

Summer Research Internship Training Programme (SRITP 2024)

Series 1 (15.05.2024 – 29.05.2024)

Series 2 (03.06.2024 – 18.06.2024)

Organised By



B.S. Abdur Rahman TM

Crescent

Institute of Science & Technology

Deemed to be University u/s 3 of the UGC Act, 1956



SUMMER RESEARCH INTERNSHIP TRAINING PROGRAMME – (SRITP)

2024

15th May 2024 to 29th May 2024

15 DAYS



About the Department

- Department of chemistry offers M.Sc. Chemistry & Ph.D Chemistry from the year 2010
- 2 dedicated Research lab and a Sophisticated Instrumentation lab
- Institute JRF for Ph. D Scholars
- 18 Faculties with International Research experience/ Industrial Experience

About the M.Sc. Chemistry Program

- 2 years Full-time Program
- One month Internship in Research Institutes/ Industries/ Academic Institutions
- Final semester dedicated for project (Individual)
- Project can also be done in Research Institutes/ Industries across India
- CSIR coaching and hands on training on Instrumentation
- Placement in Industry across India

About the Program

Department of chemistry organizing a Summer Research Internship Programme (SRITP) on "Hands on training on Instrumentation for Chemical Research". This is for PG students of Chemistry.

Objective of the Program

- To impart the basics (theoretical and experimental) of Chemical instrumentation in Research
- To provide practical knowledge on synthesis of Organic, Inorganic, Polymer and Nanomaterials
- To characterize the synthesized materials using UV-Vis, FT-IR, Fluorescence, GC and HPLC
- To develop practical knowledge about the use and significance of instruments for various materials

General Information

Registration Fee **Rs. 1500** Only 30 Seats Available

(Rs. 3000/- for 30 days on request)

Certificate will be provided for all the enrolled participants

Conveners

Dr. N. Hajarabeevi **Dr. I. Raja Mohammad**
HoD Chemistry Dean SPCS

Coordinators

Dr. J. Herbert Mabel **Dr. D. Sivasankaran**
Associate Professor Assistant Professor
+91 94442 83156 +91 73975 75840





SUMMER RESEARCH INTERNSHIP TRAINING PROGRAMME – (SRITP) 2024

3rd June 2024 to 2nd July 2024 (Series-2)



About the Department

- Department of chemistry offers M.Sc. Chemistry & Ph.D Chemistry from the year 2010
- 2 dedicated Research lab and a Sophisticated Instrumentation lab
- Institute JRF for Ph. D Scholars
- 17 Faculties with International Research experience/ Industrial Experience

About the M.Sc. Chemistry Program

- 2 years Full-time Program
- One month internship in Research Institutes/ Industries/ Academic Institutions
- Final semester dedicated for project (Individual)
- Project can also be done in Research Institutes/ Industries across India
- CSIR/GATE coaching and hands on training on Instrumentation
- Placement in Industry across India

About the Program

Department of chemistry is organizing a Summer Research Internship Programme (SRITP) on "Hands on training on Instrumentation for Chemical Research". This is for PG students of Chemistry.

Series-1 on-going from 15th May 2024

Objective of the Program

- To impart the basics (theoretical and experimental) of Chemical instrumentation in Research
- To provide practical knowledge on synthesis of Organic, Inorganic, Polymer and Nanomaterials
- To characterize the synthesized materials using UV-Vis, FT-IR, Fluorescence, GC and HPLC
- To develop practical knowledge about the use and significance of instruments for various materials

General Information

Registration Fee **Rs. 1500/ Rs. 2000/ Rs. 3000/-** for **15/ 21/ 30 days on request**

Certificate will be provided for all the enrolled participants

Bank Details

Name of Account Holder: Registrar B. S. Abdur Rahman
Crescent Institute of Science and Technology

Account Number: 165702000000440

Bank Name: Indian Overseas Bank Branch Name Vandalur,
Chennai – 48

Account Type: Current Account

IFSC Code / MICR No.: 10BA0001657 / 600020102

Registration Link
<https://bit.ly/3y3bpsz>

Scan QR for
Registration



Conveners

Dr. N. Hajarabeevi
HoD Chemistry

Dr. I. Raja Mohammad
Dean SPCS

Coordinators

Dr. A. Shajahan
Asso Prof (+91 94441 17020)

Dr. J. Herbert Mabel
Asso Prof (+91 94442 83156)

Dr. D. Sivasankaran
Asst Prof (+91 73975 75840)

Schedule

SRITP Series 1 (15 to 29 May 2024)			
Day 1	15.05.2024	Inauguration	
		Visit to CIIC	
Day 2	16.05.2024	Nanomaterial and its Synthesis	Dr. Noor Aman
Day 3	17.05.2024	Cyclic Voltammetry	Dr. N. Vasimalai
Day 4	18.05.2024	Software Tools Essential for Chemical Research	Dr. D. Sivasankaran
		Career Guidance	Dr. S. Aravindhan
Day 5	20.05.2024	Gas Chromatography for Analysis	Dr. Swapan Kumar Das
		Chalcogenides	Dr. Tuhin Subhra Dash
Day 6	21.05.2024	Introduction to Polymer and Moulding	Dr. Revathi Purushothaman
		Preparation of Chalcone and TLC	Dr. D. Sivasankaran
Day 7	22.05.2024	Fluorescent Quantum Dots - Synthesis and Characterisation	Dr. M. Asha Jhonsi
Day 8	23.05.2024	Electrochemical Cells and Batteries	Dr. S. Kutti Rani
		Column Chromatography	Dr. D. Sivasankaran
		High-Performance Liquid Chromatography (HPLC) and analysis	Dr. S. Bhagavathy
Day 9	24.05.2024	NMR	Dr. K. Karthikeyan
		Organic Preparation	Dr. D. Sivasankaran
		Visit to Polymer Engineering Lab	Dr. D. Sivasankaran
Day 10	25.05.2024	Organic Preparation	Dr. D. Sivasankaran
Day 11	27.05.2024	Organic Photovoltaics (OPVS) and Synthesis	Dr. M. Vajjiravel
Day 12	28.05.2024	FT-IR for Analysis	Dr. J. Herbert Mabel
		Green Synthesis of TiO ₂	Dr. N. Hajarabeevi

