

## INFRASTRUCTURE AND PHYSICAL FACILITIES FOR TEACHING- LEARNING

### A. ADVANCE RADIATION PHYSICS LABORATORY

1. **Name of Laboratory:** Advance Radiation Physics Laboratory. Govt. Zirtiri Residential Science College. Aizawl. Mizoram.

2. **Funding received for this Laboratory (through Research Project):**

Sl. No	Title	Funding Agency	Period	Amount	Investigators:
1	Measurement of Radon-thoron and Progeny concentrations and equilibrium factors in Mizoram. .	BRNS Sanction No. 2007/36/67-BRNS/2507 dated 31.1.2008	2008-2011 (extended upto March 2012)	Rs. 48,42,000	1.Dr. B. Zoliana 2.Dr. R.K. Thapa Co-Investigator: Dr. Mayya, Scientist G, BARC. Mumbai
2	A comprehensive study of Natural radionuclides like $U^{238}$ , $Ra^{226}$ and $Rn^{222}$ in various matrices available in Mizoram	BRNS Sanction No. 36(4)/14/68/2014-BRNS/36012 Dated 01.03.2016,	2016-18	Rs.38,03,000	1.Dr. B. Zoliana 2.Dr. Lalhmingliana 3. Dr. Malsawma Co-Investigator: Dr. B.K. Sahoo, Scientist E, BARC. Mumbai
3	Online monitoring of radon exhalation and modelling in fault regions of Aizawl and Kolasib districts of Northern Mizoram.	BRNS Sanction No. 36(4)/14/68/2014-BRNS/36016 Dated 01.03.2016,	2016-18	Rs. 33,83,750	1. Dr. Rosangliana 2. Dr. B. Zoliana Co-investigator: Dr. BK Sahoo Scientist E, BARC. Mumbai

2. **List of equipments:**

- 3.1 Gamma Survey meter
- 3.2 Radon -Thoron Monitor (RnDuo) with accessories
- 3.3 NaI (Tl) Gamma Spectrometry
- 3.4 Reference Standard
- 3.5 LED Fluorimeter
- 3.6 Water pH and temperature measuring instruments
- 3.7 Multichannel Analyser (G-Spec)
- 3.8 RAD-7 Detector and associated accessories
- 3.9 Desktop Computer
- 3.10 Twin cup dosimeters
- 3.11 Solid State Nuclear Track Detector (SSNTD) and associated accessories
- 3.12 GPS
- 3.13 Pin-Hole based Dosimeter
- 3.14 Direct Progenies Sensor

3. **List of Investigators:**

- 4.1. Prof. B. Zoliana
- 4.2. Dr. Rosangliana

- 4.3. Dr. Lawrence Zonunmawia
- 4.4. Dr. PC. Rohmingliana
- 4.5. Dr. Lalrinmawia Pachuau

**4. List of Students who utilised the instruments of the Laboratory:**

- 5.1. Dr. Lalmuanpuia Vanchhawng Ph.D. (8.11. 2012 from Dept of Physics, MZU)
- 5.2. Dr. PC. Rohmingliana (27.11. 2015 from Dept of Physics, MZU)
- 5.3. Dr. Lawrence Zonunmawia (2017 from Dept of Physics, MZU)
- 5.4. Dr. Vanramlawma (Department of Physics, MZU)
- 5.5. Dr. Hmingchungnunga (Department of Physics, MZU)
- 5.6. Mr. Laldingngheta (Research Scholar, Department of Physics, MZU)
- 5.7. Mr. Mr. Remlalsiamia (Research Scholar, Department of Physics, MZU)

**6. List of PhD from the Laboratory:**

- 6.1 Dr. Lalmuanpuia Vanchhawng
- 6.2 Dr. PC. Rohmingliana
- 6.3 Dr. Lawrence Zonunmawia
- 6.4 Dr. Vanramlawma
- 6.5 Dr. Hmingchungnunga

