

# INSTITUTE

The College of Engineering and Technology (CET) was established in the year 2002 under the aegis of The Hindu Educational Society, Moradabad (registered under the Societies Registration Act 1860). The activities of CET were promoted by a group of public spirited entrepreneurs guided by the great visionary and educationist Late Shri Onkar Saran Kothiwal, the past Chairman of the Board of Governors of the Institute, who dedicated his life for the cause of the basic education amongst the poor and women as well as for the promotion of professional education and research, in the region.

Subsequently, the College, under the able stewardship of the great creative thinker and untiring activist Dr. R. M. Dubey, the Managing Director of the College and with the administrative support and patronage from Mr. Rajiv Kothiwal, the Chairman of the Board of Governors of the College has now grown into one of the most sought after institutions in the State that has resulted from the unwavering commitments of the Society and the mandate it has given itself in terms of those commitments.

A number of colleges have been established by the Society — College of Pharmacy, comprising three departments: Pharmaceutical Chemistry, Pharmacognosy, and Pharmaceutics; Department of Computer Applications; Department of Management Studies; and College of Engineering and Technology, comprising five departments: Biotechnology, Mechanical Engineering, Computer Science and Engineering, Information Technology, and Electronics and Communication Engineering, each supported by the Department of Humanities and Applied Sciences. Each of the Departments of the Colleges of the Institute have their own separate spacious buildings. The undergraduate courses in Engineering are affiliated to Uttar Pradesh Technical University out of which three have already been accredited by NBA-AICTE.

The lush green campus of the College is spread over 50 acres of land, with sprawling lawns and playgrounds, and is aesthetically planned and designed with excellent facilities to develop a congenial environment for the students pursuing their studies, away from the daily hustle and bustle of city life. The campus provides all the modern amenities to the students and staff that include separate hostels for boys and girls, staff quarters, guesthouse, 24-hour electric power and water supply, Internet connectivity, bank, post and telegraph office, a medical dispensary, a meditation centre (Onkar Dham), and a fleet of buses for the day scholars as well as for the teaching and non-teaching staff of the College residing outside the campus.

## **CHAIRMAN'S MESSAGE**

The emergence of New India has created a palpable need for a large number of professionally trained young men and women having expertise in all fields, with the hallmark of adaptability, quality consciousness, discipline and commitment, to boost the country's economic growth.

Keeping the above need in mind, the College of Engineering and Technology (CET) was established in the year 2002 as a centre of quality education, offering undergraduate and postgraduate courses in the field of Engineering and Technology at the College of Engineering & Technology. The College is affiliated to Uttar Pradesh Technical University, Lucknow and is approved by All India Council for Technical Education (AICTE), New Delhi. A number of courses of the College have also been accredited by AICTE in the mean time. In this short span, the College has emerged as a pioneer in the field of professional education and research, with the sole objective of developing quality executives, engineers, scientists, and researchers. In addition to the courses mentioned, the Institute is having an ambitious plan to establish a Medical College in the campus in the near future.

I am proud of what we have achieved within a short time. I look at the future with optimism and confidence. I urge you to visit the campus, if possible, and witness for yourself how this College is an institution with a difference. I am sure that the time you spend here will not only be rewarding but memorable for you. I welcome you to join and experience the uniqueness of CET.

**Rajiv Kothiwal**

## MANAGING DIRECTOR'S MESSAGE

All good institutions have people with ideas, thoughts and creativity behind them. The institutions, which stand out from amongst the best, are established by people who have, in addition to the above, a vision. The College of Engineering and Technology (CET) is one such institution where the endeavour of its founder, Late Shri Onkar Saran Kothiwala, and all people actively involved, is to make it one of the best in the country. CET is one of those few institutions, which have carved out a niche for themselves among the most progressive institutions in the country.

CET has an excellent core faculty, coupled with high-profile visiting faculty from the premier institutes/universities of the country and from the corporate world. At CET, everyone's mission is to develop the all-round personality of the students by making them not only excellent professionals but also good persons of strong character and moral integrity with the understanding and regard for human values and pride in their heritage and culture, and a yearning for perfection.