Day 13	29.05.2024	Synthesis of Nanomaterial Using Green Method	Dr. N. Hajarabeevi
		Visit to Department of Pharmacy Labs	Dr. U. Ubaidulla
		Industrial Visit to Spincotech Pvt. Ltd. R&D Centre, SIDCO Pharmaceutical Complex, Alathur	
SRITP Series 2 (3 to 18 June 2024)			
Day 14	03.06.2024	Inauguration	
		Visit to CIIC	
		Visit to School of Life Sciences Labs	
Day 15	04.06.2024	Cyclic Voltammetry and Nanaoparticle Synthesis	Dr. N. Vasimalai
Day 16	05.06.2024	X-Ray Diffraction	Dr. G.V. Vijayaraghavan
		Density Functional Theory (DFT)	Dr. M. Mohamed Sheik Sirajuddeen
		Visit to Sewage Treatment Plant	
Day 17	06.06.2024	Kinetic Study Using UV-Visible	Dr. A. Shajahan
		Crystal Growth Techniques	Dr. M. Lakshmipriya
Day 18	07.06.2024	Green Synthesis of Nanomaterials (TiO ₂)	Dr. N. Hajara Beevi
		Visit to Polymer Engineering Lab	
Day 19	08.06.2024	Mendeley Reference Management Tool	Dr. J. Herbert Mabel
		FT-IR for Analysis	
Day 20	10.06.2024	Corrosion Inhibitors and Its Application	Dr. S. Kutti Rani
		Preparation of Chalcone and TLC	Dr. D. Sivasankaran
		Photocatalysis for Dye Degradation	Dr. Noor Aman
Day 21	11.06.2024	High Performance Liquid Chromatography (HPLC) and Analysis	Dr. S. Bhagavathy
		Software Tools Essential for Chemical Research	Dr. D. Sivasankaran

Day 22	12.06.2024	Fluorescent Quantum Dots (QDs)	Dr. M. Asha Jhonsi
		TLC and Column Chromatography	Dr. S. Aravindhan's
Day 23	13.06.2024	Synthesis of Polymers by Solution Polymerization	Dr. M. Vajjiravel
		Gas Chromatography (GC)	Dr. Swapan Kumar Das
Day 24	14.06.2024	Synthesis of Catalysts - MOF	Dr. Noor Aman
		Valedictory	
Day 25	15.06.2024	Visit to Sai Mirra Innopharm Private Limited, Ambattur	
		Electrochemical Energy Storage and Cell Fabrication	Dr. Sivagami
Day 26	17.06.2024	NMR	Dr. K. Karthikeyan
		Chalcogenides	Dr. Tuhin Subhra Dash
Day 27	18.06.2024	Report Submission and Farewell	

DAY 1 15.05.2024

The Summer Research Internship Training Programme (SRITP 2024) Series 1 (15.05.2024 – 29.05.2024) started with the inauguration and felicitated by Dr. S. Kutti Rani, Professor of Chemistry and Director PG Admissions and Dr. I. Raja Mohamed, Professor of Physics and Dean, SPCS.

SRITP Series 1 Inauguration on 15.05.2024



After the Inauguration, the students visited the Central Library and Sophisticated Instrumentation Lab.

In the afternoon, students visited Crescent Innovative and Incubation Council (CIIC) to see the startup facilitates, entrepreneurial and innovative ecosystem for students, faculty members, industries, investors and society.



DAY 2 16.05.2024

Session handled by Dr. Noor Aman with a discussion about the nanomaterials, types, application in catalysis and the synthesis procedure (sol-gel and solvothermal methods). Interns synthesized MOF MIL-53 Fe by using FeCl_3 and terephthalic acid in DMF in autoclave. Synthesized materials are characterized using UV-Visible DRS and calculated the band gap energy.

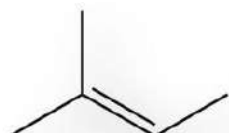
DAY 3 17.05.2024

Research scholar Mr. Askar discussed the theoretical aspects of Cyclic Voltammetry (CV), DPV (Differential Pulse Voltammetry), LSV (Linear Sweep Voltammetry), Amperometry and Impedance Spectroscopy. Then CV of K_4FeCN_6 solution demonstrated. In addition to this, cleaning the electrodes to ensure accurate measurements was also done.

Dr. N. Vasimalai discussed about the nanomaterials synthesis and prepared copper nanoparticles using electroplating method.

DAY 4 18.05.2024

Dr. D. Sivasankaran conducted an informative session on software tools essential for chemical research. ChemDraw to draw structures and MestreNova software for interpreting NMR data. Interns practiced with ChemDraw V-12 to draw simple structures, Creating and customizing a reaction scheme involving multiple steps and intermediates, Predicting and interpreting the NMR spectra for a given compound and Using Chem3D to build and optimize the structure.



2-methylbut-2-ene

Chemical Formula: C_5H_{10}

Exact Mass: 70.08

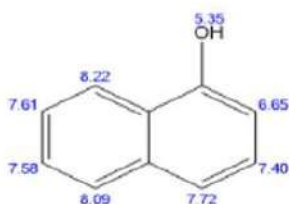
Molecular Weight: 70.13

m/z: 70.08 (100.0%), 71.08 (5.5%)

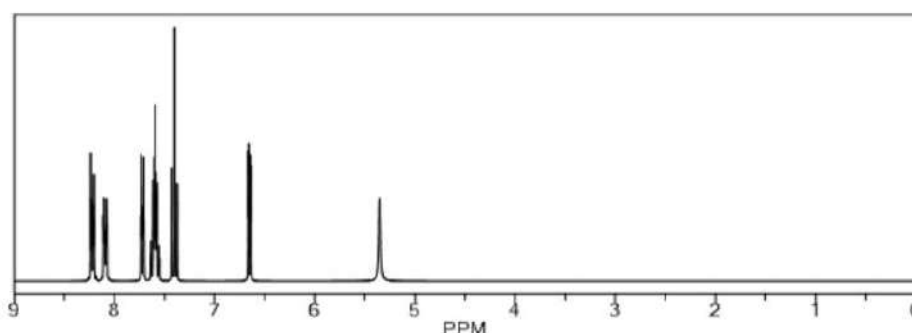
Elemental Analysis: C, 85.63; H, 14.37



ChemNMR 1H Estimation



Estimation quality is indicated by color: good, medium, rough



In the afternoon, Dr. S. Aravindhan delivered on career opportunities and skill development in the field of academics. He discussed about the various jobs for chemistry, competitive exams, how to face interviews, types of questions commonly asked and strategies to responding effectively.

DAY 5 20.05.2024

Dr. Swapan Kumar Das discussed on Gas Chromatography (GC), method development and demonstrated the analysis simple compounds and interpreted.

In the afternoon session, Dr. Tuhin Subhra Dash discussed about chalcogenides, preparation and applications.

DAY 6 21.05.2024

Dr. Revathi Purushothaman gave an introduction about polymer and its types, moulding techniques such as injection molding, blow molding, compression molding, rotational molding, thermoforming, extrusion molding, transfer molding and casting techniques.

In the afternoon session, interns prepared chalcones under the guidance of Dr. D. Sivasankaran. Chalcones were prepared by neat method and well as dry method. Progress of the reaction was monitored by TLC. Preparation of TLC plate and analysis of the sample by TLC was performed by the interns.

