100 DAYS SKILL FESTIVAL @ 70 DAYS

100 DAYS OF SKILL DEVELOPMENT
CIIDRET
100 YEARS OF UNIVERSITY OF DELHI
YEARS 1922-2022

9 WORKSHOPS
300 PARTICIPANTS FROM 90 INSTITUTIONS/COURSES
45 RESOURCE PERSONS FROM ACADEMIA & INDUSTRY

Conceptualised by
Professor Amita Gupta and Professor Vijay Chaudhary
Organised by
Centre for Innovation in Infectious Diseases, Research, Education and Training (CIIDRET)
&
Institution of Eminence-Delhi School of Skill Enhancement & Entrepreneurship Development (IoE-DSSEED), University of Delhi

YEARS 1922-2022
G20 भारत 2023 INDIA वसुधैव कुटुम्बकम् ONE EARTH • ONE FAMILY • ONE FUTURE
आज़ादी का अमृत महोत्सव
CIIDRET साक्षरता, सक्षमता, आत्मनिर्भरता
दिल्ली विश्वविद्यालय University of Delhi INSTITUTION OF EMINENCE प्रतिष्ठित संस्थान

With the blessings of Maa Saraswati

and the patronage of

Prof. Shri Prakash Singh
Director South Campus
University of Delhi

Prof. Yogesh Singh
Hon'ble Vice Chancellor
University of Delhi

Prof. Balaram Pani
Dean of Colleges
University of Delhi

Supported by

DBT-Genomic Facility at UDSC; DBT-CoE on Antibody Technology
BIRAC-Therapeutic antibodies for COVID-19

Contact

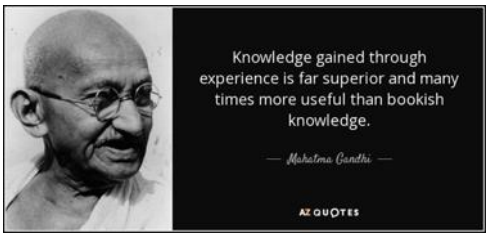
Centre for Innovation in Infectious Disease Research, Education, and Training
University of Delhi South Campus, Benito Juarez Marg, New Delhi 110021
E ciidret@south.du.ac.in **T** 011-2411-7542 **W** http://ciidret.du.ac.in
Prof. Amita Gupta - **E** amitagupta@south.du.ac.in, **T** 91-9811509609 (Director-CIIDRET)

Delhi School for Skill Enhancement & Entrepreneurship Development (DSSEED)
University of Delhi, Delhi 110007. **W** https://www.ioe.du.ac.in
Prof. V. K. Chaudhary - **E** vkchaudhary@south.du.ac.in **T** 91-9811800434 [Director (Hon.)-DSSEED]

PREAMBLE

Skilling, Upskilling, Reskilling Innovation, and Entrepreneurship are the Buzzwords today. It is important that anyone desirous of learning skill should be provided with the opportunity. There is also a constant discourse about India being great centuries ago and how India can become great **(Vishwa Guru)** again. It has to be appreciated that in those times people had skills, that were valued and promoted by the rulers. Moreover, there was the concept of gurukul and apprenticeship to learn and skill. At that time, we were Atmanirbhar (self-sufficient), and prosperous. However, in the centuries of guidance by outsiders, we forgot our inner strength and gave up our skills. **Skill sets are developed through a process of guided Observation, Training, and Practice.** Therefore, anyone who masters a specific skill set has to be valued in society as these are necessary for Research & Innovation. Such people are competent to earn a respectable livelihood and contribute to Nation Building.

In the last many decades, our education has become syllabus-based learning with the sole aim of teaching as well as learning being completion of the syllabus and good marks in examinations. The emphasis on practical training and developing Skill sets has taken a back-seat. Earlier, good score in qualifying examination were required for admission in reputed institutions. Now, for admissions, beyond the classroom teaching-learning, i.e. specialized coaching has become a necessity, where one spends huge sums of money to get skilled in solving questions quickly and accurately. But this coaching is expensive and unaffordable to many. Should we not question why such training should not be imparted during our classroom teaching and learning, where everyone has equal opportunity? A professional course can be defined as a system where a person is trained to acquire some specific skills needed to enter a profession. Be it a doctor, an engineer, a chartered accountant, or an advocate, they all go through the process of skilling and upskilling with practice (Internship) before they become useful. This also applies to farmers, carpenters, plumbers and electricians, and the skill can be improved with



knowledge of new tools and technologies. Most of these people improve their skills by practicing at work. Therefore, the same should apply to our higher education.

Skill Development/Enhancement and Innovation are an important constituent of the National Education Policy-2020 that has become applicable to Four-Year Undergraduate Program (FYUP) and will get implemented in the Post Graduate curriculum in due course. By implementing these important features in the course curriculum, the UG and PG students will gain additional skills/abilities for better job and research opportunities, be more capable of Innovation and Entrepreneurship to create their own Enterprises and become job givers, rather than be dependent on Government jobs. This system will result in Self-, Community- and Societal-Atmanirbharta, in turn making the nation Atmanirbhar, not only for its own needs but to help the World.

Our Hon'ble Prime Minister has stressed on the need for Skill Development to enable new technologies for **"Atmanirbhar Bharat"**. In line with this, since its inception in 2015 under Ordinance XV-A of the DU Act, the Centre for Innovation in Infectious Disease Research, Education and Training (CIIDRET) has practised **"Beyond Classroom Learning"** and has been conducting Skill Enhancement courses for undergraduate and postgraduate students, research scholars, scientists and college teachers on basic and advanced techniques required for carrying out life science research. Exposure to various tools and techniques through lectures by academic and industry experts, along with hands-on training and linked experiments is a feature of these training courses. In addition, the centre has been organizing lectures by entrepreneurs and innovation facilitators to encourage the young generation to take the path of innovation and entrepreneurship. CIIDRET activities are majorly focussed on Life Sciences and Biotechnology.

To expand this concept to all subjects, University of Delhi has established Delhi School of Skill Enhancement & Entrepreneurship Development (DSSEED) as part of the Institution of Eminence (IoE). DSSEED has a broader mandate to nurture young desirous students on the path of Innovation and Entrepreneurship by providing opportunities for skilling, upskilling and reskilling with an ecosystem for Incubating their ideas into processes, technologies and products, necessary for **"Atmanirbhar Bharat"**.

100 DAY SKILL FESTIVAL

A path towards "Developed India @ 100 (2047)"

The University of Delhi is celebrating its centenary year and to mark these 100 glorious years of education and empowerment and to contribute to these celebrations, CIIDRET and DSSEED have joined hands to organise a '100 days festival of Training and Skill Enhancement'. In this endeavour, many University colleges, Academies and Biopharma Industries have joined as partners.

This 100-day festival brings together students, teachers, academicians, industry and facilitators on one platform and provides an ecosystem that promotes learning, collaboration and networking. In the festival, hands-on training courses and Public Lectures spanning diverse areas in Biotechnology are being offered. The faculty for these courses include experienced teachers and renowned scientists from academia and industry. Customised courses on different topics and learning levels have been created for the skill development of students, research scholars, teachers and scientists.

