



# Synergistic Training Program Utilizing the Scientific & Technological Infrastructure (STUTI)

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Project progress report submitted to  
R&D infrastructure Division,  
Department of Science & Technology

**Name of STUTI PMU**

JSS Academy of Higher  
Education and Research,  
Mysore, Karnataka

**Period of Report**

One Year

**Date and ref. No.  
of DST Sanction letter**

9/02/2022

DST/RND/STUTI/2021/11(C)

**Address for communication**

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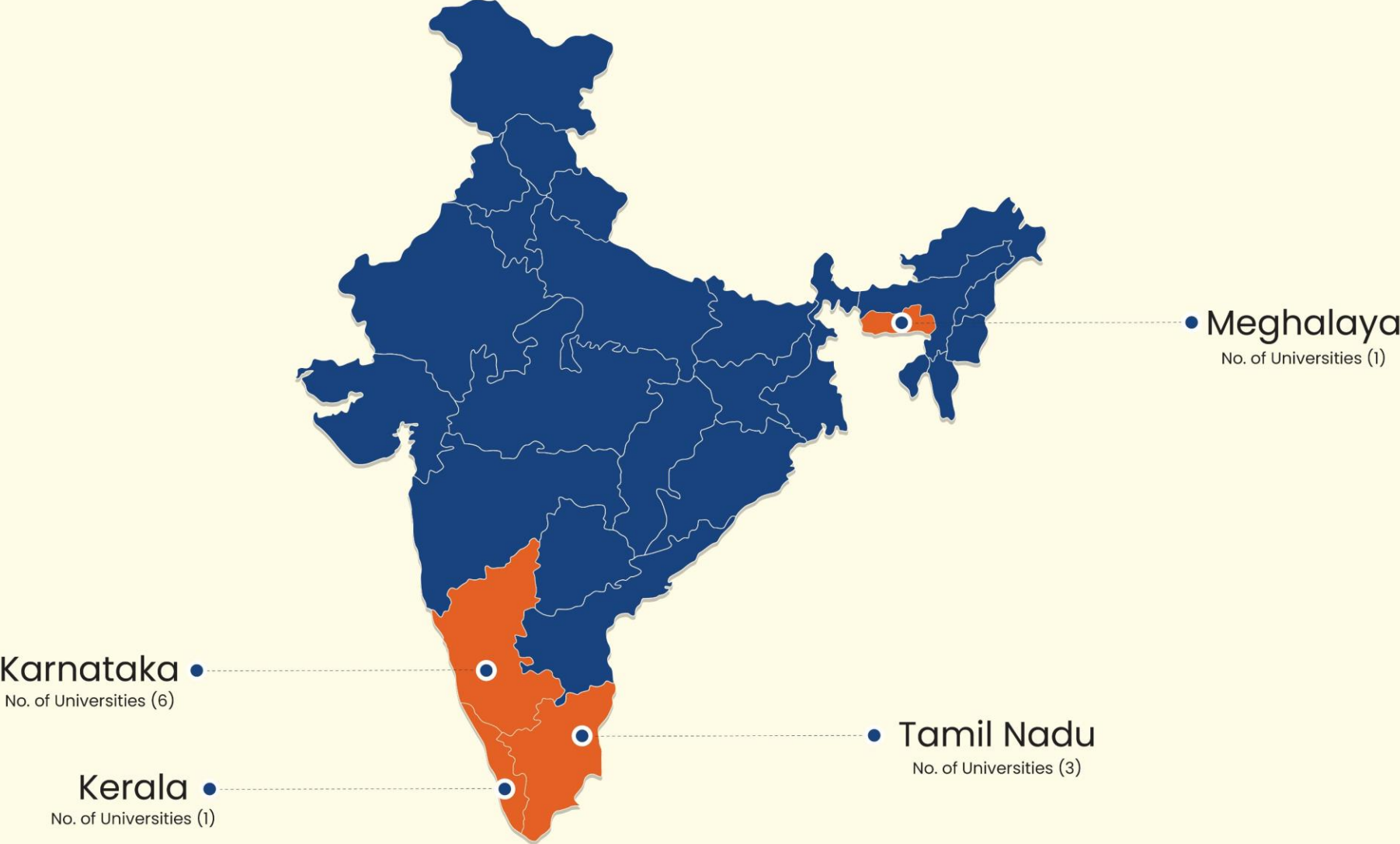
**Email address:** prashantv@jssuni.edu.in

# Details of the grants

## Expenditure details consolidated (PMU+Spoke)

| Budget Heads                            | Amount Sanctioned With date | Amount Received with date 17/02/2022 | Amount Utilized with the date | Balance Amount to be received |
|---|-----------------------------|--------------------------------------|-------------------------------|-------------------------------|
| Manpower (PMU)                          | 18,00,000.00                | 14,40,000.00                         | 18,00,000.00                  | 3,60,000.00                   |
| Laptop (PMU)                            | 1,00,000.00                 | 90,000.00                            | 1,00,000.00                   | 10,000.00                     |
| Advertisement/ Banners (PMU)            | 2,50,000.00                 | 2,00,000.00                          | 2,50,000.00                   | 50,000.00                     |
| Local travel (PMU)                      | 2,00,000.00                 | 1,60,000.00                          | 2,00,000.00                   | 40,000.00                     |
| Miscellaneous / Overhead (PMU)          | 1,50,000.00                 | 1,20,000.00                          | 1,50,000.00                   | 30,000.00                     |
| Boarding & Lodging (Training)           | 68,25,000.00                | 54,60,000.00                         | 68,25,000.00                  | 13,65,000.00                  |
| Honorarium (Training)                   | 5,60,000.00                 | 4,48,000.00                          | 5,60,000.00                   | 1,12,000.00                   |
| Stationaty / Miscellaneous (Training)   | 2,50,000.00                 | 2,00,000.00                          | 2,50,000.00                   | 50,000.00                     |
| Local travel (Training)                 | 10,00,000.00                | 8,00,000.00                          | 10,00,000.00                  | 2,00,000.00                   |
| Contingency (Training)                  | 2,00,000.00                 | 1,60,000.00                          | 2,00,000.00                   | 40,000.00                     |
| Local Travel (Awareness Program)        | 1,20,000.00                 | 96,000.00                            | 1,20,000.00                   | 24,000.00                     |
| Refreshment & Lunch (Awareness Program) | 90,000.00                   | 72,000.00                            | 90,000.00                     | 18,000.00                     |
| Memorabilia / Prize (Awareness Program) | 45,000.00                   | 36,000.00                            | 45,000.00                     | 9,000.00                      |
|   | <b>1,15,90,000.00</b>       | <b>92,82,000.00</b>                  | <b>1,15,90,000.00</b>         | <b>23,08,000.00</b>           |

# DST-STUTI training program: Conducted states



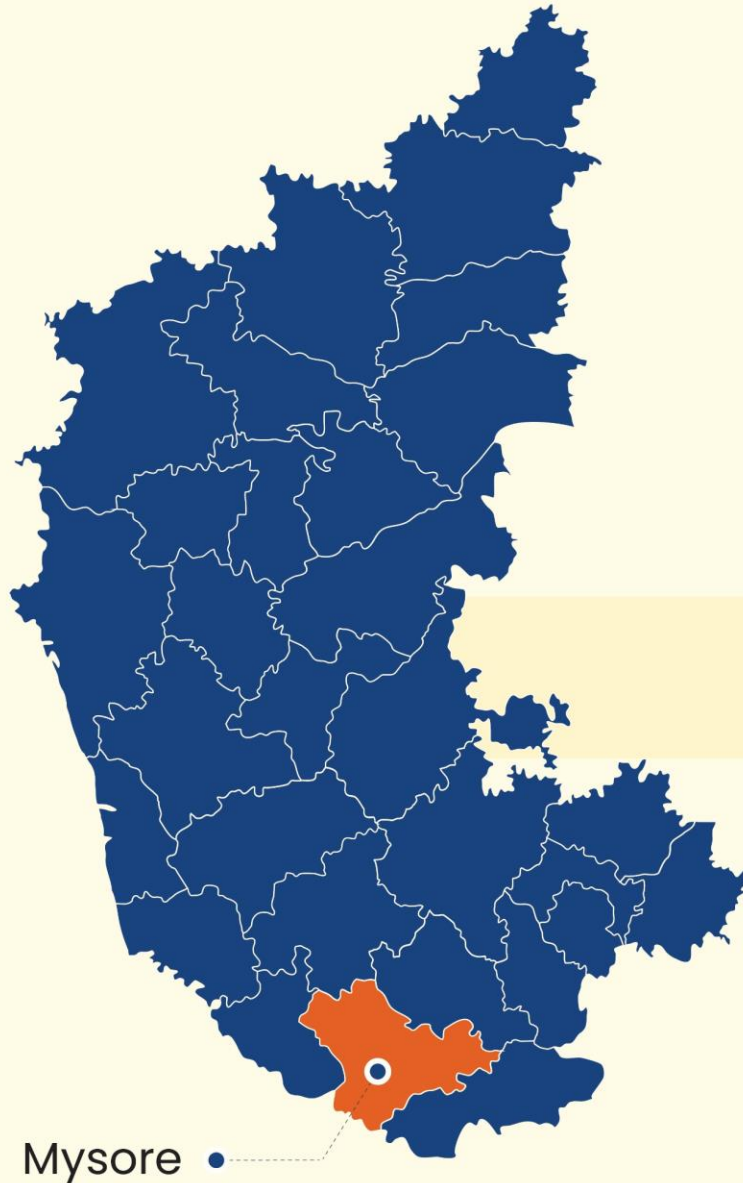


# Details of different trainings conducted

- JSS Medical College, JSS AHER, Mysore, Karnataka
- University of Mysore, Mysore, Karnataka
- JSS Medical College & Hospital. JSS AHER, Mysore, Karnataka
- JSS College of Pharmacy, Ooty, Tamilnadu
- Kuvempu University & Sahyadri Science College, Shivmogga, Karnataka
- Bharathiar University, Coimbatore, Tamilnadu
- Mangalore University, Mangalore, Karnataka
- Bharathidasan University, Tiruchirapalli, Tamilnadu
- North-Eastern Hill University Shillong, Meghalaya
- Mahatma Gandhi University, Kottayam, Kerala & St. Dominic's College, Kanjirapally, Kerala
- Indian Institute of Science Bangalore, Karnataka

