Accredited by NAAC
NBA Accredited UG Programs: CSE, EEE, ECE and MECH
Department of Mechanical Engineering
Academic Year 2021 – 2022. (Odd Semester)

Details of Programme Organized

Sl. No.	Contents	Details
01.	Title of the programme	Three Value added courses on Industrial Welding Practices and its Troubleshooting
02.	Programme Theme	Advanced concepts in Welding Technology
03.	Programme Type	Value added Course with certification
04.	Details of resource person	1. Mr.N.Rajasekaran, Hon. Secretary (IWS) & Former DGM, BHEL, Tiruchirappalli. 2. Mr.S.Singaravelu, Consultant and Former AGM, WTC, BHEL, Vice Chairman, IWS, South Zone. 3. Dr.N.Raju, Former AGM, BHEL, Hon. Zonal Secretary, IWS, South Zone 4. Mrs.A.Santhakumari, Addl.GM, BHEL, Hon. Treasurer, IWS. 5. Mr.N.Parameswaran, Former Dy.GM, BHEL.
05.	Mode & Venue / Platform	Mechanical Seminar Hall & Google Meet Link https://meet.google.com/gao-npwz-opg
06.	Date & Duration	From 11.10.2021 to 13.10.2021 & 15 Hrs
07.	No. of Student Participants	55
08.	No. of Faculty Participants	03
09.	No. of External Participants	NIL
10.	Expenditure amount (if any)	Rs. 40,000/- (Course Fee, Resource Persons Remuneration & Travel Allowances)

11.	Social Media URL	-
12.	Video URL (if any)	-

13. Objective of the Programme:

- To gain knowledge in advanced welding techniques and its applications.
- To classify the different welding processes and its industrial applications.
- To understand the various materials behavior during welding operations and it weldability.
- To acquire basic knowledge in Nondestructive testing methods and its industrial applications.
- To learn Wire arc additive manufacturing (WAMM) and its applications.

14. Detail description of the activity:

Course Schedule:

RIT – IWS STUDENT FORUM

"Industrial Welding Practices and Its Troubleshooting"

Dates: 11th October 2021 to 13th October 2021 **Each session 60 minutes**

Timing: FN Session 09.30am to 1.15pm **AN Session: 1.45pm to 3.50pm**

Day 1 – 11.10.2021 (Mechanical Seminar Hall)		
S.No	**Topic Covered**	
1	Advances in TIG Welding (Hot Wire TIG Narrow GAP GTAW and K TIG Welding, Activated TIG, Interpulse TIG, TIP TIG	Mr.N.Rajasekaran
2	Beam Welding Processes (Laser & Electron Beam) & Diffusion Bonding	Dr.N.Raju
3	Overview of NDT methods and its specific applications.	Mr.N.Rajasekaran
4	Submerged arc welding and its developments. Plasma welding and its advancements. Industrial gases, Pre and Post Flow	Mr.N.Rajasekaran
5	Welding Consumables and their classifications	Mr.S.Singaravelu
Day 2 – 12.10.2021 (Mechanical Seminar Hall)		
6	Advances in GMAW & FCAW Processes and Troubleshooting (Wave form controlled GMAW Processes & Industrial	Mr.N.Rajasekaran

	Applications of GMAW & FCAW Processes	
7	HSLA Steels – Q & A Steels, Cr- Mo Steels.	Mr.S.Singaravelu,
8	Distortion Control & Methods	Dr.N.Raju
9	Introduction to Additive Manufacturing and WAAM	Mr.N.Rajasekaran
10	Weldability of titanium and its alloys, Weldability of copper	Mr.S.Singaravelu
11	Weldability of aluminium and its Alloys Weldability of Magnesium alloys.	Mr.N.Rajasekaran
Day 3 – 13.10.2021 (Google Meet Link)		
12	Weldability of Carbon steels and Alloy steels	Mr.N.Parameswaran
13	Weldability of Stainless steels	Mr.N.Parameswaran
14	MFDC Spot Welding processes – Projection Welding MIAB a Seam Welding – Deformation Resistance Welding Processes	Mrs.A.Santhakumari
15	Flash Butt Welding Processes, Magnetic Pulse Welding Friction & Friction Stir Welding Processes	Mrs.A.Santhakumari

