



The logo of GFSU (Gujarat Foundation for Science and University) is a shield-shaped emblem. It features a gold border and a gold banner at the top with the letters "GFSU". The shield is divided into four quadrants: top-left (blue with a white computer monitor icon), top-right (red with a white fingerprint icon), bottom-left (red with a white circular arrow icon), and bottom-right (blue with a white DNA double helix icon). Below the shield is a gold banner with the Sanskrit motto "विद्यया अमृतं अश्नुते" (Vidyayā amṛtaṁ aśnute).

Knowledge | Wisdom | Fulfilment

A group of students in white lab coats are working in a chemistry laboratory. They are standing at a long white lab bench, which is equipped with various glassware, including beakers, flasks, and bottles. Some students are looking at papers, while others are handling the equipment. The background shows shelves stocked with more laboratory supplies. The lighting is bright, and the overall atmosphere is one of focused academic activity.

Knowledge | Wisdom | Fulfilment

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**INSTITUTE OF
RESEARCH & DEVELOPMENT**



ABOUT THE INSTITUTE

The Institute of Research & Development is stepping in its 9th year since its inception. An important aim of the Institute is to provide quality education and fostering pioneering innovative research in fields spanning the entire range of Food Technology, Pharmaceutical science, Nanotechnology, Chemistry, Environmental Science, Medical Devices and Structural Engineering with a focus on their application in Forensic technology for crime scene investigation. The Institute seeks to contribute to civilization, peace and prosperity in the nation and world, and aims at developing global human capabilities par excellence through pioneering research and education in science and technology. To achieve this mission, the Institute has an eye on educating highly moral students to acquire sound academic knowledge in selected disciplines and transform those from basics to practice with academic mastery through research.

At presently, the Institute provides MS, MSc, M Tech. M Pharm and Doctoral degrees to the students covering the realm of forensic sciences in various specializations such as Food Technology, Pharmaceutical Science, Nanotechnology, Environmental Science and management, Chemistry, Forensic Structural Engineering and Medical Devices leading to the development of experts in these fields. The courses are designed with keeping in mind their relation to forensic science and their usefulness in terms of job opportunities in different industry and government sectors. The faculties of the Institute have received various research grants from governmental and industrial bodies.

The Institute is actively collaborating with premier Institutes and industries of both national and international repute. More than 150 publications including research articles, reviews, patents, monographs, book-chapters of national and international repute during last 9 years span reveal its dedication to wards a research center of excellence. This high-quality, high-performance research environment, combined with a uniquely bottom-up approach to scientific innovation, has enabled the Institute to foster an environment in which researchers are able to thrive.

The scenario of placement is quite luminous. Our post-graduate and doctoral students are the most sought-after in industry, academia and research and for varied professional including legal services and postdoctoral positions in abroad.



FROM THE DIRECTOR'S DESK



Prof. Y. K. Agrawal

(Director)

MSc, PhD, D Sc (USA),
D Sc (India), F R S C (UK),
C Chem (UK), F I C, FS (Switz),
F A S C (USA)



I welcome you on behalf of Institute of Research & Development, GFSU and appreciate your keenness about us.

Since envisioned inception of GFSU in 2009, Institute of Research & Development is engaged in fostering and nurturing technocrats who are capable of making difference in all vicinities of their specialization. Highly specialized programmes offered by the institute cater need of talented manpower in the fields of forensics, pharmaceutical sciences, civil engineering, nanoscience, biotechnology, chemistry and environmental science. Our inclination and competence to conquer interdisciplinary challenges in these fields help us in acquiring superiority in epitome of competition era.

We believe in making students equipped with resources and knowledge so that they can lead themselves in cutting edge advancements of new products and processes to change the future of mankind. The infrastructure and facilities available in research labs, classrooms and campus make sense of belongingness to the student community and contributors. Presence of our alumni in esteemed organizations and our association with interdisciplinary core of eminent scientists is making the image of the institute captivating in research fraternities especially in India. The State of art research environment and a pool of dedicated brains provide a transformational experience to the students and investigators that's why Institute of Research & Development continuously attracting aspirants from all over the India and even abroad. Encouragement for collaborative activities and inculcating professional ethics in scientific activities make our institute enriched with high impact research output.

Finally, I appreciate the farsighted policies of The Govt. of Gujarat and their desire to make evolution in education excellence by establishing such a remarkable research institution which is turning out to be an element of serving the mother nation by mean of the highest level of scientific research.