# KARNATAKA

## Molecular Epidemiology of Infectious Diseases: Translational Research from Bench to Bedside to the Field



Mysore ●

Place

**Mysore, Karnataka**

Organization

**JSS Medical College, JSS AHER**

Date

**21<sup>st</sup> to 27<sup>th</sup> March, 2022**

Major Equipments/Facilities utilized

**Advanced confocal microscopy, Polymerase Chain Reaction, MLST and analysis of gene sequence data, Multiplex PCR, Real Time PCR**

# Scientific and technological methodologies used to impart the training program

Training Program 1: Molecular Epidemiology of Infectious Diseases: Translational Research from Bench to Bedside to the Field

Demonstration and application of advanced confocal microscope

Multiplex PCR: Protocol development and applications

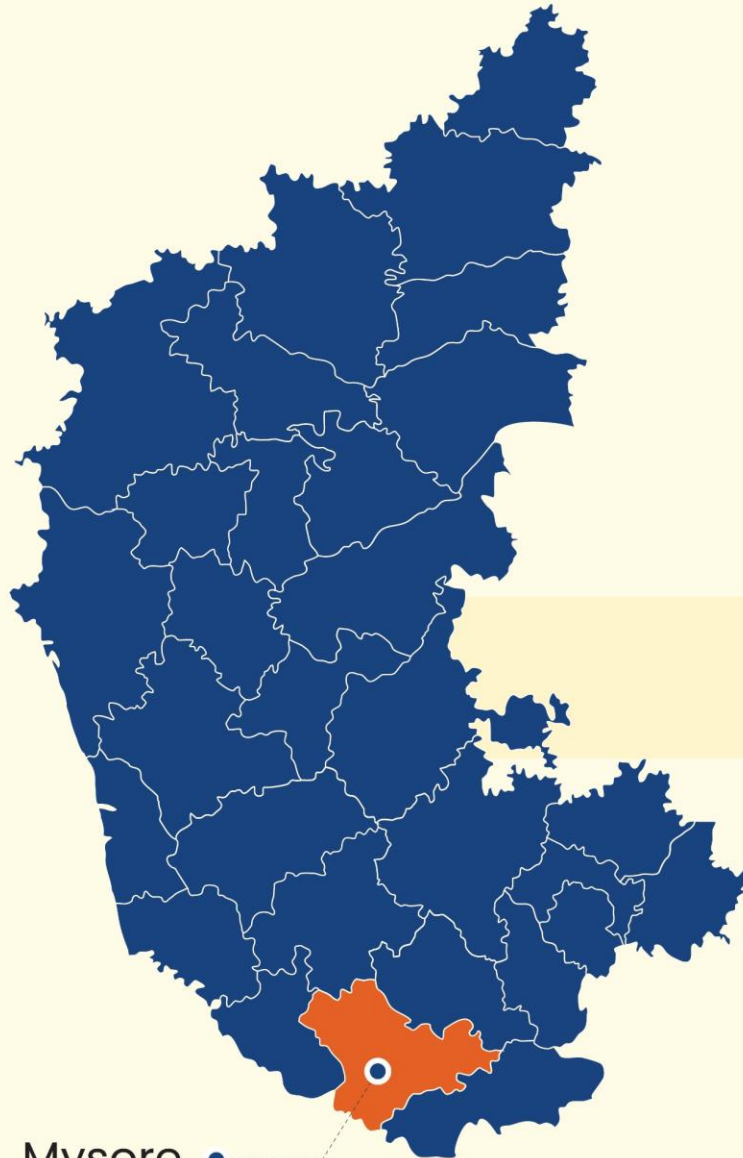
Isolation of nucleic acids from cancer cells, quantification and quality assessment

Real Time PCR: Protocol and applications in disease diagnosis



# KARNATAKA

## Advanced Equipment Handling and Applications in Molecular Biology



Mysore ●

Place

**Mysuru, Karnataka**

Organization

**University of Mysore**

Date

**25<sup>th</sup> to 01<sup>st</sup> May, 2022**

Major Equipments / Facilities utilized

**Confocal Scanning Laser, NMR and next  
generation sequencing (NGS)**



# Scientific and technological methodologies used to impart the training program

## Training Program 2: Advanced Equipment Handling and Applications in Molecular Biology

Fundamentals of NMR Spectrometry (multidimensional) and Confocal Spectroscopy and their applications

Application of NMR in determination of proteins and nucleic acids

Next Generation Sequencing (NGS)

Small molecule: structure and dynamics

# KARNATAKA

## Cytogenetics, Cell, and Molecular Biology Techniques

Place

**Mysuru, Karnataka**

Organization

**JSS Medical College  
and Hospital, JSS AHER**

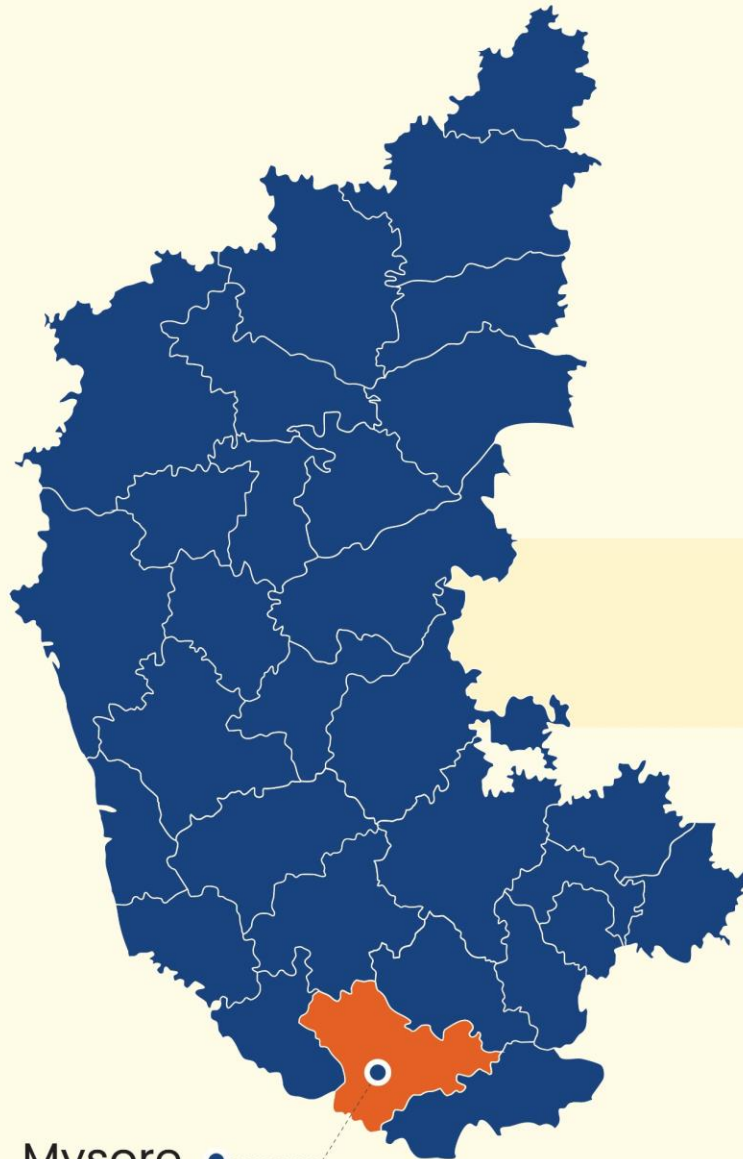
Date

**18<sup>th</sup> to 24<sup>th</sup> June**

Major Equipments / Facilities utilized

**Real time PCR, qRT-PCR, SDS-PAGE, Fluorescence in situ  
Hybridization (FISH)**

Mysore



# Scientific and technological methodologies used to impart the training program

## Training Program 3: Cytogenetics, Cell, and Molecular Biology Techniques

Culture setup, Harvesting & banding

Fluorescence in situ hybridization (FISH)

Karyotyping- characterization of normal and abnormal chromosomes

DNA isolation from blood, DNA isolation from bacteria

Mammalian cell culture, Cell counting, Sub culturing, Collection of protein lysates & western blotting

