

काशी हिन्दू  
विश्वविद्यालय



BANARAS HINDU  
UNIVERSITY



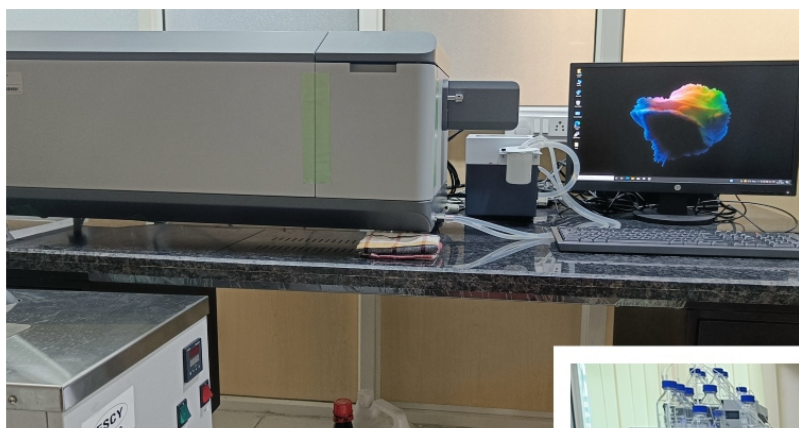
AMITY  
UNIVERSITY

## ADVANCED TRAINING ON TECHNIQUES OF ADVANCED IMAGING AND MASS SPECTROSCOPY

Organized by: \_\_\_\_\_

**Banaras Hindu University, Varanasi**

1<sup>st</sup> June – 7<sup>th</sup> June 2022 | **REGISTER:** <https://bit.ly/3vnhWti>  
(Last date for Registration: 20<sup>th</sup> May, 2022)



SPONSORED By



सत्यमेव जयते

विज्ञान एवं प्रौद्योगिकी विभाग

**DEPARTMENT OF  
SCIENCE & TECHNOLOGY**

Under

**SYNERGISTIC TRAINING PROGRAM UTILIZING THE SCIENTIFIC AND TECHNOLOGICAL INFRASTRUCTURE (STUTI)**

Registration QR | For More Information



+91 9289394650



[dststuti@amity.edu](mailto:dststuti@amity.edu)

# PATRONS



**Prof. Sudhir K Jain**  
Vice Chancellor,  
Banaras Hindu University



**Dr. W. Selvamurthy**  
D.Sc., FAMS, FABMS, FIMSA, FIANS, FIAY  
President, Amity Science, Technology & Innovation  
Foundation (ASTIF)  
Director General, Amity Directorate of Science &  
Innovation  
Chancellor, Amity University Chhattisgarh, and Chair  
Professor for Life Sciences



**Prof. Dr. Rakesh Bhatnagar**  
President / Vice Chancellor of  
Amity University, Rajasthan



## ADVISORY TEAM



**Prof. Vijay Kumar Shukla**  
FCWCS, FNAMS,  
Rector,  
Former Director,  
Institute of Medical Science,  
Banaras Hindu University



**Prof. Anil Kumar Tripathi**  
FNA, FASc, FNASc, FNAAS,  
JC Bose National Fellow,  
Director, Institute of Science,  
Banaras Hindu University



**Prof. (Dr.) Bhudev C. Das**  
FNASc, FASc, FAMS, FNA &  
Formerly J.C. Bose National  
Fellow  
Chairman & H. G. Khorana  
Chair Professor  
Amity Institute of Molecular  
Medicine & Stem Cell Research  
(AIMMSCR)  
DEAN, Health & Allied Sciences  
Vice President, Amity Science,  
Technology & Innovation  
Foundation (ASTIF)



**Prof. Madhoolika Agrawal**  
FNA, FNASc, FNAAS,  
JC Bose National Fellow,  
Dean, Institute of Science,  
Banaras Hindu University



**Prof. Maya Shankar Singh**  
FNA, FASc, FNASc,  
JC Bose National Fellow,  
CNR Rao Rotating Chair  
Professor,  
Coordinator, Central Discovery  
Centre,  
Banaras Hindu University

## ORGANIZING COMMITTEE



**Prof. J K Roy**  
Department of Zoology,  
Institute of Science,  
Banaras Hindu University



**Prof. Debabrata Dash**  
Department of Biochemistry,  
Institute of Medical Sciences,  
Banaras Hindu University



**Prof. Sunit Kumar Singh**  
Department of Molecular  
Biology,  
Banaras Hindu University



**Prof. Arvind M Kayastha**  
Department of Biotechnology,  
Institute of Science,  
Banaras Hindu University



**Prof. Abhijit Mandal**  
Associate Professor  
Department of Radiotherapy and  
Radiation Medicine,  
Institute of Medical Sciences,  
Banaras Hindu University



