

# CSIR Integrated Skill Initiative



## Certificate course on Skill Development in Advanced Spectroscopic (NMR, HPLC LC-MS, UV/IR) Techniques CSIR-CDRI



Under CSIR-Integrated Skill Initiative, CSIR-Central Drug Research Institute is offering a certificate course on SKILL DEVELOPMENT in advanced spectroscopic techniques. It is intended to generate human resources that are employment ready who gains the knowledge of operating, maintenance of state-of-art spectrometers and also the analysis of the spectroscopic data to fulfil the need and requirement of Pharmaceutical industry and research in the country.

CSIR-CDRI invites applications for “**Certificate course on Skill Development in Advanced Spectroscopic (NMR, HPLC, LC-MS, UV/IR) techniques**” as per the details given below:

<b>Title of the course</b>	<b>: Certificate course on Skill Development in Advanced Spectroscopic (NMR, HPLC, LC-MS, UV/IR) Techniques</b>
<b>Duration</b>	<b>: 3 Months</b>
<b>No of Seats</b>	<b>: 28</b>
<b>Educational Qualification</b>	<b>: B.Sc., B.Tech., B. Pharm., M.Sc., M.Tech., M. Pharm. and Ph.D.</b>
<b>Age Group</b>	<b>: 21-45 years</b>
<b>Date of Commencement</b>	<b>: 20<sup>th</sup> Aug-16<sup>th</sup> Nov'2018 (AST01)</b>
<b>Venue of the course</b>	<b>: CSIR-CDRI, Lucknow</b>
<b>Course Fee</b>	<b>: Rs. 20000/-</b>
<b>Sponsorship</b>	<b>: Public/private sectors are welcomed to sponsorship.</b>

### TRAINING CURRICULUM

- Basic Principles of Mass Spectrometry, instrumentation, types of ion formation, fragmentation process and pattern, Various ionization techniques i.e., EI & CI, API-MS, FAB-MS, MALDI-MS, interpretation of Mass spectral data and MS applications in Drug Discovery.
- Basics of NMR Spectroscopy, nuts & bolts of NMR instrumentation, chemical shifts and spin-spin coupling constants, FT-NMR, homo and hetero nuclear two-dimensional NMR. Hands on training on state-of-art NMR spectrometers and interpretation of data, its variety of applications in Drug Discovery.
- Chromatographic methods and theory of chromatography. Principles, techniques, instrumentation, derivatization and applications of GC, HPLC and HPTLC. Applications of ion exchange and ion pair chromatography, affinity, size exclusion, SFC, GC-MS and LC-MS methods.
- Theory and applications of UV-VIS spectroscopy, interpretation of spectra, multi component assay, difference and derivative spectra.
- Theory, instrumentation and applications of FT-IR, ATR and NIR.

### SALIENT FEATURES OF THE TRAINING

- Practical sessions as per the course curriculum.
- Understanding basic principles.
- Lectures assisted with multimedia aids.
- Interactive session.
- Exposure to diverse sample preparation techniques
- Brief Hands-on practical exposure on the state-of-the-art equipments
- Planning experiments for obtaining meaningful results.
- Troubleshooting
- Additional inputs on soft skills and personality development

### **SALIENT FEATURES OF THE TRAINING**

- About 40% Theory and 60% Practical sessions as per course curriculum
- Hands on training
- Job oriented curriculum
- Understanding basic principles
- Lectures assisted with multimedia aids
- Interactive session
- Exposure to animal's health and genetic monitoring techniques.
- Brief Hands-on practical exposure on the state-of-the-art equipments
- Planning, setting of breeding and obtaining meaningful results
- Troubleshooting

### **EVALUATION OF TRAINEES**

Evaluation will consist of the following components

#### **Theory Courses (50 Marks)**

- (a) Continuous assessment through assignments
- (b) Term end examination

#### **Practical Courses (50 Marks)**

- (a) Guided Experiments
- (b) Unguided Experiments

### **CERTIFICATION**

Certificate will be issued to the successful candidates for the course

# CSIR Integrated Skill Initiative



## Certificate course on Skill Development in Computational Approaches to Drug Design and Development CSIR-CDRI



CSIR-CDRI (Central Drug Research Institute), a constituent Laboratory of CSIR, is devoted to R&D activities, technology support and academic (including Skill Training/HR) for the benefit of industry and research in the country. It is a premier drug research Institute with global image and vast experience in whole gamut of drug research modules which include lead generation and identification from phyto-chemicals/ fine-chemicals, biological evaluations to clinical trials.