Primer designing & PCR, ARMS PCR for mutation analysis

RNA isolation & quality check, cDNA synthesis

Quantitative real time PCR, Data analysis



# TAMIL NADU

## Basic Techniques in Pharmaceutical Formulation, Analytical and Preclinical Studies

Place

**Ooty, Tamil Nadu**

Organization

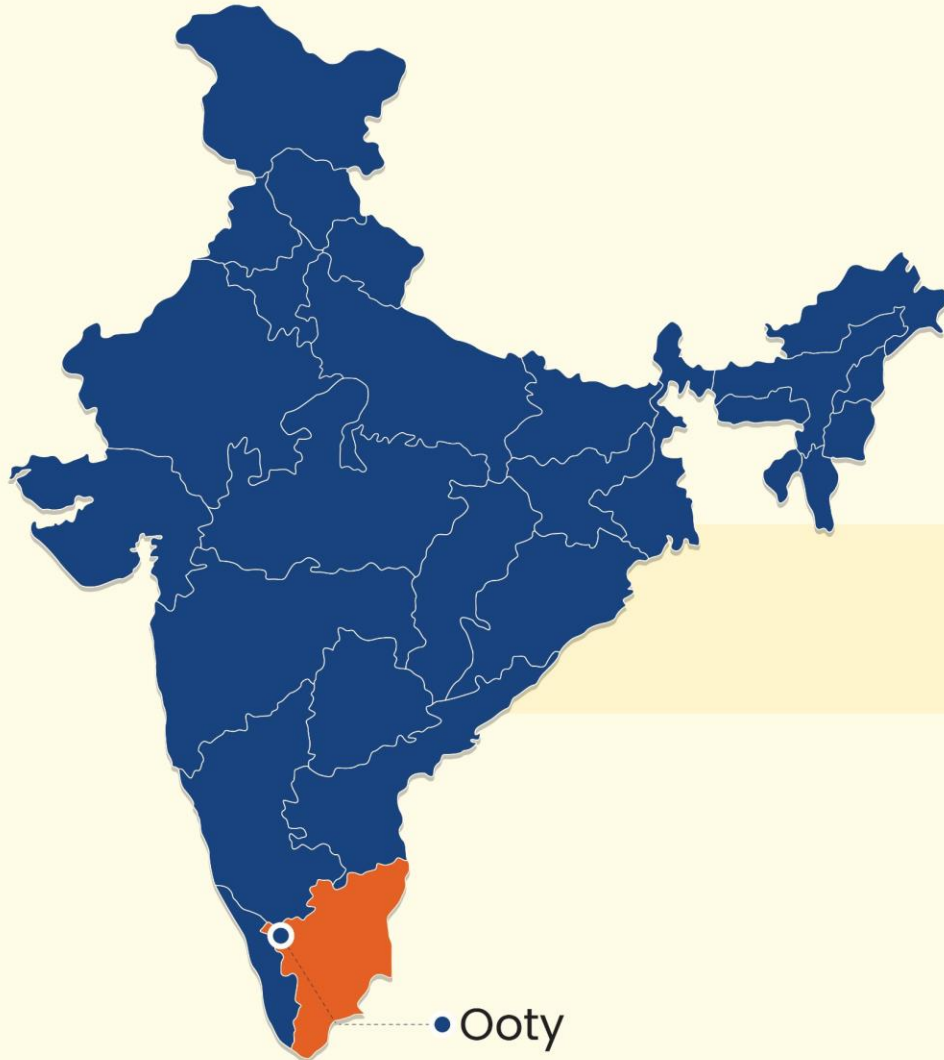
**JSS College of Pharmacy**

Date

**27<sup>th</sup> to 03<sup>rd</sup> July, 2022**

Major Equipments / Facilities utilized

**Differential Scanning Calorimetry, FT-IR Spectrometer,  
LCMS, LC/MS/MS, OPLC, AAS and Spectrometer.**



• Ooty



# Scientific and technological methodologies used to impart the training program

## Training Program 4: Basic Techniques in Pharmaceutical Formulation, Analytical and Preclinical Studies

Demonstration and experiments on spray dryer, texture analyzer, particle sizer and Differential Scanning Calorimetry

Handling of laboratory animals

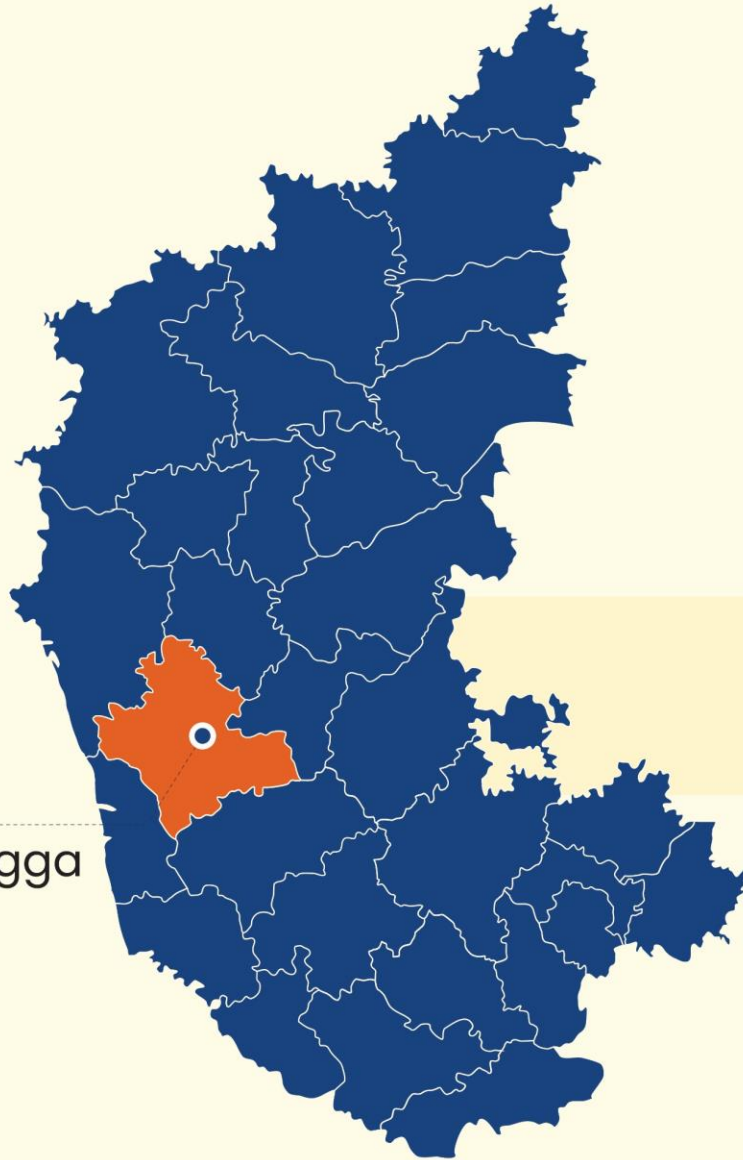
Routes of drug administration

Bioassay using Chick Ileum

Blood collection techniques & surgical techniques isolated tissue experiments & design of pre-clinical experiments

# KARNATAKA

## Phytomedicines: Extraction, Purification, *In vivo* and *In vitro* studies



Shivamogga

Place

**Shivmogga,  
Karnataka**

Organization

**Kuvempu University &  
Sahyadri Science College**

Date

**24<sup>th</sup> to 30<sup>th</sup> June, 2022**

Major Equipments/Facilities utilized

**Real time PCR, qRT-PCR, SDS-PAGE, TLC and silica gel  
chromatography**

# Scientific and technological methodologies used to impart the training program

## Training Program 5: Phytomedicines: Extraction, Purification, *In vivo* and *In vitro* studies

Phytochemical extraction methods, purification from the extracts based on their charge, hydrophobicity and size

Characterization of purified molecules using UV-Visible spectrophotometer

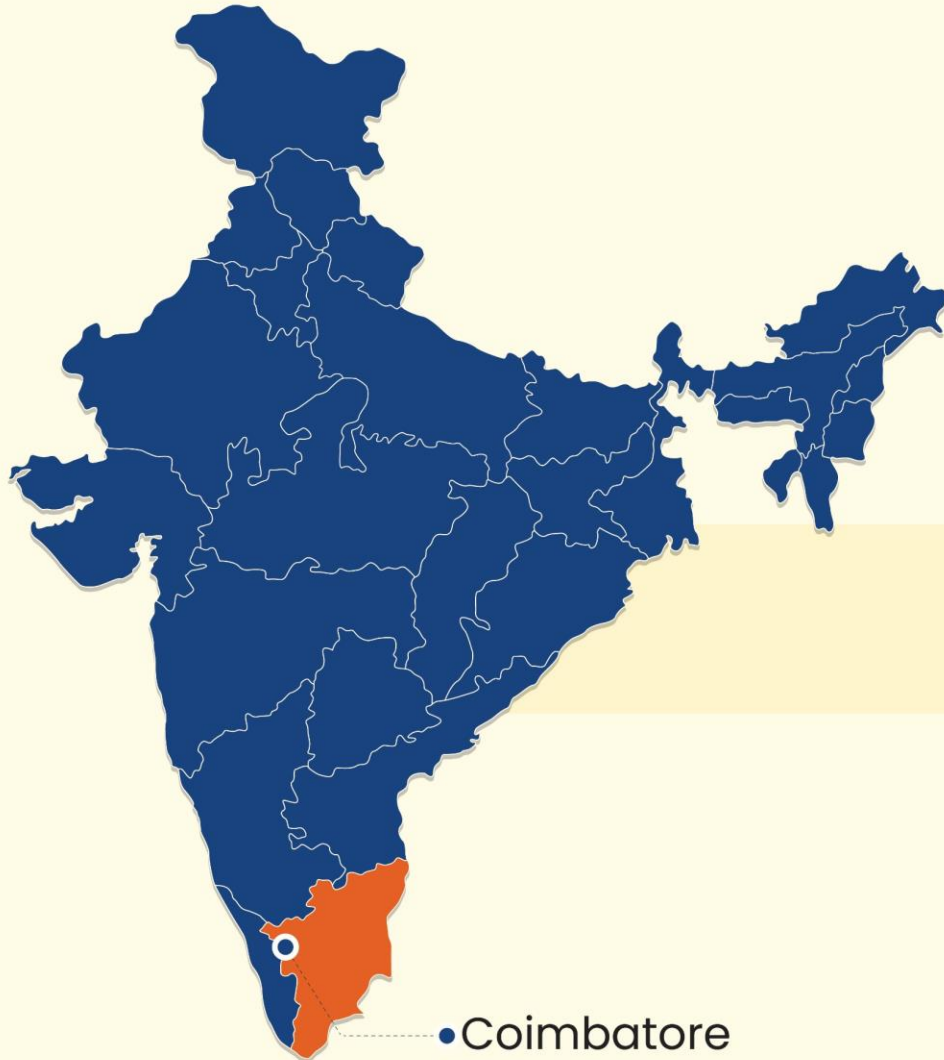
Thin Layer Chromatography (TLC) & High-Performance Liquid Chromatographic (HPLC) procedures

Mammalian cell culture methods (freezing, thawing, and propagation of cell lines, cell viability determination by MTT etc)

Extraction of total RNA, quality assessment, cDNA synthesis and quantitative real time polymerase chain reaction (qRT-PCR)

Isolation and quantification of proteins from cultured cells and detection of a specific protein by SDS-PAGE and western blotting