Day 1 (11.10.2021)

Session Topic: Advances in TIG Welding (Hot Wire TIG Narrow GAP GTAW and K TIG Welding, Activated TIG, Interpulse TIG, TIP TIG

Handled By: Mr.N.Rajasekaran

Highlights of important concepts:

- TIG welding fundamental concepts, construction and working principle were explained to the students.
- Explain the various components joining processes practiced in BHEL industries.
- Major difference in TIG and MIG welding Processes were discussed with the students.
- Discuss about appropriate voltage and current set for TIG welding & MIG welding without any spatter and defects.
- Discuss the various positioning in welding operations and its significances.

Session Topic: Beam Welding Processes (Laser & Electron Beam) & Diffusion Bonding

Handled By: Dr.N.Raju

Highlights of important concepts:

- Electron Beam welding (EBW) and Laser beam welding (LBW) major differences and its specific industrial applications.
- Discuss the construction, working principle of EBW & LBW.
- Explain the influential process parameters in EBW & LBW.
- Explain how these welding techniques used in BHEL, ISRO & DRDO for joining various components.
- Discuss the diffusion bonding effects in joining components.

Session Topic: Overview of NDT methods and its specific applications

Handled By: Mr.N.Rajasekaran.

Highlights of important concepts:

- Explain about the various NDT techniques.
- Discuss the surface, subsurface defects and internal defects in welding, casting and other manufacturing processes.
- NDT practices followed in BHEL to analyze the defects present in the components.
- Show real time examples and procedures followed in identifying defects in components using Radiography testing methods.

Session Topic: Submerged arc welding and its developments. Plasma welding and its advancements. Industrial gases, Pre and Post Flow

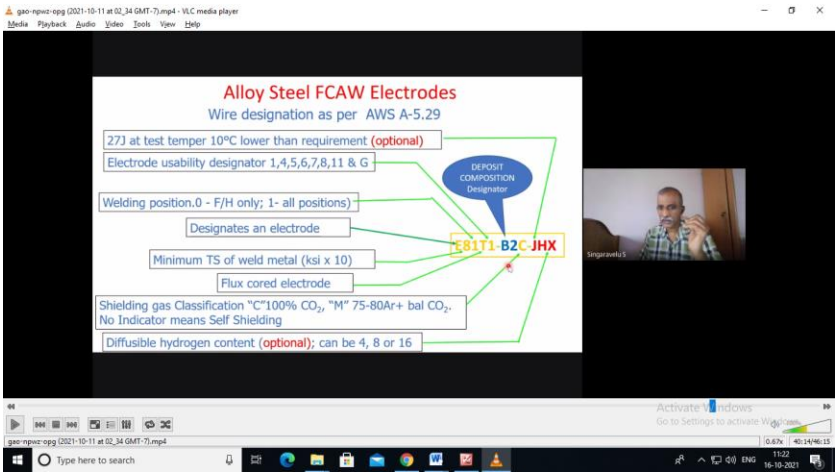
Handled By: Mr.N.Rajasekaran.

Highlights of important concepts:

- Discuss the specific applications in submerged and plasma arc welding, particularly joining high thickness pipes.
- Discuss the submerged arc welding machine specifications and its significant operations carried out in Welding Research Institute, Trichy.
- Explain the Transferred and Non Transferred Plasma arc welding processes in PAW.
- Process parameters (Voltage and Current) set for defect free welding components.

Session Topic: Welding Consumables and their classifications

Handled By: Mr.S.Singaravelu



Highlights of important concepts:

- Discuss AWS (American Welding Society) classification of Welding electrodes and other consumables.
- Discuss the alloy designator as per AWS standard.
- Explain classification of various welding electrodes.
- Explain the flux and electrode classifications.
- General guidelines for storage and drying of electrodes as per AWS standard.