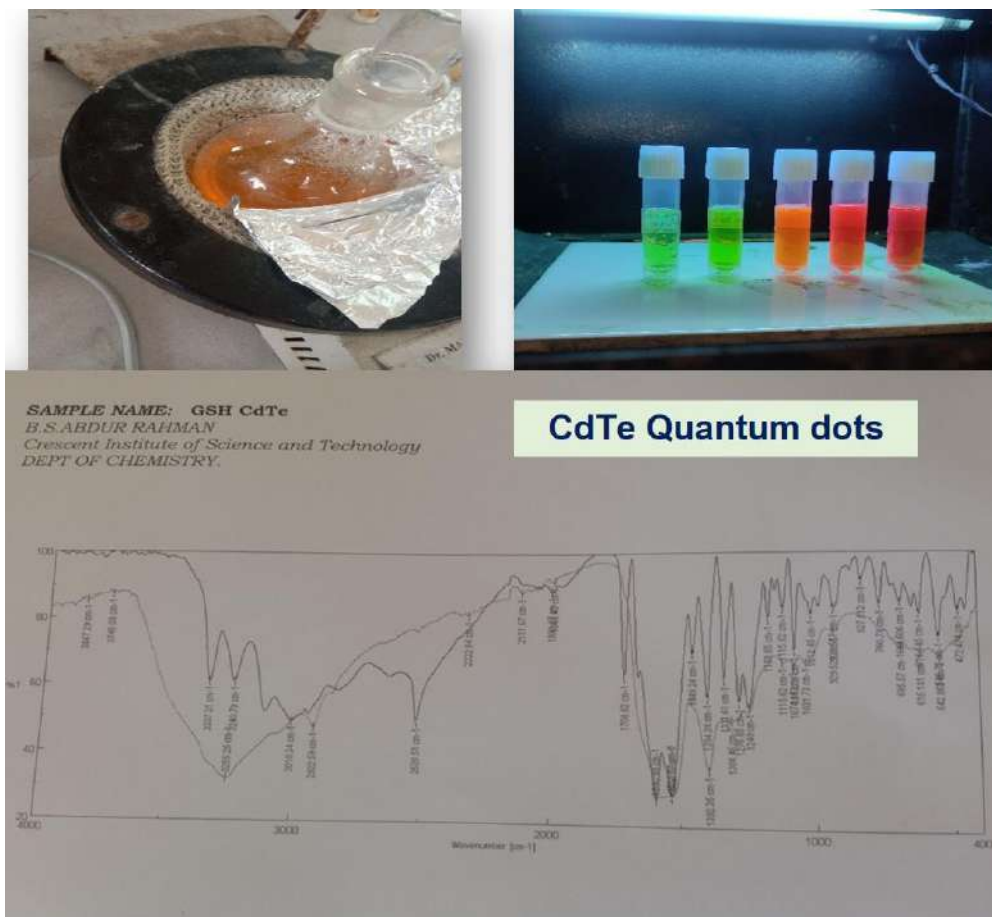


From the TLC analysis, the R_f value was also calculated.

DAY 7 22.05.2024

First session handled by Dr. M. Asha Jhonsi. She discussed about fluorescent quantum dots, Jablonski diagram, factors influencing fluorescence behavior of fluorophore, quantum yield, Stoke shift and Kasha's law.

Then the interns synthesized CdTe Quantum dots and analyzed using UV-Visible and FTIR.



DAY 8 23.05.2024

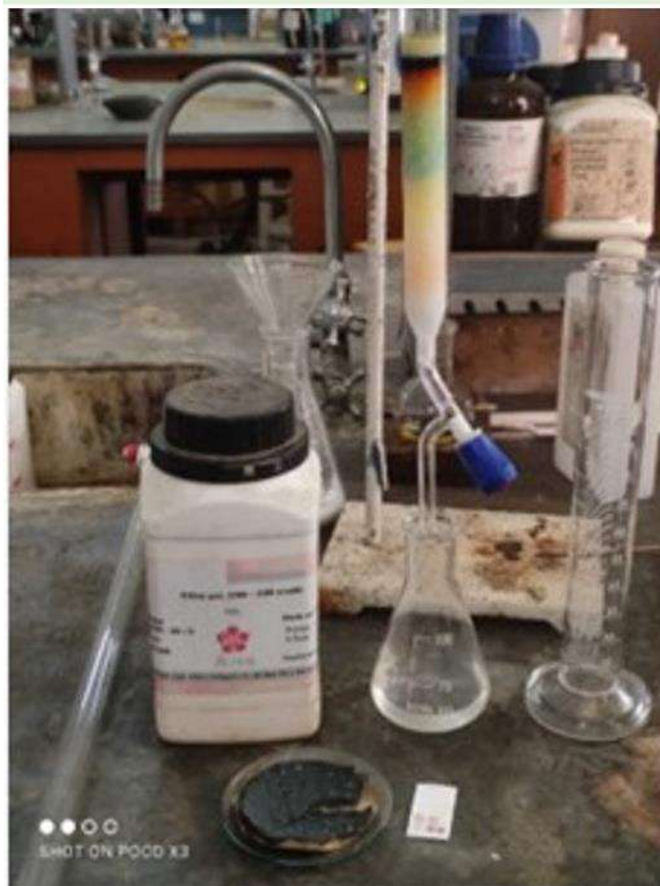
Dr. S. Kutty Rani delivered a lecture on electrochemical cells and batteries. Redox reactions, various types of cells such as the galvanic cell and electrochemical cells, and problems based on Nernst equation were solved.

Then Mr. Askar, research scholar, demonstrated the components of AA battery.

Afternoon session, Dr. D. Sivasankaran demonstrated the packing of column in a column chromatography. Then a sample was run through the column and the eluents are collected.

Dr. S. Bhagavathy and the scholars Ms. Amirtha E.S. and Mr. Senthil Kumar demonstrated High-performance liquid chromatography (HPLC) to the interns.

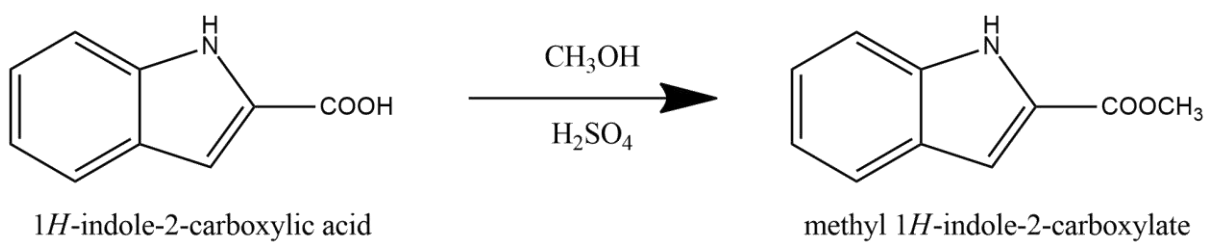
Column Chromatography



DAY 9 24.05.2024

Dr. K. Karthikeyan delivered a detailed lecture on ^1H NMR and ^{13}C and its interpretation.