# TAMIL NADU

## Advanced Immunotechniques

Place

**Coimbatore,  
Tamil Nadu**

Organization

**Bharathiar University**

Date

**07<sup>th</sup> to 13<sup>th</sup> September,  
2022**

Major Equipments / Facilities utilized

**ELISA and Flow, Cytometry SDS-PAGE  
analysis**



# Scientific and technological methodologies used to impart the training program

## Training Program 6: Advanced Immunotechniques

Hands-on training on Immunoblotting

Immuno cytometric analysis such as ELISA and Flow cytometry

Immunohistochemical staining

Isolation and quantification of protein samples, SDS-PAGE analysis, guidance in selection and dilution of antibodies

Trouble shooting in transfer techniques and cell preparations for flow cytometry-based cell cycle analysis

Basic techniques in mammalian cell culture handling, passaging and harvesting of adherent cells and protein isolation from cells

# KARNATAKA

## Applications of Radiation and Radioisotopes in Physical, Materials, Chemical and Biological Science Research

Place

**Mangalore,  
Karnataka**

Organization

**Mangalore University**

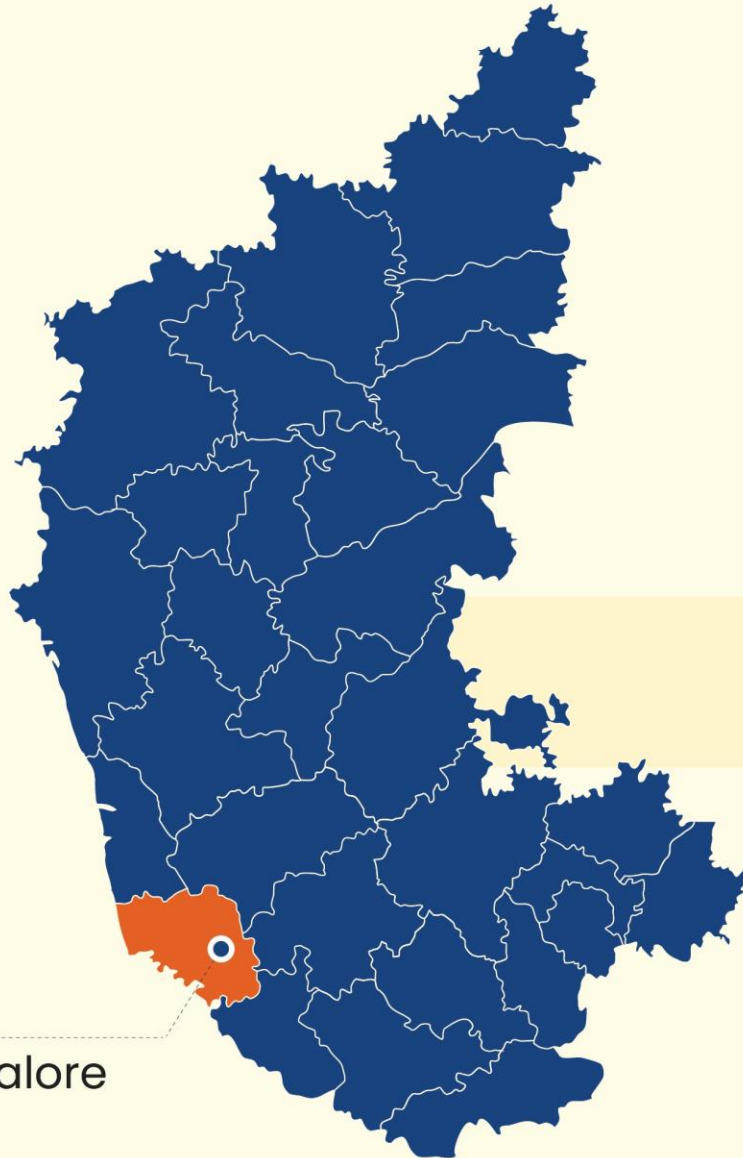
Date

**10<sup>th</sup> to 17<sup>th</sup> October, 2022**

Major Equipments / Facilities utilized

**HPGe Gamma Spectrometers, Liquid Scintillation Spectrometer, FESEM, Single Crystal XRD, NMR Spectrometer, Laser Scanning Confocal Microscope, TGA/DSC, LCMS/MS and GCMS**

Mangalore



# Scientific and technological methodologies used to impart the training program

## Training Program 7: Applications of Radiation and Radioisotopes in Physical, Materials, Chemical and Biological Science Research

$^{14}\text{C}$ -UBT for *Helicobacter pylori* detection.

Irradiation assisted synthesis of nanocomposites

Linear accelerators and brachytherapy systems for radiation therapy

Radiation dosimetry

Radioimmunoassay (RIA)



# TAMIL NADU

## Marine Bioresources and Pollutant Biomarkers

Place

**Tiruchirapalli,  
Tamil Nadu**

Organization

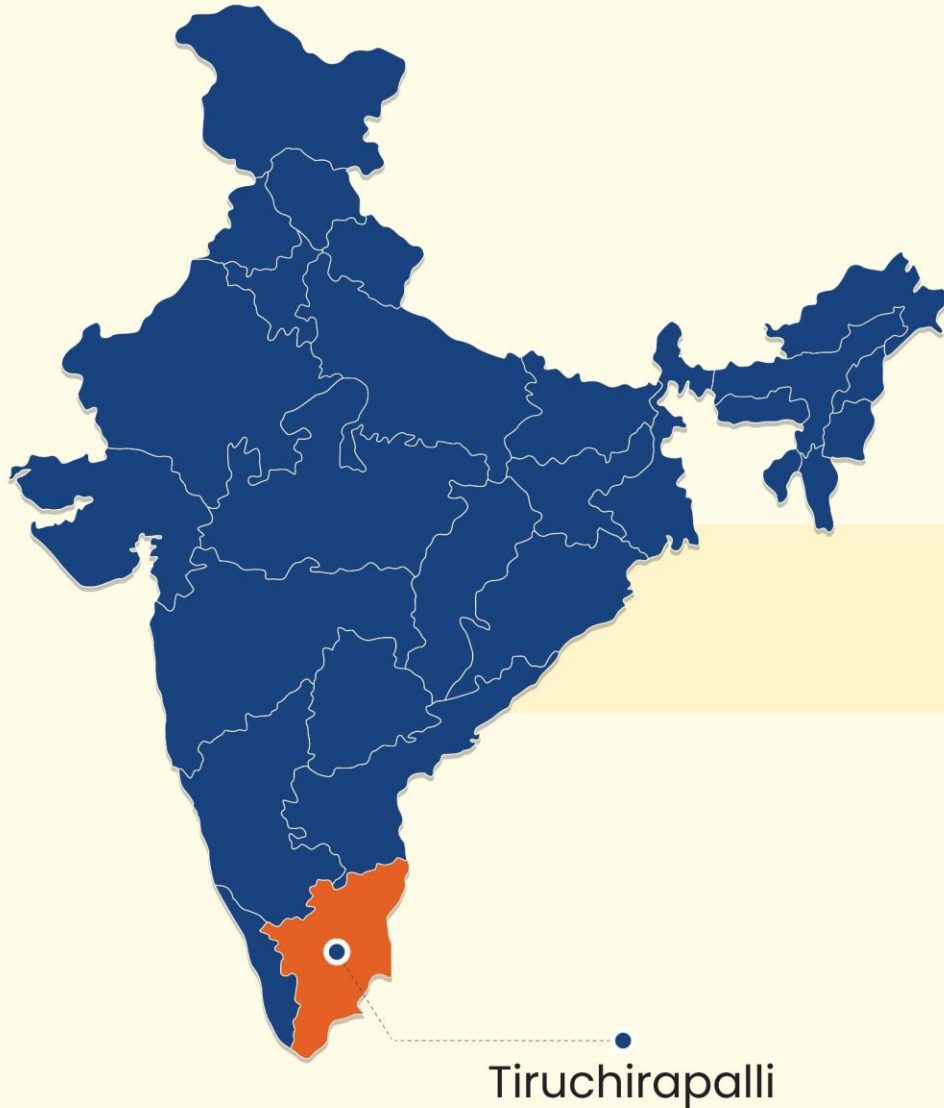
**Bharathidasan University**

Date

**13<sup>th</sup> to 19<sup>th</sup> October, 2022**

Major Equipments / Facilities utilized

**LCMS, GCMS, RT-PCR**



Tiruchirapalli





Shillong

# MEGHALAYA

## Advanced analytical and imaging techniques

Place

**Shillong,  
Meghalaya**

Organization

**North - Eastern Hill  
University (NEHU)**

Date

**01<sup>st</sup> to 07<sup>th</sup> November,  
2022**

Major Equipments / Facilities utilized

**TEM, SEM, Microscope with image analyzer FT-NMR,  
ICP-OES, GF-AAS and LC-MS**

# Scientific and technological methodologies used to impart the training program

## Training Program 8: Marine Bioresources and Pollutant Biomarkers

Hands-on analytical sessions using LCMS, GCMS and RT PCR aimed to provide an overview of environmental contamination, techniques, and analysis methods with relation to marine resources and pollution

Resourceful lectures on Biomarker studies and the Advanced Instrumentation for pollution analysis with emphasis to marine environment collected from Mandapam bioreserve

## Training Program 9: Advanced analytical and imaging techniques

CD-Spectroscopy, Western blotting & Immunohistochemistry, RNA isolation, cDNA synthesis, PCR, RT-qPCR, chromatographic separation of proteins, their principle, and applications.