During the 100 days festival, Hands-on workshops, Theoretical workshops/FDPs (online) on advanced technologies employed in Biotech Research, Process and Product development, and Public lectures by experts on different aspects of Agriculture/Food, Environment and human diseases and their mitigation are being organised. In addition, protection of new knowledge as Intellectual Property, will be taught through a course on Patents, copyright, trademark and technology transfer. There will be a virtual workshop of 2 weeks duration on Antibody Technologies: Learn to discover, produce and characterize antibodies for different applications with the Theme: "Science of Antibody molecules- Lab to market". It is expected that lectures on these topics would mimic classroom teaching for deep understanding by participants from academics and Industry.

100 DAY SKILL FESTIVAL

A report of activities and achievements

The 100 days skill festival started on 17 December 2022.

The **first hands-on workshop of the festival** on **"Basic Techniques in Microbiology" was held from 17th to 23rd December 2022 in association with Ram Lal Anand (RLA) College.** RLA College is a constituent college of University of Delhi and has a very strong teaching group in Microbiology ably led by the Principal of the college, Professor Rakesh Kumar Gupta.

This workshop was designed to provide extensive hands-on training in basic techniques used in Microbiology such as media preparation, isolation of microorganisms, handling and purification of microbial cultures, use of different kinds of media in a microbiology laboratory, various bacterial staining methods and differentiation of bacteria based on morphological and cultural characteristics. The registration for the workshop was opened for undergraduate and postgraduate students studying biological sciences/ botany/ zoology/ biochemistry/ biotechnology in University of Delhi and other Institutions. The workshop aimed at skilling the participants in handling and maintaining pure bacterial and fungal cultures for practical and research purposes. The interest in the training programme is reflected by the fact that RLA had to close the registration after taking 27 participants against the planned intake of 20. More applications are deferred for a repeat workshop planned for March 2023. The participants for this workshop were from different Life Science courses. Amazingly, two PhD scholars

from the Electronics Sciences department of the University working on Biosensors also joined to get Hands-on training on topics relevant to their research. This is a perfect example of the interdisciplinary training required by students, a key component of FYUP under NEP-2020, and a "Beyond Classroom" learning.

The workshop started with this diverse batch of participants. In the inaugural address, Prof. Rakesh Gupta enthusiastically acknowledged the motivation and strength received from CIIDRET and DSSEED that led their Microbiology department to conduct such a large Hands-on workshop. Prof. Amita Gupta, Director, CIIDRET, threw light on activities of CIIDRET and the conceptualisation of the Mega 100-days Skill festival. Thereafter, Prof. Vijay Chaudhary, Director, DSSEED (Hon.) described DSSEED plans to expand similar activities in other areas of Sciences (Biological, Chemical and Physical), Humanities and Social sciences. The inauguration was graced by Prof. R.C. Kuhad, Former Vice - Chancellor of Central University of Haryana. In his address, Prof. Kuhad stressed on the importance of Skill Enhancement in undergraduate programs and described how this concept was first introduced in the Choice Based Credit System (CBCS). The Skill Enhancement Courses (SEC), along with Internship and Dissertation has been incorporated as an important constituent of the Four-Year Undergraduate Program (FYUP) under the New Education Policy 2020 (NEP-2020). He voiced his appreciation for the concept and plan of activities under the "100-Day Skill Festival" and announced the support of two important National organizations, namely, Association of Microbiologists of India (AMI) and Academy of Microbiological Sciences (AMSc.) for the festival. He also announced that these organisations will publish a compendium of activities conducted under the "100-days Skill Festival".

The workshop was coordinated by Prof. Vandana Gupta from the Microbiology Department at RLA College. The activities included theoretical lectures as well as hands-on exercises on good laboratory practices, planning and responsible conduct of research, Biosafety levels, Sterilization, Principle, and working of instruments used in Microbiology laboratory (Autoclave, hot air oven, membrane filtration, incineration, Laminar flow, BSL 2 cabinet, incubators, microscope), Media preparation for bacterial and fungal growth, streak plate technique, spread plate technique, disk diffusion test for antibiotic sensitivity, staining methods, visualisation of microorganisms using simple and compound light microscopes, fluorescence microscopy, hanging drop method, observation of motile bacteria, and fungal specimens.

The participants found the sessions very engaging, useful and informative. Being from non-Microbiology background, they found the hands-on experiential learning thrilling. The Oral and written feedback was given by the participants on the last day of the workshop (Video recordings for their feedback were made). The participants were impressed with the number of state-of-the-art instruments available in the laboratory. They thanked the resource persons for discussions, guidance and encouragement to perform each and every experiment with their own hands.

The valedictory session was held on 23 December, 2022, and graced by Prof. S. K. Khare, Dean R&D, IIT Delhi and Prof. Rani Gupta, Former Head of the Department of Microbiology, Delhi University. In his address, Prof. Khare made reference to Skill Education in older times and expressed his pleasure that the participants from non-microbiology subjects learnt the basics of Microbiology. Prof. Rani Gupta was amazed at the concept of “100 days Skill Festival”, and said “Never heard of such Effort”! She especially liked the concept of calling it a Festival where everyone could learn with enjoyment and not as a burden. All in all, the workshop was an enriching experience for everyone.

The second workshop in the Festival, "Hands-on training workshop on techniques for manipulation of nucleic acids for application in genomics" was held at CIIDRET premises in the South campus of Delhi University from 26th December 2022 - 7th January 2023. For this workshop also, against a planned intake of 20 seats based on workspace and instructor strength, 30 participants were registered with more in waiting.

The workshop inauguration was graced by Prof. K. Ratnabali, Dean Academics & Projects, DU as the Chief Guest, Prof. Rajendra Prasad, Former Rector, JNU, currently, Director, Amity Institute of Biotechnology, Amity University, Manesar, as the Guest of Honour. Prof. Sanjeev Singh, Joint Director, UDSC presided over the Function. Prof. Ratnabali applauded the hands-on skill training efforts at CIIDRET and the humongous task of implementing it for a duration of 100 days. She voiced her thoughts on the extension of some of the training components by CIIDRET for the skill course curriculum in the University. This workshop had participants pursuing Life science courses

from different colleges of DU and other institutions, along with PG students from institutions including Delhi Technological University. The participants braved the severe cold and worked enthusiastically from 9 am in the morning to 6 pm in the evening daily for two weeks. The participants were divided into three groups with three mentors.

The participants learnt and practiced isolation of plasmid DNA and genomic DNA from bacterial cells by various methods. These methods included (a) column method (b) alkaline lysis-PEG precipitation method and (c) isolation of genomic DNA by nanoparticle method. For each method, the trainer first explained the principle of the method, and demonstrated the method including preparation of the media, streaking of the culture, inoculation of bacterial colony in liquid media and processing of the bacterial culture in a biosafety bench. Thereafter, participants individually did the entire procedure multiple times to gain proficiency. The isolation of bacterial genomic DNA using magnetic nanoparticles was taught by teacher-expert, Dr. Abhijeet Mishra from Shivaji College. The participants also observed and set up reaction for sequencing of isolated DNA using Sanger Dideoxy Chain termination method. The sequencing data obtained was analysed by each participant. Their excitement and learning were reflected by their full attendance for the entire duration of the workshop. Their sense of achievement was evident in their feedback at the valedictory session held on 7th January at UDSC.