Further, at CET, students and faculty experience an open-ended and free-flowing academic and professional environment of intellectual enquiry, technological studies, extra-curricular activities and self-development. All of us, the founders, the mentors, the faculty members and well wishers of CET are enthused with the zeal to open all avenues to suit the needs, requirements and ambitions of every student entering the portals of this Institute.

It is my great pleasure and honour to invite you to join the CET family for a memorable journey of quality education, training and learning that will open for you excellent career prospects in emerging areas of Engineering and Technology.

**R. M. Dubey**

## **MISSION**

**TO PROVIDE KNOWLEDGE-BASED EDUCATION TO OUR STUDENTS, RELEVANT TO THE NEED OF THE SOCIETY AND THE NATION, BY INCULCATING IN THEM THE INDIAN VALUES AND ETHOS**

## **VISION**

**TO BECOME AN INTERNATIONALLY ACKNOWLEDGED INSTITUTION TO GENERATE GLOBALLY COMPETITIVE HUMAN RESOURCE WITH ETHICAL SENSE, CAPABLE OF MEETING THE CHALLENGES OF THE ADVANCING SOCIETY**

## **GOAL**

**TO DEVELOP COMPETENT, SELF-RELIANT AND TECHNO-SAVVY PROFESSIONALS WITH ADVANCED ENTREPRENEURIAL SKILLS THROUGH KNOWLEDGE BASED LEARNING PROCESSES, AND TO IMBIBE IN THEM A PASSION FOR TEAM WORK AND A YEARNING FOR PERFECTION**

## **QUALITY POLICY**

**TO PROVIDE THE QUALITY EDUCATION IN THE VARIOUS FIELDS OF ENGINEERING, SCIENCE, TECHNOLOGY, MANAGEMENT, COMPUTER APPLICATION AND PHARMACY BY IMPARTING THEORETICAL AND PRACTICAL KNOWLEDGE TO STUDENTS AND TO ENABLE THEM TO COMPETE AND EXCEL IN THEIR RESPECTIVE FIELDS IN NATIONAL AS WELL AS INTERNATIONAL SETTINGS**

# **BOARD OF GOVERNORS**

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Member, Hindu Educational Society  
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Govt. Poly technique Campus  
Vikas Nagar, Zoo Road, Kanpur  
(Ex-Officio)

### **Director of Technical Education,**

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Sr. President  
V H B Life Sciences, Mumbai

### **Mr. Ramesh Singh**

Vice President (HR)  
TEVA API India Ltd. Gajraula  
J. P Nagar

## CAMPUS AND ITS LOCATION

The College residential campus is situated at Lodhipur in Moradabad, Uttar Pradesh, internationally known as the Brass City of India. The campus is at a distance of 12 km from Moradabad Railway Station on Lucknow-Delhi National Highway-24. At a distance of around 140 km from Delhi, the city of Moradabad is well connected to Varanasi, Allahabad, Kolkata, Delhi, Amritsar, Mumbai and many other major cities of the country, besides Delhi, by direct Railway services and road. The nearest Domestic and International Airports are at Delhi, which are easily reachable by railway/road from Moradabad.

## COURSES

| Course   | Duration<br>(in Years)  | Intake |
|--|---|--------|
| <b>Department of Computer Science &amp; Engineering</b>        |   |        |
| Computer Science & Engineering                                 | 4   | 120    |
| <b>Department of Information Technology</b>                    |   |        |
| Information Technology   | 4   | 120    |
| <b>Department of Electronics and Communication Engineering</b> |   |        |
| Electronics & Communication Engineering                        | 4   | 120    |
| <b>Department of Mechanical Engineering</b>                    |   |        |
| Mechanical Engineering   | 4   | 60     |
| <b>Department of Bio Technology</b>                            |   |        |
| Biotechnology  | 4   | 60     |
| <b>Department of Management Studies</b>                        |   |        |
| Master of Business Administration                              | 2   | 60     |
| <b>Department of Applied Sciences</b>                          |   |        |
| Physics  | Department floats the supporting courses for all the different branches of Engineering College. |        |
| Chemistry  |   |        |
| Mathematics  |   |        |
| English  |   |        |
| Environmental Studies  |   |        |

B.Tech. (**Electronics & Communication Engineering**), B.Tech. (**Computer Science & Engineering**) and B. Tech. (**Information Technology**) courses of the college have been **accredited by National Board of Accreditation, AICTE**, the highest Govt. Body for Quality Assurance of Technical Education in the country. Accreditation is a prestigious achievement that confers the global recognition to the degree of pass out students of the institution, and opens all avenues for the faculty members for research and projects grants from AICTE.

