KALAISELVI	IT
28	1824	BHARATHI B	IT
29	1731	KEERTHANA.R	IT
30	1600	LAVANYA R	IT

6-Day Agenda: HANDS-ON MACHINE LEARNING AND DEEP LEARNING WITH TENSOR FLOW FOR ENGINEERING INNOVATION

Day 1: Introduction & Foundations

Session 1: Inauguration & Orientation

- * FDP objectives and outcomes
- * Overview of AI, ML, and Deep Learning
- * Why TensorFlow? Industry relevance and applications
- * TensorFlow ecosystem (TF, Keras, TF Lite, TFX)

Session 2: ML & DL Fundamentals (Refresher)

- * Supervised and unsupervised learning
- * Train-validation-test split
- * Neural networks: neurons, layers, activation functions
- * Loss functions and optimizers

Hands-on:

- * Python environment setup
- * Introduction to Google Colab

Day 2: TensorFlow Basics & Core APIs

Session 1: Getting Started with TensorFlow

- * TensorFlow installation (CPU/GPU)
- * TensorFlow architecture
- * Tensors and tensor operations
- * Eager execution vs computational graphs

Session 2: Core TensorFlow APIs

- * ``tf.constant`, `tf.Variable``
- * Automatic differentiation with ``tf.GradientTape``

- * Understanding gradients and optimization

Hands-on:

- * Tensor operations and gradient computation

Day 3: Keras & First Deep Learning Model

Session 1: Keras High-Level API

- * Keras overview and advantages
- * Sequential vs Functional API
- * Model building, compilation, and training

Session 2: Instructor-Led Demo

- * Handwritten digit recognition using MNIST
- * Callbacks: Early stopping and checkpoints

Hands-on Lab 1:

- * Build, train, and evaluate a neural network
- * Save and load models (SavedModel format)

Day 4: Computer Vision with CNNs

Session 1: Convolutional Neural Networks

- * CNN intuition and architecture
- * Conv2D, MaxPooling, Flatten, Dense layers
- * Overfitting and regularization techniques

Session 2: CNN Demo

- * CIFAR-10 image classification walkthrough

Hands-on Lab 2:

- * Image preprocessing and augmentation
- * Build and evaluate a CNN model

Day 5: NLP & MLOps Orientation

Session 1: NLP with TensorFlow

- * Text preprocessing and tokenization
- * Sequence models: RNN, LSTM, GRU
- * Sentiment analysis demo

Session 2: TensorFlow Extended (TFX) & MLOps

- * Introduction to MLOps
- * TFX pipeline components
- * Reproducibility and versioning

Hands-on:

- * Text classification mini exercise.

Day 6: Deployment, Teaching Practices & Capstone

Session 1: Model Deployment

- * Model formats (SavedModel, H5)
- * TensorFlow Serving overview
- * Cloud deployment overview (AWS/GCP)
- * TensorFlow Lite and on-device ML

Hands-on Lab 3:

- * Convert a model to TensorFlow Lite
- * Run inference in a lightweight environment

Session 2: Teaching & Assessment Strategies

- * Best practices for teaching TensorFlow
- * Designing labs, assignments, and projects
- * Capstone project ideas

Valedictory Session

CHIEF GUEST PROFILE



Eneeyan N is a highly motivated **Data Analytics and Data Science professional** with over **6 years of experience** spanning analytics consulting, business intelligence, data science, and large-scale corporate training. He has a strong track record of transforming complex data into actionable insights using tools such as **Power BI, Tableau, SQL, Python, MongoDB, and Talend**, enabling data-driven decision-making and business growth. With a passion for teaching and mentoring, he has successfully trained thousands of professionals and students across corporate and academic environments.

Professional Experience

Currently, Eneeyan works as a **Consultant – Data Analytics & Business Intelligence at Verizon**, where he leads sales dashboard operations for the Americas region, supports revenue growth initiatives, and collaborates with cross-functional teams to align analytics with strategic goals.

Previously, as a **Senior Data Analyst at Freshworks**, he managed sales operations analytics for key North American clients, conducted forecasting calls, built real-time Power BI dashboards, and delivered actionable insights to optimize sales performance while ensuring high data accuracy.

At **LatentView Analytics**, he worked as a **Data Analyst (Data Science)**, developing machine learning models for sales forecasting and customer segmentation, along with designing dashboards and ETL workflows. Earlier, at **Great Learning**, he served as a **Business Analyst**, where he automated placement analytics, designed OLTP databases, created data marts, and built dashboards to improve institutional performance metrics.