Then the interns prepared methyl-1H-indole-2-carboxylate by acid-catalyzed esterification under the guidance of Dr. D. Sivasankaran. Product formation was monitored by TLC.



Finally calculated the % yield.

Afternoon, interns visited polymer engineering laboratory. They were explored the semi- automatic injection molding machine, automatic injection molding machine, extrusion molding, rubber synthesizing units.



DAY 10 25.05.2024

Under the supervision of Dr. D. Sivasankaran, the interns synthesized chalcone, 4-Nitrochalcone and 4-Chlorochalcone using the Claisen-Schmidt condensation reaction.



Crude chalcone



Recrystallized chalcone



DAY 11 27.05.2024

Dr. M. Vajjiravel discussed about organic photovoltaics. Followed by the synthesis of eco-friendly synthesizs of PAN (Poly Acrylonitrile) and PMMA (Poly Methyl Methacrylate) under the guidance of Ms. Suchithra S. It was a heterogeneous solution phase green synthesis using sonicator.



DAY 12 28.05.2024

Dr. J. Herbert Mabel discussed about the principle of FTIR. Sample prepared by pelleting technique, analyzed the sample and interpreted the IR peaks.



Afternoon, Ms. Pavithra, research scholar from the Physics Department helped the interns to synthesise TiO_2 using neem leaf extract (green synthesis).



DAY 13 29.05.2024

Dr. N. Hajara Beevi discussed about the synthesis of nanomaterial using green method by plant extract or microorganism.



Then visited the Department of Pharmacy. With a brief introduction by Dr. M. Vijaya Vara Prasad, Dean, followed by a full visit to all the pharmacy labs coordinated by Dr. U. Ubaidulla.



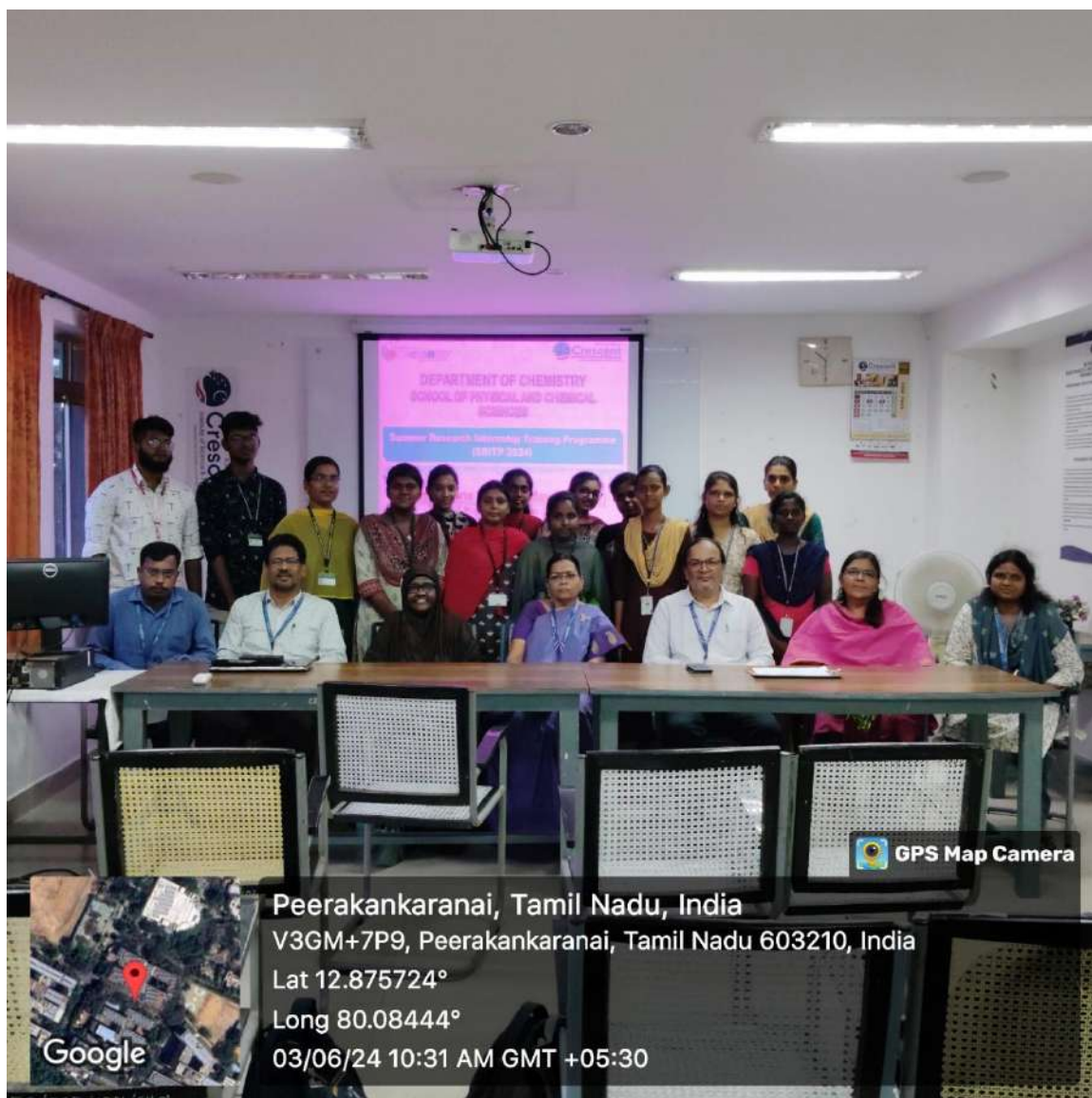


Afternoon, interns visited Spincotech R&D Centre in SIDCO, Alathur, Thiruporur. After a warm welcome, we visited from the synthesis lab to analytical labs as well as the instruments such as HPLC, NMR, lyophilizer.



DAY 14 03.06.2024

The Summer Research Internship Training Programme (SRITP 2024) Series 2 (03.06.2024 – 18.06.2024) started with the inauguration and felicitated by Dr. S. Kutti Rani, Professor of Chemistry and Director PG Admissions and Dr. I. Raja Mohamed, Professor of Physics and Dean, SPCS.



After the inauguration, the interns visited Crescent Innovation and Incubation Council (CIIC), where the incubation and startup facilities were exhibited by the CIIC members.