Day 2 (12.10.2021)

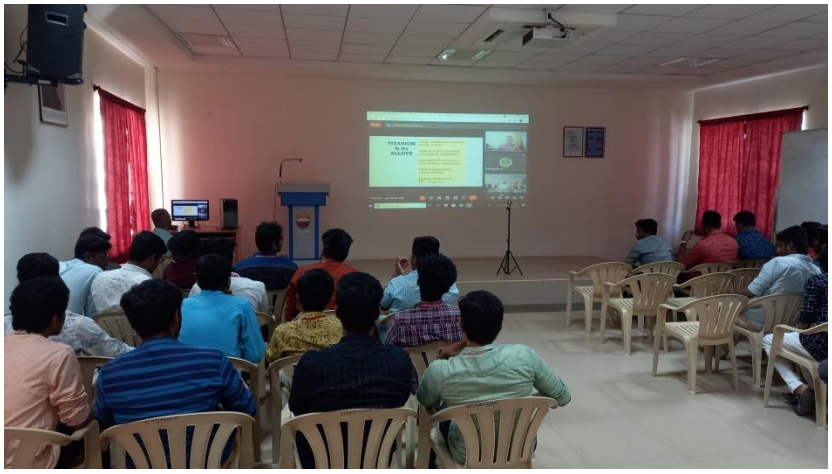
Session Topic: Advances in GMAW & FCAW Processes and Troubleshooting (Wave form controlled GMAW Processes & Industrial Applications of GMAW & FCAW Processes

Handled By: Mr.N.Rajasekaran.

Highlights of important concepts:

- Explain Standard operating procedures of GMAW & FCAW processes.
- Discuss the DC current Straight Polarity (DCSP), DC current Reverse Polarity (DCRP) connections in GMAW
- Explain the two modes of metal transfer and its applicable current and voltage for specific materials during welding operations.
- Discuss the current research and project carried out in GMAW in WRI & BHEL.

Session Topic: HSLA Steels – Q & A Steels, Cr- Mo Steels.
Weldability of titanium and its alloys, Weldability of copper
Handled By: Mr.S.Singaravelu.



Highlights of important concepts:

- Discuss the High strength low alloy steel and its elements present in ferrous material.
- Explain Strengthening process of various steel material. Iron carbon equilibrium
- Discuss the challenges faced in welding HSLA steel and titanium and copper materials in industrial applications.
- Appropriate welding techniques to be followed to weld above said materials without any defect.

Session Topic: Introduction to Additive Manufacturing and WAAM &
Weldability of aluminium and its Alloys Weldability of Magnesium alloys
Handled by: Mr.N.Rajasekaran


Highlights of important concepts:

- Discuss the aluminum and magnisium industrial applications.
- Current research in Al and Mg Metal matix composites.
- Current challenges faced in welding Al & Mg materials.
- TIG and MIG welding techniques to be practiced in welding of these materials.
- Friction welding & Friction Stir welding techniques to be practices for Al and dissimilar welding.
- Detailed explanation of WAAM process for fabrication of components like Turbine plates (Inconel material), Engine components with less time.

Session Topic: Distortion Control & Methods

Handled by: Dr.N.Raju

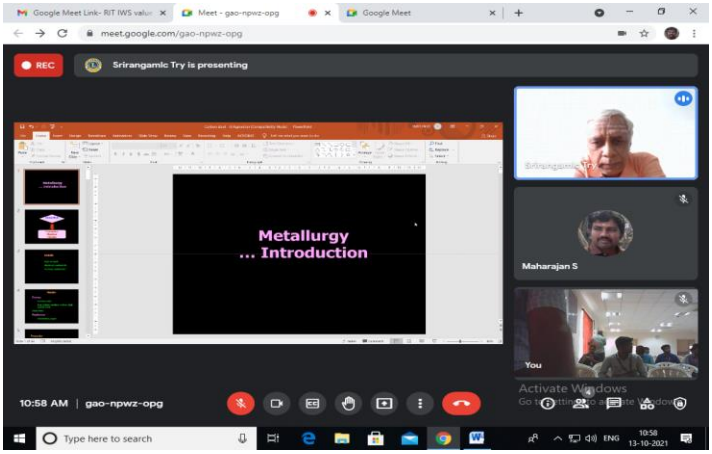
Highlights of important concepts:

- Shared his experience in welding of components in specific applications like DRDO & ISRO space launch vehicle.
- Various distortions occurred when joining components and remedial measures taken to control over distortions.

Day 3 (13.10.2021

Session Topic: Weldablity of carbon steels & Alloy steel & Stainless steel.