The workshop valedictory was graced by Prof. Payal Mago, Principal, Shaheed Rajguru College of Applied Sciences for women, Director, COL, DU as the Chief Guest, and Prof. Jaya S. Tyagi, Department of Biotechnology, AIIMS, New Delhi, as the Guest of Honour. Professor Jaya Tyagi appreciated the concept of organising the 100 days Festival to impart Skill Enhancing training in Hands-on mode. She said the skill sets obtained through such workshops are very important to improve the handling of instruments and conducting experiments in Life Science research. She stressed on Innovations but advised that each Innovation should be backed by strong fundamental research.

Prof. Payal Mago, the Director of School of Open Learning (SOL) and Convener of Skill Enhancement Courses (SEC) committee of Delhi University, in her valedictory address, elaborated the University's plan for SEC and desired that institutions like CIIDRET and DSSEED should mentor college teachers for implementation of such Hands-on courses in the curriculum of the FYUP.

She also visited the CIIDRET research facility, created through the funds received from Government funding agencies and partner Industries, that is currently being used for conducting Hand-on training courses. CIIDRET does not have a dedicated space for Skill activities. Availability of a separate space will enable CIIDRET to offer courses round the year and give training to teachers in many areas which could be developed as SECs in Life Sciences for the FYUP. **Further, it was discussed that for implementation of meaningful SECs in hands-on mode,**

college teachers need to be trained and required facilities be developed in designated colleges. CIIDRET and DSSEED with their experience will be of great help in training and mentoring the teachers. In the valedictory function, Principals and teachers of DU colleges also desired interaction with CIIDRET and DSSEED to offer such courses in their colleges.

Mr Amit Chopra, Managing Director, India and South Asia of Thermo Fisher Scientific, a global Fortune 500 company, visited CIIDRET and interacted with the participants.

The third workshop of the festival **"Hands-On Training Workshop on Python for Biology & Its Practical approach was held from 9th - 13th January 2023 at CIIDRET premises in collaboration with Hansraj College, University of Delhi.** Dr. Pooja Arora and Dr. Baljeet Kaur from Hansraj College and Dr. Vikas Sood from Jamia Hamdard were resource persons for this workshop. The participants were from different institutions and universities in Delhi-NCR. On the first day, workshop participants were introduced to Basic Python Programming language and data sciences. In the second half, the practical session was conducted where they were taught how to operate different platforms for coding. The

second day started with the Python modules such as Variables, Data types, for loops, conditional statements and operators, whereas in the second session, the practical was conducted on the same topics. The Third day started with quite an advanced python session such as functions and later in the second session, the practical was conducted. The students were given practical questions for practice. The participants were able to understand the basic as well as advanced python concepts. On the fourth and the fifth day, case studies from published research papers were discussed where python programming was used to understand biological intricacies.

The Fourth Workshop on "NGS and Genomic Data Science and Analysis" was held from 16th to 19th January 2023 at CIIDRET, in collaboration with Experts from Theomics International, Thermo Fisher Scientific, and Premas Life Sciences. The participants were PG students, Research scholars, scientists and teachers from the University of Delhi, IARI, and one Associate Professor from SGT University.

The workshop's inaugural function was graced by Prof. Akhilesh Tyagi as the Chief Guest and Prof. Daman Saluja as the Guest of Honour along with many other dignitaries and Faculty members. Both the Guests emphasized the need for teaching basic and fundamentals, and their applications through hands-on practical work. Prof. Daman Saluja was especially drawn to the concept of

"Teacher Incubation Centre" conceived in the mandate of the DSSEED as explained by Prof. Vijay Chaudhary. Prof. Akhilesh Tyagi described the National and International collaborative efforts in the sequencing of different plant genomes using conventional and Next Generation Sequencing methods. He also explained the quality of data obtained from these techniques and the intense requirement of bioinformatic tools in creating the assembly that finally leads to the complete sequence of a genome. He described that to have all the genomic data be available at one place, the Department of Biotechnology (DBT) of Ministry of Science and Technology has

established, 'Indian Biological Data Centre (IBDC) at the Regional Centre of Biotechnology (RCB), Faridabad. Dr. Richi Mahajan, Programme Officer for Genomic Data Sciences at DBT made a presentation and explained DBT's efforts in bioinformatics and in establishing genome data centres and their utility and access procedures.

Following the inaugural function, **two Industry experts gave detailed lectures** about the various Sequencing platforms and their applications.

Dr. Nityanand Sharma from Premas Life Sciences representing Illumina platform explained the basic principles of Sequencing by Synthesis (SBS) technology and provided details about various Illumina instruments and their throughput along with the improvements made. He mentioned that it cost USD 2 billion and several years to sequence the human genome using conventional technology. Now with new technology, it has become possible to sequence a human genome in USD 200 thus reducing the cost by 10 million-fold. He then explained numerous applications in clinical settings

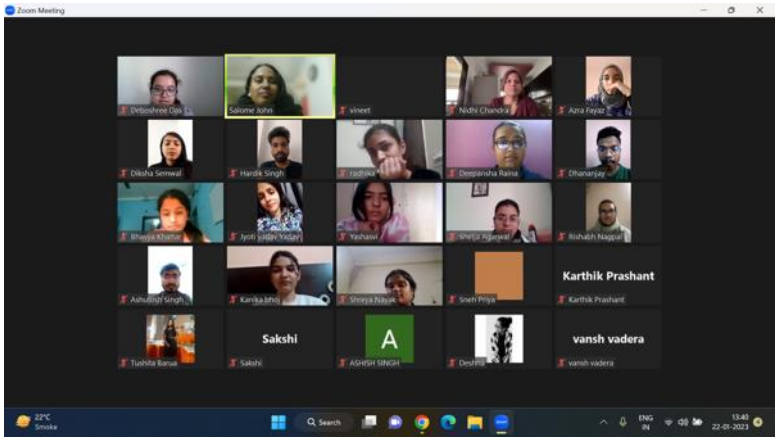
including diagnostics and management of Cancer Patients, understanding genetic disorders, monitoring infectious disease surveillance, etc. He also emphasized the need for a multi-omics approach to improve the predictive outcome of cancer treatments. He also showed how NGS has also opened the avenue to generate high throughput protein data from biological samples even at single-cell resolution. The technology is also helping researchers to map the RNA and protein data over the tissue sections at 1-10 cell resolution. These new developments would help to see the biological data like never before and uncover the complexity of biology. As per him, genomics technologies have immense potential to achieve our sustainable goals.

Dr. Sailesh Gochhait, from Thermo Fisher Scientific, described the technology employed in their platform, Ion Torrent. He described in detail the application of this platform in clinical medicine. He explained the method for template and library preparation for sequencing. He also explained briefly about the analysis of data obtained from the sequencer. He elaborated on the application of NGS-based genomic analysis for improved cancer therapies and presented the published case studies where such approaches have been beneficial.