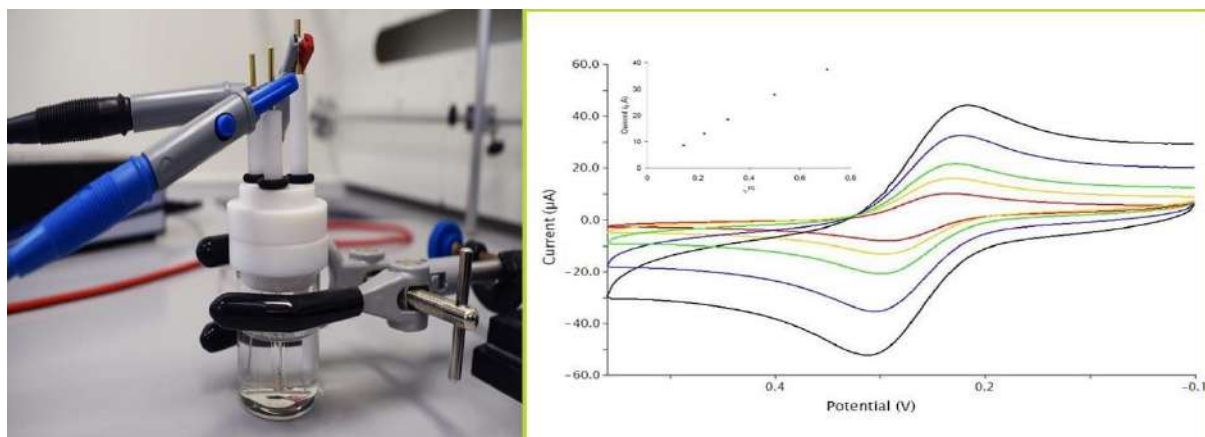


Afternoon, along with the Series 1 interns, visited the Life Science laboratories. Department. Dr. Mohd Shahanbaj Khan, Dr. S.M. Fazeela Mahaboob Begum and Dr. Naseer Hussain showed all the facilities and explained all the major and minor equipments thoroughly.



DAY 15 04.06.2024

Mr. Varadharajan, research scholar, explained about Cyclic Voltammetry (CV) and its application. Then a demo was done with K_4FeCN_6 solution.



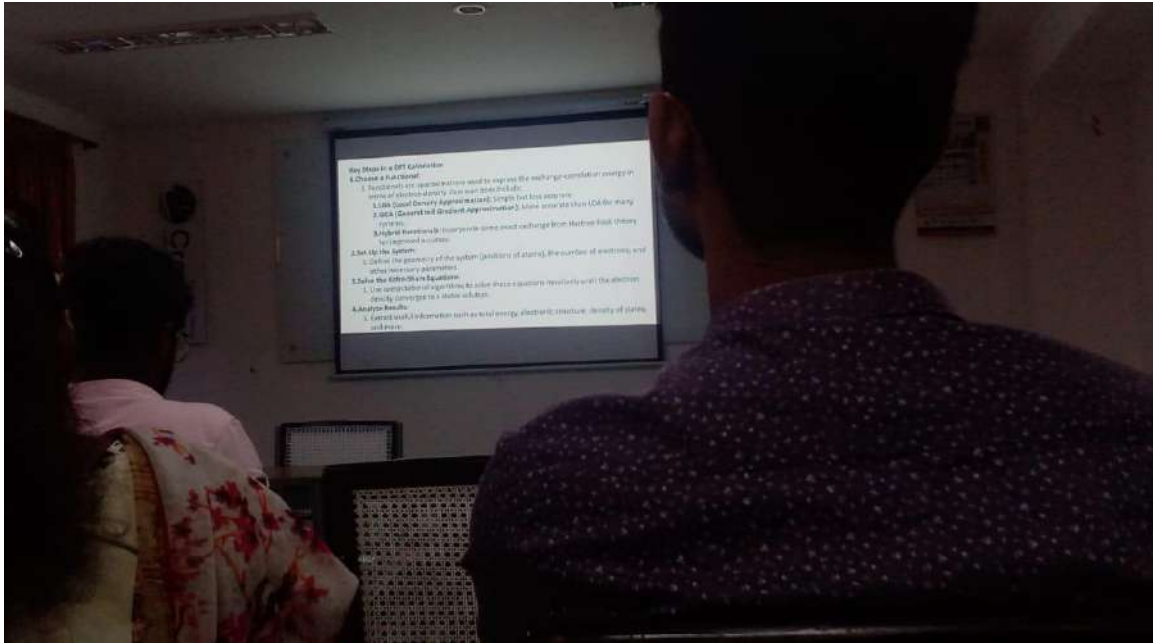
Afternoon, Cu nanoparticle was prepared by electroplating method and Zn NP by reduction method under the guidance of Dr. N. Vasimalai.

DAY 16 05.06.2024

Dr. G.V. Vijayaraghavan delivered a detailed lecture on the introduction of crystallography and Bravais lattice and the seven crystal system.



Followed by a lecture on Density Functional Theory (DFT) by Dr. M. Mohamed Sheik Sirajuddeen. He briefed the Hohenberg–Kohn theorem and Kohn-sham theory and their applications of DFT.



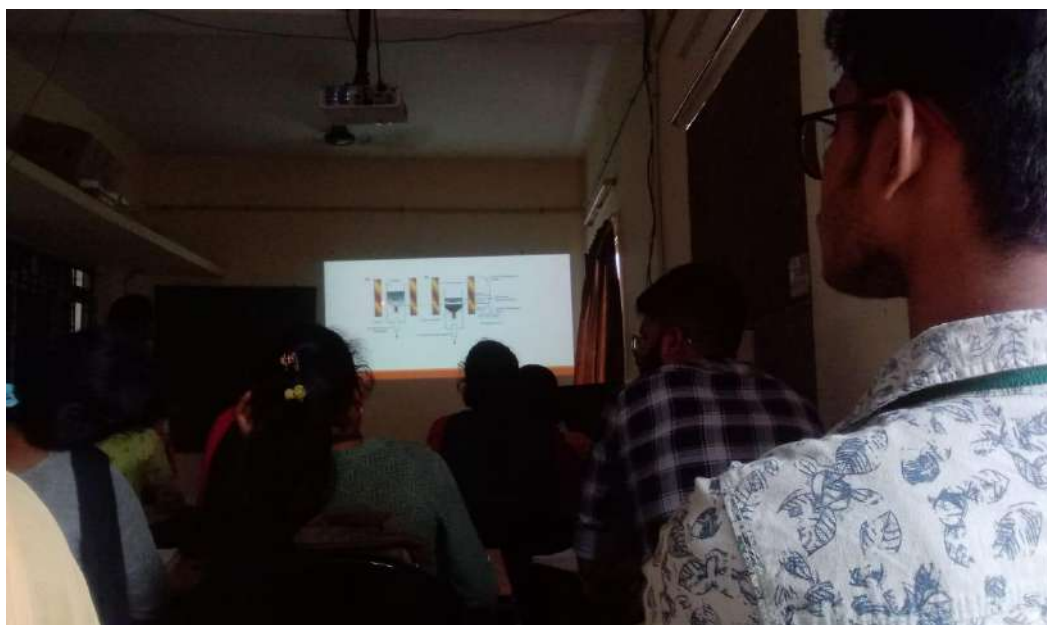
During the afternoon session, interns visited the sewage treatment and biogas plants inside the hostel campus.



