

## CSIR Integrated Skill Initiative



### Certificate course on Skill Development in Advanced Spectroscopic (NMR, MASS, 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, MASS, 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, MASS, UV/IR) techniques</b>
<b>Duration</b>	:	<b>12 Weeks</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., Ph.D.,</b>
<b>Age group</b>	:	<b>21-45 years (relaxation for SC/ST/OBC and Women and Divyang candidates and Industry sponsored persons as per GoI rules)</b>
<b>Date of commencement</b>	:	<b>21<sup>st</sup> August 2017</b>
<b>Venue of the course</b>	:	<b>CSIR-CDRI, Lucknow</b>
<b>Course Fee</b>	:	<b>Rs. 20,000 for students/unemployed &amp; Rs. 25,000 for employed</b>
<b>Sponsorship</b>	:	<b>Established public/private sectors are welcomed to sponsor candidates of their interest.</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

### **EVALUATION OF TRAINEES**

Evaluation will consist of the following components

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

- (a) Continuous assessment through assignments
- (b) Term and 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 Microscopy (Electron Microscopy, Confocal and Intra vital Microscopy) and Flow Cytometry 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 involving these 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 these areas. Trained candidates will also have an edge while applying for positions in cell biology labs in various research institutes requiring practical experience in these techniques. Candidates should find suitable positions such as Scientists, Technicians, Research assistants, etc in research/diagnostic laboratories and applications/marketing positions in various companies, etc. This training at state-of-the-art facilities will equip candidates to apply for these positions with the requisite theoretical and practical knowledge and experience.

CSIR-CDRI invites applications for '**Certificate course on Skill Development in Microscopy (Electron Microscopy, Confocal and Intra vital Microscopy) and Flow Cytometry**' as per the details given below:

<b>Title of the Course</b>	:	<b>Certificate course on Skill Development in Microscopy (Electron Microscopy, Confocal and Intra vital Microscopy) and Flow Cytometry</b>
<b>Duration</b>	:	<b>8 Weeks</b>
<b>No. of Seats</b>	:	<b>20</b>
<b>Educational Qualification</b>	:	<b>B.Sc./B.V.Sc./B.Tech/B.Pharm./M.Sc./M.Tech./M.Pharm./M.V.Sc./Ph.D./ Qualification may be relaxed for industry sponsored applicants</b>
<b>Age group</b>	:	<b>21-45 years (relaxation for SC/ST/OBC and Women and Divyang candidates and Industry sponsored persons as per GoI rules)</b>
<b>Date of commencement</b>	:	<b>21<sup>st</sup> August 2017</b>
<b>Venue of the course</b>	:	<b>CSIR-CDRI, Lucknow</b>
<b>Course Fee</b>	:	<b>Rs. 35,000</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
- 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
- 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 flurochrome in vivo
- Assessing the intra-vascular interactions
- Injection of flurochrome
- 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)**

- (c) Continuous assessment through assignments
- (d) Term and examination

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

- (c) Guided Experiments
- (d) Unguided Experiments

### **CERTIFICATION**

Certificate will be issued to the successful candidates for the course

## CSIR Integrated Skill Initiative



### Certificate course on Skill Development in Regulatory safety studies and Animal experimentation CSIR-CDRI



This course aims at generating trained human resources ready for employment in industry. It will provide a unique opportunity for skill development and provide a basis for planning future studies in regulatory safety studies. The course will improve their job prospects as there is no such expertise available in India while there is a great demand for trained manpower in these areas. Trained candidates will also have an edge while applying for positions in regulatory study groups in various public sectors or private research institutes requiring practical experience in these areas. Candidates should find suitable positions such as Scientists, Technicians, Research assistants, etc in research laboratories in various companies and Contract Research Organisations etc. This training at state-of-the-art facilities of CSIR-CDRI will equip candidates to apply for these positions with the requisite theoretical and practical knowledge and experience. They will be fit for understanding all the aspects of regulatory studies that are essential for IND filing.

CSIR-CDRI invites applications for '**Certificate course on Skill Development in Regulatory safety studies and Animal experimentation**' as per the details given below:

<b>Title of the Course</b>	:	<b>Certificate course on Skill Development in Regulatory safety studies and Animal experimentation</b>
<b>Duration</b>	:	<b>26 Weeks</b>
<b>No. of Seats</b>	:	<b>50</b>
<b>Educational Qualification</b>	:	<b>B.Sc., B Tech (biotech), B. Pharm, B.VSc., MBBS,</b>
<b>Age group</b>	:	<b>20-35 years (relaxation for SC/ST/OBC and Women and Divyang candidates and Industry sponsored persons as per Gol rules)</b>
<b>Date of commencement</b>	:	<b>21<sup>st</sup> August 2017</b>
<b>Venue of the course</b>	:	<b>CSIR-CDRI, Lucknow</b>
<b>Course Fee</b>	:	<b>Rs. 35,000 non refundable</b>
<b>Residential/Non-residential</b>	:	<b>Non-residential</b>
<b>Sponsorship</b>	:	<b>Public/private sector are welcome to sponsor their candidates</b>

#### **TRAINING CURRICULUM:**

1. Experimental animal care, management and animal techniques:

General introduction to research animals, their biology and behavior, basic husbandry practices, feeding and nutrition, animal diseases, basic handling and restraining techniques, sample collection, routes of drug administration, anaesthesia, euthanasia, animal ethics and welfare.

2. Specialized care and breeding of transgenic and genetically modified animals:

Breeding and management of transgenics, knockouts and other genetically modified animal models, their monitoring and usage in drug research.

3. Importance of Purity, Stability of NCEs in Pharmacokinetics.

4. Safety Pharmacology

**a)** Cardiovascular System (CVS): In vivo safety pharmacology studies including evaluation of basic cardiovascular parameters, measuring blood pressure, heart rate, surgical implantation of transmitter (telemetry), recording data and analysis

**b)** Central Nervous System (CNS): In vivo safety CNS studies in animal models including effect of test substance evaluating behavioral changes using Irwin's test, spontaneous motor activity using animal activity meter, motor coordination using rota-rod, sensory/motor reflex responses using hot plate analgesia meter and body temperature using temperature multiplexer

**c)** Respiratory System: Effect of test substance on respiratory system in rats using whole body plethysmograph by evaluating frequency of respiration, tidal volume, inspiratory time, expiratory time, peaks, enhanced pause.

**d)** HERG binding Studies: Assay setup, execution and analysis using cell free HERG binding studies.

5. Regulatory Toxicology including concepts and design of studies as per regulatory guidelines: Systemic toxicity, Reproductive toxicity, Immuno-toxicity, Genotoxicity

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

- About 50% Theory and 50% 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)**

- (e) Continuous assessment through assignments
- (f) Term and examination

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

- (e) Guided Experiments
- (f) 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</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>Open as per Educational Qualification</b>
<b>Date of commencement</b>	:	<b>21<sup>st</sup> August 2017</b>
<b>Venue of the course</b>	:	<b>CSIR-CDRI, Lucknow</b>
<b>Course Fee</b>	:	<b>Rs. 10,000</b>
<b>Residential/Non-residential</b>	:	<b>Non-residential</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/ Bioinformatics/Cheminformatics 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.

**Selection Procedure:** The selection of the candidates will be done by a committee through screening of applications, entrance test and/or interview

**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 METHOD:**

Evaluation will consist of the following components:

**Theory**

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

**Practical**

- (a) Guided Tutorials (40%)
- (b) Unguided Assignments (60%)

**CERTIFICATION:**

CSIR-CDRI will award certificates to the successful candidates.

**For further information, please contact:**

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