## **ADMISSION**

### **Counselling**

For B.Tech courses, admissions are through a common entrance test (**Uttar Pradesh State Entrance Examination - UP-SEE**), followed by counselling, and conducted by **Uttar Pradesh Technical University (UPTU)**, Lucknow.

### **Management Seats**

15% seats are filled up at the institute level against the management quota.

### **Lateral entry**

The Uttar Pradesh State Entrance Examination implements the direct admission to 2nd year in B.Tech for diploma holders with minimum 60% marks in aggregate.

### **Vacant seats**

The vacant seats in all the courses are directly filled up by the management as per the directives of the State Government of Uttar Pradesh.

### **NRI Seats**

The NRI seats are filled up as per the directives of the State Government of Uttar Pradesh and concerned Entrance Test conducting agency.

### **Other relevant information**

Notwithstanding the above, further information on admission may be seen, for the sake of completeness, in the Website of Uttar Pradesh Technical University, Lucknow (**[www.uptu.ac.in](http://www.uptu.ac.in)**)

## FEES

|  |   |
|--|---|
| <b>Annual Fee</b>                                | As per the directives of Government of Uttar Pradesh  |
| <b>Exams or Enrolment etc</b>                    | As per the directives of Uttar Pradesh Technical University, Lucknow  |
| <b>Registration/Hostel/Bus Charges</b>           | As per the directives of the Institute  |
| <b>Alumni Life Membership (One-Time Payment)</b> | To be adjusted out of the security money as per the Uttar Pradesh Technical University, Lucknow and the Institute norms |

## LIBRARY

The College has an air-conditioned Central Library aesthetically designed with a spacious hall, stack-areas and a reading room. It has a rich collection of text and reference books of Management Science, Engineering, and Technology concomitant with adequate number of audio-video CDs, project reports, and industry/company brochures, besides annual Department Information Bulletins and quarterly Institute Newsletters. The library subscribes to more than 150 Indian and foreign journals and magazines. Besides, each department maintains a well equipped Departmental Library with a stock of key reference books and monographs, besides the journals of particular relevance to the department concerned. Besides, the online e-journals such as [www.springerlink.com](http://www.springerlink.com) and [www.sciencedirect.com](http://www.sciencedirect.com) are also accessible to students and faculty.

## HOSTEL

There are three hostels for boys and one hostel for girls in the campus with a total capacity of 1000 boys and 300 girls. The hostel rooms are equipped with cupboards, chairs, tables, bookshelves, optional STD phone connection, etc. Each hostel is provided with a common room. A weekly laundry/linen service is provided. The hostels are provided with 24-hour electricity and water (hot and cold) supply, purified drinking water and cooperative non-profit mess service for food with utmost hygienic care; the campus canteen/cafeteria is also available during the Institute working hours. The hostel superintendents take care of the boarders in each hostel. The hostel boarders benefit from the other Institute amenities (described under a separate section). The hostel superintendents take care of the boarders in each hostel. Round-the-clock security is provided by professional security personnel.

## **AMENITIES**

The students and staff can avail of the campus facilities/amenities, namely, STD/ISD/PCO Service, Medical Dispensary, Bank, Post Office, Canteen/Cafeteria, Shopping Center, Playground, Gymnasium, Open-Air Theatre, Hobby Clubs, and Meditation Hall.

## **STAFF RESIDENTIAL QUARTERS**

The College campus has the residences of Managing Director, Programme/College Directors, Technical Advisors, Faculty members and non-teaching staff. The Hostel Wardens have been provided accommodation in their respective hostels. There is a Guesthouse Complex for the accommodation of external experts. The staff residing in the campus can avail of the campus facilities/amenities such as STD/ISD/PCO, Medical Dispensary, Bank, Post Office, Canteen/Cafeteria, Shopping Centre, Children's Park with all amenities, Playground, Open-Air Theatre, and Meditation Hall. Free 24-hour electricity and water supply is made available to the staff quarters. The College also provides free school bus facilities to the children of the campus.