Handled by: Mr.N.Parameswaran

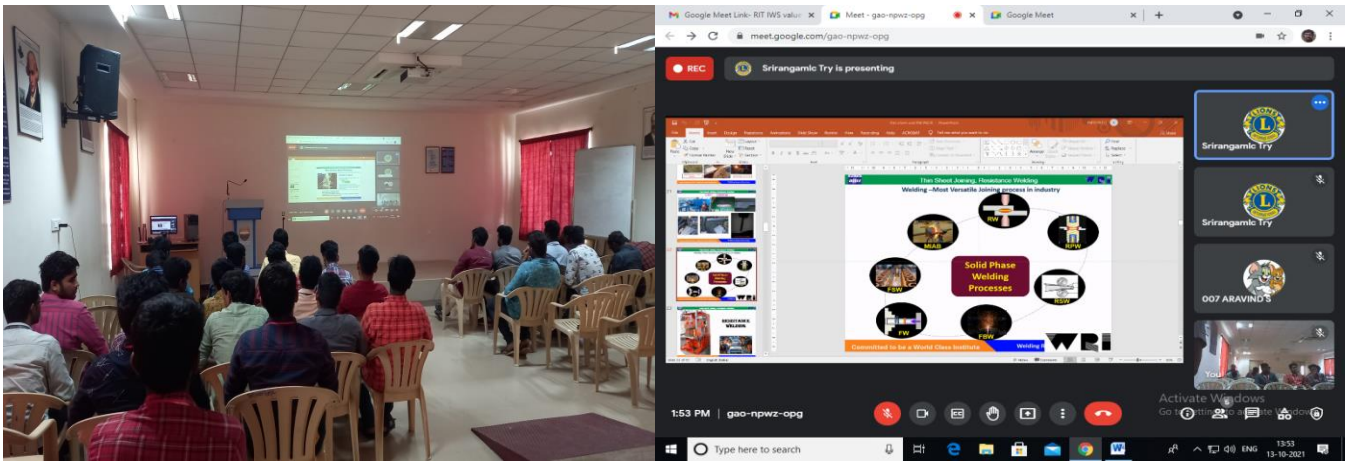


Highlights of important concepts:

- Brifely explain the material science fundamental i.e. Iron carbon equilibrium diagrams, Alloy steels.
- Explain the microstructure constituents of steels and its mechanical properties.
- Discuss the hydrogen induced cracking in welding operation. Remedial measures to be followed to avoid this defect.
- Explain the cracking mechanism and sources of hydrogen in crack initiation and crack propagation.
- Explain Cr- Mo steel and effect of alloying element in steels. HAZ and its causes and remedies.
- Specific applications of Austenitic, Ferritic, Martensitic Stainless steel and its weldability.

Session Topic: MFDC Spot Welding processes – Projection Welding MIAB a Seam Welding – Deformation Resistance Welding Processes, Flash Butt Welding Processes, Magnetic Pulse Welding Friction & Friction Stir Welding Processes.

