DWR RADAR & Radiosonde Industrial Visit
India Meteorological Department Machilipatnam
04 Mach 2024

A Report on Industrial Visit

DWR RADAR Station, India Meteorological Department
Govt. of India, Machiliptnam
Date of Visit: 04/03/2024

by

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
KONERU LAKSHMAIAH EDUCATION FOUNDATION
(Deemed to be University estd, u/s, 3 of the UGC Act, 956)
(NAAC Accredited "A++" Grated University)
Green Fields, Guntur District, AP, India – 522 502

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INDUSTRIAL VISIT *DWR RADAR, IMD, Machilipatnam*

DATE	:	04.03.2024
SECTION	:	B.Tech III Year (MCP-2; section-37)
EVENT	:	Industrial Visit

Faculty Coordinators:

1. *Dr. G. China Satyanarayana,* Associate Professor, ECE
2. Dr. S. Arunmetha, Associate Professor, ECE
3. *Dr. Vankayalapati Sahiti, Assistant Professor, ECE*

IMD DWR Scientists:

1. *S. Prayek , Scientist D & HEAD*
2. *D. RAJENDRA BABU , SCIENTIFIC ASSISTANT*

Student Coordinators:

1. *M. H. G. Subhang*
2. *A. Leela Ramakrishna*
3. *N. Shyam Sriram*
4. *P. Abbas Ali*

Prepared by Dr. G. Ch. Satyanarayana, Associate Professor, ECE

Number of students attended: 62 (List enclosed separately)

EVENT DESCRIPTION: An industrial visit has been organized by the Department of Electronics and Communication Engineering for III-year Even semester students on 04.03.2024 between 13:00 to 20:00hrs. An industrial visit to the IMD (India Meteorological Department) for meteorological observations recording offers students a valuable opportunity to witness firsthand the processes involved in monitoring and recording weather-related data. IMD is the national meteorological agency of India, responsible for providing weather forecasts, warnings, and other meteorological services. Here's an introduction to what students might experience during such a visit:

1. **Introduction to IMD:** The visit begins with an overview of the India Meteorological Department, its role, and significance in providing weather information and forecasting services to the country.

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Group photo: IMD DWR Radar Station , Machilipatnam

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2. **Meteorological Instruments and Equipment:** Students will be introduced to various meteorological instruments used by IMD for data collection. This may include instruments for measuring temperature, pressure, humidity, wind speed and direction, Rainfall, Solar Radiation, Sunshine hours, and other atmospheric parameters.

3. **Observation Stations:** The students will have the opportunity to visit different observation stations within the IMD facility. These stations may include weather stations equipped with anemometers, barometers, rain gauges, and other instruments used for continuous monitoring.

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4. **Doppler Weather Radar (DWR):** A visit to the Doppler Weather Radar station can be a highlight, where students can observe the operation of radar equipment used to track precipitation, storms, and monitor atmospheric conditions.

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5. **Radiosonde Observation:** Students may witness the preparation and release of radiosondes, which are weather balloons equipped with sensors. These instruments gather data on temperature, humidity, pressure, and wind speed at various altitudes.

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Photo: Radiosonde Balloon observation launching at 4:30PM on 4 March 2024
(Dr. G. Ch. Satyanarayana, Dr. Arun Mehatha and Dr. V. Sahithi)

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Students Photo: Radiosonde Balloon observation launching

6. **Data Recording and Analysis:** The students will learn about the procedures for recording and analyzing meteorological data. This includes understanding how observational data is collected, processed, and used to generate weather forecasts.