**7. List of Papers produced from this laboratory:**

- 7.1. *Measurement of indoor concentrations of radon and thoron in Mizoram, India*, P.C. Rohmingliana, Lalmuanpuia Vanchhawng, R.K. Thapa, B.K. Sahoo, R. Mishra, B. Zoliana and Y.S. Mayya, *Sci. Vis.* **10(4)**, (2010) . ISSN (print) 0975-6175; ISSN (online) 2229-6026.
- 7.2. *Measurements of Equilibrium factor of radon in Aizawl, Mizoram, India*. Lalmuanpuia Vanchhawng, P.C. Rohmingliana, R.K. Thapa, R. Mishra, B.K. Sahoo, B. Zoliana and Y.S. Mayya. *Sci. Vis.* **11(2)**, (2011). ISSN (print) 0975-6175; ISSN (online) 2229-6026.
- 7.3. *Radon and the risk of lung cancer in Aizawl District, Mizoram, India*, B. Zoliana, Lalmuanpuia Vanchhawng, P.C. Rohmingliana and R.K. Thapa, *Sci. Vis.* **10(2)**, 66-72 (2010). ISSN (print) 0975-6175; ISSN (online) 2229-6026.
- 7.4. *Study of radon concentrations in relation with the radioactivity content of building materials in Aizawl district, Mizoram, India*. Lalmuanpuia Vanchhawng, P.C. Rohmingliana, R.K. Thapa, B.K. Sahoo, R. Mishra, B. Zoliana, Y.S. Mayya, Proceeding of SSNTD-17, M.S. University of Baroda, Gujarat, 17-19 Oct. 2011. Published by Narosa Publisher, Delhi. ISBN 978-81-8487-259-0
- 7.5. *Study of radon flux from soil surface in middle part of Mizoram, India*. P.C. Rohmingliana, Lalmuanpuia Vanchhawng, R.K. Thapa, B.K. Sahoo, R. Mishra, B. Zoliana, Y.S. Mayya, Proceeding of SSNTD-17, M.S. University of Baroda, Gujarat, 17-19 Oct. 2011. Published by Narosa Publisher. Delhi. ISBN 978-81-8487-259-0.
- 7.6. *Seasonal Variation of Radon/Thoron and their progeny concentration in Saiha District, Mizoram, India*. P.C. Rohmingliana, Lalmuanpuia Vanchhawng, R.K. Thapa, B. Zoliana, B.K. Sahoo, R. Mishra, Y.S. Mayya. Proceedings of International conference of Advances in Environmental Chemistry, Mizoram University, 16-18, Nov. 2011. Published by Excel India Publisher, New Delhi. ISSN No. 978-93-81361-53-5

- 7.7. *Study of Population Dosimetry in Middle Part of Mizoram, India.* Lalmuanpuia Vanchhawng, P. C. Rohmingliana, R. K. Thapa, B. K. Sahoo, Rosaline Mishra, B. Zoliana, Y. S. Mayya. Proceedings of International conference of Advances in Environmental Chemistry, Mizoram University, 16-18, Nov.2011. Published by Excel India Publisher, New Delhi. ISSN No. 978-93-81361-53-5
- 7.8. *Measurement of radon concentration inside and around dwellings in fault regions of Aizawl city, Mizoram, India.* B. Zoliana, P.C. Rohmingliana, Lalmuanpuia Vanchhawng, R.K.Thapa, R.Mishra, B.K.Sahoo, Y.S.Mayya.Proceedings of International conference of Advances in Environmental Chemistry, Mizoram University, 16-19, Nov.2011. Published by Exel India Publisher, New Delhi. ISSN No. 978-93-81361-53-5
- 7.9. *Measurement of radon concentration in dwellings from the affected landslide area of Mamit town, Mizoram, India* P.C. Rohmingliana, L. Vanchhawng, R. K. Thapa, M. Lalthansangi, Lalrintluangi, Laltlanchhungi, Lalremruati Hmar, Lalnunthara, B. K. Sahoo, Y. S. Mayya and B. Zoliana. *Sci. Vis.* **12 (3)**, 92-96 (2012). ISSN (print) 0975-6175, ISSN (online) 2229-6026
- 7.10. *Indoor radon concentration and radon flux measurement in north east India.* B. Zoliana, P.C. Rohmingliana, R.K. Thapa, L. Vanchhawng, J.H. Zoremthanga, B.K. Sahoo and Y.S. Mayya. *ISST Journal of Applied Physics*, **Vol. 5 No. 2**, (2014), p.p. 40-43. ISSN No. 0976-903X
- 7.11. *Measurement of inhalation dose for radon in dwellings using direct progeny sensors in southern part of Mizoram, India.* P.C. Rohmingliana, R.K. Thapa, Lalmuanpuia Vanchhawng, B. Zoliana, B.K. Sahoo, R. Mishra and Y.S. Mayya. . *ISST Journal of Applied Physics*, **Vol. 5 No. 2**, (2014), p.p. 85-88. ISSN No. 0976-903X
- 7.12. *Observation of radon concentration and measurement of natural gamma radiation inside the tourist-visited-caves in Mizoram, India.* B. Zoliana, P.C. Rohmingliana, L.Z. Chhangte, Laltanpuia and B.K. Sahoo. *Sci. Vis.* **15** (supplementary) (2015). ISSN (print) 0975-6175, ISSN (online) 2229-6026, p s19-s22.
- 7.13. *Measurement of indoor radon concentrations in correlation to geographical location and construction type of buildings in middle part of Mizoram, India.* P.C. Rohmingliana, B. Zoliana, Lawrence Z. Chhangte, B.K. Sahoo, R. Mishra and Y.S. Mayya. . *Sci. Vis.* **15** (supplementary) (2015). ISSN (print) 0975-6175, ISSN (online) 2229-6026, p s58-s63.
- 7.14. *Measurement of radon concentration in dwellings in the region of highest lung cancer incidence in India.* B. Zoliana, P.C. Rohmingliana, B.K. Sahoo, R. Mishra, Y.S. Mayya *Radiation Protection Dosimetry*. ISSN: 0144-8420 Impact Factor 0.913 P 1-4. doi:10.1093/rpd/ncw056,(2016)
- 7.15. *Annual inhalation dose of indoor radon in dwellings in Aizawl City, Mizoram, India.* Lalmuanpuia Vanchhawng, P.C.Rohmingliana, B.Zoliana, B.K.Sahoo and R.Mishra. P 16-21 *Science Vison* ISSN (print) 0975-6175; ISSN (online) 2229-6026.
- 7.16. *Seasonal Variation of Indoor Radon Concentrations in dwellings in Eastern part of Mizoram,* Lalmuanpuia Vanchhawng, P.C. Rohmingliana, B. Zoliana, R. Mishra and B.K. Sahoo, . Proceedings of Mizoram Science Congress 2016 held at Mizoram University during 13-14 October 2016, Allied Publishers Pvt. Ltd. ISBN 978-93-85926-49-5 (2017)