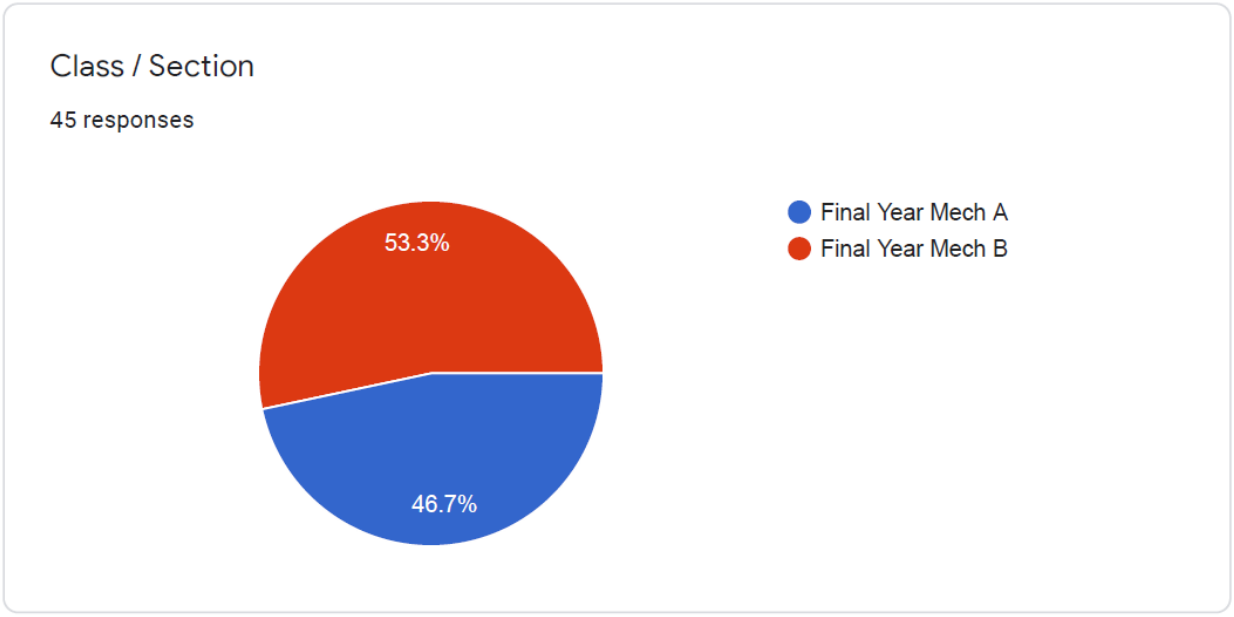
Handled by: Mrs.A.Santhakumari



Highlights of important concepts:

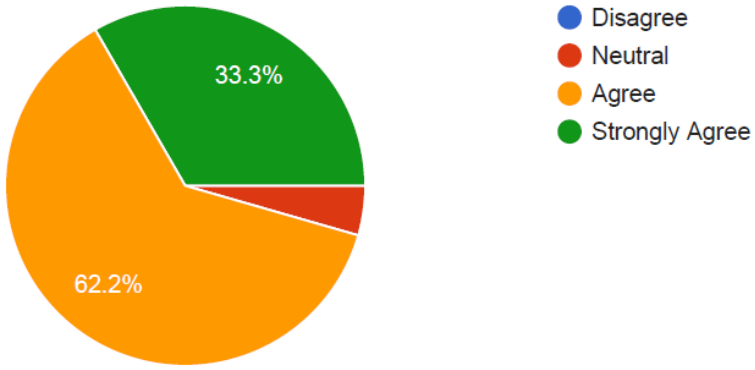
- Welding processes to be carried out for fabricating automobile components.
- Welding current and voltages set for Resistance welding process to join thin sheet metals.
- Process variables and material variables to be ascertained for Resistance welding.
- Construction and working principle of friction and friction stir welding processes.
- Explain the project and research works in WRI, Trichy related Friction Stir welding processes

<u>Feedback on Three Days Value added courses on Industrial Welding Practices and its Trouble shooting from 10.11.2021 to 13.10.2021</u>



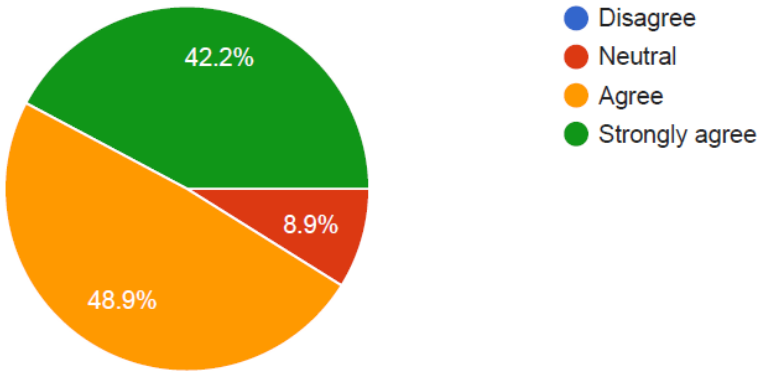
The Value added course provided me with valuable information regarding theme.