In recent times computational procedures are widely adopted in drug research and pharmaceutical industry. In view of this to fill the gap between university curriculum and industry needs, the course is designed to introduce an array of in silico methods useful in direct and indirect drug design approaches and allied fields. The course expounds on theory and application of physical, quantum mechanical, statistical techniques in drug research and informatics applications in pharma industry to improve efficiency, quality and risk assessment in the development of drugs, formulations, agrochemicals and molecular materials.

CSIR-CDRI invites applications for “**Certificate course on Skill Development in Computational Approaches to Drug Design and Development**” as per the details given below:

<b>Title of the course</b>	<b>: Certificate course on Skill Development in Computational Approaches to Drug Design and Development Certificate</b>
<b>Duration</b>	<b>: 8 Weeks</b>
<b>No of Seats</b>	<b>: 20</b>
<b>Educational Qualification</b>	<b>: M.Sc/ M.S. (Chemistry/ Life Sciences/ Biotechnology/ Bioinformatics), B.Pharm/ M.Pharm (Pharmaceutical Chemistry/Medicinal Chemistry), B.E/ B.Tech/ M.Tech (Biotechnology/Bioinformatics). Basic knowledge of computer is essential.</b>
<b>Age Group</b>	<b>: 21-45 years (Open as per Educational Qualification)</b>
<b>Date of Commencement</b>	<b>: 10<sup>th</sup> Dec'18 – 1<sup>st</sup> Feb'2019 (CADDD02)</b>
<b>Venue of the course</b>	<b>: CSIR-CDRI, Lucknow</b>
<b>Course Fee</b>	<b>: Rs. 10000/-</b>
<b>Sponsorship</b>	<b>: Public/private sectors are welcomed to sponsorship.</b>

**Training for whom:** The course may meet the aspirations of students, young researchers and industry sponsored personnel looking for training in computational approaches to drug design and development aspects. This course will provide an opportunity for skill development and hands-on experience in the chosen area. It will also provide a basis for planning future studies involving these techniques. **The course will improve the job scope of the candidates in the drug research and development sector of the industry.**

**Course Structure:** This course is oriented for academic research / industrial R&D. It introduces computational methods to enhance the productivity in the fields of Medicinal Chemistry, Biochemistry, Structural Chemistry and Biology and pharmaceutical solid form development. While covering the fundamental concepts behind the methods, this course will provide a strong focus on the practical aspects of computational approaches for drug design and development. Areas to be covered in this course include theoretical and practical aspects of wide array of computational and modelling techniques used in drug research and development. This course includes theory/lectures and practical/ hands-on sessions through selected software modules.

### Topics to be covered

- Fundamentals of computing, Operating Systems, Information Technology etc
- Introduction to statistical thinking in drug research; types of data; sample and population; data summarization; hypothesis testing; regression methods etc
- Introduction & Applications of Computer-Aided Drug Design/ Bio-informatics/ Chem-informatics etc
- Molecular indices in QSAR; 2D and 3D QSAR methods – significance; Feature selection data reduction approaches; Interpolation and extrapolation; Retro-QSAR – status and scope etc
- Protein sequence and structural databases; Modeling; Docking etc
- Introduction to Solid form informatics; computational approaches in crystalline form selection and solid form development; polymorph screening of drugs etc
- Hands-on training/tutorials and/or project assignments

**Management and Faculty:** CSIR-CDRI has unmatched expertise in drug research with state-of-art facilities and talent. Faculties for this course are highly experienced and extremely well trained experts in this area.

**Methods of Instruction:** Instruction methods involve lectures and hands on practice. Medium of instruction will be in English and Hindi.

**Sponsorship:** Industries are encouraged to sponsor candidates of their interest.

## **SALIENT FEATURES OF THE TRAINING**

- 40% Theory and 60% Practical Sessions as per the course curriculum.
- Tutorials based on the specific needs of the candidates and/or industry
- Interactive session.
- Focus on current needs of Pharma/ Life Science industry
- Guest lecturers of experts from Industry.