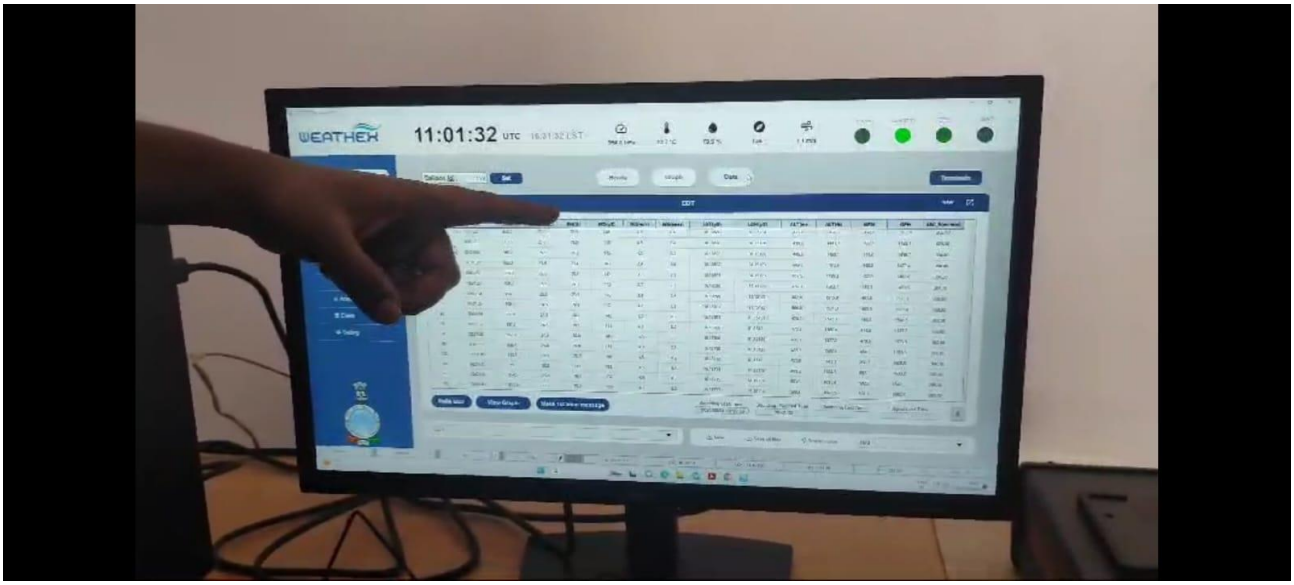

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Table : Radiosonde balloon observational data on 04 March 2024