45 responses



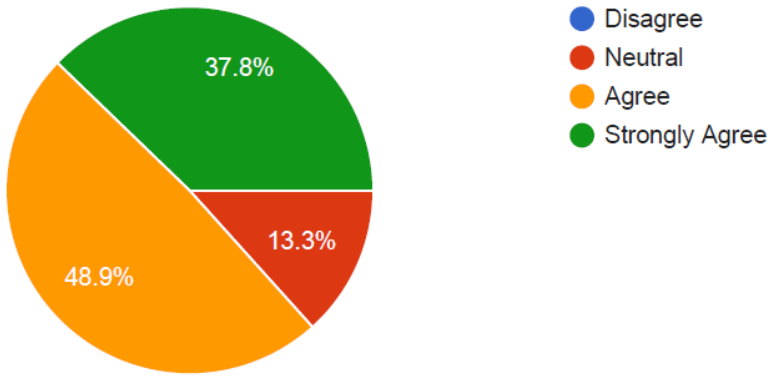
The content delivered by resource person was useful.

45 responses



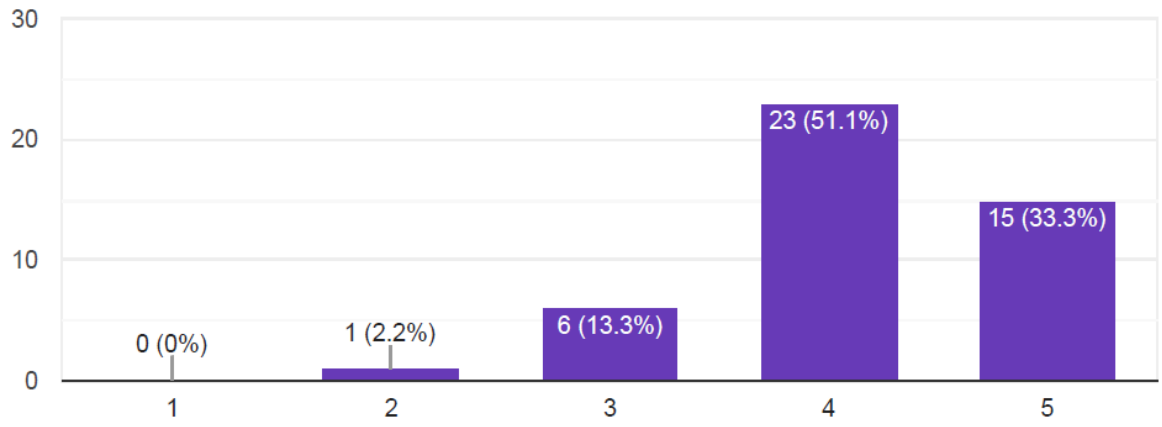
The technological support was strong enough to execute Online and Off line sessions smoothly.

45 responses



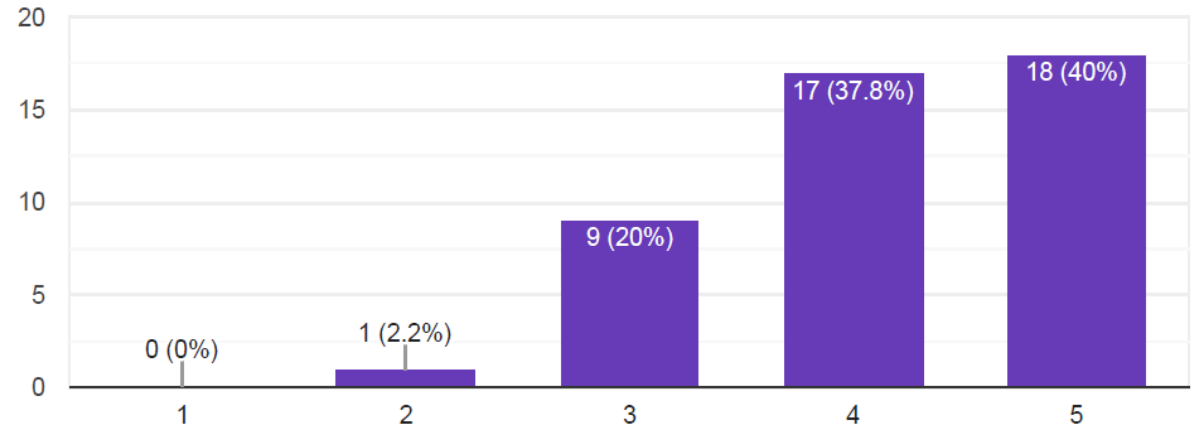
Rate the duration for Value added Course(1 is Low and 5 is High)