Training & Mentoring

Eneeyan has delivered extensive **corporate training programs** on Power BI, Tableau, SQL, Python, MongoDB, Excel, and Talend for reputed organizations including **Uber, TVS Credit, EY, LatentView Analytics, Onward Technology, ACV Auctions, and Ola**. His training focuses on practical, industry-oriented analytics workflows, ETL integration, and scalable data solutions, helping organizations improve efficiency and decision-making.

Academic Projects & Technical Expertise

His academic and applied projects include consumer review classification using machine learning, wine quality analysis with PCA and clustering, time-series-based sales forecasting, inventory management dashboards, and comprehensive OLTP/OLAP database design. His core expertise spans **data analytics, business intelligence, machine learning, ETL, database design, forecasting, and KPI-driven dashboards**.

Education & Certifications

Eneeyan is currently pursuing an **MBA in Business Analytics from Anna University** and holds a **B.Tech in Information Technology** from St. Joseph's College of Engineering. He has earned multiple certifications in SQL, Power BI, NLP with Python, AWS, Big Data, and English proficiency.

Key Achievements

Trained **6,000+ students and professionals** in analytics and data science

Mentored corporate teams to optimize data workflows and analytics adoption

Led high-impact sales analytics initiatives at Freshworks and Verizon

HANDS-ON MACHINE LEARNING AND DEEP LEARNING WITH TENSOR FLOW FOR ENGINEERING INNOVATION

DETAILED REPORT

Introduction:

Artificial Intelligence (AI) and Machine Learning (ML) have transitioned from niche research topics into core technologies driving innovation across industries such as healthcare, finance, manufacturing, education, and entertainment. Among the various frameworks enabling AI and ML development, **TensorFlow** has emerged as one of the most powerful, scalable, and widely adopted platforms. This report presents a detailed 20-page expansion of the *Faculty Development Programme (FDP)* on TensorFlow, designed to equip faculty members with both conceptual understanding and practical skills required to teach and apply modern AI/ML techniques.

The FDP emphasizes a balanced approach combining theoretical foundations, instructor-led demonstrations, hands-on laboratories, and industry-oriented best practices. It aims not only to build technical proficiency but also to empower educators to confidently integrate TensorFlow into undergraduate and postgraduate curricula.

Rationale for TensorFlow:

TensorFlow is an open-source end-to-end machine learning platform developed by Google. Its popularity stems from its flexibility, scalability, and comprehensive ecosystem. TensorFlow supports the entire ML lifecycle, including data ingestion, model building, training, evaluation, deployment, and monitoring.

Key reasons for choosing TensorFlow include:

- * Strong industry adoption and community support
- * Seamless integration with Python and other languages
- * Support for deep learning, traditional ML, and Generative AI pipelines
- * Deployment across cloud, edge, and mobile devices.

TensorFlow Ecosystem Overview:

The TensorFlow ecosystem consists of several complementary tools:

TensorFlow Core: Low-level APIs for numerical computation and automatic differentiation

Keras: High-level API for rapid model development

TensorFlow Lite (TF Lite): Lightweight models for mobile and embedded devices

TensorFlow Serving: Production-grade model serving system

TensorFlow Extended (TFX): End-to-end MLOps platform

Understanding this ecosystem allows faculty to present a holistic view of ML systems rather than isolated model-building exercises.

Programme Structure and Learning Outcomes:

The FDP is structured to move from fundamentals to advanced applications:

1. Conceptual refreshers
2. Guided demonstrations
3. Hands-on labs
4. Deployment and MLOps orientation
5. Teaching strategies and assessment design

By the end of the programme, participants are expected to:

- * Build and train ML/DL models using TensorFlow
- * Explain TensorFlow concepts effectively to students
- * Design practical assignments and capstone projects
- * Demonstrate basic deployment workflows

Machine Learning Foundations:

A refresher on ML fundamentals ensures a common baseline among faculty. Topics include:

- * Supervised vs unsupervised learning
- * Classification, regression, and clustering
- * Data splitting strategies (training, validation, testing)
- * Bias–variance trade-off

These concepts are mapped directly to TensorFlow abstractions to help participants understand how theory translates into code.