Faculties from Theomics International Pvt Ltd, under the leadership of Mr Madavan Vasudevan trained participants with key skills and fundamental knowledge of two Major Genomic Applications. In-depth teaching and case studies were discussed with reference to Whole Genome Sequencing and Whole Transcriptome Profiling. The total learning programme spanned three days with live illustrations, demonstration and hands-on training of the participants on essential web-based and offline software for attaining the above-mentioned purpose. The workshop also covered an understanding of quantitative and qualitative genomics data analysis. The teaching expanded from whole genome and whole transcriptome to other applications such as Metagenomics and Epigenomics. In addition, the participants were also taught about the essential

consideration in planning a genomics experiment with a key emphasis on critical quality control checkpoints. Participants had hands-on experience in online resources for data analytics like www.useglaaxy.org, https://www.bv-brc.org/, http://bioinformatics.sdstate.edu/idep94/ and https://cs.wellesley.edu/~btjaden/ Rockhopper/ data science & analytics computational pipelines. Mr. Hersh Parik from Thermo Fisher Scientific taught Ion Torrent NGS data analysis.

The fifth workshop was an Online Certificate Course (40 hours, 20 days, weekends, 4hr/day) on "Basic Statistics for Biological Sciences", was conducted from 14th January till 19th February 2023. It was organised jointly with the Department of Microbiology, Ram Lal Anand College, University of Delhi in online mode. 70 participants attended this course. It had Dr Rita Jain from the Department of Statistics, RLA College, and Ms. Deboshree, RLA College Alumnus of batch 2017 as resource persons. This is a good example of involving Alumni in Skill Enhancement activities. The course was very well appreciated by all participants.



The Sixth Workshop on "Phage Biology - Discovery & Analysis" was held from 20th- 25th January 2023 in collaboration with Acharya Narendra Dev College (ANDC), University of Delhi and Society for Bacteriophage Research and Therapy (SBRT), India. This one-week long workshop had two modules. The participants were UG & PG students, and PhD scholars from the University of Delhi, IARI, UPES Dehradun, Jamia Millia Islamia, JIIT, Noida. The hands-on training was conducted both at CIIDRET premises on 21-22 January, and at ANDC on 23-25 January, 2023.

The inaugural function at ANDC was graced by Prof. Rup Lal, former Professor and Head, the Department of Zoology, University of Delhi and currently INSA Senior Scientist at ANDC, and Prof. Pawan Sharma, former Scientist at ICGEB, New Delhi. Prof. Urmi Bajpai, the coordinator of the workshop at ANDC, briefed participants on the experiments planned.

Two online talks on the fundamentals of bacteriophages (phages, the natural viruses of bacteria) and their application as therapeutics were held. These sensitized the participants to the growing menace of antibiotic-resistance worldwide and made them aware of the importance of phages and encoded lysin-based antibiotics (enzybiotics) as a possible solution to the antibiotic resistance pandemic. The Speakers were from industry

and academia who have made significant contributions to the field and enthused the participants toward the long-term prospects of the theme of the workshops.

Dr. T.S. Balganesh, President GangaGen Biotech Pvt. Ltd., Bangalore (GBPL) has three decades of experience in antibacterial drug discovery. As the Head of Research at AstraZeneca, Bangalore, he led the unit to deliver AstraZeneca's first anti-tuberculosis molecule for clinical development. He presented the merits of lysins as alternative/complement to antibiotics and shared his company's long and successful journey of developing the only phage lysin tested so far in a clinical trial in the country.

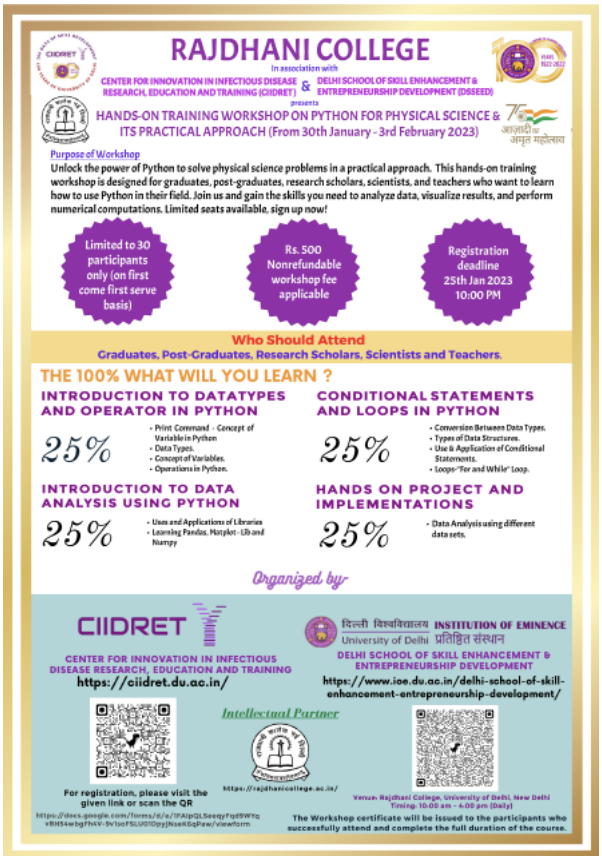
Dr. Sabrina Green is Research Associate at KU Leuven, Belgium. She co-founded a not-for-profit service center to source and prepare phages for patients with serious, drug-resistant infections and served as its R&D director. She highlighted her experience in finding and characterizing phages for phage therapy. Both sessions were engaging and gave an opportunity to the participants to interact with the subject experts.

The next day, at UDSC, the participants were initiated into the good laboratory practices and introduced to the lab instruments such as an incubator shaker, laminar hood, and sterilization methods using autoclave and membrane filtration. They learned the basic microbiology techniques, media preparation and colony inoculation. Alongside, the basics of phage biology and the concept of colony and plaque forming units (cfu/pfu) was introduced. The participants then performed plaque assay individually.

Having gained an understanding and hands-on of the required techniques, at ANDC laboratories, the participants were trained for the isolation of phages from the collected environmental samples using double-agar assay & phage genomic DNA was isolated using PCI method (non-kit based).

On the final day, phage plaque morphology was studied, phage titre (pfu/ml) was determined, and the isolated DNA was analysed using Agarose Gel Electrophoresis. Quantitative estimation of DNA and the significance of purity of preparation in the context of whole genome sequencing (WGS) was explained. In addition to the wet-lab experiments, a bioinformatics session introduced students to bacteriophage genome annotation, using online tools. The exercises included ORF prediction, BLAST annotation using RAST and prediction of putative functions of protein using InterProScan/HMMER.

The Seventh workshop of the festival, Hands-On Training Workshop on "Python for Physical sciences & Its Practical approach" was held from 30th January – 3rd February 2023 in collaboration with Rajdhani College, University of Delhi. The participants were UG and PG students from mathematics and physics. The interest in the workshop is reflected by the fact that Rajdhani College had to close the registrations after taking 42 participants against the intake of 30.



The workshop's inaugural function was graced by Prof. Pratibha Luthra as the Chief Guest. She appreciated the efforts being made under the festival for skilling students.

The workshop was designed to provide extensive hands on training in Python covering various topics like basic syntax of python, variables, data types and control structures to make their base strong in python. Besides learning the basics, the students also learnt various modules like pandas and matplotlib and their application in analysing and visualising different real time data sets.