- 7.17. *Measurement of Gamma radiation dose and its correlation with radon concentration in the southern part of Mizoram, India*, LZ Chhangte, Z. Pachuau, P.C. Rohmingliana, B. Zoliana, B.K. Sahoo and B.K. Sapra. Proceedings of Mizoram Science Congress 2016 held at Mizoram University during 13-14 October 2016, Allied Publishers Pvt. Ltd. ISBN 978-93-85926-49-5 (2017)
- 7.18. *Comparison of single and double entry twin cup dosimeter in measuring indoor radon and thoron concentration in Mizoram, India*. LZ Chhangte, Z. Pachuau, P.C. Rohmingliana, B. Zoliana, B.K. Sahoo and B.K. Sapra. *Sci Vis* **18** (1), p 51—55. ISSN (print) 0975-6175; ISSN (online) 2229-6026. (2018).
- 7.19. *Measurement of Primordial Radionuclides in Soil and Building Materials from Mizoram, India*. L.Z. Chhangte, Hmingchungnunga, Vanramlawma, Laldingngheta, Remlalsiama, Z Pachuau, B. Zoliana, P.C. Rohmingliana, B.K. Sahoo, B.K. Sapra, J. Malsawma, L. Hnamte. Proceedings of Mizoram Science Congress 2018 held at PUC during 4-5 October 2018, Atlantis Press, Amsterdam, Paris, Beijing, p186-189. ISSN 2352-5401; ISBN 978-94-6252-638-9.
- 7.20. *Assessment of Radon Content in Water Using Smart RnDuo in North East India*. Hmingchungnunga, L.Z. Chhangte, Vanramlawma, Laldingngheta, Remlalsiama, Z. Pachuau, B. Zoliana, Rosangliana, B.K. Sahoo, B.K. Sapra, J. Malsawma, L. Hnamte. Proceedings of Mizoram Science Congress 2018 held at PUC during 4-5 October 2018, Atlantis Press, Amsterdam, Paris, Beijing, p186-189. ISSN 2352-5401; ISBN 978-94-6252-638-9.
- 7.21. *Measurement of Natural Radioactivity Using NaI (Tl) Detector in Soil Samples Collected from Aizawl, Mizoram, India*. Vanramlawma, Hmingchungnunga, Laldingngheta, Remlalsiama, L.Z. Chhangte, Z. Pachuau, B. Zoliana, Rosangliana, B.K. Sahoo, B.K. Sapra, J. Malsawma, L. Hnamte. Proceedings of Mizoram Science Congress 2018 held at PUC during 4-5 October 2018, Atlantis Press, Amsterdam, Paris, Beijing, p186-189. ISSN 2352-5401; ISBN 978-94-6252-638-9.
- 7.22. *Study of Indoor Radon/ Thoron Concentration with Respect to Construction Types of Dwellings in Mizoram, India* L.Z. Chhangte, P.C. Rohmingliana, Zirliannurga, B.K. Sahoo, B.K. Sapra, B. Zoliana and Z. Pachuau. *Science and Technology Journal* **Vol. 6, No.:** 2, July–December 2018, p 44-46. ISSN: 2321–3388.
- 7.23. *Measurement of radon exhalation from soil samples in various fault regions of Aizawl district, Mizoram, India*. Laldingngheta, Vanramlawma, Hmingchungnunga, L.Z. Chhangte, R.C Tiwari, Rosangliana, B. Zoliana, B.K. Sahoo, T.K. Agarwal. Proceedings of Mizoram Science Congress 2018 held at PUC during 4-5 October 2018, Atlantis Press, Amsterdam, Paris, Beijing. ISSN 2352-5401; ISBN 978-94-6252-638-9. Page 198-201.
- 7.24. *Estimation of Radon Mass Exhalation Rate and Radium Content in Soil Samples Collected from Kolasib District of Mizoram, India*. Vanramlawma, Hmingchungnunga, B. Zoliana, L. Z. Chhangte, B. K. Sahoo, B. K. Sapra, Z. Pachuau. *International Journal for Research in Applied Science & Engineering Technology (IJRASET)* ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429 **Volume 8 Issue VI** June 2020- A. Page 793-798.