DAY 17 06.06.2024

Dr. A. Shajahan handled a hands-on training on kinetic study using UV spectrophotometer. He demonstrated with a sample.

During the afternoon session, a lecture on crystal growth techniques was discussed by Dr. M. Lakshmipriya.



DAY 18 07.06.2024

Dr. N. Hajarabeevi had a discussion on green approach to synthesise nanomaterials from plant extract (phytonanotechnology) and synthesized TiO_2 from fresh plant extracts.



Afternoon, interns visited the polymer processing lab. Mr. John explained and demonstrated the moulding processes and how rubber is made from raw ingredients in real time.

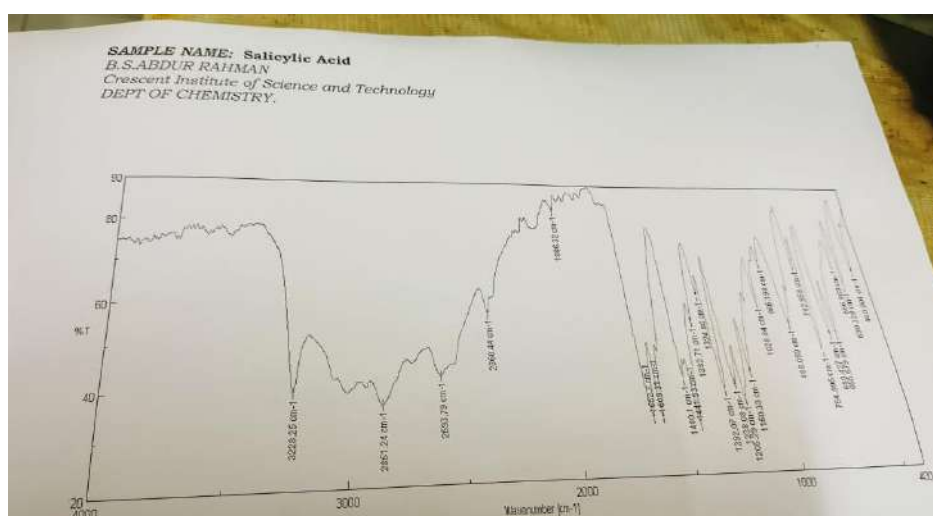


DAY 19 08.06.2024

Mendeley, referencing manager tool session was conducted by Dr. J. Herbert Mabel. Using Mendeley, how to organize the references was demonstrated with a sample document.



Afternoon, Dr. J. Herbert Mable discussed about the principle of FTIR, pelleting technique and analysis and interpretation.



DAY 20 10.06.2024

During the morning session, Dr. S. Kutti Rani discussed about corrosion inhibitors and its application.

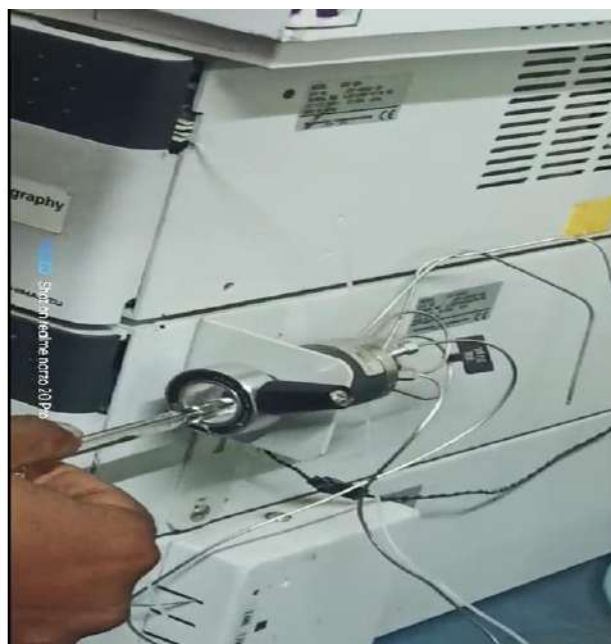
Then Dr. D. Sivasankaran discussed the practical aspects of Halcon reaction and the characterization of the reaction products using TLC.



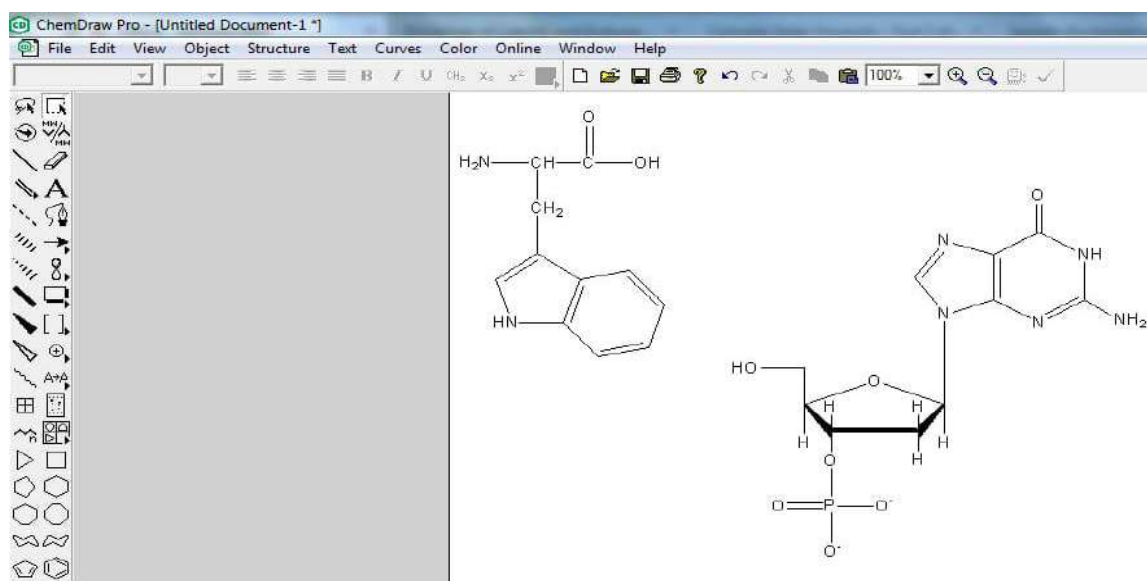
Afternoon, Mr. Basheer Ali discussed about the dye degradation (Methylene blue) by Photocatalysis and demonstrated the same.