## **EVALUATION OF TRAINEES**

Evaluation will consist of the following components

### **Theory Courses (50 Marks)**

- (a) Continuous assessment through assignments (60%)
- (b) Term end examination (40%)

### **Practical Courses (50 Marks)**

- (a) Guided Experiments (40%)
- (b) Unguided Experiments (60%)

## **CERTIFICATION**

CSIR-CDRI will award certificates to the successful candidates.

# CSIR Integrated Skill Initiative



## **Certificate course on Skill Development in Care, Management of Laboratory Animals & Experimental Techniques CSIR-CDRI**



CSIR-CDRI is a unique R & D Institution in the country with state of the art infrastructure for new drug discovery and development from “Concept to Commercialization”. It is poised to become a global leader through cutting edge science & technology. For New India, the Institute is re orienting itself into a multidisciplinary nodal centre for development of drug for the unmet medical needs as well as the expectation of the industry. While focusing on the discovery & development of drugs, the institute is aligned & contributing towards the national missions programmes such as Make in India, Swatch Bharat, Skill India, Digital India, Start-up India, Accessible India and Sashakt Bharat.

The objectives of this training course are to generate skilled human resources ready for employment in the industry and academia. This is a unique opportunity for skill development and basic training in the area of laboratory animal care, management and experimentation. The course will cover the basic of how to manage animal facility, routine care and husbandry practices of animals, experimental procedures and techniques, quality control procedures etc. The trained and skilled candidates will have good job prospect in the area of biomedical research, animal facilities in public and private research institutes, Pharma industries, and academia. The candidates will have opportunity to good exposure for laboratory animals including Non Human Primates available at State of art Laboratory Animal Facility, CSIR-CDRI.

CSIR-CDRI invites applications for ‘**Certificate course on Care, Management of Laboratory Animals & Experimental Techniques**’ as per the details given below:

<b>Title of the course</b>	<b>: Certificate course on Care, Management of Laboratory Animals &amp; Experimental Techniques</b>
<b>Duration</b>	<b>: 6 Weeks</b>
<b>No of Seats</b>	<b>: 20</b>
<b>Educational Qualification</b>	<b>: 10+2 onwards (Science stream will be preferred)</b>
<b>Age Group</b>	<b>: 18-41 years (Open as per Educational Qualification)</b>
<b>Date of Commencement</b>	<b>: 5<sup>th</sup> Nov-14<sup>th</sup> Dec'2018 (CMLAET02)</b>
<b>Venue of the course</b>	<b>: CSIR-CDRI, Lucknow</b>
<b>Course Fee</b>	<b>: Rs. 5000/-</b>
<b>Sponsorship</b>	<b>: Public/private sectors are welcomed for the sponsorship.</b>

## **TRAINING CURRICULUM**

1. **Basic Principles of Laboratory Animal's Care & Management:**  
General introduction to research animals of various species, their biology and behavior, basic laboratory animal husbandry practices, animal facility layout and functional units, general routine sanitation and hygiene practices, cleaning, washing and sterilization of animal cages, racks, and bedding etc.
2. **Breeding Techniques of different species of Laboratory Animals:**  
Basic introduction to different methods of breeding practices, inbreeding and out breeding, factors responsible for successful breeding of animals, setting and caring of breeding colonies, Breeding and management of transgenic, knockouts and other genetically modified animal models genetic characterization of animals etc.
3. **Experimental techniques in Laboratory Animals:**  
Hands on training on basic experimental techniques on laboratory animals like animal handling and restraining, routes of administration, sampling techniques, necropsy techniques, anaesthesia and euthanasia in animals etc.
4. **Patho-physiology of commonly occurring diseases and their preventive measures:**  
Basic introduction to common diseases observed in animals, implementation of health monitoring program and methodologies, prevention and treatment of diseases etc.
5. **Record keeping & Documentation:**  
Recording and upkeep of various kinds of records related to animal breeding, receipt, distribution and dispatch of animals, feed and bedding, disposal records etc.
6. **Animal Nutrition: Basic requirements of animal nutrition, preparation and formulation of animal feed, storage and distribution of animal feed, quality analysis etc.**
7. **Animals Ethics & Welfare.**  
Basic concepts on animal welfare and ethics, introduction to animal national and international regulations and guidelines related to animal welfare, preparation and designing animal experimental protocol, Institutional Animal Ethics Committee (IAEC) and its functionaries etc.