- 7.25. *Seasonal Variation of Radon Concentration in Water Sources using Smart RnDuo* Hmingchungnunga, Vanramlawma, Z. Pachuau, B. Zoliana, L. Z. Chhangte, B. K Sahoo, B. K Sapra. International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429 **Volume 8 Issue VI** June 2020- A. Page 95-100.
- 7.26. *Determination of Radon Mass Exhalation Rate in the Region of Highest Lung Cancer Incidence in India.* LZ Chhangte, PC Rohmingliana, B. K. Sahoo, B. K. Sapra, Hmingchungnunga, Vanramlawma, Remlalsiama, Z. Pachuau and B. Zoliana. Radiation Environment and Medicine 2019 **Vol.8, No.2** p113–117.

## 8. IERMON CENTRE

Environmental Assessment Division of Bhabha Atomic Research Centre, Mumbai has developed solar powered Environmental Radiation Monitor (ERM) for keeping an eye on radiation level in the environment, round the clock. This system is designed and developed for open field installation with wireless data communication using Short Message Service (SMS) of GSM Cellular Network, powered by solar panel with battery backup.

The system has been deployed at various locations in India covering Nuclear Power Plant sites (NPPs), uranium mining sites, Metro cities and other important locations under the Indian Environmental Radiation Monitoring Network (IERMON). The college is one of the few IERMON Center that transmit background environmental radiation data to a central station at Mumbai. It will serve as an early warning system in case of a nuclear emergency leading to increase gamma radiation levels in the environment.

The nuclear emergency incidence is not a common occasion but when it happens, it could be fatal and usually affects a very large region, for example, when Fukushima Nuclear Accident happened in March 12, 2011, not only in Japan, but the neighbouring countries like China, USA, etc. were being warned of the possible radiation cloud that could migrate in the air causing radiation hazards. There were lots of nuclear hoax all over the world that the spread of radiation could affect anywhere in the neighbouring countries, and it could also come to India where the route could also include Mizoram. After that incidence, the authority of the institution contacted Environmental Assessment Division of Bhabha Atomic Research Centre, Mumbai to install this radiation monitoring system in the college. The EAD, BARC also readily accepted the request and the system was installed in June 16th 2011. The system has provided the status of Gamma radiation level of Aizawl round the clock and sends the data to IERMON central station BARC, Mumbai.

## B. INSTITUTIONAL BIOTECH LABORATORY

Institutional Biotech Hub was initially functioning and established in 2012 with funding from the Dept. Biotechnology (New Delhi). The Hub was established to serve as a platform for teaching and undertaking research. Since its introduction, Hands-on training and teaching were given to students as well as faculty members on the latest techniques in biotechnology. A number of outreach programs had conducted for Higher Secondary School students. Till date, the Hub is functioning smoothly and is being used for research works by teachers and also for conducting practical classes. Several facilities were procured through this project for conducting basic routine experiments. This centre was sponsored by Department of Biotechnology, New Delhi vide sanction letter No. BT/22/NE/2011 dated 30.11.2011. The followings part-time personnel were engaged in the Hub.

- Coordinator: Laltanpuia, Head, Dept. of Biochemistry
- Assistant Coordinator: Dr. R. Lalengmawia, Head Dept. of Botany
- One JRF: Goldy K. Lalhmangaihi
- One SRF: Dr. PC. Lalrinfela