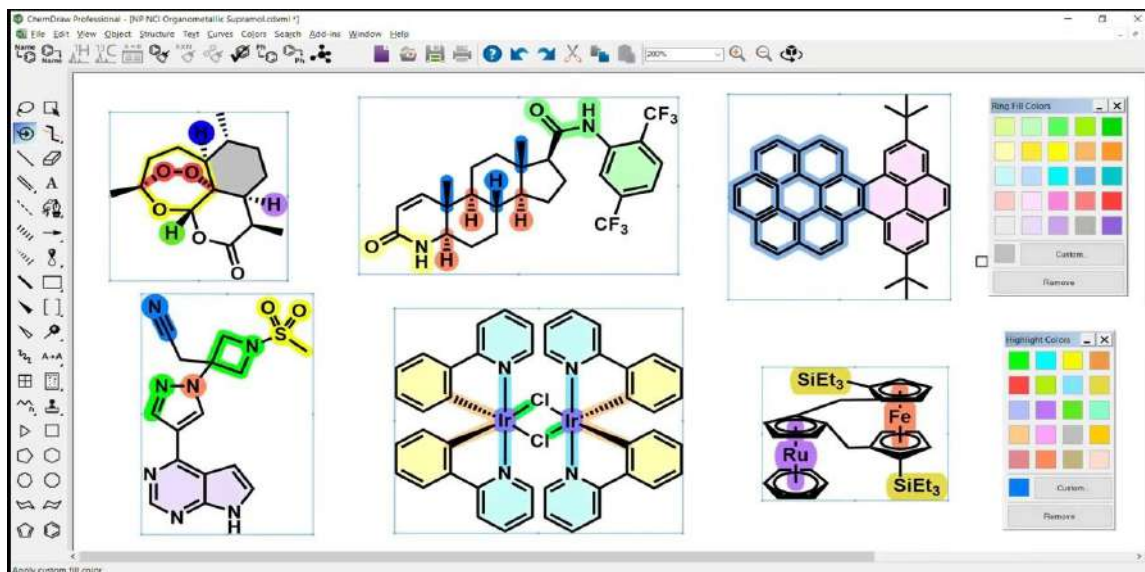
DAY 21 11.06.2024

Dr. S. Bhagavathy discussed High Performance Liquid Chromatography, an analytical method for separating, identifying, or quantifying each component in a mixture and the same was demonstrated.



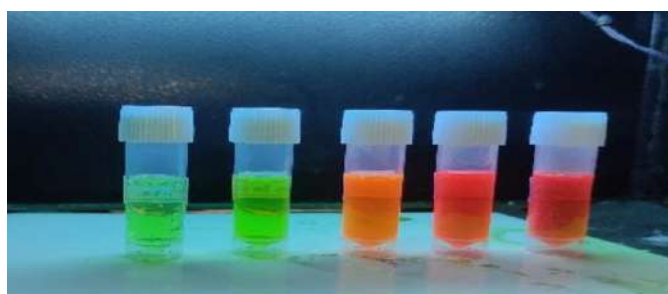
In the afternoon, ChemDraw software demonstrated by Dr. D. Sivasankaran. Sample examples are given to train chemdraw.





DAY 22 12.06.2024

Dr. M. Asha Jhonsi gave a short overview of nanomaterials and their synthesis types and fluorescent quantum dots (QDs). CdTe QDs were prepared and analysed.



Dr. S. Aravindhan demonstrated column chromatography and thin-layer chromatography (TLC) to purify and analyse chemicals.



DAY 23 13.06.2024

Dr. M. Vajjiravel's session was started with basics of polymers and its types. He demonstrated solution polymerisation for the synthesis.

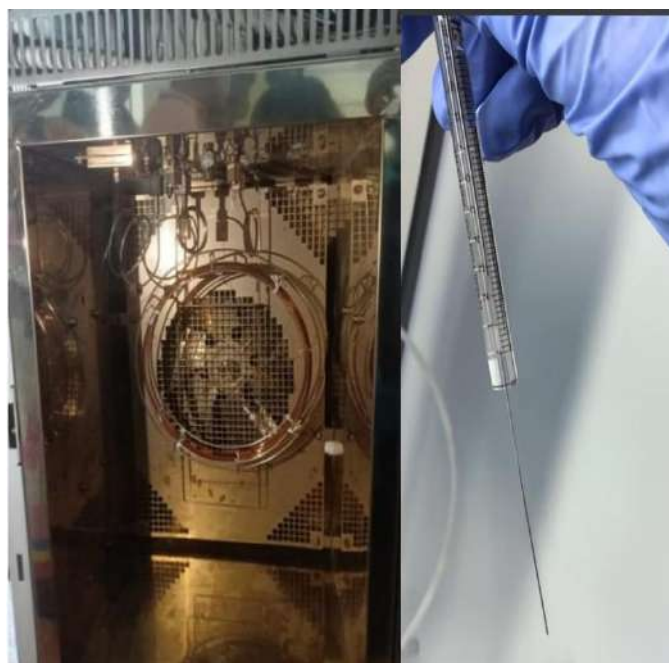


Purge processing



Synthesis setup

In the afternoon session, Dr. Swapan Kumar Das discussed about Gas chromatography (GC). He demonstrated GC with a sample.