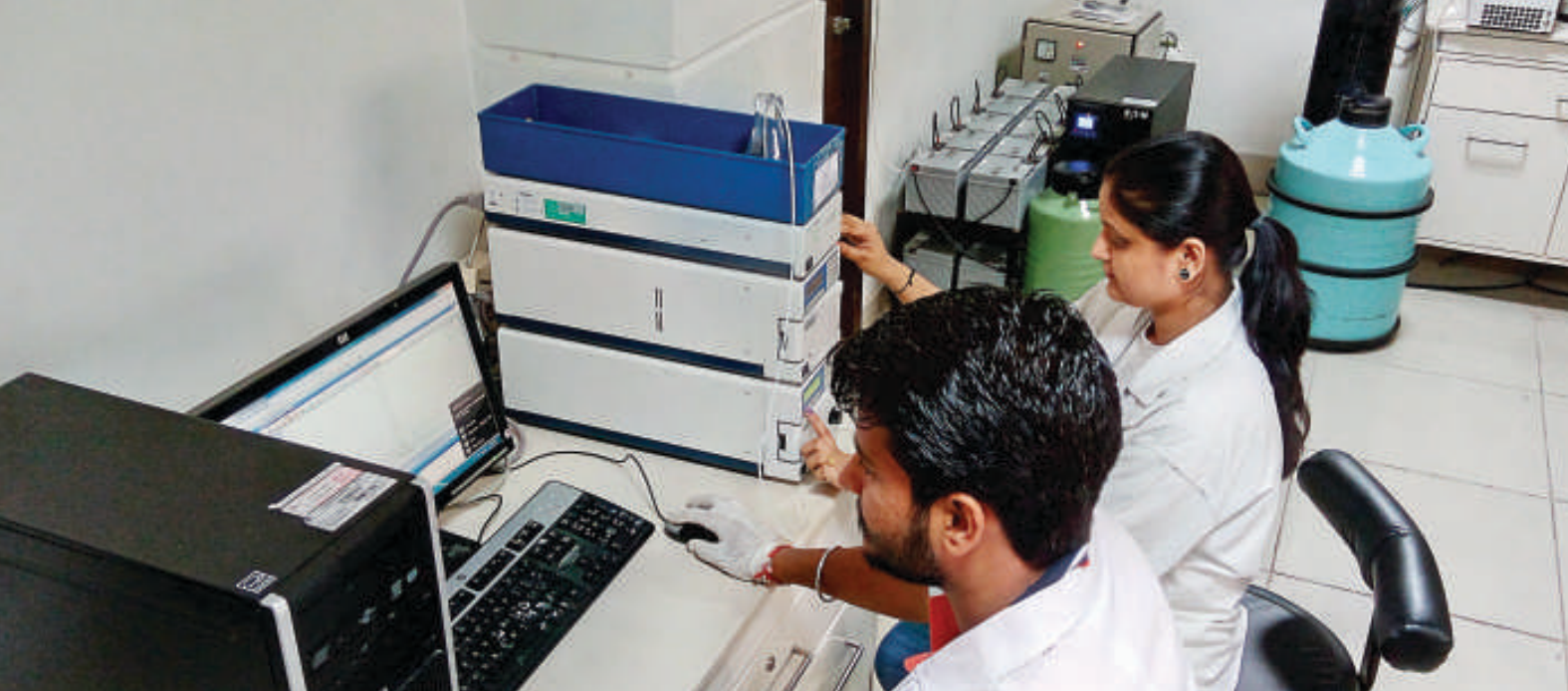


- LC-MS/MS/MS
- Automated Smart-HPLC system
- Isocratic & Gradient HPLC
- Supercritical Fluid Chromatography
- ELISA Reader
- DSC (Differential Scanning Calorimetry)
- ZetaSizer ZS Nano
- UV Visible spectrophotometer
- UV/VIS/NIR Spectrophotometer
- Chiral HPLC
- Probe Sonicator
- Spectrofluorimeter
- Low Temperature High Speed Centrifuge
- Lyophilizer
- RT-PCR
- Fluorescence and Inverted Microscope
- Seismic shake table
- STAAD-Pro / Building design softwares
- Chemical synthesis facilities
- Powder X-ray Diffractometer
- Atomic Force Microscope (AFM)
- Digital Compression Testing Machine (3000 kN)
- Universal Testing Machine
- Rebound Hammer
- Ultrasonic Pulse Velocity Machine
- Autosampler Dissolution Apparatus
- High speed Homogenizers
- Hot Air Oven/ Microwave Oven
- FT-IR spectrophotometer
- FT-IR with image microscope
- Raman spectrophotometer
- Gel electrophoresis
- Langendorff apparatus with NIBP system (AD Instruments)
- Electroconvulsometer
- Plethysmometer
- Data Acquisition system
- GEL-DOC System
- Brookfield Viscometer
- GC-MS/MS
- ICP-OES

FACILITIES & RESOURCES

The Institute of Research & Development has state of the art infrastructure and instrumental facilities including excellent class-rooms and conference/seminar halls with high-tech presentation facilities. All class rooms are air-conditioned and equipped with overhead projectors, LCD projectors and computers with internet facility. The institute currently has total nine laboratories with high end research facilities and sophisticated instruments. These are Raman Laboratory, Max-Planck Laboratory, Lehn Laboratory, Faraday Laboratory, Kroto Laboratory, Edison Laboratory, Braggs Laboratory, Curie Laboratory and Einstein Laboratory. The Institute is well connected with an excellent Central library that has large number of books and journals. The Institutes also has animal house facility approved by CPCSEA, New Delhi with large number of animals. Some state-of-art instruments available are listed below.





PROGRAMS OFFERED

| Programs & Duration | Specializations | Eligibility |
|---|---|--|
| MS Forensic Pharmacy (4 Semesters, 2 Years) | <ol style="list-style-type: none"> 1. Quality Assurance and Pharmaceutical Analysis 2. Regulatory Affairs and Management 3. Nano Drug Delivery System 4. Pharmacology and Toxicology 5. Pharmacokinetics & Clinical Pharmacy 6. Medical Devices | B.Pharm Degree with minimum 55% marks, preference will be given to GATE/GPAT Qualified candidates |
| MS Forensic Nanotechnology (4 Semesters, 2 Years) | <ol style="list-style-type: none"> 1. Nano-science and Nanotechnology 2. Nano Biotechnology 3. Nano Engineering | Bachelor's degree in any discipline of Science / Medicine / Engineering / Pharmacy with minimum 55% marks |
| M Tech Civil Engineering (4 Semesters, 2 Years) | Forensic Structural Engineering | BE/BTech Civil Engineering with 55 % marks |
| MS Chemistry (4 Semesters, 2 Years) | Forensic Analytical Chemistry | BSc in Chemistry with 55% marks |
| MSc Food Technology (4 Semesters, 2 Years) | Forensic Food Analysis | Bachelor's degree in any discipline of Science / Medicine / Engineering / Pharmacy with minimum 55% marks |
| MS Environmental Science (4 Semesters, 2 Years) | Environmental Forensics | Bachelor degree in any discipline of Science (except mathematics and statistics), medicine, pharmacy, Environmental / B.E. Civil, Chemical, Environmental Engineering with 55% marks |

| | | |
|---|---|--|
| MS Environment Management (4 Semesters, 2 Years) | Environmental Forensics | Bachelor degree in any discipline of Science (except mathematics and statistics), medicine, pharmacy, Environmental / B.E. Civil, Chemical, Environmental Engineering with 55% marks |
| MSc Medical Devices (4 Semesters, 2 Years) | Medical Devices | Bachelor's degree in any discipline of Science / Medicine / Engineering / Pharmacy with minimum 55% marks |
| M.Pharm. Forensic Pharmacy (3 years) (for in Service Personal) | <ol style="list-style-type: none"> 1. Quality Assurance and Pharmaceutical Analysis 2. Regulatory Affairs and Management 3. Nano Drug Delivery System 4. Pharmacology and Toxicology 5. Pharmacokinetics & Clinical Pharmacy 6. Medical Devices | B.Pharm Degree with minimum 55% marks and 5 years of experience in industry or academic |

INTEGRATED M.S. PROGRAMS

| | | |
|--|-------------------------|--|
| Environmental Management and MS Environmental Science (3 Years) | Environmental Forensics | Bachelor degree in any discipline of Science (except mathematics and statistics), medicine, pharmacy, Environmental / B.E. Civil, Chemical, Environmental Engineering with 55% marks |
|--|-------------------------|--|

PH.D /INTEGRATED PH.D. PROGRAMS

| | | |
|---------------------------------|--|--|
| MS-PhD (5 Years) | MS Forensic Pharmacy | B.Pharm Degree with minimum of 60% marks, preference will be given to GATE/GPAT Qualified candidates |
| MS-PhD (5 Years) | MS Forensic Nanotechnology | A candidate should have Bachelor's degree in any discipline of Science / Medicine / Engineering / Pharmacy with minimum 60% marks. |
| PhD (Minimum 3 Years) | Forensic Pharmacy, Forensic Nanotechnology, Chemistry, Structural engineering, Environmental science | Master's degree in any discipline of Science/ Medicine/ Engineering/ Pharmacy, with minimum 55% marks or its equivalent in grades |

FORENSIC PHARMACY

MS Forensic Pharmacy deals with the application of Pharmaceutical Sciences in the broader area of Forensic investigative work. Students possessing degrees in Forensic Pharmacy will work with scientists in pharmaceutical industries as well as with various governmental and private organizations and laboratories dealing with forensic analysis. The main employment agencies will be pharmaceutical industries, hospitals, Universities Defense/Army headquarters, Central Forensic Science Laboratories, Narcotics Department, Insurance Agencies, Law-firms and many more.