### 1. The followings are the equipments sanctioned in the Hub

SI No.	Name of the equipment	Model No. & Brand Name	Cost in Rupees
1	UV Spectrophotometer	Bio-Spectrometer Basic (Eppendorf)	3,67,500.00
2	College PCR Package (PCR Leader Bundle) inclusive of the following items:	Eppendorf (package)	4,99,800.00
	Centrifuge Mini-Spin		
	PCR Mastercycler Personal + PCR tubes		
	Pipettes (20 $\mu$ l + 200 $\mu$ l) with tips		
	Electrophoresis apparatus Elpho Kit with power pack		
	UV Transilluminator with Camera		
3	Microwave Oven	MH-2548QPS (Brand LG)	10,590.00
4	Digital Balance	Citizen	26,000.00
5	pH Meter	Elico	14,000.00
6	Laptop Computer	Core i5 (Dell)	41,000.00
7	Magnetic stirrer with hot plate	Systronics	7,400.00
8	Micropipette (0.1-10 $\mu$ l & 1000 $\mu$ l) with tips	Tarsons	23,710.00
9	Autoclave	Ikon Upright	45,000.00
10	Hot Water Bath	Realtech	25,500.00
11	Micropipette 0.1 – 10 $\mu$ l, 1000 $\mu$ l	Biohit	16,500.00
12	Micropipette 0.2 – 2 $\mu$ l	Borosil	3,700.00
13	Micropipette 2 - 20 $\mu$ l	Tarsons	5,100.00
14	Ph Meter	Deluxe	14,000.00
15	Weighing Balance	Wensar	55,000.00
16	10 KVA Online UPS	Better Power	2,50,000.00
17	Electrophoresis unit	Genei	7,775.00
18	PowerPack	Genei	6,500.00
19	Digital Anal Balance	Wensar	55,000.00

20	Deep Freezer	Relitech	47,000.00
21	Microscopes (3 nos.)	Olympus	40,590.00
22	Hot Air Oven	Relitech	28,800.00
23	Cooling Centrifuge	Remi	1,75,000.00
24	Vortex shaker	Tarson	8,950.00
25	Computer Projector	BenQ	46,900.00
26.	Soxhlete unit	Relitech	25, 000
27	Rotary Vacuum Flash Evaporator	Relitech	50,490.00

## **2. Faculties who had utilized Hub for PhD work**

1. K. Zosangpuii Research scholar, Zoology dept. MZU
2. S. Thangrimawii, Research scholar, Zoology dept. MZU
3. Lalzahawmi Chenkual, Research scholar, dept of Environmental Science, MZU

## **3. Students who had utilized Hub for summer training**

1. Ramluahpuii, 6th Sem, Zoology dept
2. H. Lalrinhlui, 6th Sem, Zoology dept
3. Lalremsiama, 6th Sem, Zoology dept
4. Jonathan Lalrinchhana, 6th Sem, Zoology dept
5. Samuel Lalrammawia, 6th Sem, Zoology dept
6. B. Lalnghahpuii, 6th Sem, Zoology dept
7. Annie Vanlalruati, 6th Sem, Zoology dept

## **4. Life Science students for carrying out practicals every semester**

### **5. Main activities Biotech Hub:**

#### *5.1. Basic research under Biotech Hub*

1. Analysis of banana varieties using RAPD markers
2. Characterization of resistance gene analogues in banana cultivars
3. Morphological and molecular characterization of chili landraces of Mizoram
4. Phytochemical analysis of selected medicinal plants of Mizoram

#### *5.2. Organize Training programmes to College Teachers & students*

The Biotech Hub of our college also organised a special workshop for college teachers on 'Techniques in Bio-technology and Bio-informatics' during 21-23 august 2013 in collaboration with Biotech Hub of Pachhunga University college and State Biotech hub, Mizoram university. Altogether, 28 participants from science colleges across the state participated in this workshop.

#### *5.3. Outreach programmes to Higher Secondary School/College students*

1. Biotechnology – Introduction & Application at Govt. Republic Higher Sec School, Aizawl organized by IBT Hub, GZRSC on 11th Sept, 2013
2. "Biotechnology – Introduction & Application" at Govt. JL Higher Sec. School, Aizawl organized by IBT Hub, GZRSC on 20th Oct, 2013
3. Biotechnology – Introduction & Application Staine's Memorial Sec. School, Aizawl organized by IBT Hub, GZRSC on 22nd Nov, 2013
4. An introduction to Biotechnology, applications and social implications at Govt. Zemabawk Higher Secondary School, Aizawl organized by IBT Hub, GZRSC on 5th Dec, 2014
5. One day seminar with Hands-on Training on 'Advance in Biotechnology' at Govt. Kolasib College on 27th Feb, 2015
6. Seminar on "Recent trends and prospects in Biotechnology" at Govt. Zirtiri Residential Science College, Aizawlon 28th Feb. 2015

7. One day seminar cum Hands-on Training on 'Advances in Biotechnology' at Lunglei Govt. College, Lunglei on 13th Mar, 2015

**Fig:**



Outreach activity on Advances in Biotechnology at Govt. Lunglei College on 13th March, 2015