## **SALIENT FEATURES OF THE TRAINING**

- About 40% Theory and 60% Practical sessions as per course curriculum
- Hands on training
- Job oriented curriculum
- Understanding basic principles
- Lectures assisted with multimedia aids
- Interactive session
- Exposure to animal's health and genetic monitoring techniques.
- Brief Hands-on practical exposure on the state-of-the-art equipments
- Planning, setting of breeding and obtaining meaningful results
- Troubleshooting

## **EVALUATION OF TRAINEES**

Evaluation will consist of the following components

### **Theory Courses (50 Marks)**

- (a) Continuous assessment through assignments
- (b) Term end examination

### **Practical Courses (50 Marks)**

- (a) Demonstration of Experimental techniques
- (b) Guided breeding and management techniques

## **CERTIFICATION**

Certificate will be issued to the successful candidates for the course



# CSIR Integrated Skill Initiative



## Certificate course on Skill Development in Electron Microscopy CSIR-CDRI



This course aims at generating trained human resources ready for employment in industry and academia. It will provide a unique opportunity for skill development and provide a basis for planning future studies in cell biology and nanotechnology involving EM techniques. The course will improve their job prospects as there is limited expertise available in India while there is a great demand for trained manpower in this area. Trained candidates will also have an edge while applying for positions in EM labs in various research institutes requiring practical experience in these techniques. Candidates should find suitable positions such as Scientists, Technicians, Research assistants, etc in various institutes, research/diagnostic laboratories and applications/marketing positions in various companies, etc. This training at a state-of-the-art facility will equip candidates to apply for these positions with the requisite theoretical and practical knowledge and experience.

CSIR-CDRI invites applications for '**Training Programme for Electron Microscopy**' as per the details given below:

<b>Title of the Course</b>	<b>: Training Programme for Electron Microscopy</b>
<b>Duration</b>	<b>: 6 Weeks</b>
<b>No. of Seats</b>	<b>: 10</b>
<b>Educational Qualification</b>	<b>: B.Sc./M.Sc./B.Tech/M.Tech/B.Pharm/M.Pharm/Ph.D./B.V.Sc,M.V.Sc; Qualification may be relaxed for industry sponsored applicants</b>
<b>Age group</b>	<b>: 21-45 years (relaxation for SC/ST/OBC as per GoI rules and Industry sponsored persons)</b>
<b>Date of commencement</b>	<b>: 03.06.2019</b>
<b>Venue of the course</b>	<b>: CSIR-CDRI, Lucknow</b>
<b>Course Fee</b>	<b>: Rs. 15,000</b>
<b>Sponsorship</b>	<b>÷ Public/private sector are welcome to sponsor their candidates</b>

## **TRAINING CURRICULUM:**

### **Electron Microscopy (TEM, SEM)**

- How to work in the electron microscopy laboratory, safety procedures, maintenance of EMs and ancillary equipment, handling of toxic reagents
- Transmission Electron Microscopy (TEM): principles, magnification and resolution, aspects of image formation, components of TEM, physical basis of contrast; Applications of TEM in biology.
- Biological specimen preparation for TEM: Preparation of coated grids, Negative staining and Embedding techniques (adherent/suspension cells, tissues)
- Visualizing nanostructures; Characterization of viruses and virus like particles by TEM for optimization of vaccines and diagnostic virology
- Obtaining thin sections using ultramicrotomy, contrasting of thin sections
- Basic TEM operation/handling, alignments, aberration corrections, and imaging; Visualizing and understanding cellular ultrastructure
- Scanning Electron Microscopy (SEM): principles of SEM, applications in biology and medicine, components of SEM
- Specimen preparation methods for SEM (powder specimens, adherent/suspension cells, tissues, etc.), critical point drying, sputter coating
- Using various specimen preparation equipments like sputter coater, critical point dryer, high vacuum evaporator, ultramicrotome
- Characterization of drug formulations and nano delivery systems using EM