PRES hPa	HGHT m	TEMP C	DWPT C	RELH %	MIXR g/kg	DRCT deg	SKNT knot	THTA K	THTE K	THTV K
1010.0	3	31.2	23.2	63	18.10	160	3	303.5	357.5	306.8
1009.0	12	30.0	21.0	59	15.78	150	9	302.4	349.3	305.2
1008.0	20	29.4	20.9	60	15.70	140	14	301.9	348.4	304.7
1007.0	29	28.8	20.8	62	15.61	140	14	301.4	347.5	304.2
1001.0	81	29.6	21.6	62	16.52	140	11	302.7	351.8	305.6
1000.0	90	30.0	22.0	62	16.96	140	10	303.1	353.7	306.2
994.0	144	27.8	20.8	66	15.82	129	9	301.5	348.3	304.3
992.0	162	26.6	19.6	65	14.69	125	9	300.4	343.8	303.1
989.0	188	27.4	20.4	66	15.51	120	9	301.5	347.4	304.3
987.0	206	28.4	21.4	66	16.55	116	8	302.7	351.9	305.7
982.0	251	26.8	20.8	70	16.02	107	8	301.5	348.9	304.4
981.0	260	25.6	19.6	69	14.86	105	8	300.4	344.2	303.1
976.0	306	26.4	21.4	74	16.74	96	7	301.6	351.2	304.7
968.0	378	24.6	20.1	76	15.55	81	6	300.5	346.4	303.3
962.0	433	25.6	21.7	79	17.32	70	5	302.1	353.4	305.2
949.0	553	23.8	18.9	74	14.70	45	4	301.4	344.9	304.1
945.0	590	23.2	18.2	73	14.12	38	3	301.2	342.9	303.7
940.0	636	23.0	19.0	78	14.94	28	3	301.4	345.6	304.1
934.0	692	24.0	18.0	69	14.10	17	2	303.0	345.0	305.6
929.0	739	26.4	7.4	30	7.00	7	1	305.9	327.4	307.2
928.0	749	26.5	4.2	24	5.60	5	1	306.1	323.6	307.2
926.0	768	26.8	-2.2	15	3.53	18	2	306.6	317.9	307.3
925.0	777	26.2	-6.8	11	2.49	25	3	306.1	314.2	306.6
924.0	786	25.4	-7.6	11	2.35	26	3	305.4	313.0	305.8
902.0	997	23.2	-6.8	13	2.56	41	4	305.2	313.5	305.7
891.0	1103	23.4	-13.6	7	1.51	49	5	306.5	311.5	306.8
867.0	1340	22.6	-10.4	10	2.01	67	6	308.1	314.7	308.4
858.0	1431	23.0	0.0	22	4.48	74	7	309.4	323.7	310.2
850.0	1512	22.8	-0.2	22	4.46	80	7	310.0	324.2	310.9
843.0	1584	22.8	-1.2	20	4.18	70	7	310.8	324.2	311.5
801.0	2024	18.2	2.2	34	5.63	8	6	310.4	328.2	311.5
748.0	2605	13.4	1.9	45	5.88	285	5	311.4	330.0	312.5
741.0	2684	12.8	1.8	47	5.92	283	6	311.5	330.2	312.6
705.0	3101	10.4	-3.6	37	4.18	272	14	313.3	326.9	314.1
700.0	3160	10.0	-5.0	34	3.78	270	15	313.5	325.9	314.2
643.0	3858	5.0	-9.0	36	3.02	289	26	315.6	325.6	316.1
640.0	3896	4.9	-10.6	32	2.69	290	27	315.9	324.9	316.4
633.0	3986	4.8	-14.2	24	2.02	288	27	316.7	323.6	317.1
622.0	4128	4.8	-22.2	12	1.04	284	26	318.3	322.1	318.5
612.0	4260	4.8	-24.2	10	0.89	281	25	319.8	323.0	320.0
587.0	4598	3.0	-27.0	9	0.72	272	23	321.6	324.2	321.7
575.0	4765	2.4	-42.6	2	0.16	268	22	322.8	323.4	322.8
561.0	4963	1.8	-41.2	2	0.19	263	21	324.3	325.1	324.4
558.0	5006	2.4	-46.6	1	0.10	262	21	325.5	326.0	325.6
515.0	5647	-2.3	-38.3	4	0.27	246	17	327.4	328.5	327.4
500.0	5880	-4.5	-39.5	5	0.25	240	16	327.5	328.5	327.5
470.0	6363	-7.9	-37.9	7	0.31	239	19	329.1	330.4	329.2
464.0	6463	-7.7	-43.7	4	0.17	238	20	330.6	331.3	330.6
456.0	6598	-7.9	-42.9	4	0.19	238	21	332.0	332.8	332.0
400.0	7600	-15.3	-46.3	5	0.15	235	28	335.0	335.6	335.1
371.0	8162	-19.5	-46.5	7	0.16	242	30	336.7	337.4	336.8