MS FORENSIC PHARMACY

Course content offered at GFSU and other Universities

Instrumental Techniques for Evaluation of APIs and Drug Products/Stability Testing/ Biotechnology in Pharmaceutical Sciences/ Drug Delivery Systems/Pharmaceutical Product Development/ Experimental Pharmacology/ Biopharmaceutics and Pharmacokinetics / Drug Metabolism / Pharmacological Screening and Assays/ Clinical Pharmacology and Regulatory Toxicology

Additional courses offered by IRD, GFSU

- Forensic Science & Biostatistics
- Impurity profiling
- Federal regulations of drugs
- Forensic drugs and toxicology
- Nano analytical techniques
- Drug Abuse
- Drug Registration
- Nano Biotechnology
- Characterization techniques for Nano particulates



FORENSIC NANOTECHNOLOGY

The MS forensic nanotechnology program will provide you very fundamental knowledge on nanotechnology as well as its wide applications in different branches including forensic science. Nanotechnology requires advanced level infrastructure and equipment and the opportunity to work in a quality environment, which will be provided here. Thus, the program provides the theoretical basis and knowledge of experimental methods and technological applications of nanotechnology. So you will become an expert on nanotechnology, which is a highly demanding branch of science and technology with enormous prospects in the coming days ahead. These students have good job opportunities in different academic institutes as well as research laboratories along with different private industrial sectors and in abroad. A lot of prospects await nanotechnology professionals in abroad in various sectors like medicine, health care, catalysis, energy production, semiconductors.

MS FORENSIC NANOTECHNOLOGY

Course content offered at GFSU and other Universities

- Nanophotonics
- Nanolithography and Device Fabrication
- Nanoelectronics
- Computational Methods in Engineering
- Quantum Mechanics for Nanotechnology
- Statistical Thermodynamics for Nanosystems
- Solid State Technology

Additional courses offered by IRD, GFSU

- Nanosensors, Nanocatalysis & Nanoelectronics
- Forensic Science & Biostatistics
- Nano bio-engineering
- Bionano Separation Technology
- Bio Functionalization and self-assembly of Nano structural materials
- Biointerfacial strategies & Nano fabrications
- Computational Nanoscience
- Forensic nanotechnology



ABOUT THE COURSES

FORENSIC ANALYTICAL CHEMISTRY

Advances in analytical science have produced a revolution in forensic, environmental and pharmaceutical sciences development. There is a strong worldwide demand for imaginative, skilled analysts with knowledge and hands-on experience of modern analytical instrumentation. Course work of this specialization will help students to participate in multidisciplinary activity that relies on chemical and analytical techniques to provide invaluable evidence from investigation of disasters, nanotechnology based research, failure in product or process, accident and criminal activities.

MS Chemistry

Course content offered at GFSU and other Universities

- Molecular Spectroscopy
- Inorganic chemistry
- Molecular bonding and computational chemistry
- Organometallic chemistry
- Instrumental technique
- Physical chemistry

Additional courses offered by IRD, GFSU

- Forensic science and biostatistics
- Analytical Chemistry
- Interpretative Spectroscopy
- Modern Methods of Analysis
- Separation Techniques
- Analysis of Drugs and Biologically active compounds.
- Nano-sensor
- Nano Analytical Techniques
- Analysis of Explosives and Narcotics



FORENSIC STRUCTURAL ENGINEERING

This is a new and unique program started by the institute for engineering graduates. The course on Forensic structural engineering has been developed with an aim to develop graduates with technical and legal practices in the field of forensic investigation involving cases of civil structures. The candidate with education of this program can grab opportunities in government and private civil work quality auditing agencies, Government and Private Companies engaged in infrastructure development, Consultancy firms for attorneys practicing land disputes and construction disputes, International companies practicing in structural failure analysis and failure preventions, Government departments engaged in rural and urban infrastructure development and maintenance, Government and private structural material testing laboratories.

M.Tech Civil Engineering

Course content offered at GFSU and other Universities

Courses offered by other universities in structural engineering :

- Advance solid mechanics
- Finite Element Method
- Advanced Steel Structure Design
- Concrete Technology
- Design of Bridge
- Structural Dynamics & Earthquake Engineering
- Concrete Structure Design

Additional courses offered by IRD, GFSU

- Forensic Science & Biostatistics
- Forensic Structural Analysis
- Structural Assessment & Failure
- Prevention & resolution of Construction Disputes
- Design of Structures with Indian as well as International Standards.
- Material Specific Forensic Investigations
- Failure & Damage investigation through real life case studies
- Detailed Non Destructive Testing
- Experiment Based Research Projects



ENVIRONMENTAL SCIENCES

The Institute provides various MS program in the area of Environmental Science:

1. MS Environmental Science with specialization in Environmental Forensics
2. MS Environmental Management
3. MS environmental Management and MS Environmental Science (Integrated)

Environmental Science & Management course offers research and legal opinions towards the use and conservation of natural resources, protection of habitats and control of hazards; spanning the field of applied environment without any traditional boundaries. The course's objective is to improve expertise, generate ideas and results through contributions from biology, botany, climatology, ecology, ecological economics, environmental engineering, fisheries, environmental law, forest sciences, geology, information science, public affairs, zoology and other subjects. As the principal user of nature, humanity is responsible for ensuring that its environmental impacts are benign rather than catastrophic. Environmental Management presents a novel opportunity for academic researchers and professionals outside universities, including those in business, government, research establishments, and public interest groups, presenting a wide spectrum of viewpoints and approaches

MS Environmental Science

Course content offered at GFSU and other Universities

- Human population and environmental pollution,
- Environmental legislation ,
- Environmental bioscience,
- Air/noise/water treatment,
- Environmental chemistry and impact assessment,
- Microbiology

Additional courses offered by IRD, GFSU

- Environmental Forensic science and biostatistics.
- Modern Methods of Analysis
- Remote sensing and GIS, Modern instrument analysis,
- Solid waste management.
- Students learns to handle sophisticated analytical instruments like LC-MS/MS for identification of pollutants, fabrication and development of sensors to make on-site testing of environmental pollutants.

FOOD TECHNOLOGY WITH FORENSIC FOOD ANALYSIS

Food safety and food quality are much needed topics in our society and are important issues for the individual consumer. Food safety for VIPs is immensely important in the context of present vulnerable situation in the world. Institute is currently running a two-year Master's program on Food Technology with the specialization on "Forensic Food Analysis". The program deals with the challenges associated with food production, food safety, food quality and health along with a rich infrastructure facility to make the students experts in food analysis from forensic investigation prospective. The passouts of this program will have good employment prospect in food and pharmaceutical industries, Defense/Army headquarters, Central Forensic Science Laboratories, Narcotics Department, Insurance Agencies, Law-firms and many more.