The Talk for the technical session on the first day of the workshop was given by **Mr. Siddarth Srivastava** in which he emphasized on the importance of learning Python, its role in Physical Sciences and substantiated with

many Practical Examples. He also discussed the role of Python in Artificial Intelligence and Machine Learning. All the participants thoroughly enjoyed his talk.

Over the next four days, the resource persons for the various sessions, **Ms. Sheetal Mavi** and **Ms. Akansha Gautam** from Department of computer Science, Rajdhani College trained the participants. The various sessions consisted of theory lectures on Python in the morning followed by Hands on training session (Application of the concepts) in the afternoon. The Participants were assessed daily, through assignment and Quiz and in the last session of the workshop they made a small project by applying all the knowledge which they gained from the workshop.

All the participants heartily appreciated the efforts put in by the team for organizing the workshop and shared their experience of gaining a lot of new information from the workshop through the feedback form provided to them on the last of the workshop.

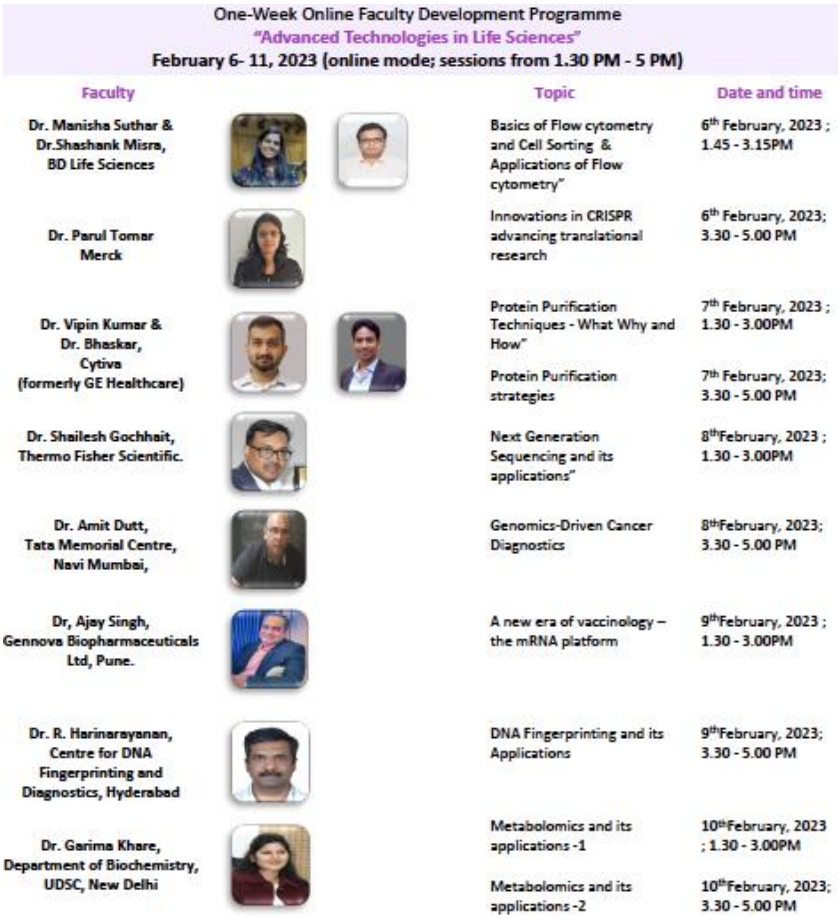
The Valedictory function for the workshop was held on the 3rd February 2023 in the Rajdhani College Auditorium. The Chief Guest of the function was **Prof. Raj Kishore Sharma**, Dean Research, Physical and Mathematical sciences, Delhi University. He appreciated the efforts and congratulated all the organizing committee members along with dedicated team of student volunteers and participants on the successful completion of the workshop.

The Eighth workshop of the festival, a Faculty Development Program (FDP) entitled "Advanced Technologies in Life Sciences" was conducted through Mahatma Hansraj Faculty Development Centre, Hansraj College, University of Delhi, from 6th – 10th February 2023. The topics for the FDP were selected keeping in view the use of modern tools and techniques in Life science research as learning by teachers will percolate to students from very early time during undergraduate teaching and to align with the objective of National Education Policy-2020. The faculty were experts in their field and were drawn from Academia and Industry. The FDP had online lectures by expert faculty for each topic.

The FDP had 72 participants from 57 universities, colleges, and institutes across the country. Scientists from Industry also joined the FDP.

On the first day in session 1, the lectures were on **"Basics of flow cytometry and cell sorting & applications of flow cytometry"** by Dr. Manisha Suthar and Dr. Shashank Misra, from BD Life Sciences where the basic fundamentals of Flow cytometry technique and the instruments were explained. Following this, many applications of flow cytometry in basic research and clinical sciences were presented with case studies. In session-2, a most modern Nobel Prize (2020)-winning technology which has revolutionised the cell & genomic sciences was explained through the topic **"Innovations in CRISPR advancing translational research"** by Dr. Parul Tomar from Merck-Sigma.

The second day was devoted to another equally important technology, Protein Purification, which has been in practice for nearly 50 years with constant evolution and is the basis of commercial production of most biologics and antibodies which are used as drugs by the society. This technology was explained in two sessions through lectures "Protein purification techniques - what, why and how" and Protein purification strategies by Dr. Vipin from Cytiva (Formerly GE Healthcare).



One-Week Online Faculty Development Programme
"Advanced Technologies in Life Sciences"
February 6- 11, 2023 (online mode; sessions from 1.30 PM - 5 PM)

Faculty	Topic	Date and time
Dr. Manisha Suthar & Dr.Shashank Misra, BD Life Sciences	Basics of Flow cytometry and Cell Sorting & Applications of Flow cytometry"	6th February, 2023 ; 1.45 - 3.15PM
Dr. Parul Tomar Merck	Innovations in CRISPR advancing translational research	6th February, 2023; 3.30 - 5.00 PM
Dr. Vipin Kumar & Dr. Bhaskar, Cytiva (formerly GE Healthcare)	Protein Purification Techniques - What Why and How"	7th February, 2023 ; 1.30 - 3.00PM
	Protein Purification strategies	7th February, 2023; 3.30 - 5.00 PM
Dr. Shailesh Gochhait, Thermo Fisher Scientific.	Next Generation Sequencing and its applications"	8thFebruary, 2023 ; 1.30 - 3.00PM
Dr. Amit Dutt, Tata Memorial Centre, Navi Mumbai,	Genomics-Driven Cancer Diagnostics	8thFebruary, 2023; 3.30 - 5.00 PM
Dr, Ajay Singh, Gennova Biopharmaceuticals Ltd, Pune.	A new era of vaccinology – the mRNA platform	9thFebruary, 2023 ; 1.30 - 3.00PM
Dr. R. Harinarayanan, Centre for DNA Fingerprinting and Diagnostics, Hyderabad	DNA Fingerprinting and its Applications	9thFebruary, 2023; 3.30 - 5.00 PM
Dr. Garima Khare, Department of Biochemistry, UDSC, New Delhi	Metabolomics and its applications -1	10thFebruary, 2023 ; 1.30 - 3.00PM
	Metabolomics and its applications -2	10thFebruary, 2023; 3.30 - 5.00 PM

The third day was devoted to another important technology of DNA sequencing using Next Generation Sequencing (NGS) Platforms. These platforms have reduced the cost of human genome sequencing from USD billions to hundreds and time from years to days. While these platforms are being employed for sequencing genomes of animals, plants etc., their applications in clinical science are immense and are revolutionizing the detection and management of dreaded diseases like cancer, tuberculosis etc. During the COVID-19 pandemic, this technology was responsible for quick identification of SARS-CoV-2 DNA sequences of millions of samples and to know about genome variation, which was the basis of RT-PCR based diagnostics and also development of vaccines. In the sessions, through the lecture on **"Next generation sequencing and its clinical applications"** by Dr. Sailesh Gochhait from Thermo Fisher Scientific, the participants were exposed to the basics of NGS and how it has been applied to clinical sciences. The second lecture **"Genomics-driven cancer diagnostics"** by the senior faculty, Dr. Amit Dutt from ACTREC- Tata Memorial Centre, Navi Mumbai explained the real use of genomic

information in the clinic with case studies to illustrate use of technology in implementing intelligent evidence-based treatment strategies.