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363.0	8323	-20.1	-50.1	5	0.11	244	30	338.0	338.5	338.1
341.0	8782	-23.5	-46.5	10	0.17	249	32	339.5	340.2	339.5
340.0	8803	-22.7	-46.7	9	0.17	249	32	340.9	341.6	340.9
339.0	8825	-21.9	-50.9	5	0.11	250	32	342.2	342.7	342.3
327.0	9089	-23.3	-60.3	2	0.03	253	33	343.9	344.0	343.9
301.0	9686	-28.7	-59.0	4	0.04	260	35	344.5	344.7	344.5
300.0	9710	-28.9	-58.9	4	0.05	260	39	344.5	344.7	344.5
265.0	10588	-35.4	-70.2	2	0.01	275	140	347.4	347.5	347.4
250.0	11000	-38.5	-75.5	1	0.01	250	39	348.7	348.7	348.7
216.0	11982	-45.2	-79.6	1	0.00	230	50	353.1	353.1	353.1
212.0	12108	-46.1	-80.1	1	0.00	229	48	353.7	353.7	353.7
200.0	12490	-49.7	-82.7	1	0.00	225	42	353.9	353.9	353.9
164.0	13760	-60.9	-90.9	1	0.00	235	34	355.8	355.8	355.8
150.0	14310	-65.9	-93.9	1	0.00	240	31	356.4	356.4	356.4
148.0	14390	-66.6	-94.4	1	0.00	240	28	356.6	356.6	356.6
128.0	15251	-73.9	-99.9	1	0.00	248	30	358.5	358.5	358.5
105.0	16386	-80.3	-104.3	1	0.00	260	32	367.2	367.2	367.2
103.0	16494	-80.5	-104.5	1	0.00	270	33	368.9	368.9	368.9
100.0	16660	-80.7	-104.7	1	0.00	270	32	371.6	371.6	371.6
92.1	17123	-81.7	-105.7	1	0.00	274	23	378.4	378.4	378.4
86.1	17500	-82.5	-106.5	1	0.00	277	16	384.2	384.2	384.2
81.0	17841	-82.8	-106.8	1	0.00	280	9	390.3	390.3	390.3
79.2	17966	-82.9	-106.9	1	0.00	256	16	392.6	392.6	392.6
78.0	18052	-81.4	-105.4	1	0.00	240	21	397.5	397.5	397.5
77.0	18124	-80.1	-104.1	1	0.00	242	19	401.6	401.6	401.6
71.2	18572	-76.3	-101.3	1	0.00	257	8	418.8	418.8	418.8
70.0	18670	-74.9	-100.9	1	0.00	260	6	423.8	423.8	423.8
64.0	19191	-73.6	-99.6	1	0.00	175	21	437.7	437.7	437.7
61.2	19451	-72.9	-98.9	1	0.00	133	10	444.9	444.9	444.9
60.0	19567	-72.2	-98.5	1	0.00	115	5	448.9	448.9	448.9
55.0	20081	-69.2	-96.8	1	0.00	140	17	467.2	467.2	467.2
54.0	20189	-68.5	-96.5	1	0.00	127	15	471.2	471.2	471.2
50.0	20650	-67.3	-95.3	1	0.00	70	4	484.5	484.5	484.5
44.0	21427	-64.5	-93.1	1	0.00	55	30	509.3	509.4	509.3
40.9	21871	-62.9	-91.9	1	0.00	72	25	524.1	524.1	524.1
33.0	23200	-60.7	-90.4	1	0.00	120	11	563.1	563.1	563.1
30.0	23790	-59.7	-89.7	1	0.00	85	20	581.3	581.3	581.3
29.3	23938	-57.9	-88.9	1	0.01	85	21	590.2	590.2	590.2
20.0	26350	-56.5	-87.5	1	0.01	90	30	662.5	662.6	662.5
19.6	26478	-56.5	-87.5	1	0.01			666.3	666.4	666.3