Sample preparation and working with SEM, TEM, ICAS, Confocal microscopy





# KERALA

## Chromatography, Spectroscopy and Microscopy

Place

**Kottayam, Kerala**

Organization

**Mahatma Gandhi  
University and St. Dominic's  
College, Kanjirapally**

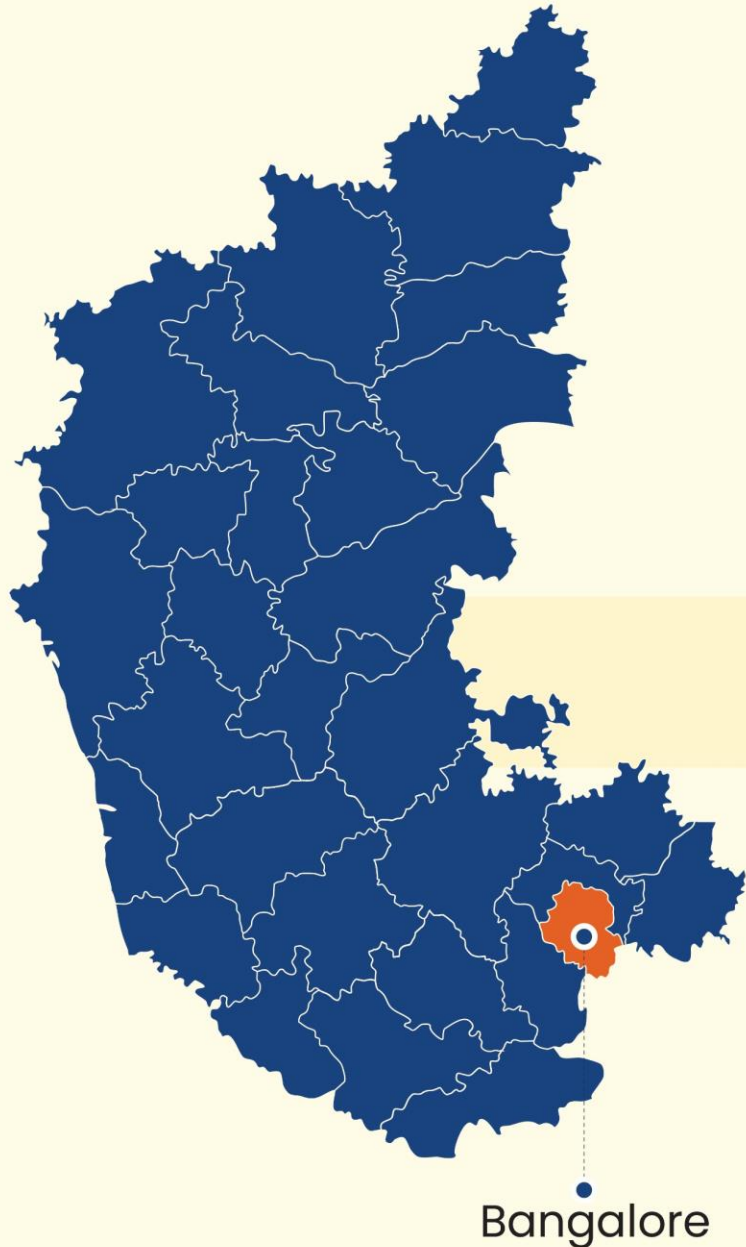
Date

**01<sup>st</sup> to 07<sup>th</sup> November,  
2022**

Major Equipments / Facilities utilized

**LC-MS/MS, ICP-MS, LC-QTOF, HPLC, FESEM, UV-Visible Spectrophotometer, Fluorescence Spectrometer with life time detector and Confocal Raman Microscope with Atomic Force Microscope (AFM), Fourier-Transform Infrared Spectroscopy (FTIR), Atomic Absorption Spectroscopy (AAS), Universal Testing Machine (UTM)**





# KARNATAKA

## Mass spectrometry

Place

**Bangalore,  
Karnataka**

Organization

**Indian Institute of  
Science (IISc)**

Date

**02<sup>nd</sup> to 08<sup>th</sup> January**

Major Equipments / Facilities utilized

**Liquid Chromatography and Mass Spectrometry (LCMS)  
and Gas Chromatography and Mass Spectrometry  
(GCMS), QTOF, MALDI TOF**

# Scientific and technological methodologies used to impart the training program

## Training Program 10: Chromatography, Spectroscopy and Microscopy

Basics of LC-MS/MS, ICP-MS, LC-QTOF, HPLC, FESEM, UV-Visible Spectrophotometer, Fluorescence Spectrometer with life time detector and Confocal Raman Microscope with Atomic Force Microscope (AFM), Fourier-Transform Infrared Spectroscopy (FTIR), Atomic Absorption Spectroscopy (AAS), Universal Testing Machine (UTM)

## Training Program 11: Mass spectrometry

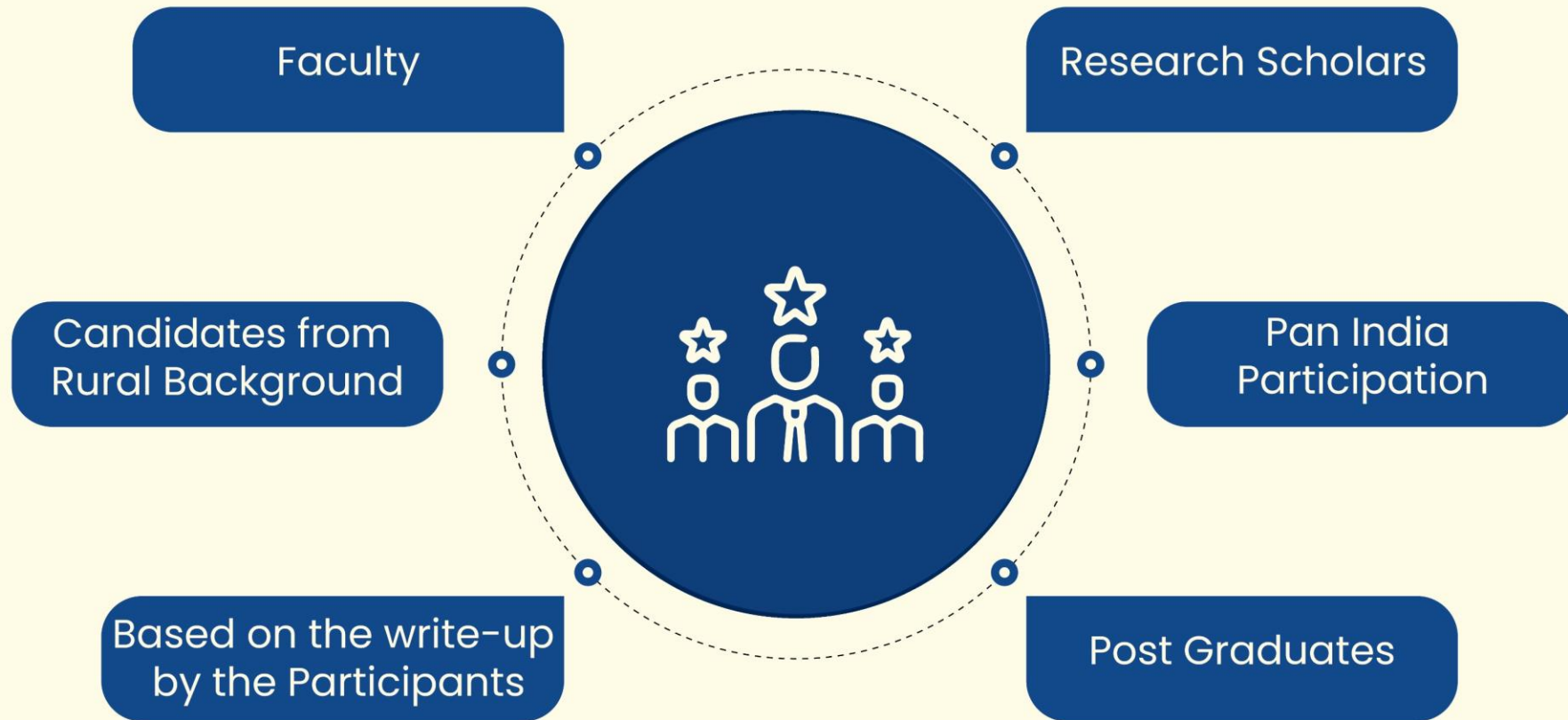
Basics of Liquid Chromatography and Mass Spectrometry (LCMS) and Gas Chromatography and Mass Spectrometry

Basics of Mass Spectrometry

Small molecule and protein profiling by MALDI and LCQTOF

Profiling of volatile compounds by GCMS, acquisition and data analysis

# Parameters adopted for selection of candidates in a training batch

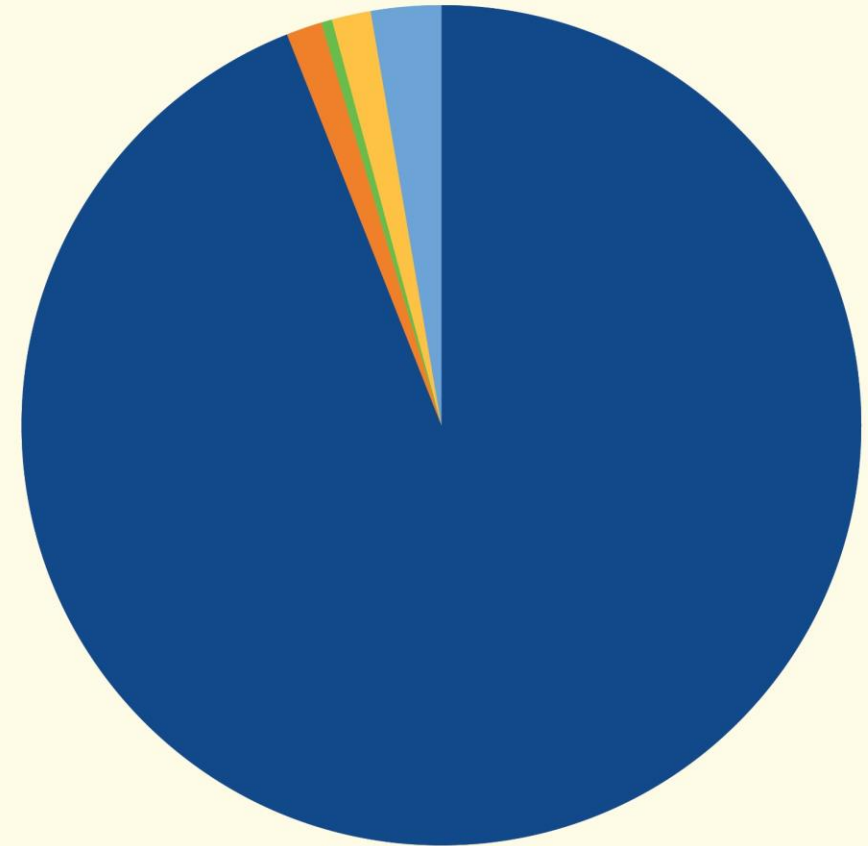




# Participants under different subject areas

## Subject Area & Number of Participants

|                        |     |
|------------------------|-----|
| ■ Life Sciences        | 322 |
| ■ Chemical Sciences    | 05  |
| ■ Engineering Sciences | 01  |
| ■ Earth Sciences       | 05  |
| ■ Physical Sciences    | 10  |