**Dr. Ankush Gupta**  
Assistant Professor  
Department of Biochemistry,  
Institute of Science,  
Banaras Hindu University



**Mr. Saikat Sen**  
Chief Operating Officer,  
SATHI-BHU,  
Central Discovery Centre,  
Banaras Hindu University



# SATHI-BHU STUTI TEAM



**Dr. Pubali Adikary**  
Principal Project Associate,  
SATHI-BHU,  
Central Discovery Centre,  
Banaras Hindu University



**Dr. Vivek Kumar Pandey**  
Principal Project Associate,  
SATHI-BHU,  
Central Discovery Centre,  
Banaras Hindu University



**Mr. Adarsh Kumar Pandey**  
Senior Project Associate,  
SATHI-BHU,  
Central Discovery Centre,  
Banaras Hindu University



**Dr. Vivek Kumar Maurya**  
Senior Project Associate,  
SATHI-BHU,  
Central Discovery Centre,  
Banaras Hindu University



**Dr. Ajay Kumar Sahi**  
Senior Project Associate,  
SATHI-BHU,  
Central Discovery Centre,  
Banaras Hindu University

## STUTI COORDINATORS



**Brig. R K Sharma**  
Director  
Amity Institute of Training & Development



**Shafali Kashyap**  
Assistant Director - Amity Foundation for  
Science Technology and Innovation Alliances  
Research Associate

## AMITY PMU - PROJECT MANAGEMENT TEAM



**Avinash Chauhan**  
Research Associate



**Harjinder Kaur**  
Project Assistant



**Digvijay Upraity**  
Project Staff



# ORGANIZERS

## BANARAS HINDU UNIVERSITY (BHU) – Partner Institution

**Banaras Hindu University (BHU)**, formerly Central Hindu College, is a central and research University located in Varanasi, Uttar Pradesh. It was established in 1916 jointly by Pandit Madan Mohan Malaviya, the Maharaja of Darbhanga Rameshwar Singh, Maharaja of Banaras Prabhu Narayan Singh, Sunder Lal and British Theosophist and Home Rule League founder Annie Besant. With over 30,000 students residing on campus, it is one of the largest residential University in Asia. The University is one of the ten public universities declared as an Institute of Eminence.

BHU is organized into six institutes, 14 faculties (streams) and about 140 departments many centers of advanced studies, 05 interdisciplinary schools with a vast knowledge base. As of 2020, the total student enrolment at the University is 30,698 coming from 48 countries. It has over 65 hostels for resident students. Several of its faculties and institutes include Arts, Social Sciences, Commerce, Management Studies, Science, Performing Arts, Law, Agricultural Science, Medical Science, and Environment and Sustainable Development along with departments of Linguistics, Journalism & Mass Communication, among others. The University's engineering institute was designated as an Indian Institute of Technology in June 2012, and henceforth is Indian Institute of Technology (BHU).

**Sophisticated Analytical and Technical Help Institute (SATHI-BHU)** is a professionally managed facility Which provides quantum leap to its innovative and translational research outputs and to cater the needs of Indian industry by providing globally acceptable analytical services related to drug discovery, and testing of food, nutraceuticals, drugs, biologicals and materials under GLP certification and NABL accreditation. It is the major node of an interdependent ecosystem in the state-of-the-art Central Discovery Centre (CDC) (a six floor building) to nurture innovation, entrepreneurship and start-ups under one roof. This centre provide centralized facilities, guidance and hand-holding support for promoting innovation at BHU, and to motivate and train researchers of other institutions of the region to make use of the facilities of the Centre. This initiative brings an opportunity to the researchers and science based entrepreneurs of the region to team together to develop and deploy new technologies, and to provide high quality analytical services for which Indian industry depends on institutions abroad. The revenue generated through quality services will be used for running the facilities in a self-sustaining manner.

SATHI-BHU organize awareness and training programs to sensitize the potential users of the facility and will encourage them to use the facility. It also connects potential users with BHU experts related to each equipment. It will also initiate a degree and diploma course on instrumentation to develop skilled manpower for the operation of high-end equipments in the country.