Station information and sounding indices

```
                          Station number: 43185
                     Observation time: 240304/1200
                     Station latitude: 16.20
                    Station longitude: 81.15
                    Station elevation: 3.0
                      Showalter index: 9.70
                         Lifted index: -1.21
LIFT computed using virtual temperature: -2.15
                          SWEAT index: 29.99
                              K index: 12.10
                  Cross totals index: 4.30
              Vertical totals index: 27.30
                Totals totals index: 31.60
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```
      Convective Available Potential Energy: 223.37
             CAPE using virtual temperature: 416.41
                       Convective Inhibition: -225.66
             CINS using virtual temperature: -109.30
                              Equilibrum Level: 293.33
 Equilibrum Level using virtual temperature: 286.80
                     Level of Free Convection: 715.29
             LFCT using virtual temperature: 760.61
                      Bulk Richardson Number: 7.76
           Bulk Richardson Number using CAPV: 14.47
  Temp [K] of the Lifted Condensation Level: 292.61
Pres [hPa] of the Lifted Condensation Level: 899.06
   Equivalent potential temp [K] of the LCL: 349.29
     Mean mixed layer potential temperature: 301.65
              Mean mixed layer mixing ratio: 16.13
              1000 hPa to 500 hPa thickness: 5790.00
Precipitable water [mm] for entire sounding: 26.08
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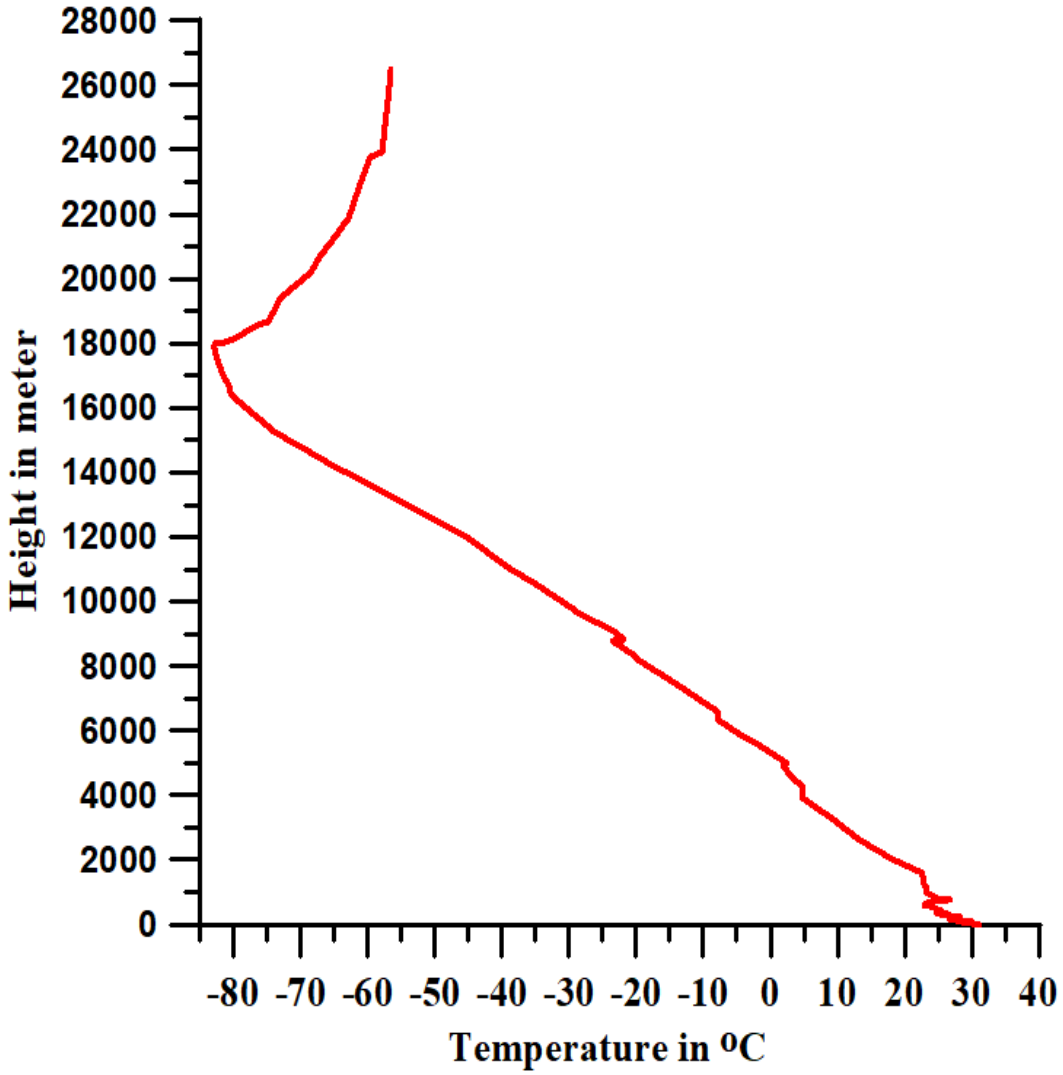


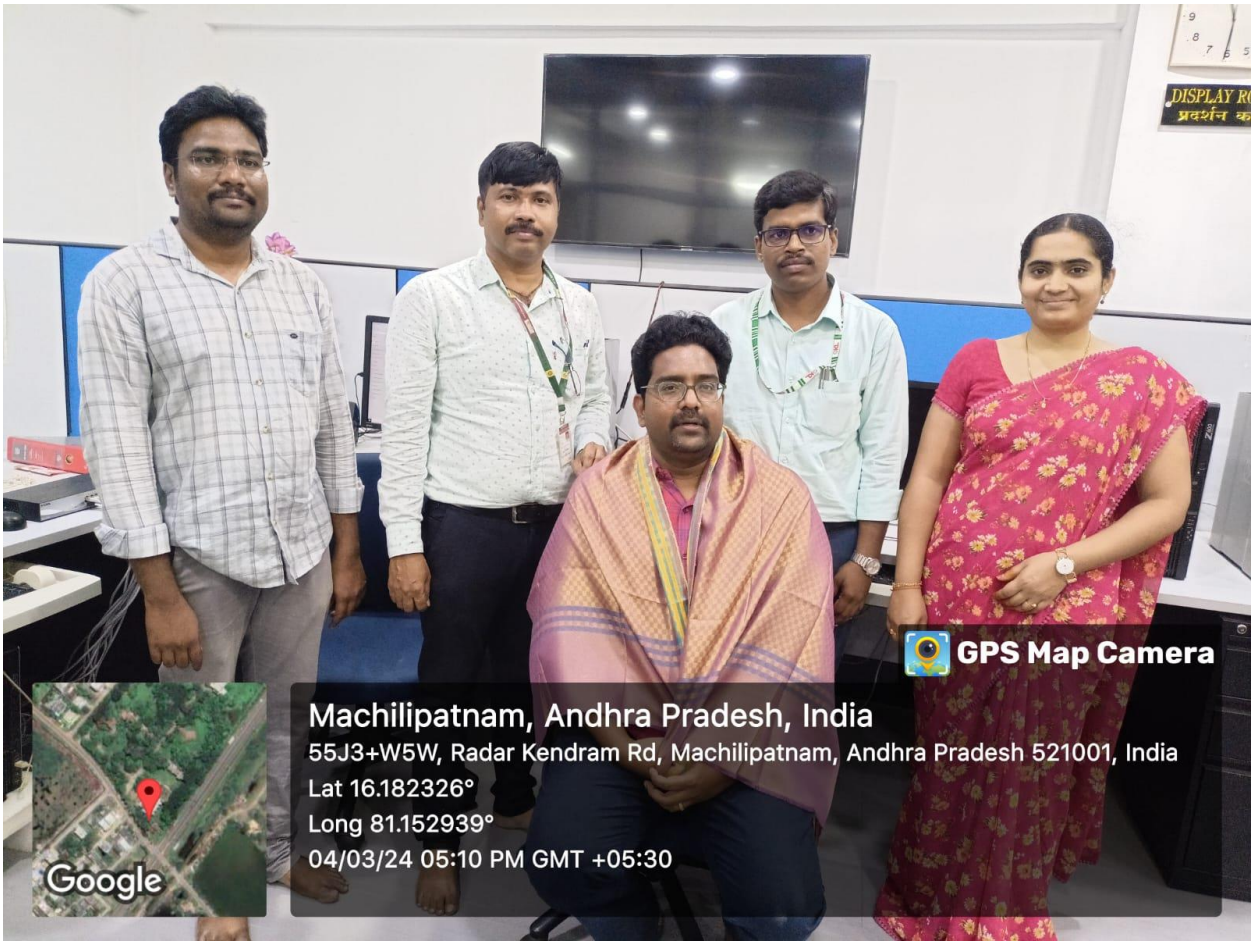
Figure: Vertical temperature of Machilipatnam DWR station using Radiosonde balloon observational data