## **TRAINING CURRICULUM**

### **Electron Microscopy (TEM, SEM)**

#### **Electron Microscopy (TEM, SEM)**

- How to work in the electron microscopy laboratory, safety procedures, maintenance of EMs and ancillary equipment, handling of toxic reagents
- Transmission Electron Microscopy (TEM): principles, magnification and resolution, aspects of image formation, components of TEM, physical basis of contrast; Applications of TEM in biology.
- Biological specimen preparation for TEM: Preparation of coated grids, Negative staining and Embedding techniques (adherent/suspension cells, tissues)
- Visualizing nanostructures; Characterization of viruses and virus like particles by TEM for optimization of vaccines and diagnostic virology
- Obtaining thin sections using ultramicrotomy, contrasting of thin sections
- Basic TEM operation/handling, alignments, aberration corrections, and imaging; Visualizing and understanding cellular ultrastructure
- Scanning Electron Microscopy (SEM): principles of SEM, applications in biology and medicine, components of SEM
- Specimen preparation methods for SEM (powder specimens, adherent/suspension cells, tissues, etc.), critical point drying, sputter coating
- Using various specimen preparation equipments like sputter coater, critical point dryer, high vacuum evaporator, ultramicrotome
- Characterization of drug formulations and nano delivery systems using EM
- Basic SEM operation/handling, astigmatism correction, optimizing parameters for imaging depending on type of specimen and imaging
- Basic principles of CryoEM
- Discussion and troubleshooting

### **Confocal Microscopy**

- Basics of microscopy (bright field, differential interference contrast and phase contrast)
- Microscope designs, optics and essentials of microscope handling
- Introduction to fluorescence microscopy, advantages and drawbacks
- Confocal microscope and its comparison with epifluorescence microscope
- Cell culture techniques with examples of mammalian and parasitic cells
- Fluorescent probes and sample preparation for confocal microscopy
- High resolution Imaging techniques and software assistance in confocal microscopy
- Optical sectioning and 3D reconstruction
- Fluorescence resonance energy transfer and fluorescence recovery after photo-bleaching
- Generation of artefacts and troubleshooting.

### **Intravital Microscopy**

- Principles of Two photon microscopy and other novel concepts of microscopy

- Preparation of samples
- Proper visualization of fluoro-chrome in vivo
- Assessing the intra-vascular interactions
- Injection of fluoro-chrome
- Visualization of cellular structures
- Troubleshooting skills

## **Flow Cytometry**

- Flow Cytometry
- Basics of Flow Cytometry including Instrument Configuration, Resolution and Performance Characteristics.
- Understanding various terminologies like QC, Setting Baseline, PMT Voltages, Spectral Characteristics (Stain Index, Spill Index, Spread Index), Color compensation (Cell-Based, Bead-Based) etc.
- Instruments set up (BD FACS Aria and BD FACS Calibur) and Software overview.
- Assay designing and standardization (Titration, Antigen Density, Non-specific Background, Blocking Buffers, Viability Dyes etc.).
- Essentials of Sample preparation including various controls (Isotype, Fluorescence Minus One-FMO, negative and positive controls).
- Protocol discussion and wet labs (1) cell cycle analysis, (2) Apoptosis (Annexin V-PI assay, JC1 assay), (3) Multicolor immunophenotyping, (4) Nitric Oxide and Reactive Oxygen Species measurement.
- Cell Sorting - Concepts and Terminologies, sort set up, different modes of sorting, pre and post sort purity analysis.
- Data Acquisition, Analysis and Troubleshooting.

## **SALIENT FEATURES OF THE TRAINING**

- About 25% Theory and 75% Practical sessions as per course curriculum
- Small batch size for effective training
- Understanding basic principles
- Lectures assisted with multimedia aids
- Interactive session
- Exposure to diverse sample preparation techniques
- Brief Hands-on practical exposure on the state-of-the-art equipments
- Planning experiments for obtaining meaningful results
- Troubleshooting

## **EVALUATION OF TRAINEES**

Evaluation will consist of the following components

### **Theory Courses (50 Marks)**

- (a) Continuous assessment through assignments
- (b) Term end examination

### **Practical Courses (50 Marks)**

- (a) Guided Experiments
- (b) Unguided Experiments

**CERTIFICATION**

Certificate will be issued to the successful candidates for the course