M.Sc. FOOD TECHNOLOGY

Course content offered at GFSU and other Universities

- Food microbiology
- Food chemistry
- Instrumental analytical techniques
- Food biotechnology
- Food packaging and preservation/Post harvesting handling practices
- Food processing technology

Additional courses offered by IRD, GFSU

- Forensic sciences and biostatistics
- Nutraceuticals
- Forensic Food Analysis
- Food product regulations.
- Application of nanotechnology in value addition to the food ingredients
- Identification and estimation of contaminants in food products
- Students learns to handle sophisticated analytical instruments like LC-MS/MS & GC/MS for identification and estimation of food adulterants etc.

MEDICAL DEVICES

Diagnostic and therapeutic medical device technologies are in prime focus these days by the healthcare departments of government of India. The government of India has made rules for medical devices manufacturing and quality control for the first time in February 2017 to meet the need of a very fast growing medical device manufacturing sector. This is a real interdisciplinary field where people from all scientific backgrounds including pharmacy, biology, chemistry, physics, engineering and medicine are required to work together to design and develop a new product. There is an acute shortage of technical manpower with sound technical knowledge in this domain of science and our institute has remained a step ahead in offering this specialization in India. This is more important when more than half of the medical device manufacturing units approved by CDSCO is based in Gujarat state only. The pass outs of this program will have good employment prospect in medical device manufacturing and research organization in India and abroad, state and central food and drug administration offices and many other nationally and internationally recognized government research laboratories. Being a relatively advanced and new field, the students pursuing this specialization can get illuminating opportunities immediately.



THE DIRECTOR

Prof. Y. K. Agrawal

(Director)

MSc, PhD, D Sc (USA),
D Sc (India), F R S C (UK),
C Chem (UK), F I C, FS (Switz),
F A S C (USA)



Prof. Y. K. Agrawal, MSc, PhD, DSc (USA) in Pharmaceutical Science, DSc (India), FRSC (UK), CChem (UK), FIC, FS (Switz), FASc (USA), FGS.A, is the Director for the Institute of Research & Development - Gujarat Forensic Sciences University. Formerly he has worked as the Director-Institute of Pharmacy – Nirma University – Ahmedabad; Director - School of Sciences - Gujarat University – Ahmedabad; and Professor and Head - Pharmacy Department - Faculty of Technology & Engineering - M. S. University - Baroda.

Prior to this he has served at different prestigious institutions of the country: like: NCL - Pune, IIT - Bombay, Bhabha Atomic Research Centre - Trombay, IISc – Bangalore; Etc., in various capacities. Prof. Agrawal has visited and experienced various International Universities at USA; UK; Australia; Spain; Israel and Germany. He is the Fellow and Member of several Chemical Societies of India and Overseas. Prof. Y. K. Agrawal has a vast teaching and research experience and has published more than 700 research papers, in National & International Journals of repute. He also holds 5 patents and so far guided 114 PhD students (in Pharmacy, Chemistry, Engineering and Bio-sciences) and also hundreds of M.Pharm, M.Phil M.E. students, during the course of his career.

He is the first to receive a grant for Excellence in Nanotechnology, by Gujcost in the year 2004. He is also the Recipient of "Russian Science Academy Award - 1985", Hari Om Ashram Award - 1989, Hari Om Ashram Award - 1991, Royal Society of Chemistry - Research Award in 1997 & 1998 (on Supramolecules in Nanotechnology), H. K. Sen Memorial Award in Pharmaceutical Science - 1998, Dr. A. K. Ganguli Oration Award - 2000 in Environmental Science, P. K. Bose memorial Award - 2001, IDMA Eminent Pharmaceutical Analyst Award - 2003, CSIR Bronze Medal for research contribution in Chemistry - 2004, Dr. V.T. Athwale Award - 2005 and IIT - New Delhi 'SPARCS Award' for outstanding work in "Application on Research in Chemical Systems for Nano particles – 2006". Very recently Prof. Agrawal received life time achievement award from Indian Chemical Society, Kolkata for the year 2014.

He is a member of International Advisory Board of Fullerene Nanotubes and Carbon Nanostructure (USA) and also Author of Fullerene Derivatives and their Analytical Applications, being published by Kluwer (USA). He is a Member of the Editorial Board; mainly Inorganic Chemistry (Bentham), Mini Res. Rev.(Bentham) for the Indian Journal of Pharmaceutical Sciences; Indian Drugs; Indian Journal of Chemistry; Journal of Chemical Research; etc.

Prof. Agrawal has been the organizer for the National Seminar on Supramolecules, Nanotechnology and Nanomedicine since 1988. He is a Member of the Atomic Energy, UGC, DST, CSIR, DSIR etc. and Indian Representative of Asian Analytical Society, Japan. He is one of the most prolific academician and researcher in India in the broader area of Chemical and Pharmaceutical Sciences.

FACULTY PROFILE



Dr. Deepak Rawtani

Qualifications: ME , PhD

Designation: Assistant Professor

Email ID: deepakrawtani@gfsu.edu.in

Specialization: Nanobiotechnology, Environmental Science

Experience: Teaching 7.5 years, Industry: 6.5 years

Publications: Papers: 22

Research Thrust Area: Nanobiotechnology special emphasis to DNA -Nanoparticle interaction, Functionalization of Halloysite nanotubes for Enzyme Immobilization and drug delivery.



Dr. Prasenjit Maity

Qualifications: MSc, PhD

Designation: Assistant Professor

Email ID: pmaity@gfsu.edu.in

Specialization: Chemistry, Nanotechnology

Experience: 8 Years in Academic & Research

Publications: Papers: 20

Research Thrust Area: Forensic Nanotechnology, Forensic Chemistry



Dr. Harshad Patel

Qualifications: MSc, PhD

Designation: Assistant Professor

Email ID: hdpatel@gfsu.edu.in

Experience: 8 Years in Academic & Research

Specialization: Materials Science, Nanotechnology

Publications: Papers: 7 Book Chapter: 1

Research Thrust Area: Synthesis, Development and Characterization of carbon nanotubes/nanofibers, Metal & Metal Oxide nanomaterials/Nanocomposites, Nanosensors and Nanocatalyst for environmental remediation.



Mr. Jasmin Kubavat

Qualifications: M Pharm, PhD (Pursuing)

Designation: Assistant Professor

Email ID: kubavatjasmin@gfsu.edu.in

Experience: 9 Years in Academic & Research

Specialization: Pharmacology and Toxicology

Publications: Papers: 05

Research Thrust Area: Drug discovery and development for coronary heart diseases, metabolic syndromes, epilepsy and drug toxicology



Qualifications: M Pharm, PhD

Designation: Assistant Professor

Email ID: PRAJESHPRAJAPATI@gfsu.edu.in

Experience: 8 Years in Academic & Research

Specialization: Quality Assurance, Pharmaceutical Analysis

Publications: Papers: 14

Research Thrust Area: Impurity Profile of drugs, Bio-Analytical method development, Sensor development, Stability studies, Analysis of herbal drugs, Drug metabolism studies etc.



Qualifications: M Pharm, PhD

Designation: Assistant Professor

Email ID: jayrajsinh.sarvaiya@gfsu.edu.in

Experience: 09 Years in Academic & Research

Specialization: Pharmaceutical Sciences

Publications: Papers: 11

Research Thrust Area: Nano drug delivery; Regulatory Affairs; Food Forensics.