7. **Technology and Innovation:** IMD is likely to showcase technological advancements in meteorological instrumentation. Students may learn about the latest technologies and innovations used to enhance weather monitoring and prediction capabilities.

8. **Quality Control Measures:** Understanding the importance of data accuracy, students may be briefed on the quality control measures implemented by IMD to ensure the reliability of meteorological observations.

9. **Operational Challenges:** Students may gain insights into the operational challenges faced by meteorologists, especially during extreme weather events, and how the IMD responds to these challenges.

This industrial visit provides students with a unique opportunity to connect theoretical knowledge with practical applications, fostering a deeper understanding of meteorological observations and the role of IMD in safeguarding the nation through accurate weather forecasting.



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DWR Station Visit Machilipatnam on 04 March 2024 (1:10PM to 6:20PM)

S.No	ID	Student Name	Signature
1	2100040027	PARCHA SAKETH KUMAR	
2	2100040078	GALETI MEGHANA RAM	
3	2100040173	CHARUGUNDLA SAI CHATURYA	
4	2100040193	BODDEPALLI HIMA SANKAR	
5	2100040223	GEDELA PRASHANTH	
6	2100040272	PAVULURI KIRAN KUMAR	
7	2100040286	SAI PRASANNA	
8	2100040287	KAMIREDDY BINDUSRI	
9	2100040288	S RAJ KUMAR	
10	2100040298	OGURI SRI LAKSHMI	
11	2100040299	GOPISETTI MANOHAR SIVA GANESH	-
12	2100040305	VIPPALA SUSMITHA	
13	2100040306	MAKINEEDI SATYA SWARUPA	
14	2100040324	THOTA SIVA SRI	
15	2100040328	POTHULA NIKHILA	
16	2100040336	CHAPA SAI TARUN	
17	2100040341	PUSULURU LEENA SRI	
18	2100040346	GUMMADI ANJALI SRI RAJYA LAKSHMI	
19	2100049096	ABHISHEK BEPARI	
20	2100049097	DIYA NARAYAN	
21	2100040001	AKULA LEELA RAMA KRISHNA	
22	2100040003	AMMIREDDY YOSHITHA	
23	2100040005	BORRA DEVI HARSHITHA	