Deep Learning Fundamentals:

Deep learning builds upon ML by using multi-layer neural networks. This section covers:

- * Artificial neurons and perceptrons
- * Activation functions (ReLU, Sigmoid, Softmax)
- * Loss functions and optimization algorithms
- * Backpropagation and gradient descent

TensorFlow's automatic differentiation engine simplifies these processes, allowing educators to focus on conceptual clarity.

TensorFlow Architecture:

TensorFlow operates on tensors—multi-dimensional arrays optimized for numerical computation. Key architectural concepts include:

- * Tensors and tensor operations
- * Computational graphs
- * Eager execution vs graph execution

Understanding these principles enables faculty to explain performance optimization and debugging techniques.

Core TensorFlow APIs:

Participants are introduced to essential APIs such as:

- * ``tf.constant`` and ``tf.Variable``
- * Mathematical operations on tensors
- * Gradient computation using ``tf.GradientTape``

These low-level tools provide insight into how higher-level APIs function internally.

Keras – High-Level API:

Keras serves as the recommended interface for most TensorFlow users. It simplifies model development through:

- * Sequential and Functional APIs
- * Built-in layers and losses
- * Easy model compilation and training

Faculty members learn how Keras accelerates experimentation while maintaining flexibility.

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**Six Days Faculty Development Program on Hands-on Machine Learning and Deep Learning with Tensor Flow
for Engineering Innovation
Attendance Sheet**

[illegible]

14	1661	J MARY HANNA PRIYADHARSHINI	CSE(AIML)	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	P ₁₃	P ₁₄	P ₁₅
15	1797	LAKSHMI PRIYA M	CSE(AIML)	N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	N ₇	N ₈	N ₉	N ₁₀	N ₁₁	N ₁₂	N ₁₃	N ₁₄	N ₁₅
16	1775	HARINI P	AI & DS	M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈	M ₉	M ₁₀	M ₁₁	M ₁₂	M ₁₃	M ₁₄	M ₁₅
17	1664	PRIYA R V	AI & DS	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	R ₇	R ₈	R ₉	R ₁₀	R ₁₁	R ₁₂	R ₁₃	R ₁₄	R ₁₅
18	1866	DURAI VASANTH R	CSE	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅
19	1787	SHARMILA BANU N	CSE(AIML)	N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	N ₇	N ₈	N ₉	N ₁₀	N ₁₁	N ₁₂	N ₁₃	N ₁₄	N ₁₅
20	1814	SANTHOSH KUMAR J	CSE	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	S ₁₁	S ₁₂	S ₁₃	S ₁₄	S ₁₅
21	1753	SUGATHI.G	IT	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	V ₇	V ₈	V ₉	V ₁₀	V ₁₁	V ₁₂	V ₁₃	V ₁₄	V ₁₅
22	1594	SOUNDHARYA.K	CSE	G ₁	G ₂	G ₃	G ₄	G ₅	G ₆	G ₇	G ₈	G ₉	G ₁₀	G ₁₁	G ₁₂	G ₁₃	G ₁₄	G ₁₅
23	1836	GOWRI SUBADRA.K	IT	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	F ₇	F ₈	F ₉	F ₁₀	F ₁₁	F ₁₂	F ₁₃	F ₁₄	F ₁₅
24	1741	SUMATHI B	IT	L ₁	L ₂	L ₃	L ₄	L ₅	L ₆	L ₇	L ₈	L ₉	L ₁₀	L ₁₁	L ₁₂	L ₁₃	L ₁₄	L ₁₅
25	1830	SATHIYA PRIYA S	IT	B ₁	B ₂	B ₃	B ₄	B ₅	B ₆	B ₇	B ₈	B ₉	B ₁₀	B ₁₁	B ₁₂	B ₁₃	B ₁₄	B ₁₅
26	1849	NANDHINI S N	IT	N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	N ₇	N ₈	N ₉	N ₁₀	N ₁₁	N ₁₂	N ₁₃	N ₁₄	N ₁₅
27	1855	JENO KALAISELVI	IT	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
28	1824	BHARATHI B	IT	K ₁	K ₂	K ₃	K ₄	K ₅	K ₆	K ₇	K ₈	K ₉	K ₁₀	K ₁₁	K ₁₂	K ₁₃	K ₁₄	K ₁₅
29	1731	KEERTHANA.R	IT	K ₁	K ₂	K ₃	K ₄	K ₅	K ₆	K ₇	K ₈	K ₉	K ₁₀	K ₁₁	K ₁₂	K ₁₃	K ₁₄	K ₁₅
30	1600	LAVANYA R	IT	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	R ₇	R ₈	R ₉	R ₁₀	R ₁₁	R ₁₂	R ₁₃	R ₁₄	R ₁₅