45 responses



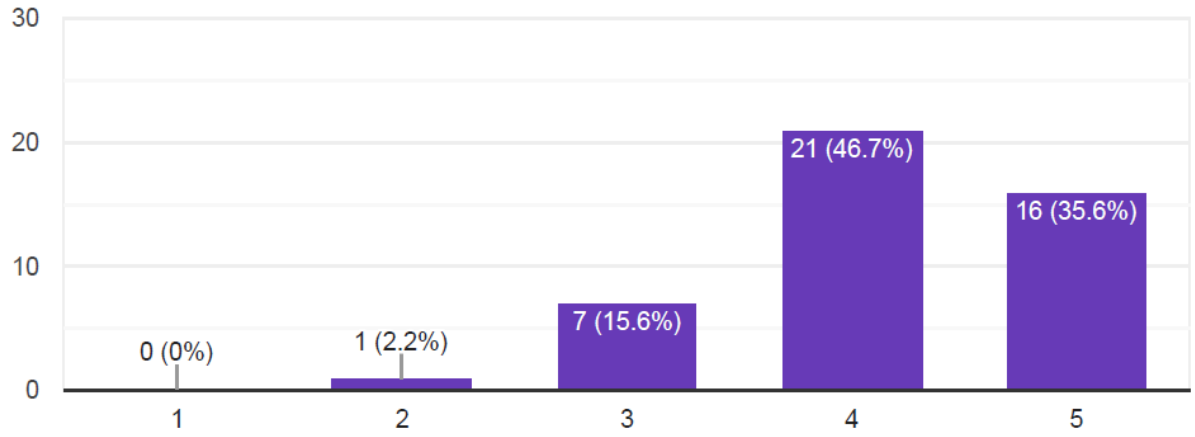
Interaction / Q&A with the resource person (1 is Low and 5 is High)

45 responses



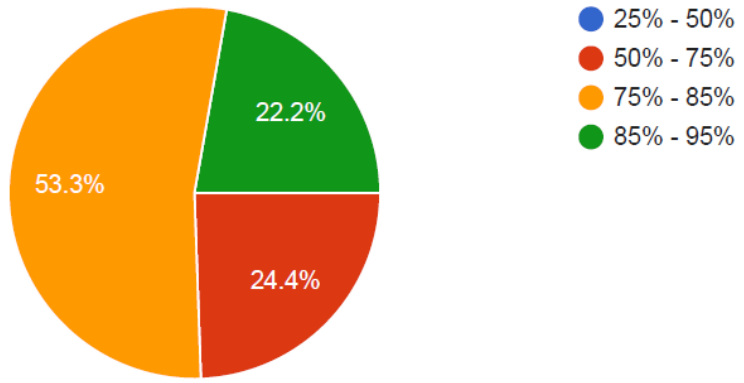
Value added Course Online and Offline Video & Audio Quality (1 is low and 5 is high)

45 responses



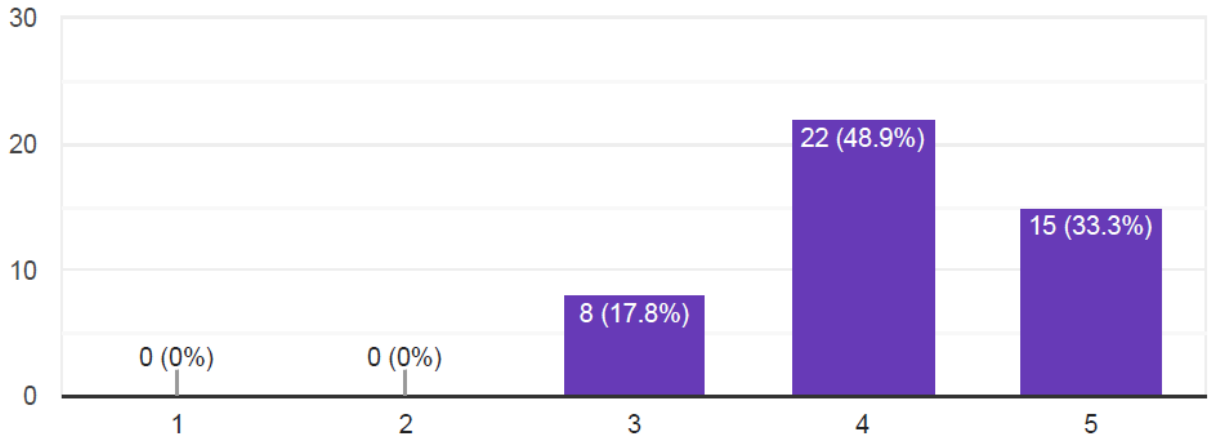
To what extent you have improved your knowledge / skills after attending the programme?