Qualifications: ME, PhD

Designation: Assistant Professor

Email ID: merooldevarsh@gmail.com

Experience: 16 Years in Academic & Research

Specialization: Structural Engineering

Publications: Papers: 15, Book:1

Research Thrust Area: Advanced structural analysis, Finite element analysis, Design of steel concrete composite structures, Structural health assessment



Qualifications: ME, PhD (Pursuing)

Designation: Assistant Professor

Email ID: mitali.patel@gmail.com

Experience: 04 Years in Academic & Research

Specialization: Structural Engineering

Publications: Papers: 6

Research Thrust Area: Advanced Structural Design, Strengthening of Reinforced Concrete Structures.



An important aim of Institute of Research and Development is to fostering pioneering innovative research in fields spanning the entire range of Pharmaceutical science, Nanotechnology, Chemistry, Environmental science and structural engineering with a focus on their application in Forensic Technology for crime scene investigation. The Institute seeks to contribute to civilization, peace and prosperity in the nation and world, and aims at developing global human capabilities par excellence through pioneering research in science and technology. The Institute is currently involved in following research areas:

- Synthesis, characterizations and applications of Supramolecules
- Optical and electrochemical sensors for detection of trace analytes (Explosives, Pesticides, Heavy Metals, and Drugs).
- Functionalized nanomaterial for Latent Fingerprint development and detection of trace elements present in it.
- Impurity profiling and self-degradation study of drugs using analytical techniques.
- Novel therapeutic strategies to treat neonatal seizures.
- In vivo and In vitro toxicity study of different nanomaterials and drugs.
- Investigation on multifunctional nanocarrier systems.
- Novel nano alloy for corrosion resistance in reinforced steel.
- Analysis of faulty construction (civil) structures.
- Food additives

The List of sponsored research projects at the Institute of Research and Development:

- 1. DST-FIST level 1 research grant of 69 Lakhs INR. (Grant Coordinator: Prof. Y. K. Agrawal)
- 2. Development of Nano Techniques and Technology for Finger Print detection and Identification and detection of Toxic Material at Nanogram levels in Biological Matrices” sponsored by Ministry of Home Affairs to Professor Y K Agrawal, 25 Lakhs
- 3. SERB (DST) sponsored project “Intrapulmonary allopregnanolone (a neurosteroid) in acute treatment of seizures’ awarded to Dr. Ashish Dhir, 17 Lakhs
- 4. SERB (DST) sponsored project “Novel functional polymer stabilized mono and multimetallic nanocatalysts for demanding catalytic transformations” awarded to Dr. P. Maity, 2014-2017, 20.5 Lakhs
- 5. DBT Ramalingaswami Grant “Novel therapeutic strategies to treat neonatal seizures” awarded to Dr. Ashish Dhir, 82 Lakhs
- 6. GUJCOST sponsored research project “Load carrying capacity of steel concrete composite deck with different bond patterns” to Dr. Merool Vakil, 1.91 Lakhs
- 7. GUJCOST sponsored research project “Development of nanotechnology based formulations of poorly bioavailable nutraceuticals and their characterization” to Professor Y K Agrawal, 4.7 Lakhs
- 8. GUJCOST sponsored research project “Halloysite Nanotube “An efficient drug delivery tool for enhancement of bioavailability of Fluoroquinolones” : A nanotechnology based approach” to Dr. Deepak Rawtani, 5.5 Lakhs
- 9. CSIR sponsored project “Design and development of functionalized nanostructures and techniques for imaging of latent fingerprints and identification of trace explosives in forensic samples” awarded to Dr. P. Maity, 2017-2020, 15 Lakhs
- 10. Dr. Lateef Bakre [Faculty, Department of Pharmaceutics and Pharmaceutical Technology Olabisi Onabanjo University Sagamu, Nigeria] awarded research grant by third world academy for research work on nanopharmaceuticals at Institute of Research and development, GFSU [2015].



RESEARCH IN NUMBERS



26.7 M

**Research
Funding
Received
so far**



110+

**Scopus
Listed
Publication**



1.38/12

**Average
Impact
Factor/
Highest IF**



20

**Externally
Funded
National &
International
Conferences**

2008-2017

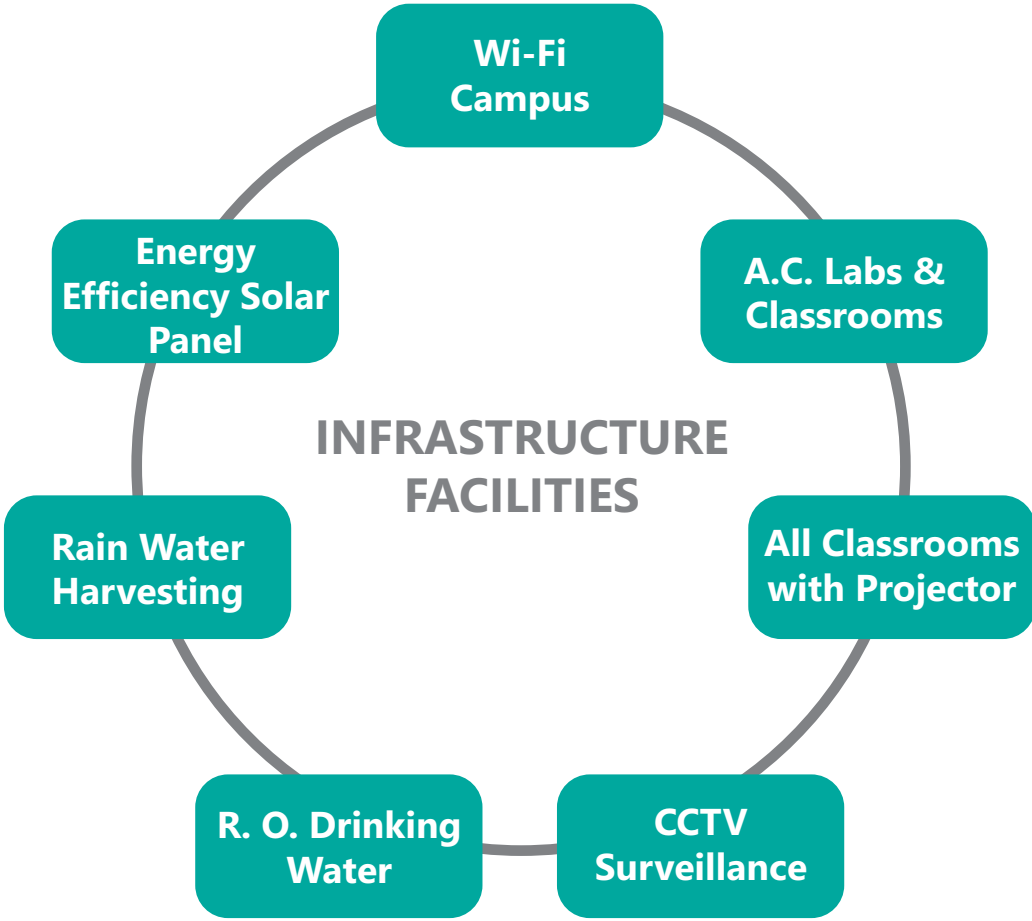
LIST OF MOU

The Institute of research and development offers research and testing consultancy services through MOU. Followings are our key partners for joint research activities:

- (1) Perna Bioinnovations research pvt ltd.
- (2) Sahjanand Laser Technology Ltd
- (3) Gujarat Environmental Management Institute
- (4) KLE University. Belgaum, Karnataka-India.