The session-1 on the fourth day started with a lecture **"A new era of vaccinology – the mRNA platform"** by Dr. Ajay Singh from Gennova Biopharma, Pune, the manufacturer of India's first mRNA vaccine. The lecture made participants learn about different vaccine platforms with special reference to the vaccines for COVID-19. The fundamentals of designing and producing mRNA based vaccines were explained in detail, besides many other applications of this platform. Special emphasis was given to their effort in back-integration of the technology to produce all the ingredients, such as enzymes being produced in-house, which are currently obtained from outside India after spending hundreds of thousands of USD. This is a true example of Innovation and a step forwards towards making India AtamNirbhar in this field. The session-2 was equally interesting and educating as through a real classroom like lecture, **"An overview of human DNA fingerprinting and its applications"** an expert scientist from Centre for DNA Fingerprinting and Diagnostics, Hyderabad, Dr. R. Harinarayanan. He explained the basis of the technology as was employed in its infancy, and is now regularly used using improved tools and techniques to solve cases for social and criminal disputes. These applications were explained very elegantly through real case studies undertaken in the laboratories at CDFD.

The last day was devoted to two lectures on**"Metabolomics and its applications"** by Dr. Garima Khare from the University of Delhi South Campus**.** In the lecture she connected the old time traditional diagnostic methods including colour, taste and texture of urine and stool were used to detect the diseases before the treatment was given. This is being replaced by modern tools and techniques including HPLC, Mass spectrometry etc., for the analysis of chemical- and bio-molecules in body fluids.

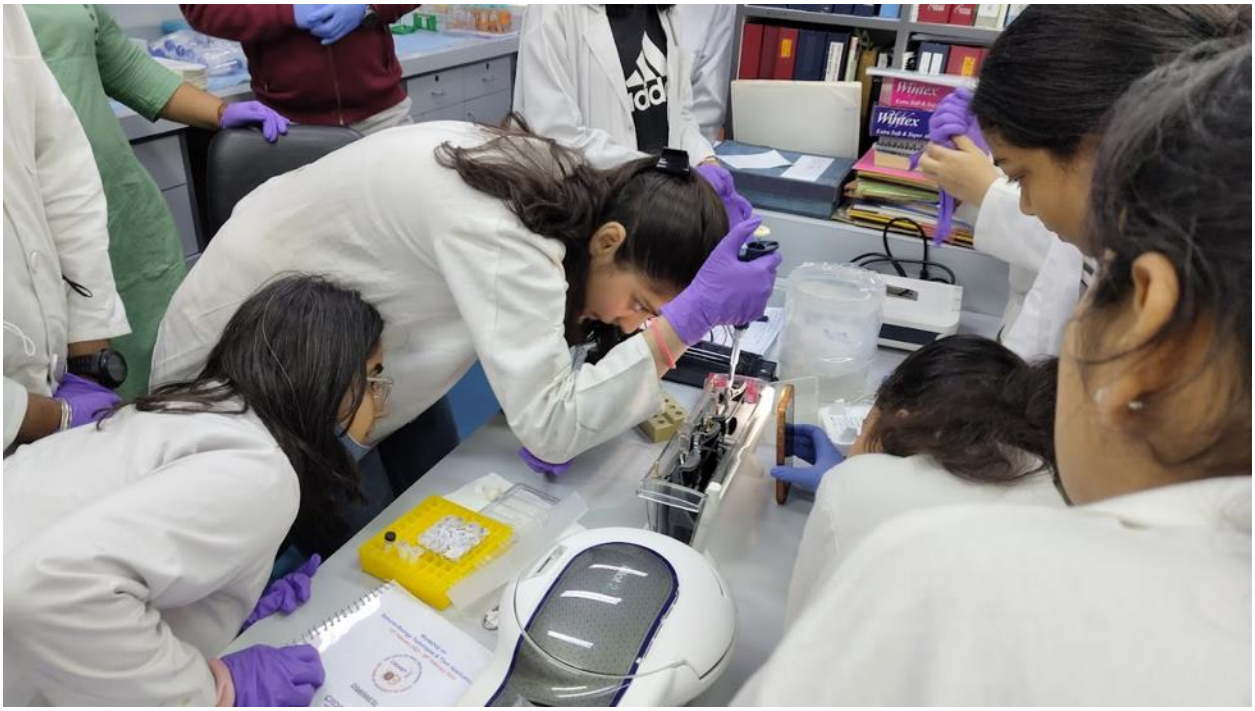
The last day was the valedictory function which was attended by all the participants and some of the FDP faculty members. In this, Conveners and Coordinator made a brief presentation and the Faculty presented their experience. Following this, many participants described how they have benefited with the lectures by experts in the field. The participants were evaluated through 50 multiple choice questions (MCQs) based on the 10-lecture series. E-certificates were given to all participants.

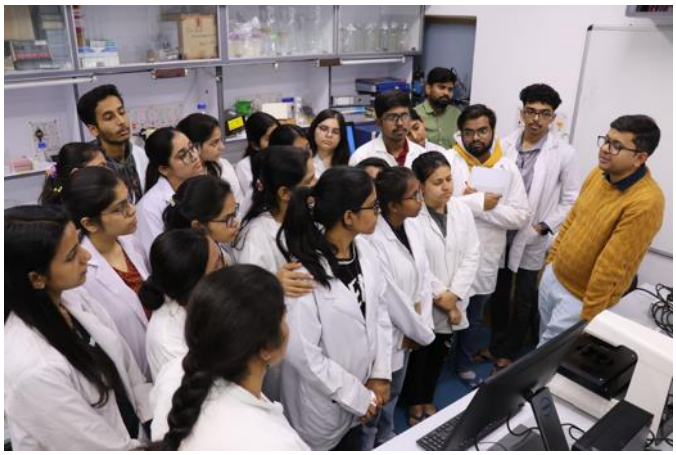
The Ninth Workshop on "Immuno-Biology Techniques & Their Applications" was held from 13th February - 25th February 2023" at CIIDRET, in collaboration with Experts from Thermo Fisher Scientific. The participants were UG, PG, PhD students and scientists from the University of Delhi, DTU, Jamia Millia Islamia, IGNOU, and one Associate Professor from AIIMS, New Delhi.