# Training organization category



## Central University

- North-Eastern Hill University, Shillong, Meghalaya



## State University

- University of Mysore, Karnataka
- Kuvempu University, Shivamogga, Karnataka
- Bharathiar, University, Coimbatore, Tamilnadu
- Mangalore University, Mangalagangothri, Karnataka
- Bharathidasan University, Tiruchirapalli, Tamilnadu
- Mahatma Gandhi University, Kottayam, Kerala

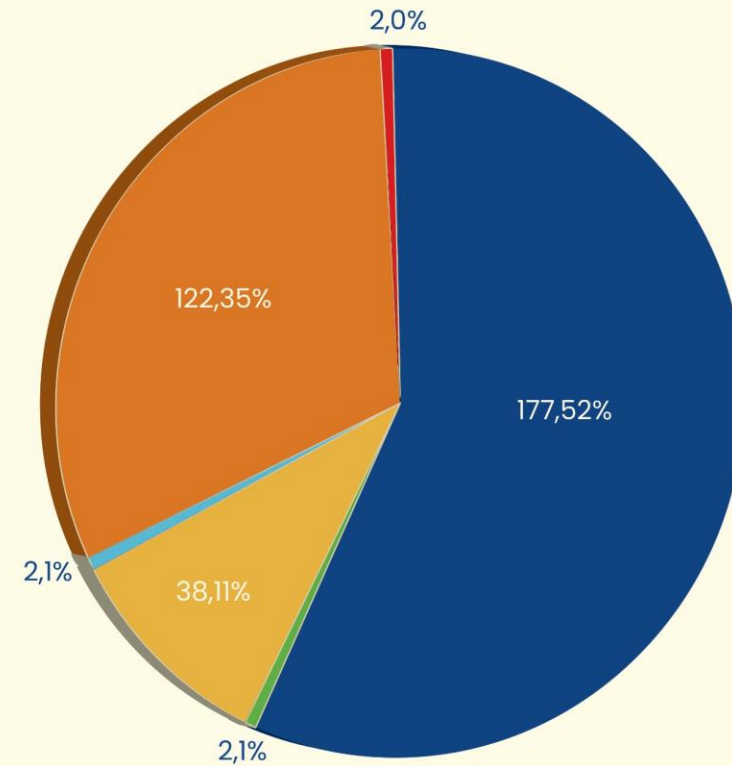


## Private Organization

- JSS Medical College and Hospital, Mysore, Karnataka
- JSS Medical College, JSS AHER, Mysore, Karnataka
- JSS Pharmacy College, Ooty, Tamil Nadu

# Participant's category

- Professional Graduates (MBBS)
- Research Scholars
- Post-Doctoral Fellows
- Faculty
- Industrial Professional
- Post Graduates





# Organizations covered for field visits



## **Bharathidasan University**

Tiruchirapalli, Tamil Nadu

Gulf of Mannar Bioserve,  
Rameswaram, Tamilnadu

Central Marine Fisheries  
& Research Institute,  
Mandapam, Tamil Nadu



## **Mahatma Gandhi University**

Kottayam, Kerala

Rubber Research Institute,  
Kottayam, Kerala

St. Mary's Rubbers Pvt.Ltd.  
Glove manufacturing  
Industry, Kanjirapally, Kerala



## **Indian Institute of Sciences (IISc)**

Bangalore, Karnataka

SCIEX- Bangalore

# Field visits



Gulf of Mannar Bioserve,  
Rameshwaram, Tamil Nadu



Central Marine Fisheries & Research  
Institute, Mandapam, Tamil Nadu



St.Mary's Rubber Pvt. Ltd.  
Glove Manufacturing Industry,  
Kanjirapally, Kerala