## 6. List of Papers produced from Institutional Biotech Hub

1. Biotechnology: an introduction, its application and social implication. K. Vanlalthmangaihi and Laltanpuia (2015). Sci. Vis. 15:S23-S29. ISSN: 0975-6175 [New Indexing: 48:05:11]
2. Analysis of genetic variation among banana genome groups of Mizoram Using randomly amplified fragment length polymorphism (RAPD) marker. PC.Lalrinfela, Laltanpuia, R. Lalengmawia and Robert Thangjam (2015). Sci. Vis. 15:S6-S12. ISSN. 0975-6175 [New Indexing: 48:05:11]
3. Isolation and characterization of resistance gene analogues (RGAs) from banana cultivars of Mizoram, India. Pachuaui Lalrinfela, Laltanpuia, R. Lalengmawia and Robert Thangjam (2015). In: Current Trends of Biodiversity Research in Mizoram (H Lalramnghinglova, Vanramliana, H Lalthanzara eds.). 242-255pp. ISBN: 978-81-287-0012-5.

*Institutional Biotech Hub has been providing a platform for conducting experiments by students since established in the college. The parental department, Biochemistry is taking role in maintaining the equipments and other relevant responsibilities. Though the project funding had already ended in 2016, the laboratory is still one of the fundamental platforms for life science students in carrying out practicals every semester. It offers convenience to the students as well as teachers for conducting prescribed syllabus practicals and related research experiments.*

## 7. Future activities and proposed action plan:

- The awareness program for biotechnology and its application in various Higher Secondary Schools.
- Providing a platform for theoretical and practical knowledge on the modern issues in the field of Biotechnology for College students through Biotech Hub
- Make more use of Biotech Hub equipments for research purpose including PhD works and collaborative research activities.

## 8. Conclusions



- The growing Biochemistry and Biotechnology in life sciences has created demand on availability of affordable scientific instruments to cope with problems.
- Establishment of Biotech Hub in the college progressively mitigates students and professors in carrying out practicals and mini project (which usually provided to students for 20 days as summer training).
- As a part of extended laboratory, the life sciences students and professors make avail of equipments as per the demand, and the parental Biochemistry department is also looking forward to make it more convenient in conducting join-research for better utilization and cultivation of qualitative efficiency in teaching and research in the new college campus.

### **C. Language Laboratory at Government Zirtiri Residential Science College**

The English Language teaching situation in Mizoram has remained largely unsatisfactory even after decades of introducing the language in formal education. Hence the language laboratory has been introduced as a teaching aid to achieve pedagogical breakthrough and to address language barriers caused by Various factors such as the geographical isolation of the region, the dominance of the Mizo language, and the high proportion of students from rural areas with primary and secondary education in Mizo medium .Under equity initiatives of RUSA 24 colleges of Mizoram were equipped with language laboratories, the first being launched at Govt. Zirtiri Residential Science College.

On 3<sup>rd</sup> June 2016 the then Hon'ble Minister, Human Resource Development (MHRD) Smt Smriti Zubi Irani inaugurated the language laboratory via Video Conferencing from New Delhi where she interacted with students of the college. The event was joined by dignitaries such as Mr. Lalsawta, Finance Minister, Commissioner and Secretary H&TE Department, Member secretary State Higher Education Council, AMC Councilor as well as local councils, officials of concerned departments, Principal a, teachers and students

In introducing the language laboratory at Govt. Zirtiri Residential Science college it is expected that it will improve the communicative skills of our students which will, in turn, result in improved academic performance. The College also seeks to better equip the students with various language skills required by them as they move out of the state to pursue higher education and better career options. The Laboratory is primarily manned by the Department of English.

The college has opted for Sanako lab software and initially our courses will begin with the teaching of English language. Hindi and other foreign languages will be added at a later stage. A certificate course in spoken English is also being designed for future implementation. At present the language laboratory is used to impart Knowledge on oral communication skills and provide hands-on training to students on how to speak English correctly and fluently. It is also utilized to fulfil the requirement of their course in the first semester which includes Oral Communication skills. (Unit 5)

#### **Why should you use a language laboratory?**

- A language lab creates a learning environment much more effective than traditional classrooms enhancing the capabilities of students and allowing a high degree of immersion and attention to diversity.
- A language laboratory encourages the participation of students.
- The use of the language lab allows students to have access to the information quickly and easily developing many types of classroom exercises, personalizing the learning process, encouraging creativity, innovation and training
- Language laboratories also favor a high degree of skill development, team and collaborative work.

## D. LIBRARY

Govt. Zirtiri Residential Science College Library was established in the year 1980. The College Library is located at the entrance of the building. Library service is the back bone of the teaching- learning process. It tries to provide the right information to the right users at the right time. Hence, the library staff give their best effort to fulfill the objective of the library.