The workshop's inaugural function was graced by Prof. Rakesh Bhatnagar, National Science Chair, JNU. He is a renowned scientist and has been former Vice Chancellor at BHU and Amity Jaipur. Dr. Bhatnagar applauded the efforts by CIIDRET for skilling students through hands-on practical work and also giving them exposure to the latest technologies through industry partners.

The participants learnt about the technique of Enzyme Linked Immunosorbent Assay (ELISA) and its applications through lecture by experts. They performed the ELISA multiple times to gain proficiency in the skill and also learnt the use of electronic multichannel pipettes and ELISA washer. They also learnt the high-throughput 384-well format of ELISA. Different types of ELISA including direct, indirect and sandwich ELISA were taught to the participants. The multiplexing of immunoassays and their use for biomarker discovery was also discussed by expert faculty.

The participants also performed western blotting by conventional method as well as the fast transfer method. They also learnt development of the immunoblot by different substrates like DAB, TMB, Fluorescence and chemiluminescence. They also used gel documentation system for imaging gels and capturing gel pictures.





Immunocytochemistry and Immuno-histochemistry were taught by experts from Thermo Fisher. The participants also carried out imaging of slides using the EVOS imaging systems that incorporate high-resolution cameras, and digitally controlled LED light sources. The participants were thrilled with hands-on working on different instruments.

The valedictory session of the workshop was graced by senior most management personal, Mr. R Ranganathan (Cytiva, Danaher group), Mr. Manish Sanghai (Thermo Fisher Scientific), Mr. Praveen Gupta (Premas Life sciences) , and Mr Sujjen Sharma (Merck- Sigma). Dr. Amulya K. Panda, from Panacea Biotech, renowned scientist and former Director NII, also graced the event. The 100-day skill festival and the mammoth efforts made by the organising team at CIIDRET was highly appreciated by everyone. A discussion was held to formulate a proposal to make the skilling activity a permanent skill

centre for genomics and antibody technology at CIIDRET wherein job-ready training will be imparted along with industry internship.

100 DAY SKILL FESTIVAL

Activities to the 100th day milestone

Hands-on workshops on

- Recombinant Protein Expression and characterization
- PCR, Real-time PCR and applications (with Thermo Fisher Scientific)
- Semiconducting Device Fabrication (with Miranda House)

- A workshop on IPR, Patents, copyright, trademark and technology transfer to bring awareness in the University system.

➢ Virtual workshop on Antibody Technologies: Learn to discover, produce and characterize antibodies for different applications. The workshop will expose, educate and create interest among researchers from both academics and Biopharmaceutical Industry by disseminating knowledge about the subject with the theme "Science of Antibody - Lab to market". This will be conducted in online mode with 36 contact hour duration and spread over 8-12 days with two lectures in 3-hour sessions each day in the month of March-April, 2023. It is expected that lectures on these topics would mimic classroom teaching for deep understanding by participants from academics and Industry. The purpose of the proposed workshop is to contribute in strengthening and expanding the manpower base to meet the challenges of Antibody discovery, production, characterization, and pre-clinical and clinical studies.

Institute and Course affiliations of Participants in the 100-days Skill Festival

S. No.	Institute Name	Course
1.	Acharya Narendra Dev College, University of Delhi (DU)	Ph.D. Electronic Science B.Sc. Life Sciences B.Sc. (H) Physics
2.	Shaheed Rajguru College of Applied Sciences for Women, DU	B.Sc. (H) Biomedical Sciences B.Sc. (H) Biochemistry
3.	Institute of Home Economics, DU	B.Sc. (H) Biochemistry
4.	Daulat Ram College, DU	B.Sc. (H) Biochemistry
5.	Shivaji College, DU	B.Sc. (H). Biochemistry
6.	Delhi Technological University	M.Sc. Biotechnology
7.	Noida International University	M.Sc. Biotechnology
8.	Bhaskaracharya College of Applied Sciences, DU	B.Sc. (H) Microbiology B.Sc. Home Science
9.	University of Delhi South Campus	M.Sc. Biochemistry
10.	Ram Lal Anand College, DU	B.Sc. (H) Microbiology
11.	Amity University, Noida	B.Sc. Medical Biotechnology
12.	Maharishi Dayanand University	M.Sc. Microbiology
13.	Jai Narain Vyas University, Rajasthan	Ph.D. Botany
14.	Institute of Applied Medicines & Research, Ghaziabad	B.Sc. (H) Microbiology
15.	Jamia Millia Islamia	M.Sc. Biochemistry, PGDMD (Molecular Diagnostics) B.Sc. (H) Biochemistry Ph.D. Biosciences
16.	Indian Agricultural Research Institute, Delhi	Ph.D. Soil Sciences
17.	Sri Venkateswara College, DU	B. Sc. (H) Zoology B.Sc.(H) Biochemistry B.Sc. (H) Botany
18.	Indian Institute of Technology, Delhi	Ph.D. Biotechnology
19.	University of Delhi	Research Trainee
		Ph.D. Scholar
20.	AIIMS, New Delhi	Ph.D.
21.	SGT University, Gurugram	Associate Professor
22.	Babasaheb Bhimrao Ambedkar University	M.Sc. Zoology
23.	Jaypee Institute of Information Technology, Noida	Ph.D. Microbial Biotechnology
24.	Alshifa College of Pharmacy	Doctor of Pharmacy

S. No.	Institute Name	Course
25.	UPES, Dehradun	Ph.D., Microbiology
26.	Rajdhani College, DU	B.Sc. (H) Mathematics B.Sc. (H) Physics B.Sc. (H) Electronics
27.	Swami Shraddhanand College, DU	B.Sc. (H) Physics
28.	TERI School of Advance Studies, Delhi	M.Sc. (Economics)
29.	Kalindi College, DU	B.Sc. (H) Physics
30.	Atma Ram Sanatan Dharma College, DU	B.Sc. (H) Physics
31.	Hindu College, DU	B.Sc. (H) Physics B.Sc. (H) Zoology
32	IMS, Ghaziabad	M.Sc. Biotechnology
33.	Indira Gandhi National Open University	Ph.D.
34	Shri Guru Tegh Bahadur Khalsa College, DU	B.Sc.(H)Zoology
35	Graphic Era, Dehradun	Ph.D. Microbiology
36.	IVRI, Izatnagar, Bareilly	Ph.D.