## **AMITY UNIVERSITY - Project Management Unit**

### **Research and Innovation-Driven University**

Amity University Uttar Pradesh (AUUP) has been awarded the STUTI program as a Project Management Unit (PMU) by the Department of Science & Technology (DST) to conduct 07 days of residential hands-on training on the state-of-the-art equipment, fully sponsored by DST.

Amity Education Group is India's largest education group having 10 Indian Universities and 14 International Campuses with a strong focus on research & innovation in the diverse areas of Science & Technology. Amity University aims to become the ideal platform for scientists, researchers, and academicians to transform their ideas into success and develop their potential. Bringing together this vast community of scholars for cutting-edge research, Amity University is committed to impacting the development and global image of India in research and innovation.

Amity education group has more than 6000 strong distinguished faculty members trained in reputed National & International research Institutes. We have more than 40 brilliant Scientists from diverse places across the globe who have received various prestigious fellowships like DBT/India Alliance Wellcome Trust Early Career Fellowship, DBT Ramalingaswami Fellowship, SERB-Ramanujan Fellowship, DST-Inspire Faculty Fellowship to name a few. These highly qualified Bright Brains are mentoring more than 100 blooming brains who are pursuing their Ph.D. with prestigious fellowships.

Amity research ecosystem includes world-class research infrastructures with high computing facilities and Scanning Electron Microscope, FT-IR, High-Performance Liquid Chromatograph, Gas Chromatograph, Fermenter, etc. funded by various national and international grants. Centres of Excellence have been established in niche areas of Science & Technology. In addition, more than 12 research clusters in areas of great national and international importance are effectively functioning to act as a force multiplier in the Amity Group.

---

## **DST – STUTI Scheme**

The Scheme 'Synergistic Training program Utilizing the Scientific and Technological Infrastructure' (STUTI) is intended to build human resource and knowledge capacity through open access to S&T Infrastructure across the country. As a complement to the various schemes of DST funding for expansion of R&D Infrastructure at academic institutions, the STUTI scheme envisions a hands-on training program and sensitization of the state-of-the-art equipment as well as towards sharing, while ensuring transparent access to S&T facilities.



## HIGHLIGHTS OF THE PROGRAMME

The aim of this 7-day training is to equip participants with the basic knowledge and skills required to function in microscopy, photoacoustic, ultrasound imaging, high-resolution accurate mass spectrometry (HRAMS), proteomics and metabolomics and its applications in research.

The participants will experience hands-on training on handling of the high-resolution mass spectrometer, instrument understanding related to (mass spectrometer) calibration process, sample preparation for metabolomics and mass spectrometer database search using compound discoverer 3.2 and data analysis.

Circular dichroism (CD) spectrophotometry and its applications in biological samples to understand the protein folding, its structure and the structure comparison of a protein obtained from different sources.

Microscopy and its applications in biological samples imaging, advanced light microscopy, image processing, quantitative analysis and panel preparation of Confocal and Super Resolution microscopy.

Photoacoustic and ultrasound imaging platform system and its application on animal models and in the field of biological and medical sciences. hands-on training on tumor detection and imaging using photoacoustic and ultrasound imaging system, Image processing and quantitative analysis of the data acquired from photoacoustic and ultrasound imaging system.

During this training program, attendees will have the opportunity to visit Banaras Hindu University (BHU) which harbour most advanced and sophisticated state-of-the-art instruments. Additionally, the attendees will have an opportunity to closely interact with eminent scientists from this field.

This workshop will provide an overview of hrams / cd / photoacoustic and ultrasound imaging platform / confocal microscope / laser scanning super resolution microscope system and its applications.



## OBJECTIVE OF PROGRAMME

To build human resource and its knowledge capacity through open access to S & T Infrastructure across the country through hands-on training programs by:

Enhancing awareness of use and application of state-of-the-art equipment's.

Sharing while ensuring transparent access of S&T facilities funded by DST

---

## WHO SHOULD ATTEND?

The training is organized to enhance the practical skills of Post Graduate Students, Research Scholars, Faculty Members from Universities/Colleges, Scientists, and Post-Doctoral Researchers who are working in multidisciplinary/ transdisciplinary and translational research in various organizations.