24	2100040013	CHITTAJALLU BALA YOGESWAR	
25	2100040015	DHANEKULA JASWANTH	-
26	2100040017	KAKARLA KUNDAN	-
27	2100040024	Mokkarala Hari Govinda Subhang	
28	2100040029	RANGAVAJJULA LAKSHMI NAMRATHA	
29	2100040049	BODDAPATI LOKESH REDDY	
30	2100040055	NADAKUDITI SHYAM SRI RAM	
31	2100040056	VEERLA LAKSHMI SAHITHI	
32	2100040059	BHUTI SAMBA SIVA NAGENDRA HARISH	
33	2100040080	MACHABATTUNI SHANMUKHA PRIYA	
34	2100040087	PINJARI ABBAS ALI	
35	2100040111	LINGALA SAINADH	
36	2100040119	NAKKALA ADAM RAJ	
37	2100040121	SURAGANI SUMANTH	
38	2100040~~129~~ 126	~~POTNURI. SHARMITHA~~ A. Vinitha	
39	2100040211	RAMANADHAM HANVITHA	

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40	2100040220	N S V G Sri Sankar	
41	2100040230	KOLLI VARSHINI	
42	2100040270	KALIGOTLA ABHINAV AKASH	
43	2100040276	NADELLA VARUN	
44	2100040283	CHIMATA VAMSI	-
45	2100040301	THIRUKKOVALLURI-YASWANTH VENKAT	
46	2100040318	GOGULAMUDI JAGADEESH REDDY	
47	2100040319	MATTA SAI VENKATA KRISHNA	-
48	2100040325	PAMARTHI VENKAT	-
49	2100040358	NADELLA LIKITH CHOWDARY	
50	2100040363	BOLLA ABHILASH	
51	2100040369	Prashanth kumar Thammareddy	
52	2100049005	BARAMA SAI GANESH	
53	2100049052	KOLACHALAM SAI CHARAN	
54	2100049066	BUGATHA NITHIN KUMAR	
55	2100049087	VALIVETI VENKATA KRISHNA SAI KARTHIKEYA	
56	2100040218	TOKALA GAYATHRI DEVI	-
57	2100040115	KANAMARLAPUDI VENKATA NAGA LAKSHMI	-
58	2100040190	TUMMALACHERUVU KAVYA SRI	-
59	2100040266	RANGAPURI SAI DURGA DEVI	-

60	2100040086	P.Ashwitha	~~A~~ shwitha
61	2100040085	S.Nikitha	Nikitha
62	2100040102	N.Sathwika	sathwika
63.	2100040340	S.Indhu	S.Indhu
64.	2100040339	V.Hounika	V.
65.	2100040313	K.Rohini	K.
66.	2100040122	S.Greeshma	Greshma
67.	2100040374	A.Harshitha	Harshith
68.	2100040028	P.Nikitha.	Nikitha
69.	2100040163	V.Lalithasree	Lalitha
70.	2100040318	Gay	—
71.	2100040329	venkat	—
72.	2100040308	Jaya prakash	
73.	2100040176	S.Bharadwaj	