INFRASTRUCTURE FACILITIES

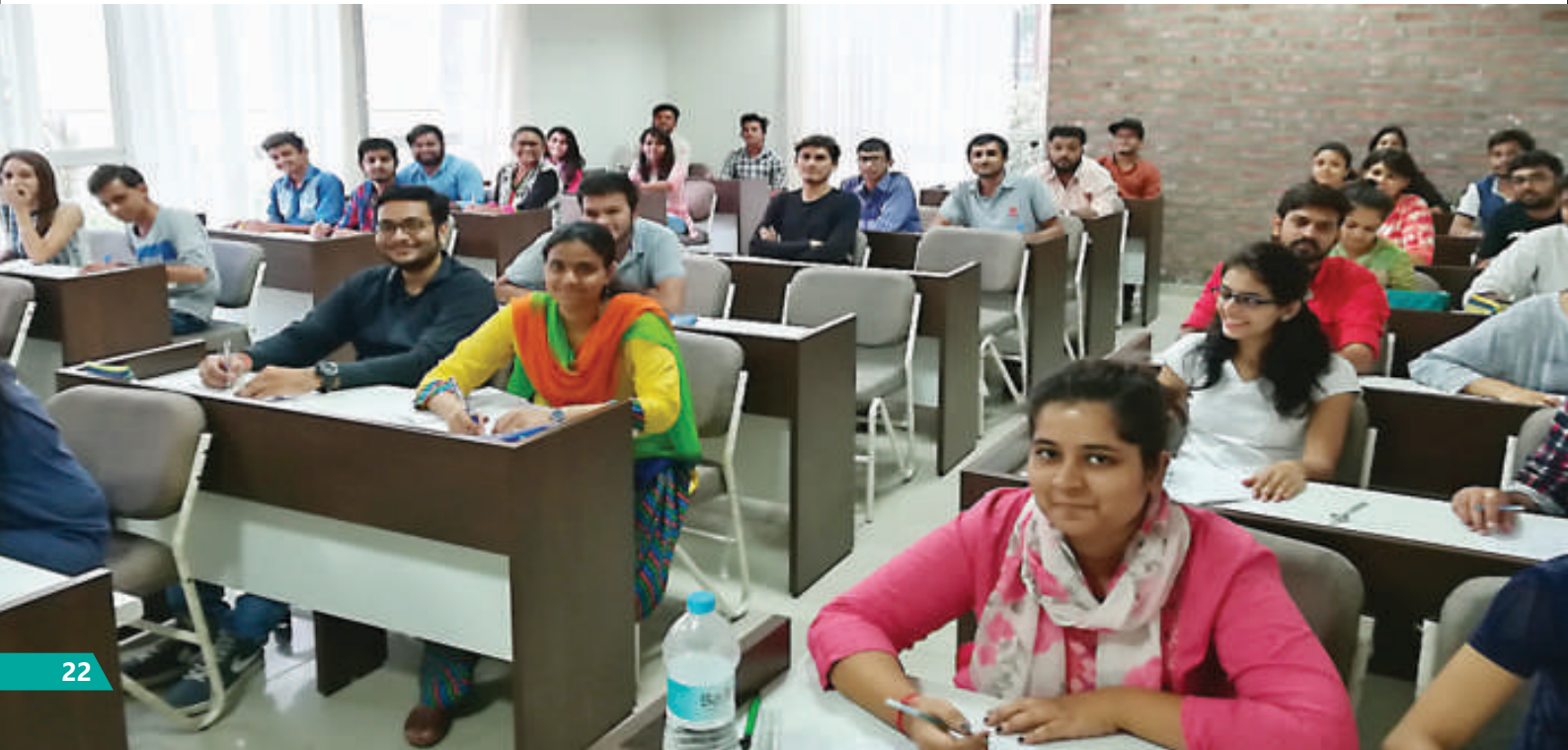
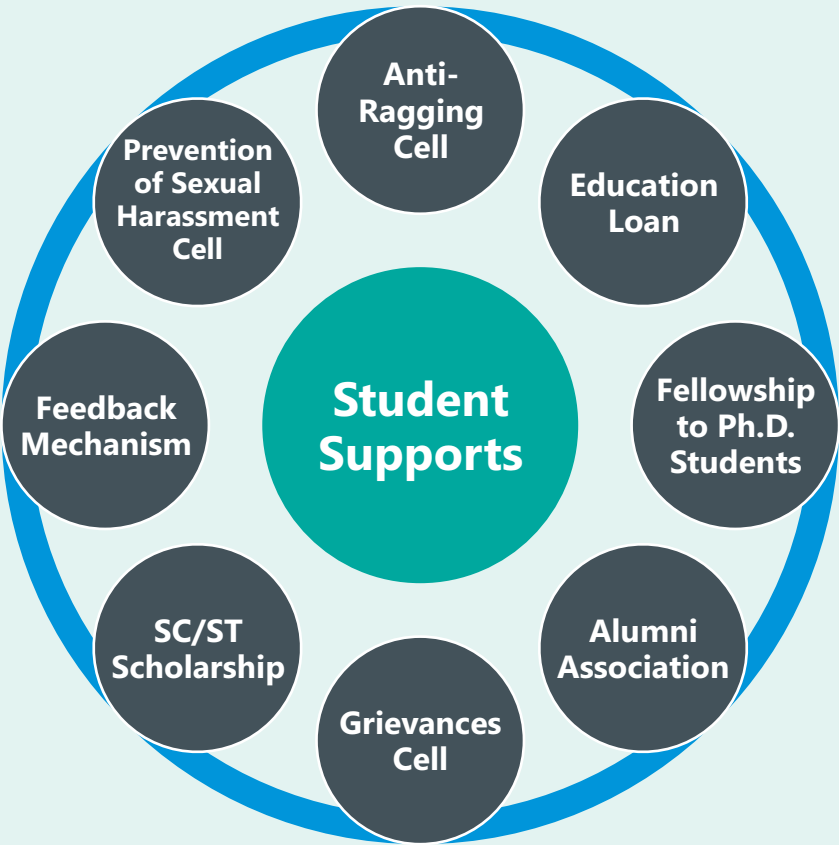