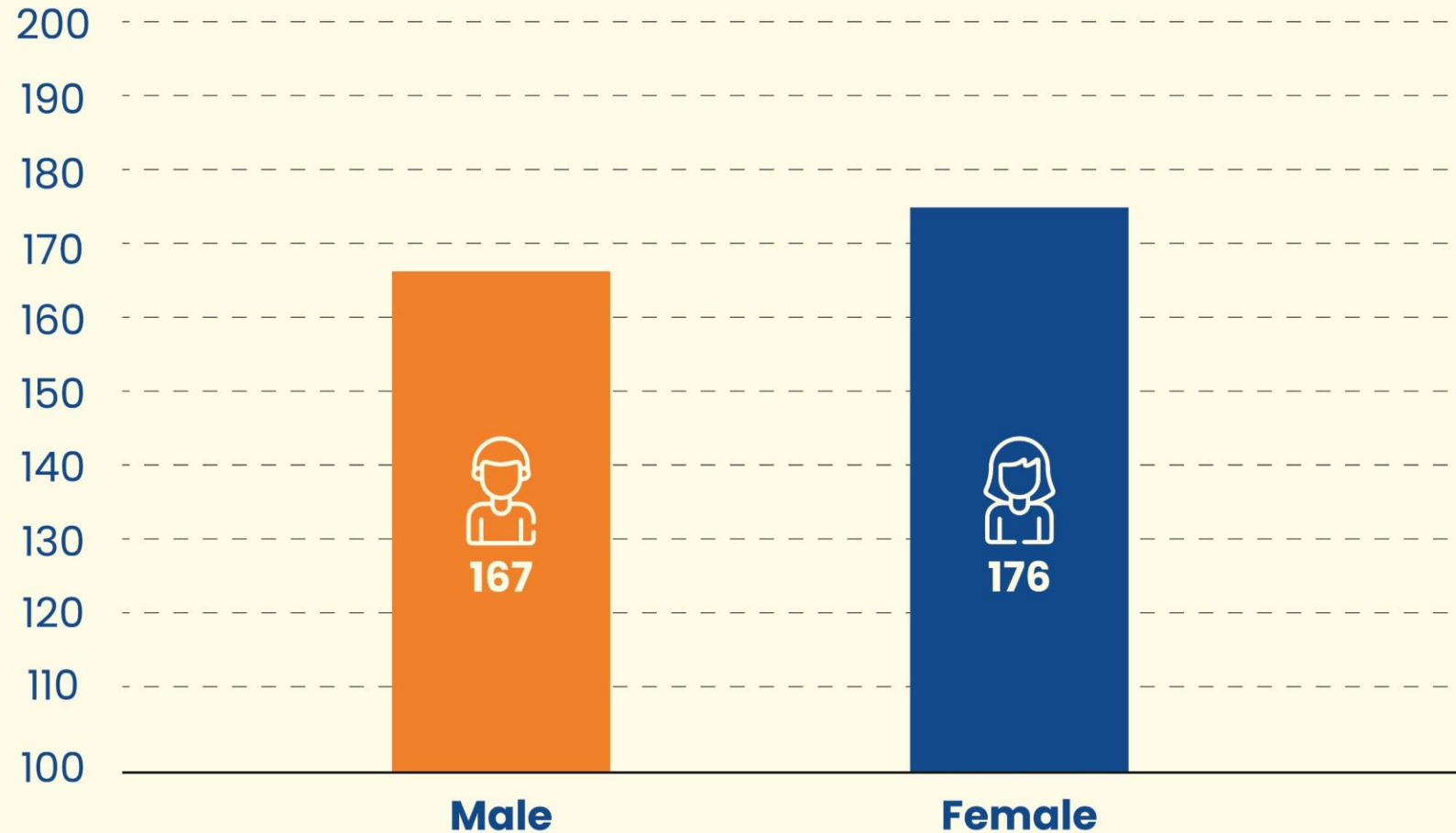


SciEx - Bangalore



Rubber Research Institute,  
Kottayam, Kerala

# Gender distribution of participants of training program

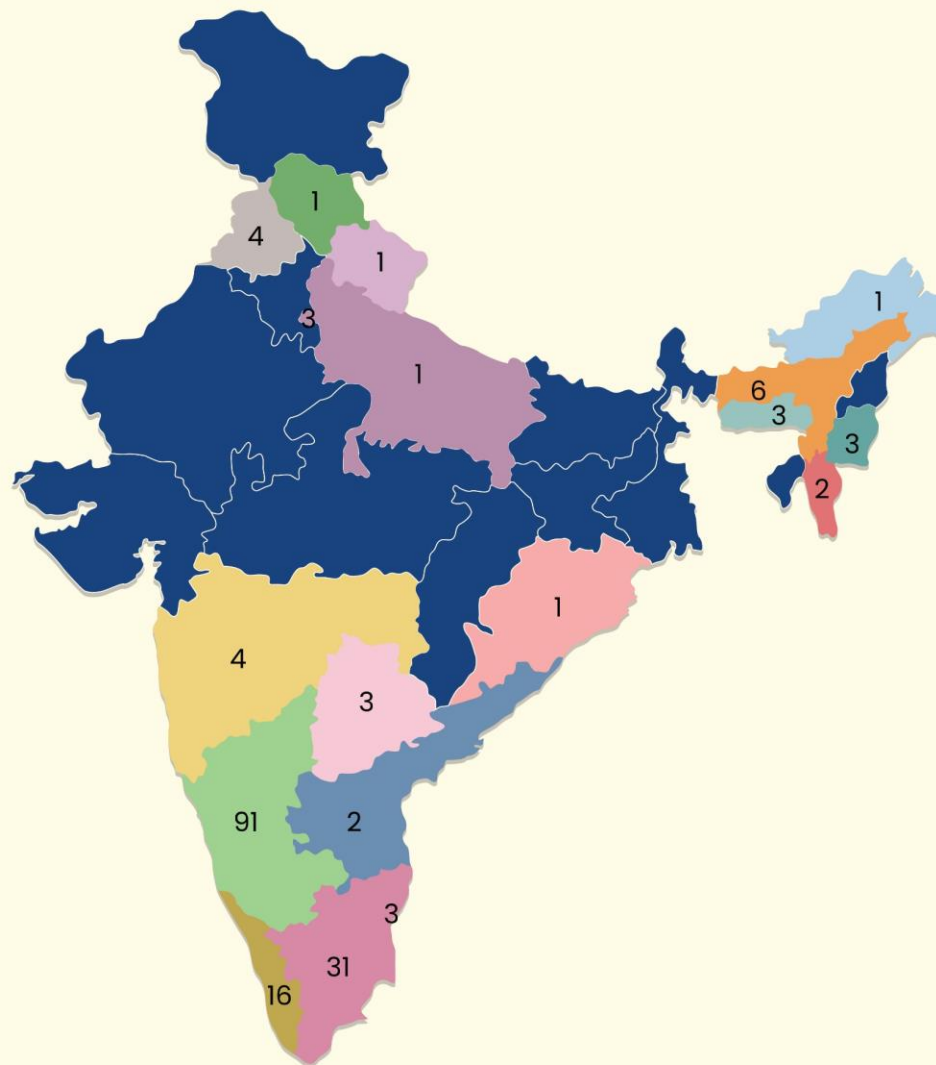




# Female participants: DST-STUTI program

## State

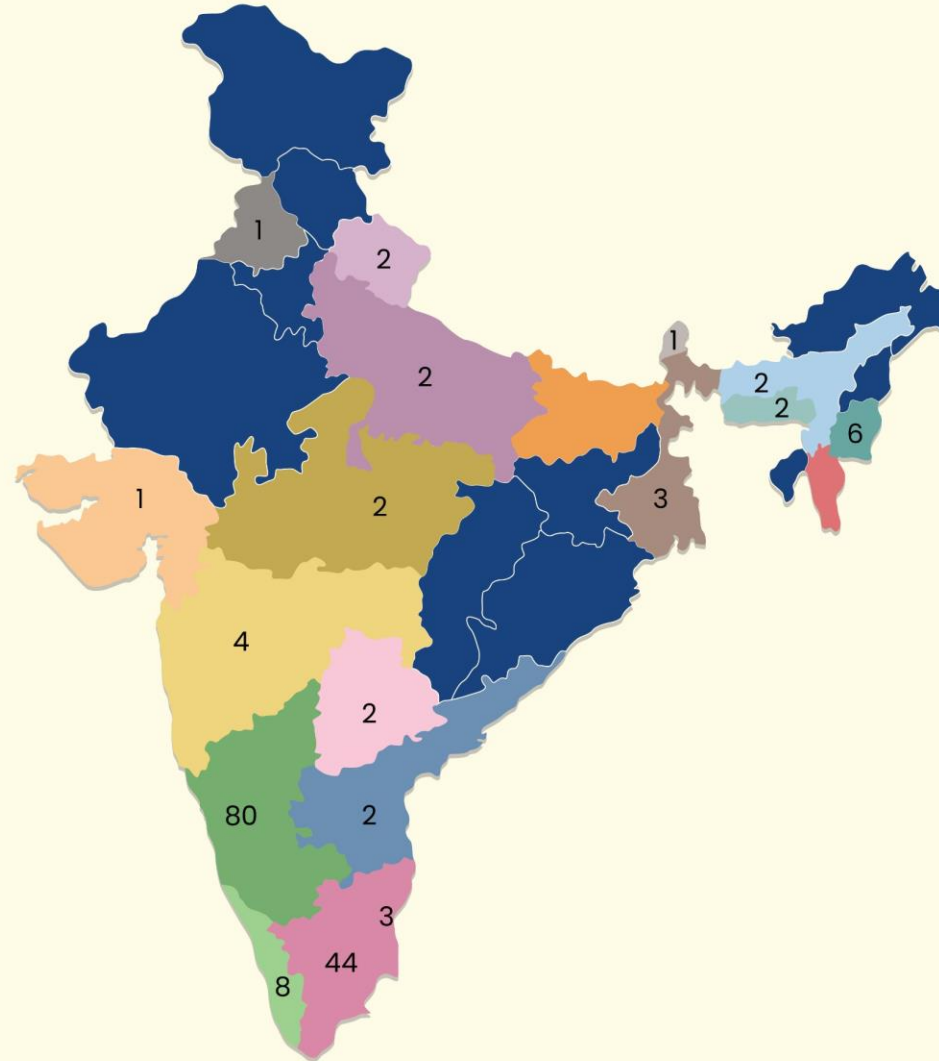
- Andhra Pradesh
- Arunachal Pradesh
- Assam
- Delhi
- Himachal Pradesh
- Karnataka
- Kerala
- Maharashtra
- Manipur
- Meghalaya
- Mizoram
- Odisha
- Pondicherry
- Punjab
- Tamil Nadu
- Telangana
- Uttar Pradesh
- Uttarakhand



# Male participants: DST-STUTI program

## State

- Andhra Pradesh
- Assam
- Bihar
- Gujrat
- Karnataka
- Kerala
- Madhya Pradesh
- Maharastra
- Manipur
- Meghalaya
- Mizoram
- Pondicherry
- Punjab
- Sikkim
- Tamil Nadu
- Telangana
- Uttar Pradesh
- Uttarakhand
- West Bengal



# Significant activities of the training program

Hands on-sessions on advanced instruments.

Special attention to every participant regarding hands-on.

Demonstration and discussions with technical experts.

Knowledge assessment of participants after the training programme.

Pre and Post assessment tests.



## Scope of the training program

STUTI Program flexible and liberal

Budgetary heads should include head of accounts for consumables

Extended the number of days of training programme

Reduce the number of participants

## Parameters of selecting institutions for training programs

Universities/Institutions supported by DST through FIST/PURSE/SAIF

# Parameters of selecting resource faculty

Industry and academia experts

Experienced faculty of renowned institutions

# Feedback from participants

Positive feedback for the workshop and appreciated the DST STUTI scheme

Demand to increase the number of training period

Focus on specific topic / instrument

Greater platform for connectivity between the researchers

## **Feedback from host institutions**

Wider collaborations and greater networking for both hub and spoke institutions

## **Pan India participation**

Propaganda of the training programs across India through social media and scientific forums

Helped applicants from various parts of the country to apply for the workshops

Preference given to participants from different parts of India and also to remote and rural areas and gender inclusivity

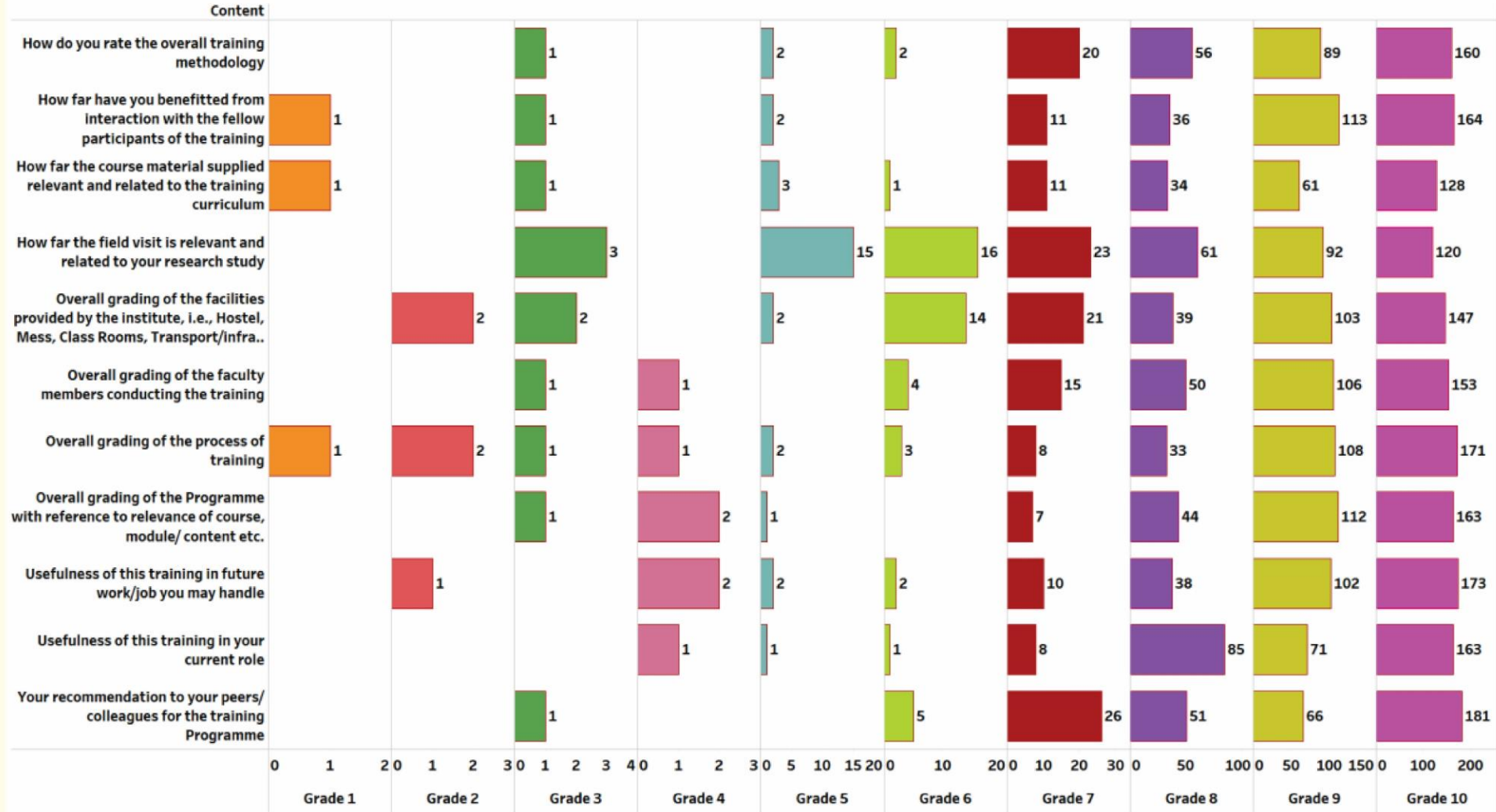


# **Summary highlighting the significant points that emerged from feedbacks as received from different participants across various training programs**