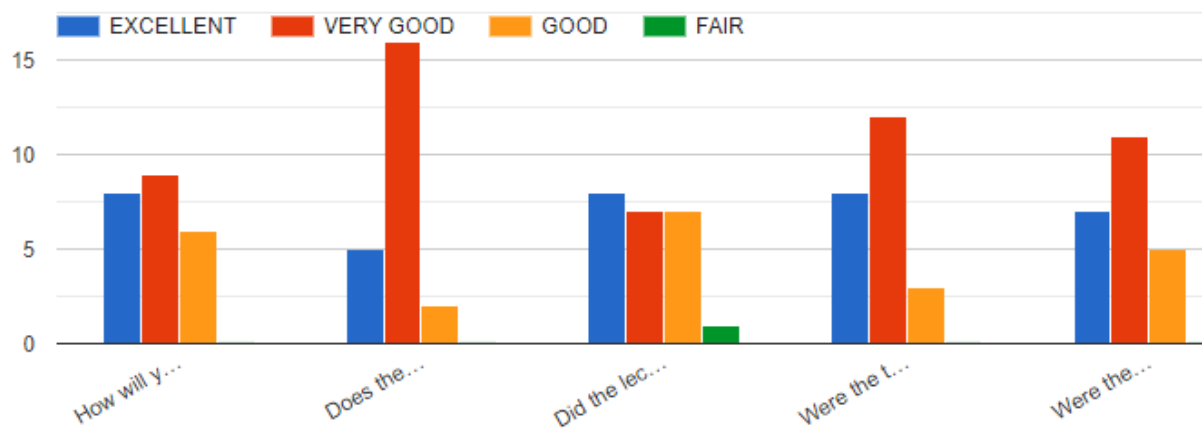
CO-CORDINATOR

COORDINATOR

CHIEF MENTOR

PARTICIPANT FEEDBACK

Rate the extent to which you agree with the following statements about the session
(1- Excellent, 2-Very Good, 3,Good, 4-Fair):



Any other comments,

Copy chart

19 responses

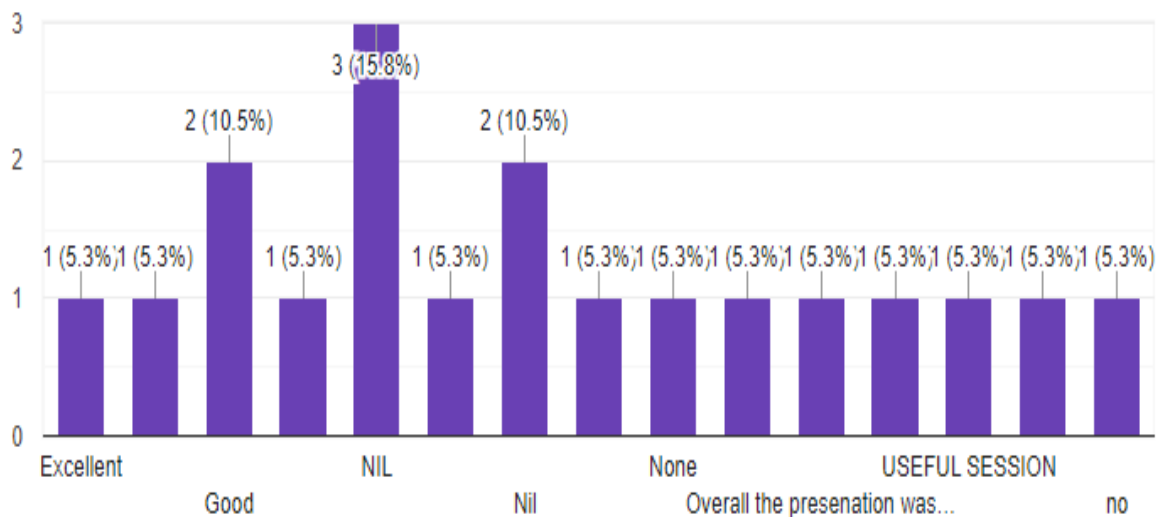


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