### ***SERVICES RENDERED:***

**1. Working Hours:** The Library opens on all working day from 9:00 am - 4:00 p.m.

**2. Library Committee:** As per UGC norms Library committee is formed where the Principal is the Chairman, Librarian as Asst. Secretary and 6 members representing Teaching Staff, Administrative Staff and Students. The committee takes responsibilities on acquiring the materials, and other activities relating the development of the library under the chairmanship of the principal.

**3. Acquisition Procedure:** Whenever fund is available, it is distributed as per requirement by the department and each and every department is informed to submit their requirement to the Principal or Library Committee and if the committee found genuine it is then, processed for purchase of the same.

**4. Collection Development:** Being a growing organism, library is trying to increase and fulfill the requirement of the target users so as to obtain their right information .The number of Collections as on 21<sup>st</sup> October, 2021 are:

• Total Number of Books	:	13121
• Total Number of Scholarly Journals Subscribed	:	9
• Total no. of Magazines	:	4
• Total no of newspapers (Dailies)	:	3
• Bound volumes of Journals	:	132
• Total no. of Non-Print Materials	:	109

**5. Organization of Books:** Collection of Library resources are arranged in a systematic way. All library books were technically classified using 'Dewey Decimal Classification' system (23rd edition). New arrivals of books, Journals and Newspaper are properly displayed.

**6. Technical Processing:** All the books in the library have been technically classified using Dewey Decimal Classification (DDC) 23<sup>rd</sup> edition. After Classifying books have been entered on accession register followed by data entry using SOUL 2.0.

**7. Maintenance:** Books are kept in an open access so that users may search their required materials easily. Regular dusting and cleaning is done properly.

**8. Circulation Service :** Circulation Service is the main service offered by the library, charging and discharging is done through the system using standard library Card. Standard library software SOUL 2.0 is used for circulation service. Library Card is issued to students and faculty members and the students are allowed to keep the 3 books for 15 days and 10 books for faculties for one semester.

**9. Orientation Programme:** Orientation Programme is organized at the beginning of the session for the fresher students.

**10. Reprographic Service:** This is an important service in this library. Due to lack of sufficient number of materials, Reprographic service is provided with a lower rate than that of market rate though we are facing shortage of manpower. It immensely helps the student's requirement for materials.

**11. Suggestion Box:** To get the suggestion of the target users, Suggestion box is placed at the entrance of the library so that best services may be provided for the users. Through this services user can share their idea for the development of the students.

**12. CCTV (Closed Circuit Television):** 7 channels CCTV was installed in the library so that every movement of the users can be traced for the safety of the library.

**13. Documentation Service:** University Exam Questions, Syllabus, College Magazines, selected topics from newspapers, Government gazette and Statistical hand books are kept properly in case they are required for the exam as well as for future research materials. Back volumes of the journals were finely binded and kept it properly.

**14. Library Staff:** Only one staff i.e. Library assistant is permanently engaged in this library. At present four staff are serving in the library:

- Librarian (M. Lib, M. Phil, Ph.D) - 1
- Library Assistant (B-Lib) - 1
- L.D.C (For assisting Technical work) - 1
- Library Attendant- 1

At present the Government cannot grant the Post of Librarian. In order to assist the need of the College Library the college employed qualified Librarian (Casual Employee) for the Post of Librarian from 1<sup>st</sup> October, 2020.

**15. Number of Library Members:**

- Students :1094
- Teachers : 57
- Non-Teaching Staff: 14

**16. Library Automation. :** The college purchased Library Software SOUL2.0 for Rs 30000/- from INFLIBNET, Ahmadabad in May 2011. Technical Assistants were temporarily employed for data entry by that time. All the Library books and Library cards have been computerized and bar-coded by using this software. Hence, the software was being utilized since Jan 2012 for circulation and for issuing ID Card.

**17. UGC Network Resource Centre:** The College Library is backed up with UGC Network Resource Centre with broadband internet facility so that users can freely access internet for their academic information need. This center is placed inside the library premise.

**18. OPAC (Online Public Access Catalogue):** The services of OPAC in the library started functioning from March 2021 in order to meet the need of the users where they can easily access their required information and save the time of the readers.

**19. N-LIST:** Under this programme all the Faculties and students have been provided Login Id

and password which are freely accessible for the users. These resources contain thousands of e-journals, e-books and databases.