### ELIGIBILITY:

- a. Person of Indian origin
- b. Minimum qualification – Post Graduate (Science)
- c. Teaching faculty up to the level of Associate Professor/Scientist C / Post-Doctoral Fellows/Ph.D. Students with 3 years of experience/Industry persons who are actively involved in research and development
- d. **All the applicants are required to provide following essential details to [sathi-bhu@bhu.ac.in](mailto:sathi-bhu@bhu.ac.in);**
  - I. **A write up of 200 words about candidate's ongoing research program**
  - II. **How the proposed training (HRAMS/CD/Photoacoustic platform/Confocal Microscope) will enable the candidate in his ongoing or future research program**

---

## WHY SHOULD YOU ATTEND?

Discover state of the art R&D infrastructure and facilities funded by DST and held by various R&D institutions / Universities in the country.

- Gain hands-on experience of research through latest S&T equipment and facilities.
- Design experiments by selecting appropriate/ alternate equipment for the various experiments.
- Connect with the R&D Organisations / Universities / Private Sector facilities / Start-ups/ MSMEs involved in research & development.

## COST OF THE PROGRAM

This training is sponsored by DST STUTI program and registration is free.

For domestic travel of participants and faculty, the reimbursement **for A/C train ticket or Deluxe Bus (only for outstation candidates/faculty) will be provided.**

Depending upon the availability in the BHU, accommodation would be provided on single/double occupancy basis.

**Accommodation request should be made at least 10 days before the commencement of the training program.**

# ABOUT R&D INFRASTRUCTURE AT BANARAS HINDU UNIVERSITY

## High Resolution Accurate Mass Spectrometer System

### LEARNING OUTCOMES:

- To understand the basic handling of the High Resolution Accurate Mass spectrometer.
- To understand the instrument (Mass spectrometer) calibration process.
- To prepare the mass analyzer for sample analysis.
- To prepare the sample for metabolic analysis.
- Mass spectrometer database search using Compound discoverer 3.2 and data analysis.



## Photoacoustic and Ultrasound Imaging platform

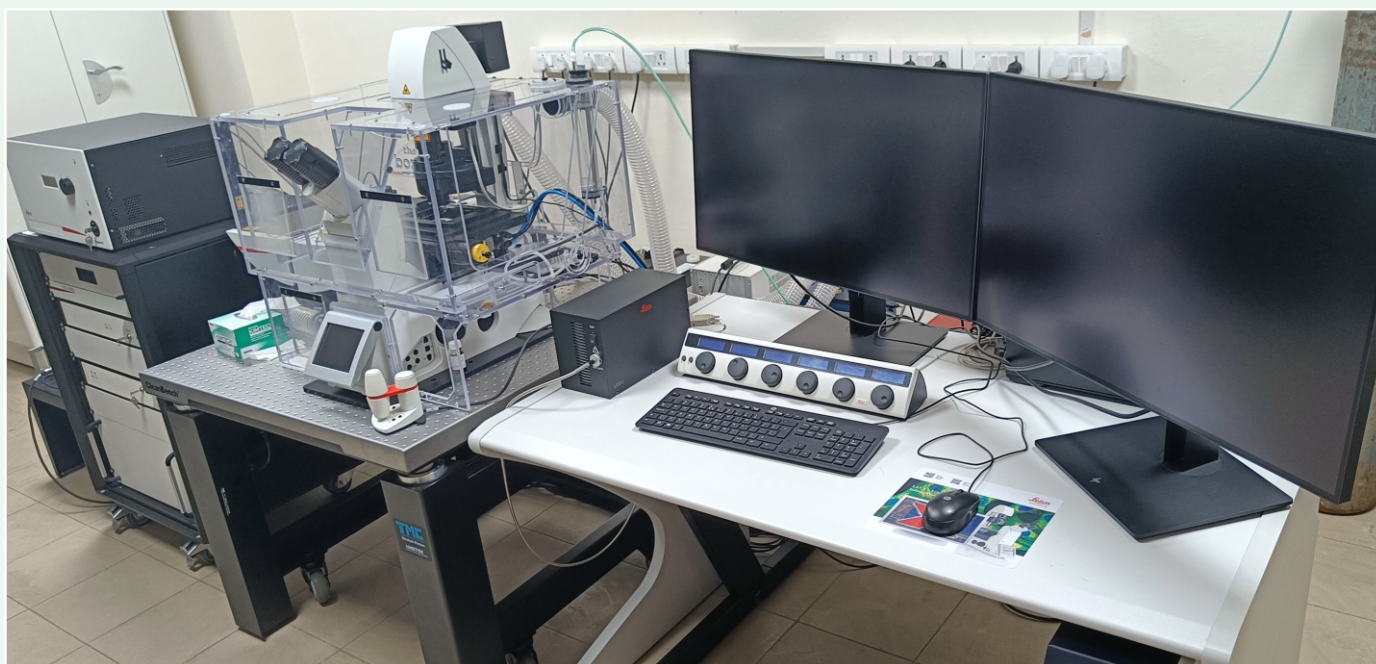
### LEARNING OUTCOMES:

- Understanding the basics of photoacoustic and ultrasound imaging platform system and its application on animal models and in the field of biological and medical sciences.
- Learning the operational procedure on tumor detection and imaging using photoacoustic and ultrasound imaging system.
- Learning the operational procedure of data processing and quantitative analysis of the data acquired from photoacoustic and ultrasound imaging system.





## Laser Scanning Super Resolution Microscope



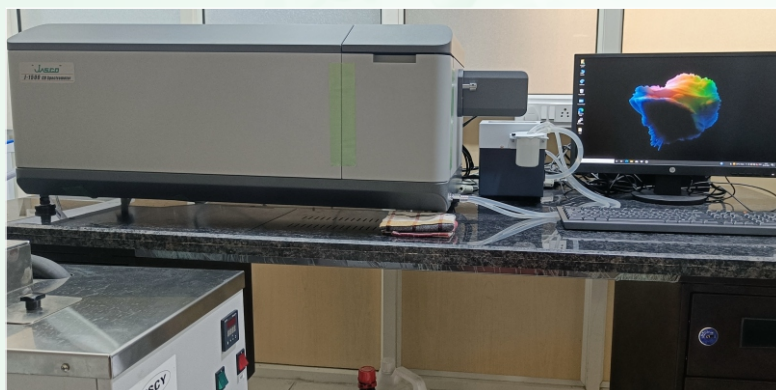
### LEARNING OUTCOMES:

- Understanding the basic concepts of Fluorescence / Confocal / Super-Resolution Microscopes.
- Learning the operational procedure to use Fluorescence / Confocal / Super-Resolution Microscopes.
- Learning the operational procedure of data processing and quantitative analysis of the data acquired from Fluorescence / Confocal / Super-Resolution Microscopes.

## Circular Dichroism Spectrophotometer

### LEARNING OUTCOMES:

- To know whether the protein is folded correctly or not and also characterization of its secondary, and tertiary structure
- Comparing the structure of a protein obtained from different sources
- To study the conformational stability of a protein under perturbation of environment caused by heat, pH, denaturants or stabilizer etc.,
- To study the effect of protein-protein or ligand-protein interaction
- CD is rapid and thus can be used to analyze a number of candidate proteins from which interesting candidates can be selected for more detailed structural analysis like NMR or X-ray crystallography





## REGISTRATION/APPLICATION

Participants are required to apply for the training program online at <https://bit.ly/3vnhWti> or scan the QR code provided at the end. The application deadline is **May 20, 2022**

---

## SELECTION OF THE PARTICIPANTS

The applications will be scrutinized by the STUTI training program selection committee and the decision of the committee will be final. Selected candidates will be informed through e-mail. The seats in the training program are limited.

## TRAINING PROGRAM SCHEDULE

Day I 01 -06-2022		
10:30 AM	11:30 AM	Registration and inauguration
11:30 AM	11:45 AM	Tea Break
11:45 AM	12:45 PM	High Resolution Accurate Mass Spectrometry System: Principles, types, and applications
12:45 PM	1:45 PM	Laser Scanning Super Resolution Microscope System: Principles, types, and applications
1:45 PM	2:15 PM	Lunch
2:15 PM	3:30 PM	Hands on High Resolution Accurate Mass Spectrometry System Group 1
2:15 PM	3:30 PM	Hands on Laser Scanning Super Resolution Microscope System Group 2
3:30 PM	3:45 PM	Tea Break
3:45 PM	5:15 PM	Hands on High Resolution Accurate Mass Spectrometry System Group 2
3:45 PM	5:15 PM	Hands on Laser Scanning Super Resolution Microscope System Group 1



## TRAINING PROGRAM SCHEDULE

### Day II 02 -06-2022

10:30 AM	12:00 PM	High Resolution Accurate Mass Spectrometry System : Applications
12:00 PM	12:15 PM	Tea Break
12:15 PM	1:45 PM	Laser Scanning Super Resolution Microscope System: Applications
1:45 PM	2:15 PM	Lunch
2:15 PM	3:30 PM	Hands on High Resolution Accurate Mass Spectrometry System Group 1
2:15 PM	3:30 PM	Hands on Laser Scanning Super Resolution Microscope System Group 2
3:30 PM	3:45 PM	Tea Break
3:45 PM	5:15 PM	Hands on High Resolution Accurate Mass Spectrometry System Group 2
3:45 PM	5:15 PM	Hands on Laser Scanning Super Resolution Microscope System Group 1