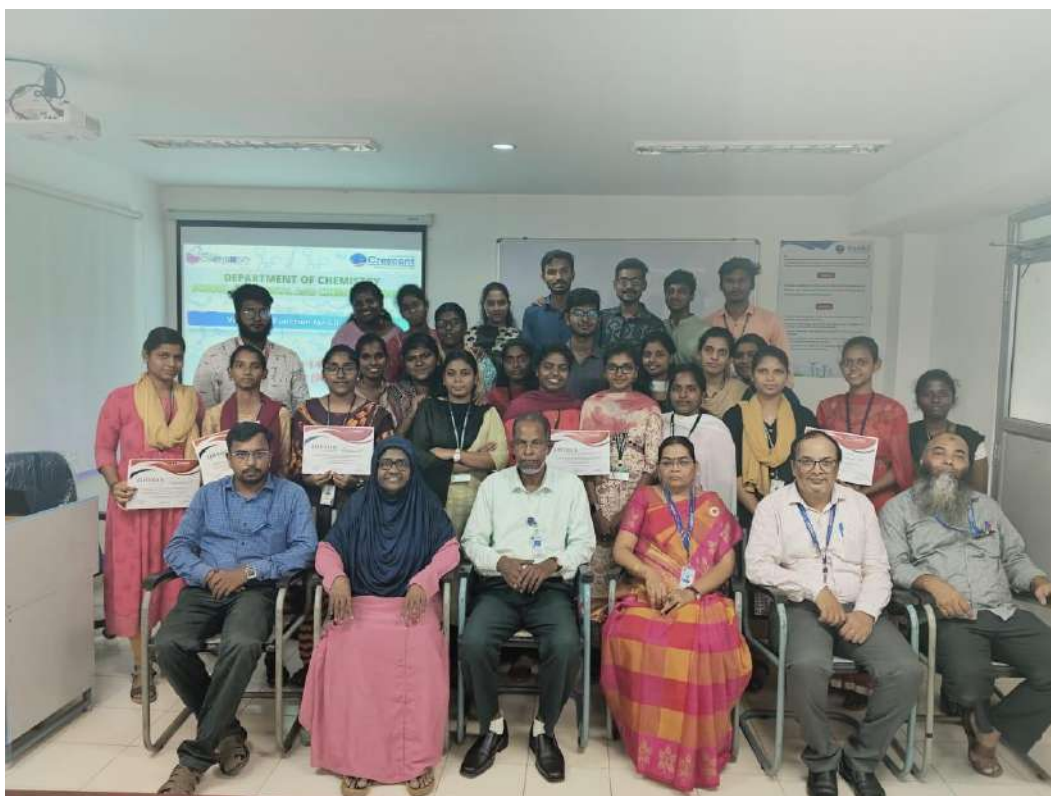


DAY 24 14.06.2024

Dr. Noor Aman gave an introduction on catalysts. He also discussed the synthesis of catalysts through hydro, solvothermal and sol-gel techniques. Then the interns prepared MOF MIL-53 Fe using a solvothermal procedure.



Afternoon, Valedictory was conducted and the certificates were also distributed to the interns.



DAY 25 15.06.2024

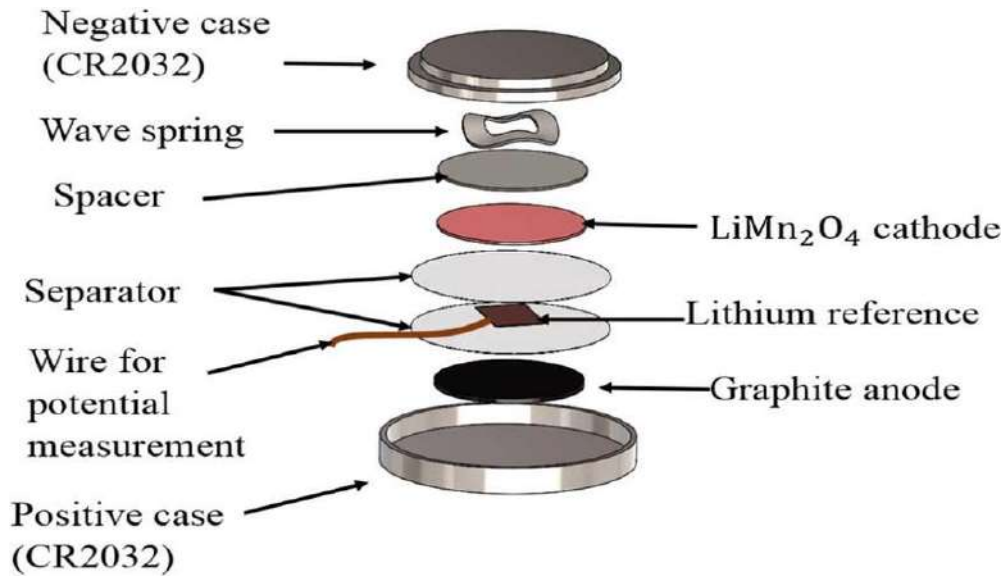
Industrial visit to Sai Mirra Innopharm Private Ltd., Sidco Industrial Estate, Ambattur, Chennai. It was a leading pharmaceutical industry known for its innovative drug development and manufacturing processes.



The team explained the importance of clinical trials and regulatory approvals, highlighting the rigorous testing and evaluation processes that ensure the safety and efficacy of new medications. Also visited the manufacturing units and the quality control and assurance labs and packaging and distribution areas.

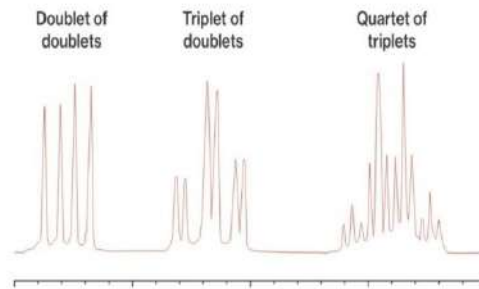
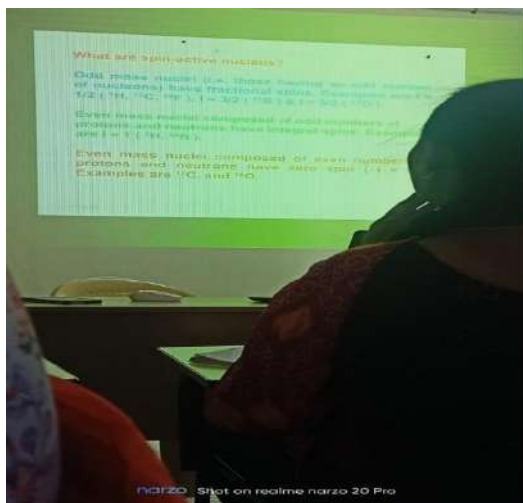


Afternoon, Dr. Sivagami demonstrated the fabrication of coin cells.

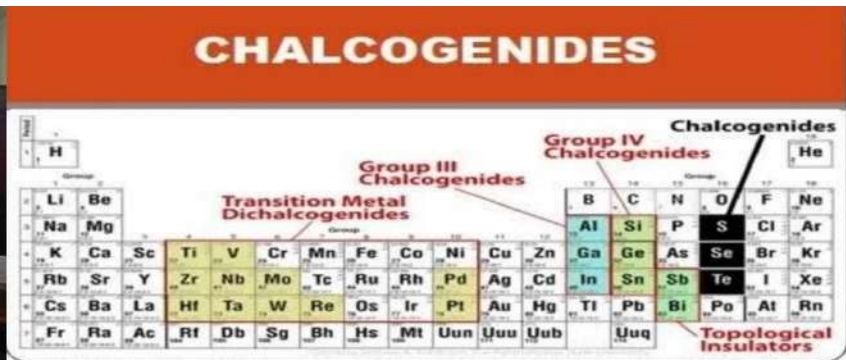


DAY 26 17.06.2024

Dr. K. Karthikeyan delivered in a detailed lecture on ¹H and ¹³C NMR.



Afternoon, Dr. Tuhin Subhra Dash introduced about the Chalcogenides, types and applications.



DAY 27 18.06.2024

Report Submission and Farewell

Students submitted the softcopy of their reports and had a gettogether in the B.Tech. lab.