Participants declared that they had acquired conducive skills and knowledge and they also mentioned that all our training programs were well organized

Overall grading of the training program assessed by the participants showed that the training programme organized by JSS AHER through DST-STUTI program had a grand success as shown by the graph below

### DST-STUTI: Feedback Analysis of Participants

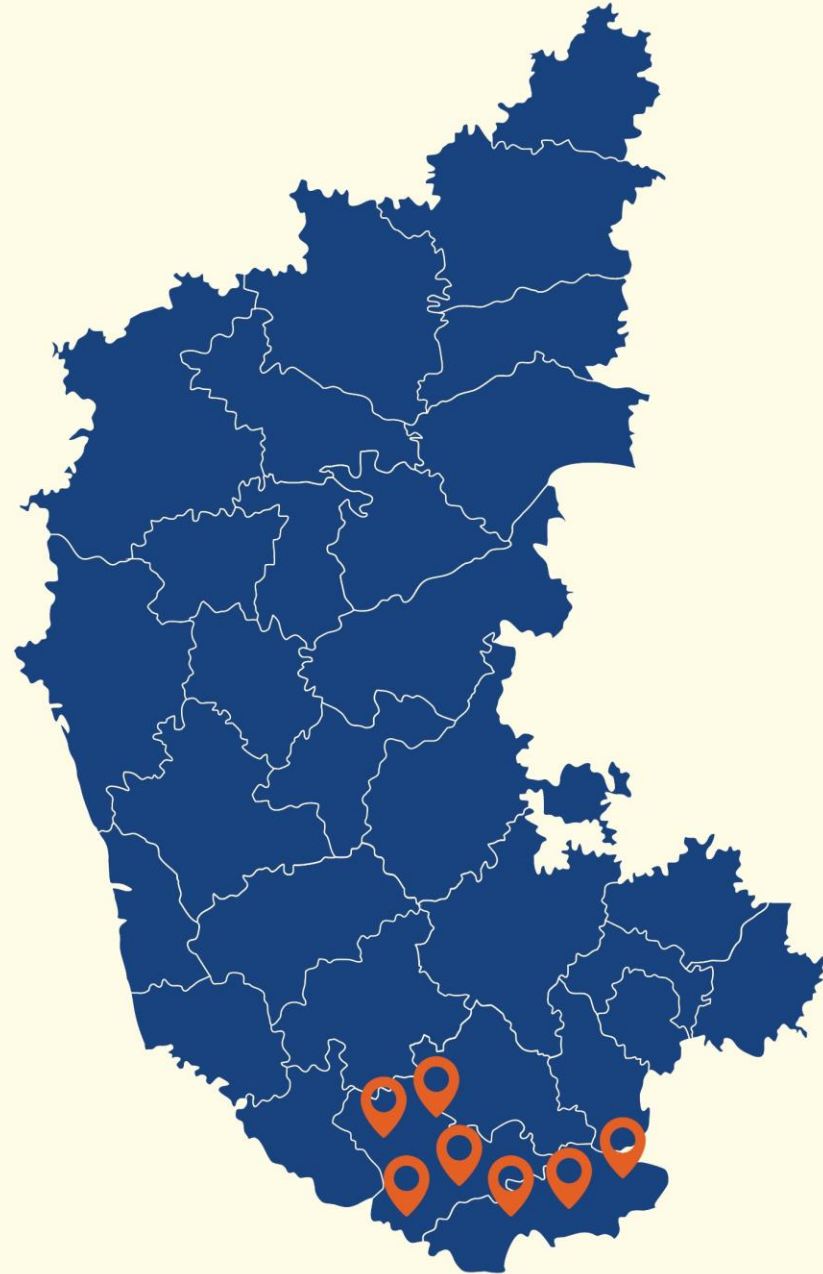


## **Other significant activities by JSS AHER through STUTI program**

PMU could organize 7 awareness programmes and 11 training workshops with the support of additional funding from the institution

Additional activities have complemented the diverse objectives of the DST STUTI scheme and helped in wider outreach and greater number of beneficiaries through the scheme





# Awariness program: Conducted places

FEB | 22<sup>nd</sup> to 28<sup>th</sup> | 2022

- Mysore
- Kollegala
- Chamarajanagar
- Gundlupete
- Sarguru
- Suttur
- Varuna

# Photographs of awareness program





# Facilities utilized to create awareness among school & college students



## Physiology

Electrocardiogram and Models of Circulatory System



## Pharmacology

Rota haler, Rota caps and Metered Dose Inhalers

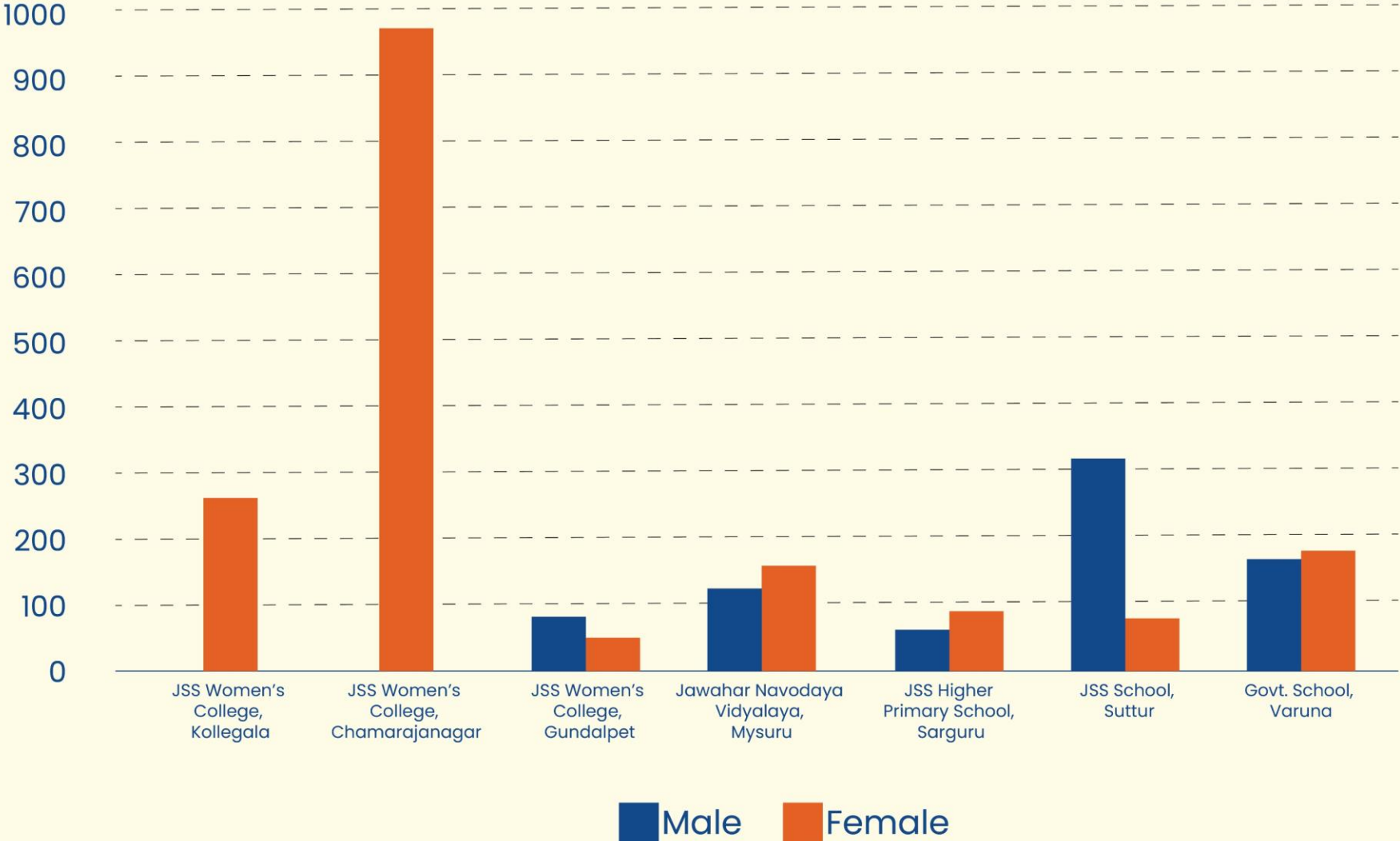


## Forensic Medicine & Toxicology

Cyber Safety Security, & Fingerprinting Techniques



# Gender distribution of awareness program



# Significant activities of awareness program

“Science -on- wheels” concept.

“Bus” enabled with internet- live stream videos related to science and technology

Benefitted over 4000 students from high Schools, colleges, and women in rural & tribal areas

Portable live-cell imaging microscope.

Live experimental models, live skits, infographics, posters, oral health screening, anaemia screening and other aspects of science

# **New collaboration established between faculties of different organizations based on research areas of mutual interest**

JSS AHER with its strong focus on health sciences research is partnering with the spoke institutions on various areas of mutual interest like

Marine Biosciences

Biomarkers

Radioisotopes

Genomics & Proteomics

Advanced Biomedical Research

Metabolomics, and genomic studies in general and ethnic populations

New collaborations have boosted the scientific temperament and would lead to meaningful research with greater outcome leading to better understanding of disease and patient care



# **New activities emerged / conceptualized, pertaining to contributing to the scientific social responsibility**

JSS AHER has conceptualized the “Science on Wheels” wherein a bus was modified by equipping scientific equipments like digital microscopes, PCR labs and other scientific equipments were carried to remote and rural areas

Accompanied by team of scientists, researchers and post graduate students to demonstrate scientific techniques

The institution has committed to create a permanent “Science on Wheels” program

Invited tenders for the purchase and supply of a “long chassis bus”

Creating a Scientific Social Responsibility by spreading the awareness among the rural and underserved population by taking science to their doorstep