FDP participants-Teachers and scientists, Research scholars from colleges, Institutions, Universities and Industry- 57 institutions

From University of Delhi:

Shivaji College	Bhaskaracharya College of Applied Sciences
Hansraj College	Shaheed Rajguru College of Applied Sciences for Women
Ramjas College	Dr. B. R. Ambedkar Centre for Biomedical Research
Sri Venkateswara College	Acharya Narendra Dev College

Outside Delhi University:

Bennett University, Noida	Sharda University, Noida
Karnatak Science college, Karnatak University, Dharwad	College of Basic Science and Humanities, Pantnagar,
Sanatan Dharma College, Ambala Cantt	NIPB,
IARI	Kurukshetra University, Kurukshetra
Dr. Harisingh Gour Vishwavidyalaya, Madhya Pradesh	K L Mehta Dayanand College for Women, Faridabad

Gulbarga University School of Biotechnology,	Dronacharya government college, Gurugram
Baba Mastanth University, Rohtak	University of Jammu
AIIMS, New Delhi	DPG Degree College, Rohtak
Veterinary College Bengaluru	University of Kerala,
Dev Bhoomi Uttarakhand University, Dehradun	College of Veterinary Sciences & Animal Husbandry, Aizawl, Mizoram
SGT University, Gurugram	Gossner college, Ranchi
Institute of Medical Sciences,	Banaras Hindu University
Indira Gandhi University, Meerpur (Rewari)	College of Basic Science and Humanities, CCSHAU Hisar
Jawaharlal Nehru Technological University	College of Veterinary Science and Animal Husbandry, Junagadh
Guru Nanak Girls College, Kurukshetra	National Dairy Research Institute, Karnal
Delhi Pharmaceutical Sciences and Research University, New Delhi	Gangadhar Meher University, Sambalpur, Odisha
Alagappa Govt. Arts College, Karaikudi	Kalaniketan Polytechnic College,
Sardar Bhagat Singh Govt P.G College, Rudrapur	Rajiv Gandhi Prodyogiki Vishwa-vidyalaya Gurukul Kangri, Haridwar
Bhagwan Mahavir College of Basic and Applied Sciences	AMU Aligarh,
Maharaja Ranjit Singh College of Professional Sciences, Indore	Apollo college of veterinary medicine, Jaipur, Rajasthan
Government Doon Medical College, HNB University	Thapar Institute of Engineering and Technology Patiala
Central University of Kashmir	T.M. Bhagalpur University, Bhagalpur
Jai Narain Vyas University, Rajasthan	Maharshi Dayanand University Rohtak
Regional Collage of Education, Magadh University, Bodhgaya	College of Veterinary and Animal Sciences, Pantnagar
Gennova Biopharma, Pune	

Resource Persons in the 100-days Skill Festival

S.No.	Name	Institute
1.	Professor V. K. Chaudhary	CIIDRET, DU
2.	Professor Amita Gupta	CIIDRET, DU
3.	Professor Vandana Gupta	Ram Lal Anand College
4.	Professor Prerna Diwan	Ram Lal Anand College
5.	Dr. M Salome John	Ram Lal Anand College
6.	Dr. Nidhi Chandra	Ram Lal Anand College
7.	Dr. Sunila Hooda	Ram Lal Anand College
8.	Dr. Shalini Swami	Ram Lal Anand College
9.	Ms. Shilpi Das	CIIDRET, DU
10.	Mr. Gaurav Kumar Singh	CIIDRET, DU
11.	Ms. Navneet Kaur	CIIDRET, DU
12.	Ms. Surbhi Chauhan	CIIDRET, DU
13.	Dr. Abhijeet Mishra	Shivaji College
14.	Dr. Vikas Sood	Jamia Hamdard
15.	Dr. Pooja Arora	Hansraj College
16.	Dr. Baljeet Kaur	Hansraj College
17.	Professor Urmi Bhajpai	Acharya Narendra Dev College
18.	Ms. Ritu Arora	Acharya Narendra Dev College
19.	Ms. Kanika Nadar	Acharya Narendra Dev College
20.	Dr. Mitesh Dagar	Acharya Narendra Dev College
21.	Dr Rita Jain	Ram Lal Anand College
22.	Ms. Deboshree	Ram Lal Anand College, Alumnus
23.	Ms. Sheetal Mavi	Rajdhani College

S.No.	Name	Institute
24.	Ms. Akansha Gautam	Rajdhani College
25.	Professor Anju Gupta	Rajdhani College
26.	Dr. Amit Dutt	ACTREC- Tata Memorial Centre, Navi Mumbai
27.	Dr. T.S. Balganesh	GangaGen Biotech Pvt. Ltd., Bangalore
28.	Dr. Sabrina Green	KU Leuven, Belgium
29.	Mr. Siddharth Srivastava	CDEC, Delhi
30.	Dr. Garima Khare	University of Delhi South Campus
31.	Mr. Madavan Vasudevan	Theomics International, Bangalore
32.	Dr. Nityanand Sharma	Premas Life Sciences, Delhi
33.	Dr. Shailesh Gochhait	Thermo Fisher Scientific
34.	Dr. Hersh Parikh	Thermo Fisher Scientific
35.	Dr. Samarth kulshrestha	Thermo Fisher Scientific
36.	Dr. Sharad Swaney	Thermo Fisher Scientific
37.	Dr. Sathya Raj.S	Thermo Fisher Scientific
38.	Dr. Sharmistha Samantaray	Thermo Fisher Scientific
39.	Dr. Naincy Girdharwal	Thermo Fisher Scientific
40.	Dr. Suparno Gupta	Thermo Fisher Scientific
41.	Dr. Manisha Suthar	BD Life Sciences
42.	Dr. Shashank Misra	BD Life Sciences
43.	Dr. Vipin	Cytiva (Formerly GE Healthcare)
44.	Dr. Ajay Singh	Gennova Biopharma, Pune
45.	Dr. R. Harinarayanan	Centre for DNA Fingerprinting and Diagnostics, Hyderabad

Academic Partners

Ram Lal Anand College
(University of Delhi)

Industry Partners

ThermoFisher SCIENTIFIC

premium serums & vaccines pvt. ltd.

cytiva

MERCK

BD

THEOMICS
END YOUR SEARCH

SPAN
DIVERGENT

premas life sciences

GENNOVA

From the Organisers

The ambitious project **"100 Day Skill Festival"** aims to celebrate 100 years of Delhi University. The Festival was conceived to evaluate the effectiveness of **"Beyond Classroom Learning"**, which has been the **organisers' (CIIDRET) motto** since its establishment. The fact that this massive effort was successful in achieving its goals—**creating connections between the university and its colleges and with the industry**—as well as **developing the skills of young undergraduates and postgraduates and teachers**—is a source of great pride and satisfaction. Intellectual assistance from 9 academic institutions, including colleges, and 9 industry partners has been crucial to this success. The scope of this work is restricted to a small subset of topics in life sciences and biotechnology. Yet, this opens the door for future growth and will act as a template for structuring comparable ongoing programmes in all other areas of learning.

The Hon'ble Prime Minister stated, "Central government is focused on offering internships and apprenticeships to give 'beyond the classroom exposure' to its students," at a post-budget webinar on February 25, 2023, titled "Harnessing Youth Power - Skilling and Education". He applauded the National Internship Portal's assistance while urging businesses and educational institutions to use it to interact with young people. **He continued by saying that as part of the New Educational Policy, equal focus is being placed on both education and skill development.** This endorses the vision of CIIDRET and substantiates its efforts over the past seven years. With DSSEED, this can expand into other subject areas as well.

This effort will not end at the festival's 100 days rather it is the beginning of a new endeavour. CIIDRET & DSSEED will continue the Skilling, Upskilling, and Reskilling of the youth through tailored courses and internship programmes in collaboration with other organisations, government initiatives, and industry partners. In addition to preparing the workforce for the future, **the goal is to foster a culture of innovation and entrepreneurship for enabling solutions and restoring India to its Vishwa Guru status and making it Atmanirbhar.**