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|--|---|--|--|--|
| Animal House <ul style="list-style-type: none">CPCSEA Approved | Experimental Lab <ul style="list-style-type: none">Nos. 08 | Instrumental Room <ul style="list-style-type: none">Nos. 03 | Major Instruments <ul style="list-style-type: none">Nos. 40 | Computer Lab <ul style="list-style-type: none">Nos. 0125 PCs with Broadband connections |
| aaaaaa Class <ul style="list-style-type: none">Nos. 06Equipped with Broad band enabled PCs with LCD Projectors | Seminar Hall <ul style="list-style-type: none">Nos. 01Equipped with Broad band enabled PCs with LCD ,OHP, Webcam, Audio systems | aaaaaa <ul style="list-style-type: none">Nos. 01 | Faculty Rooms <ul style="list-style-type: none">Nos. 03 | aaaaaa <ul style="list-style-type: none">Nos. 50PCs with BroadbandWi-Fi connectivity' |

CONFERENCE & SEMINARS

| | |
|------|--|
| 2017 | <ul style="list-style-type: none">• Conference on Supramolecular nanotechnology• INDO-IIS Workshop on the Security of Agro chemicals |
| 2016 | <ul style="list-style-type: none">• RSC West India Section Meeting of Research Scholars• DST- Funded Research Project Progress Assessment Meeting• MYRIAD- Nanotechnology based Model Design and presentation• National Conference on "Supramolecules and nanotechnology" |
| 2015 | <ul style="list-style-type: none">• Workshop on dissolution technologies• Workshop on USFDA-cGMP for drug regulators of India• Workshop on Bioequivalence studies in clinical research• Promoting Bio Innovations• Conference on Supramolecules and nanotechnology |
| 2015 | <ul style="list-style-type: none">• Medical Device Regulation• MYRIAD- Nanotechnology based Model Design and presentation• National conference on green chemistry• Special Lecture on Research & Funding opportunities in India• Conference on Supramolecules and nanotechnology |
| 2013 | <ul style="list-style-type: none">• National conference on Supramolecules & Nanotechnology• National seminar on green chemistry• MYRIAD-Nanotech based model design for application in healthcare and engineering |
| 2012 | <ul style="list-style-type: none">• MYRIAD Nanotechnology based model designing• Conference on Supramolecules and nanotechnology |
| 2011 | <ul style="list-style-type: none">• Nano HPLC: Theory & Practice• International Conference on Forensic Nanotechnology |

STUDENT ACTIVITIES



AWARDS AND MEDALS CONSTITUTED BY INSTITUTE

The Institute of Research and Development has introduced a scheme of awards for meritorious students & scholarship for Ph.D research scholars.

Gold medal for following courses are currently awarded

- MS Forensic Pharmacy [by Troikaa Pharmaceutical, Ahmedabad]
- MS Forensic Nanotechnology [by Troikaa Pharmaceutical, Ahmedabad]
- MS Chemistry [by Accent Chemicals, Ahmedabad]
- MS Environmental Science [by GEMI, Gandhinagar]
- M.Tech Civil Engineering [by Cube construction, Vadodara]

AWARDS AND RECOGNITIONS:

- Identified by DST as a research center of excellence with a special research grant for procurement of high end instrument by awarding FIST level 1 research grant.
- Prof. Y.K Agrawal has received Lifetime Achievement Award by Indian Chemical Society, Kolkata- 2014.
- Prof. Y. K. Agrawal, felicitated by Pandit Deendayal Petroleum University, Gandhinagar for his outstanding contribution in Teaching and Research on Teacher's Day -2015.
- Dr. Dhir has received Rafaelsen Young Investigator Award by International College of Neuropsychopharmacology-2014.
- Dr. Dhir received prestigious Ramalingaswami Fellowship from DBT, India-2012.

FILED AND GRANTED PATENTS:

- (1) New methods for the synthesis of calixarene nanoparticles [Inventor: Y.K.Agrawal]
- (2) Anticounterfeiting packaging foil [Inventors: Ruchir Shah, Talati Ram and Parikh Saumil]
- (3) Water dispersible metal nanoparticles obtained from novel calix[4]resocinarenehydrazides and applications thereof [Inventor:Y.K.Agrwal]



R&D Activity

- More research grants
- Effects of food habits
- Nano drug Delivery systems for cancer therapy
- Development of genetically modified crops
- Scholarship for PA, RA, and Post doc.
- Nano energetic

New Programmes

- MS in Forensic Drug Regulations
- M. Tech in Forensic
- Networking and Information Technology
- M. Tech in Mechanical Engineering
- M.Sc. Nuclear forensics

Centre of Excellence

- Nanomaterials testing center
- USFDA recognition for Forensic
- Pharmacy Center
- Mobile van for structural failure and disaster management
- Training centers

GLIMPSES OF RECOGNITION OF OUR ACTIVITIES BY LEADING NEWS PAPERS

GFSU plans forensic filters for VVIP food

Parth.Shastri@timesgroup.com

Ahmedabad: Emperors and rulers down the ages have relied on 'food tasters' to ensure that what they were about to eat was safe and pure. In fact, US President Barack Obama is known not to eat any food without his official taster declaring it safe.

Now, Gujarat Forensic Sciences University (GFSU) has

come up with a new course to meet the growing demand for food tasters. The university has launched a two-year master of food technology programme which begins next



month with 15 students getting training in forensic food analysis.

Prof Y K Agrawal, director of GFSU's Institute of Research and Development, said that they had

over 100 inquiries as the admission process is still going on. The course will commence in August, he said. "The decision to start a course was taken after we noticed a demand for such a specialized job," said Agrawal. "VVIP security will, of course, offer big jobs but the course is also useful for investigators of food poisoning cases."

► Course for food, PG

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FORGET PURIFIERS, JUST 'DIP DIP' FOR SAFE DRINKING WATER

Updated: Oct 3, 2015, 10:09 PM IST

AD

SquareFoot (The Official Site)

Get indoor & Outdoor Flooring Solutions. 100s of Shades & Designs. Enquire Now.



Think your purifier or expensive RO system is providing you with 100% arsenic-free water? Think again as no purifier comes with a guarantee of total eradication of arsenic content from water. Imagine, a tea bag-sized and pocket-friendly formula that can turn your water arsenic-free? And what else can one ask if the same comes at a price of Rs 10 only for every filtered liter.

The Gujarat Forensic Sciences University's Institute of Research and Development (IRD) that has developed a Super Molecular Bag termed 'dip dip' that claims of absorbing arsenic from drinking

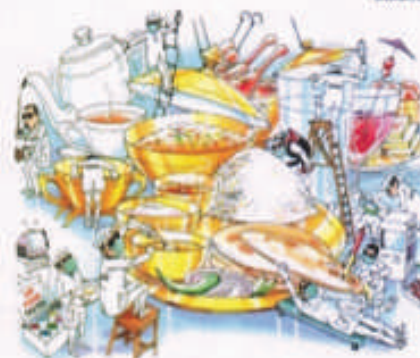
GFSU course to cover food forensics and toxicity

► Continued from P 1

He further said that the course will add to the skills of those working with agencies such as Food and Drugs Administration (FDA) and Central Drugs Standard Control Organization (CDSCO). "It will equip them better to find ways of identifying adulterated goods and counterfeit products," Agrawal said.

The course will comprise papers such as toxicology, food processing, food forensics, microbiology and chemistry, preservatives and biology.