### Day III 03 -06-2022

10:30 AM	12:00 PM	Photoacoustic Imaging Platform: Principles, types, and applications
12:00 PM	12:15 PM	Tea Break
12:15 PM	1:45 PM	Hands on Photoacoustic Imaging Platform Group 1
12:15 PM	1:45 PM	Hands on Training Group 2 & 3
1:45 PM	2:15 PM	Lunch
2:15 PM	3:30 PM	Hands on Photoacoustic Imaging Platform Group 2
2:15 PM	3:30 PM	Hands on Training Group 1 & 3
3:30 PM	3:45 PM	Tea Break
3:45 PM	5:15 PM	Hands on Training Group 1 & 2
3:45 PM	5:15 PM	Hands on Photoacoustic Imaging Platform Group 3

### Day IV 04 -06-2022

10:30 AM	12:00 PM	Photoacoustic Imaging Platform: Applications -II
12:00 PM	12:15 PM	Tea Break
12:15 PM	1:45 PM	Hands on Photoacoustic Imaging Platform Group 1
12:15 PM	1:45 PM	Hands on Training Group 2 & 3
1:45 PM	2:15 PM	Lunch
2:15 PM	3:30 PM	Hands on Photoacoustic Imaging Platform Group 2
2:15 PM	3:30 PM	Hands on Training Group 1 & 3
3:30 PM	3:45 PM	Tea Break
3:45 PM	5:15 PM	Hands on Photoacoustic Imaging Platform Group 3
3:45 PM	5:15 PM	Hands on Training Group 1 & 2

### Day V 05 -06-2022

10:30 AM	12:00 PM	Circular Dichroism Spectrophotometer: Principles, types, and applications
12:00 PM	12:15 PM	Tea Break
12:15 PM	1:45 PM	Hands on Circular Dichroism Spectrophotometer Group 1
12:15 PM	1:45 PM	Hands on Training Group 2 & 3
1:45 PM	2:15 PM	Lunch
2:15 PM	3:30 PM	Hands on Circular Dichroism Spectrophotometer Group 2
2:15 PM	3:30 PM	Hands on Training Group 1 & 3
3:30 PM	3:45 PM	Tea Break
3:45 PM	5:15 PM	Hands on Circular Dichroism Spectrophotometer Group 3
3:45 PM	5:15 PM	Hands on Training Group 1 & 2



## TRAINING PROGRAM SCHEDULE

### Day VI 06 -06-2022

10:30 AM	12:00 PM	Circular Dichroism Spectrophotometer: Applications
12:00 PM	12:15 PM	Tea Break
12:15 PM	1:45 PM	Hands on Circular Dichroism Spectrophotometer Group 1
12:15 PM	1:45 PM	Hands on Training Group 2 & 3
1:45 PM	2:15 PM	Lunch
2:15 PM	3:30 PM	Hands on Training Group 1 & 3
2:15 PM	3:30 PM	Hands on Circular Dichroism Spectrophotometer Group 2
3:30 PM	3:45 PM	Tea Break
3:45 PM	5:15 PM	Hands on Training Group 1 & 2
3:45 PM	5:15 PM	Hands on Circular Dichroism Spectrophotometer Group 3

### Day VII 07 -06-2022

10:30 AM	1:45 PM	Field Visit
1:45 PM	2:15 AM	Lunch
2:15 PM	3:00 PM	Field Visit
3:15 PM	3:30 PM	Tea Break
3:30 PM	5:15 PM	Valedictory session





**AMITY**  
UNIVERSITY

काशी हिन्दू  
विश्वविद्यालय



BANARAS HINDU  
UNIVERSITY

**For More details about the R&D facility at  
BHU (Details of the person assign from BHU  
for coordination.)**

**Name :** *Mr. Shailendra Kumar*

**Contact Number :** 9838005212

**Email :** *shailendrak@bhu.ac.in*

---

**For More details and Queries about the Programme**

**Contact Number :** +919289394650

**Email :** *dststuti@amity.edu*

**Registration  
QR**



**For More  
Information**

