



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
CATEGORY - 1 UNIVERSITY BY UGC



SHORT TERM INTERNSHIP ON THIN FILM SYNTHESIS AND ITS ADVANCED CHARACTERIZATION

22 – 26,
APRIL
2024



Centre for Nanoscience and Nanotechnology (CNSNT)
International Research Centre (IRC)
Sathyabama Institute of Science and Technology,
Chennai



UG/PG/Research Scholars/Postdoc/Academic/Research
Faculties/Industry: **Rs. 4000/-**

Contact Us:

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E-mail contact: eventsconsnt@gmail.com

Registration Link : <https://forms.gle/vk3D9kYq98M7nsDE6>

- Accommodation will be provided based on the availability.
- Certificate will be issued to all the participants.
- Bulk participation from same institute will be preferred to arrange a separate training.
- **Last date for registration : 15/04/2024**
- Limited to 25 participants only

Who can attend?

Faculties, Scientists, Research Scholars and UG/PG Students from Universities, R&D Organizations and Industries can participate.

Account Name: Dean (Publications & Conferences),
Sathyabama Institute of Science and Technology,
Account Number : 891734627
IFSC Code : IDIB000T020
Branch Code : 098
Bank & Address : Indian Bank, Thousand Lights
Branch, Chennai - 600006

About the Institute

Sathyabama Institute of Science and Technology is a prestigious Institution which excels in the fields of Engineering, Science and Technology for more than three successful decades. It offers multi-disciplinary academic programmes in various fields of Engineering, Science, Technology, Law, Dental Science, Pharmacy, Nursing, Management, Arts and Science and Allied Health Sciences. It is established under Sec.3 of UGC Act, 1956 and is Accredited with 'A++' Grade by the National Accreditation and Assessment Council. The Institution has been ranked in 51st position by the National Institutional Ranking Framework (NIRF), Government of India among the Universities in India for the year 2023 and ranked one among the top 100 Universities for eight consecutive years. Sathyabama Institute of Science and Technology is ranked among the Top 5 Institutions in the Country for Innovation by ATAL ranking of Institution for Innovation Achievements, Govt. of India. The Institution has been ranked 10th among the top 160 private engineering Institutions in India. Sathyabama has emerged as a leading Institution and achieved excellence in higher education of International standards owing to its research and academic excellence.

About the Centre for Nanoscience and Nanotechnology

The Centre for Nanoscience and Nanotechnology was established in January 2006 at the University campus to accomplish the goal of enhancing advanced research in the areas of Nanoscience and Nanotechnology. The leading area of research includes nanomaterials, nanotechnology, nanocomposites, nanoelectronics, nanofabrication etc. In addition to research, the Centre also conducts training and awareness programmes, workshops national and international conferences on recent trends and developments of nanoscience & nanotechnology on various themes of national interests. The Centre is undertaking research and development projects from various agencies and is offering consultancy services to industries and research organizations in India and abroad. The Centre has several sophisticated instruments such as HRSTEM, FESEM, XRD, Raman, AFM, Hall Effect measurement system, UV-vis spectrometer, FTIR, EBPVD, RF/DC Magnetron sputtering, PLD, CVD, etc.

About the Internship

Sathyabama Institute of Science and Technology, being a premier academic and research organization is committed to find out various scientific solutions for industrial problems and applications. A variety of coating technologies are being developed at CNSNT for specific needs of the industries. In this context, the five days internship will touch upon the synthesis of various thin film coating techniques and its advanced characterization.

Techniques covered in hands-on training

- ***Specimen Preparation: Cutting, Polishing, Ball milling, Pelletization, Sintering of powder samples***
- ***Thermal Evaporation***
- ***Electron Beam Physical Vapour Deposition (EBPVD)***
- ***RF and DC Sputtering***
- ***Pulsed Laser Deposition (PLD)***
- ***Stylus Profilometer***
- ***X-Ray Diffraction (XRD)***
- ***Atomic Force Microscopy (AFM)***
- ***Field Emission Scanning Electron Microscopy (FESEM)***
- ***High Resolution Scanning Transmission Electron Microscopy (HRSTEM)***
- ***X-ray Photoelectron Spectroscopy (XPS)***
- ***Raman Spectroscopy***

Patrons

- Dr. Mariazeena Johnson, **Chancellor**
Dr. Marie Johnson, **President**
Mrs. Maria Bernadette Tamilarasi, **Vice President**
Mr. J. Arul Selvan, **Vice President**
Ms. Maria Catherine Jayapriya, **Vice President**
Dr. T. Sasipraba, **Vice Chancellor**

Organizing Secretary

Dr. P. Kuppusami, Professor (Research)

Convener

Dr. T. Dharini, Assistant Professor (Research)

Co-Convener

Dr. P. Vengatesh, Assistant Professor (Research)

Technical Team

- Dr. S. Anandh Jesuraj, Assistant Professor (Research)
Dr. B. Vigneswaran, Assistant Professor (Research)
Dr. D. Ramachandran, Assistant Professor (Research)
Dr. K. Viswanathan, Assistant Professor (Research)
Dr. Gopika G, Assistant Professor (Research)
Dr. D. Balaji, Assistant Professor (Research)
Mr. M. Thangam, Scientific Assistant