## **20. Service Rendered:**

1. Classification done by using DDC 22<sup>nd</sup> & 23<sup>rd</sup> Edition.
2. Data Entry
3. Circulation of Books done by using standard Library software SOUL 2.0
4. Issue of Students' ID cum Library Card.
5. Purchase of Books
6. Dealing File on Library Matters
7. Reprographic Service.
8. Reference Service
9. Enable Internet Access through UGC Network Resource Centre.
10. Maintaining Question Bank and uploading the recent Question Papers in the College Website
11. Maintaining Visitor Record.
12. Binding of back volume of Journals & News papers
13. Displaying New Arrivals.
14. Current Awareness Service like Displaying Content List of Journals done.
15. Separate reading rooms for boys and Girls.
16. Online Public Access Catalogue for the users.
17. Distributing Best User's Award every year.

## **21. Library Equipments:** The Library has been equipped with the following:

Steel Bookrack - 47 nos  
Wooden bookrack - 15  
Journal display rack - 3  
Reading tables - 29 seaters  
Cubicles - 12 seaters  
Desktop computer - 9  
Laser printer - 1  
Photocopier/Xerox machine- 2  
CCTV-7 channels  
Lamination machine- 1  
Barcode laser scanner- 2  
Telephone connection-1  
Broadband internet connectivity- 1  
Property rack – 4  
SOUL 2.0 server-1  
Clients- 2  
Inverter- 2  
Non-Print material showcase- 1

## **22. Library Collection Statistics (as on Oct. 2021):**

Total no. of Book volume – 13121  
Total no. of Titles – 4446  
Computerized database catalogue – 12467  
Non-Print Materials – 109  
• Average no. of daily visitors:  
Teachers (2020) – 4

- Students (2020) – 24  
Teachers (2021) – 2  
Students (2021) – 12
- No. of books issued in a year (2020-21)  
2020 – 1015  
2021 – 650
  - No. of books returned in a year (2020-2021)  
2020 – 1205  
2021 – 700
  - Collection Development (2020 – 2021)  
2020 – 12865  
2021 – 12865+256 = 13,121
  - e-resources under UGC INFLIBNET N-LIST:  
e-books – 195,809 + 600000 e-books through NDL  
e-journals – 6,293

## E. ICT TOOLS

### 1. Hardwares

SI No	Items	Quantity
1	Desktop Computers	104
2	Laptop	14
3	Projector	23
4	Computer Printer (Laser & Inkjet)	10
5	Xerox Machine	5
6	UPS	34
7	Scanner	1
8	Stabilizer	5
9	Network Switch	3
10	Woofers	3
11	Headphone	20
12	Modem	2
13	CCTV	1
14	Lamination Machine	1
15	Barcode Reader/Scanner	1

### 2. Software

Sl. No	Name of Software	Quantity
1	MIS	2
2	Tina V10	1
3	Sanako	12
4	AIMIL Daq V1.1	1
5	Geostar V 3.22	1
6	QGIS	1
7	Surfer V15	1
8	Libre Office	37
9	XAMPP	37
10	Turbo C++	57
11	Ubuntu	57
12	Fortran Compiler	10
13	Soul 2.0	1

## F. ICT ENABLED CLASSROOMS

### Note:

All the classrooms are equipt with LCD Projectors. Some projectors are taken down for security reason during the Covid-19 Pandemic Period.



101 - Mathematics Core Room





Lat N 23° 44' 22.4916" Long E 92° 43' 20.2476"  
25/01/21 11:23 AM

**102 - Physics Core Room**



**Lat N 23° 44' 22.8048" Long E 92° 43' 20.316"**  
**25/01/21 11:22 AM**

**103 - BCA 1/2 Sem Room**



**Lat N 23° 44' 22.074" Long E 92° 43' 20.3628"**  
**25/01/21 11:28 AM**

**201 & 202 – 1/2 Sem Life Science Room**





**203 & 204 - 3 & 4<sup>th</sup> Sem Life Science**



Same Room different view

**301 – Geology General Room**



302 – 3/4 Sem Home Science Room





303 – 1/2 Sem Home Science Room



**304 – 5/6 Sem Home Science Room**





**305 – Biochemistry Room**



**306 & 307 – 3/4 Sem Physical Science Room**





**Lat N 23° 44' 22.1244" Long E 92° 43' 20.316"**  
**25/01/21 11:40 AM**

**308 – Chemistry Core Room**



**401 & 404 – 5/6<sup>th</sup> Sem BCA Room & Botany Core  
(Partition taken down for Exam)**





**Lat N 23° 44' 22.9596" Long E 92° 43' 20.3304"**  
**25/01/21 12:03 PM**

**402 – 1 & 2<sup>nd</sup> Sem Physical Room**



403 – 3 & 4<sup>th</sup> Sem BCA Room





**Electronics Theory & Practical Room**



Lat N 23° 44' 25.3788" Long E 92° 43' 20.3736"  
04/06/21 02:00 PM

**Multipurpose Hall**

**17 Classrooms and 1 Multipurpose Hall**

All photos taken using 'GPS MAP CAMERA; Geotag Photos & Add GPS Location'