In Gujarat, it was then chief minister Narendra Mo



of food in 2013. He took the expert's help for two months during his whirlwind visits

The FSL official for food testing was attached to Modi's room till he was sworn in as

Medical devices to be under drug control law

This Will Help Indian Manufacturers Standardize Devices

Parth.Shastri@timesgroup.com

Ahmedabad: At the moment, doctors can use devices ranging from pacemakers to artificial knee joints of their liking and can ask the patients to go for the same. With no definitive rule pertaining to medical devices, most of the doctors go for the ones that have approvals from countries such as the US.

The Central Drugs Standard Control Organization (CDSCO) that looks after the standardization of drugs and cosmetics under the Drugs and Cosmetics Act, 1930, is now poised to include medical devices ranging from artificial limbs to heart stents under its purview. An amendment for this purpose is likely to be presented to the Parliament in upcoming session. The draft of Drugs and Cosmetics (Amendment) Bill, 2015 has now been



RIGHT FOOT FORWARD

put in public domain, said CDSCO officials.

The central agency has organized a five-day workshop for more than 75 drug control officials from across the country on medical devices regulation at the Gujarat Forensic Sciences University (GFSU) starting from February 16. The workshop will cover a wide range of topics including definition of medical devices, existing guidelines in India and abroad, quality control and management, safety prerequisites and steril-

ization, regulatory audits and impact of proposed amendments on current procedures.

"With the advancement in medical technology, the agency felt that it is time to amend the existing rules to encompass the medical devices that have become integral part of the treatment. While even countries such as Bangladesh have their own rules on the issue, India being a major consumer and producer of devices doesn't have such regulations," said a senior CDSCO official.

How will the move help patients? The officials said that as the drug regulations help identification of counterfeit, harmful medicines and help keep an eye on malpractices, once the devices are identified and categorized, the similar procedure will help in quality control and systemization of the market.

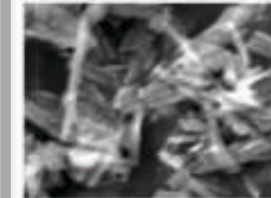
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TUBERCULOSIS PATIENTS, BEWARE OF FATAL DRUGS

Ahmedabad Mirror | Updated: Aug 31, 2015, 10:40 AM IST

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Research by Institute of Research and Development (IRD) at GFSU on active ingredients used in tuberculosis drugs has found that they contain more impurities than the permissible limits. The drugs namely isoniazid, rifampicin, pyrazinamide, ethambutol and streptomycin have been found with 0.25 per cent impurities which exceed the maximum allowed proportion of 0.1 per cent.

Dr Y K Agrawal, director of Institute of Research and Development at GFSU, said, "Among all the drugs, isoniazid drug is used for the treatment as well as prevention of TB. It has to be taken for longer periods. It contains two major ingredients among which streptomycin and GGT problems which might eventually have fatal consequences on one's health. Ethambutol, another active ingredient present in TB drug, contains impurities in the enantiomeric form which causes blindness."

The research will be patented by the next six months as the institute is already holding talks with the concerned authorities in that concern. "Each of these TB drugs contains high level of impurities and hence their overuse may also cause death. Monitoring impurities in drugs is a prerequisite to ensure drug safety and quality. Specific requirements for impurities are set by the regulatory authorities while they submit new drug. We will test more types of drugs in the near future and may come up with a few more findings," added Agrawal.

"We have used various conventional methods for the separation, identification and recovery of the active ingredient of the drug from the impurities present. The method we have used is called the sequential carbon dioxide which is an ecofriendly and a natural method as it uses the carbon dioxide which is thrown out of the human body. The method helped in identifying the impurity present in the drug," said Prakash Prasad, a PhD student at IRD.

AhmedabadMirror | TUESDAY, AUGUST 11, 2015 | 8

GFSU works on nano materials

The IRD at forensic university, in collaboration with DRDO, is building nano energetic materials

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The Institute of Research and Development at GFSU in collaboration with DRDO, Chandigarh is developing nanocomposites (energetic materials) that can be used extensively for defence. These materials can be used in explosives, propellants, li-



Nanocomposites consist of nano particles and polymer matrix

went to intern with DRDO at Chandigarh in 2012. During his internship, he started working on a project similar to the one we are now working on. The authorities at DRDO recognised his work and got in touch with our institute. One thing led to another and finally we have joined hands."

As per sources, the metals being used in making the nano-energy material are aluminium, cobalt and sil-

Printed from
THE TIMES OF INDIA

GFSU researcher develops tool for treating DNA

TNN | Jul 27, 2015, 10:43 PM IST

AHMEDABAD: Researchers have been trying to diagnose and treat diseases such as cancer at the DNA level with various techniques but nanotechnology has opened up scope for highly selective bio-sensing applications.

Now, a scientist of Gujarat Forensic Sciences University (GFSU), Dr Deepak Rawtani, has successfully used 'Haloysite nanotubes' with gold and silver nanoparticles as sensing tools for diagnosis and treatment at the DNA level. Haloysite is a natural occurring nanotube formed over millions of years from aluminum, silicon, hydrogen and oxygen. This tool is considered non-toxic and more effective for DNA diagnosis.

Earlier, researchers used to work with carbon nanotubes whose dimension was 1/10,000th of the diameter of a human hair.

"One of the problems faced in using current diagnostic tools is their sensitivity and selectivity," said Rawtani. "During the study, it was evident that metal nanoparticles created from Haloysite nanotubes can be used as a sensing tool for study of damaged DNA."

The study was conducted in the laboratory to monitor interaction of nanoparticles with DNA coupled with spectroscopy and spectro-fluorometry. The method was found highly sensitive. Metal nanoparticles are known for their strong interaction with DNA and this interaction can be used as an important tool for monitoring molecular diagnoses.

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THE TIMES OF INDIA

Nano tech to fight spurious drugs

TNN | Jun 21, 2014, 08:13 PM IST

AHMEDABAD: India is the largest manufacturer of generic drugs in the world, and the pharmaceutical industry is worth billions of dollars in both domestic and overseas markets. Consequently, there has been a major issue with counterfeits of popular drugs and production of sub-standard drugs with similar-sounding names. Government agencies put the figure for such drugs at 0.4%, but independent agencies believe it could be as high as 12 to 20%.

A consumer in the large rural or even urban market may not be able to differentiate between the two, and this could even cause a patient's death. Law enforcement agencies have a tough task at hand — how to identify a sample as sub-standard or fake quickly and without doubt.



OUR ALUMNUS ARE WORKING AT VARIOUS POSITION IN RENOWNED ORGANIZATIONS

- Claris Life Science
- Lambda Therapeutics
- Sun Pharmaceuticals
- Zydus Cadila
- Cadila Pharmaceuticals
- Ascent Chemicals
- Bhabha atomic research center
- CIMS Hospitals
- Indian Air Force
- Mangalam drugs and organics limited
- Apotex Research
- Vedanata
- Lincoln pharma
- West Coast Pharma
- Novartis Pharma
- Oxygen healthcare
- Alembic Pharma
- Torrent Research Center
- West Cost Pharmaceuticals
- Regis University, USA
- University of Bordeaux, FRANCE

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