Day 1: 22/04/2024

Time	Activities
9.00 to 9.30 AM	Registration
9.30 to 10.30 AM	Expert talk on PVD methods: Fundamentals and Applications (Thermal, EBPVD, RF and DC Magnetron Sputtering, PLD)
10.30 to 10.45 AM	Tea Break
10.45 to 12.30 PM	Specimen Preparation: <ul style="list-style-type: none"> Step by step explanation on cutting and polishing of substrates. Ball milling of nano powder and its pelletization. High temperature sintering of prepared pellets.
12.30 to 1.30 PM	Lunch
1.30 to 3.00 PM	Hands on training on Thermal Evaporation and EBPVD: <ul style="list-style-type: none"> Explanation of coating chamber Evaporating source material loading Substrate material loading Achieving substrate temperature Achieving rough vacuum Achieving working pressure
3.00 to 3.15 PM	Tea Break
3.15 to 4.00 PM	Hands on training on Thermal Evaporation, EBPVD (continuation): <ul style="list-style-type: none"> Explanation of coating chamber Evaporating source material loading Substrate material loading Achieving substrate temperature Achieving rough vacuum Achieving working pressure

Day 2: 23/04/2024

Time	Activities
9.30 to 10.30 AM	Hands on training on Thermal Evaporation and EBPVD: <ul style="list-style-type: none"> Deposition of source material to substrate Discussion on difficulties in degassing and achieving uniform thin films
10.30 to 10.45 AM	Tea Break
10.45 to 12.30 PM	Hands on training on Thermal Evaporation and EBPVD (continuation): <ul style="list-style-type: none"> Deposition of source material to substrate Discussion on difficulties in degassing and achieving uniform thin films
12.30 to 1.30 PM	Lunch
1.30 to 3.00 PM	Hands on training on RF & DC sputtering, PLD: <ul style="list-style-type: none"> Explanation of coating chamber Evaporating source material loading Substrate material loading Achieving substrate temperature Achieving rough vacuum Achieving working pressure
3.00 to 3.15 PM	Tea Break
3.15 to 4.00 PM	Hands on training on RF & DC sputtering, PLD (continuation): <ul style="list-style-type: none"> Explanation of coating chamber Evaporating source material loading Substrate material loading Achieving substrate temperature Achieving rough vacuum Achieving working pressure

Day 4: 25/04/2024

Day 3: 24/04/2024

Time	Activities
9.30 to 10.30 AM	Hands on training on RF & DC sputtering, PLD: <ul style="list-style-type: none"> • Deposition of source material to substrate • Discussion on difficulties in degassing and achieving uniform thin films
10.30 to 10.45 AM	Tea Break
10.45 to 12.30 PM	Hands on training on RF & DC sputtering, PLD (continuation): <ul style="list-style-type: none"> • Deposition of source material to substrate • Discussion on difficulties in degassing and achieving uniform thin films
12.30 to 1.30 PM	Lunch
1.30 to 2.30 PM	Expert talk on thin film characterization techniques Stylus Profilometer, XRD, FESEM, HRSTEM, AFM, XPS and Raman Spectroscopy.
2.30 to 3.00 PM	Stylus profilometer <ul style="list-style-type: none"> • Explanation on how to find thickness of the thin film
3.00 to 3.15 PM	Tea Break
3.15 to 4.30 PM	Raman Spectroscopy <ul style="list-style-type: none"> • Explanation of Raman Spectroscopy instrument (optical alignment, laser source etc.) • Sample loading and sample focusing • Explanation on single spectra, point and line mapping, high temperature Raman spectra

Time	Activities
9.30 to 10.30 AM	AFM <ul style="list-style-type: none"> • Explanation of AFM instrument • Sample loading • Explanation on different modes and achieving roughness value
10.30 to 10.45 AM	Tea Break
10.45 to 12.00 PM	FESEM <ul style="list-style-type: none"> • Introduction to the instrument • Sample preparation details • Characterization: Alignment & Analysis
12.00 to 1.00 PM	Lunch
1.00 to 3.00 PM	XRD <ul style="list-style-type: none"> • Basics of XRD • Introduction to the instrument (X-ray gun, Monochromator, Sample Stage, Detector) • Sample Loading (Powder, GI Mode) • Interpretation and Analysis
3.00 to 3.30 PM	Tea Break

Day 5: 26/04/2024

Time	Activities
9.30 to 11.30 PM	HRSTEM <ul style="list-style-type: none"> • Introduction to the instrument • Sample preparation details • Characterization: Alignment & Analysis
11.30 to 12.45 PM	XPS <ul style="list-style-type: none"> • Introduction to the instrument • Sample preparation details • Characterization: Alignment & Analysis
12.45 to 1.45 PM	Lunch
1.45 to 2.00 PM	Certificate Distribution

Facilities at International Research Centre (IRC) and Advanced Characterization Facility (ACF) at Sathyabama Institute of Science and Technology



EBPVD (MEB 600 Plassys, France)



RF and DC Sputtering (PLASSYS MP300, France)



Thermal Evaporation System (HHV, Bangalore)



Stylus Profilometer, Dektak XT, Bruker, USA



PLD Quanta Systems, (Italy)



XPS Systems, (Thermofisher Scientific)



AFM (NTEGRA PRIMA, Modular Mode, Ireland)



XRD (Thermofisher Scientific, USA)



FESEM (Carl Zeiss SIGMA 300)



HRSTEM (Thermofisher Scientific, TALOS F200S G2)



Raman Spectrophotometer (RENISHAW, UK)