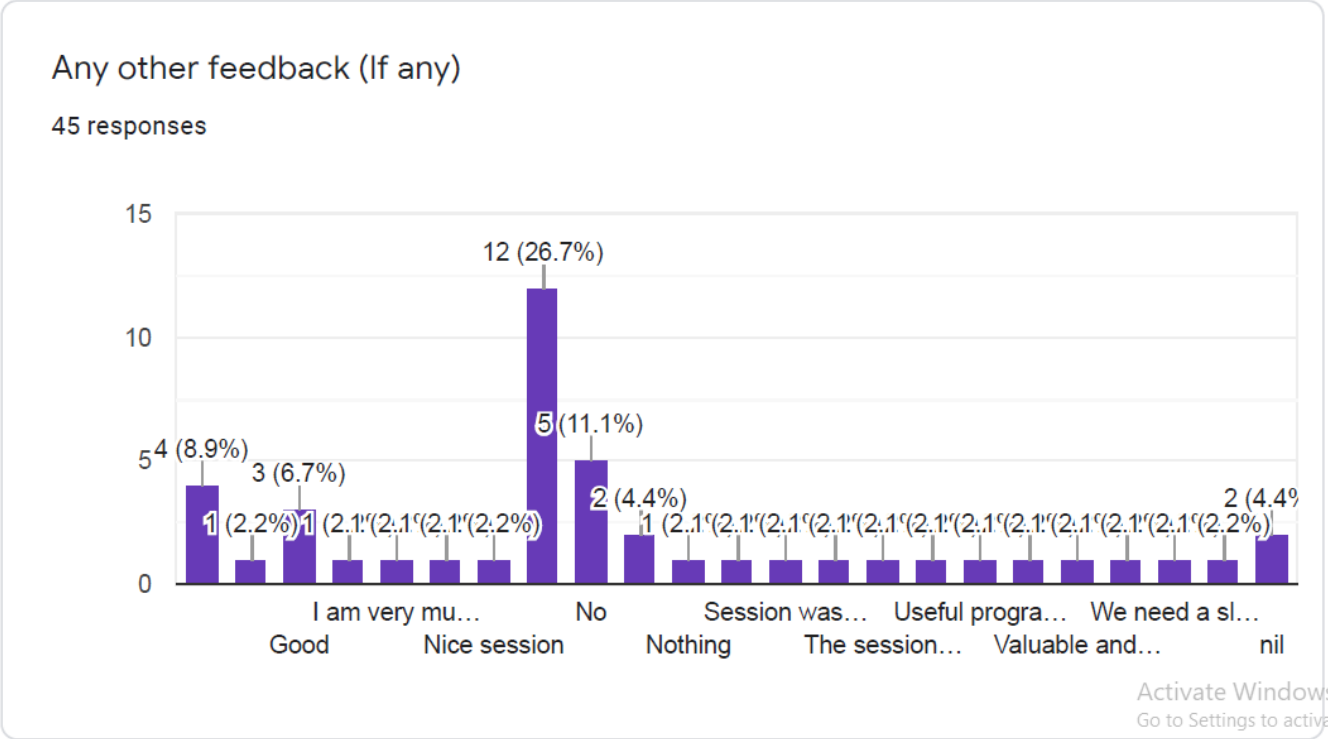
45 responses



How do you rate the timely communication in all aspects of the programme? (1 is Low and 5 is High)

45 responses




Any other feedback (If any)
45 responses
15
10
5
0
4 (8.9%)
3 (6.7%)
12 (26.7%)
5 (11.1%)
2 (4.4%)
2 (4.4%)
Good
I am very mu…
Nice session
No
Nothing
Session was…
The session…
Useful progra…
Valuable and…
We need a sl…
nil
Activate Windows
Go to Settings to activat