## **MEDICAL**

The College provides adequate medical aid to the students and staff at its medical care centre/dispensary, under a fulltime medical officer. The College also provides ambulance service for the students and staff and takes utmost care in their emergent medical treatment in reputed city hospitals.

## **INTERNET**

Internet Labs are available in each department with 30 systems and a Server provides 24-hour Internet service through RF at 2 Mbps bandwidth.

## **COMMUTING FACILITIES**

The College has a fleet of 14 buses plying for the day scholars. The bus service is also available for the students' educational/industrial/placement tours/excursions. Similarly, there is a separate bus service for the teaching and non-teaching staff of the Institute residing outside the campus. Besides, the College extends the school bus facility to the school children residing in the campus.

## **SPORTS, CULTURAL, AND CO-CURRICULAR ACTIVITIES**

Sports kits and equipments are available providing the outdoor game facilities for Cricket, Football, Tennis, Basket Ball, Badminton, etc. as well as for the indoor game facilities for Table Tennis, Carom, Chess, etc. In addition, facilities are also available for cultural activities, which are arranged by the students from time to time. Some of the regular events are the inter-departmental football and cricket tournaments, freshers' welcome, art and technology exhibitions, the celebration of the social and National festivals. The Institute supports a Hobby Club for the students.

## **CENTRE FOR RESEARCH & DEVELOPMENT AND CONTINUING EDUCATION AND OFFICE OF DEAN (RESEARCH)**

The College sincerely believes that teaching and research are the two sides of the same coin and that the academia has sincere commitments towards building research competence of the country. Motivated by this spirit, the College has established this Centre. The Centre is responsible for arranging invited lectures by distinguished teachers and researchers of the country and abroad. The Centre hosts seminars, symposia, and workshops in the College. Further, the Centre continuously supports the teachers of the College to improve their educational qualification, for instance, by joining doctoral programmes, publishing research papers in peer-reviewed journals, participating in technical conferences and organising such conferences, and by sponsoring visits to national and international research centres and universities for collaborative research. The Centre also motivates the teachers of the Institute to apply for the membership of professional societies in their respective fields of research interest. Though most of the Departments of the Institute have been accredited by AICTE and the remaining departments are going to be accredited soon, the Centre takes the responsibility to monitor the activities of the students and teachers to ensure that the Institute continues to maintain, and never falls short of, the academic and research standards of AICTE. A senior professor of the institute of national and international repute advises the Centre.

Furthermore, it is the responsibility of both the Dean (Research) of the Institute, who is a professor of the Institute and who has acclaimed research contribution in the country and abroad, and his office, to keep a record of the academic and R&D achievements of the Institute, and bring out Newsletters highlighting these achievements.

## **Department of Computer Science & Engineering**

The Department of computer science and engineering was established in the year 2002 with the initial intake of 60 students in the course of B. Tech in Computer Science and Engineering of Uttar Pradesh Technical University, Lucknow. The course was approved by All India Council for Technical Education (AICTE). Subsequently, the intake was increased to 120, and the course was accredited by National Board of Accreditation, All India Council of Technical Education.

Nearly 160 state-of-the art computers with configuration that can support very demanding applications are available for use by the students for 24 hours. All computers have the access to the internet through a dedicated 2 Mbps VSAT and RF link.

The thrust areas of the department are

- Reverse Engineering
- Wi-Fi Security
- Data Mining
- Information Security
- Machine Learning
- Information Retrieval
- Ad Hoc Network
- Embedded System
- Multimedia Systems
- Computational Intelligence

## **LABORATORIES**

Some of the laboratories of this department are:

- Computer Graphics Lab
- Programming Lab
- Multimedia Lab
- Networking Lab
- Linux Lab
- Internet Lab
- Project Lab

## Research (Computer Science and Engineering)

The research areas of the department are:

- Reverse engineering

In this work, a technique has been proposed to transform the state model extracted from the legacy code, in the form of finite state machine, to its equivalent statechart model that alleviates the problem of state explosion.

The work is also carried out in the problem of transformation of finite state machine (FSM) to its equivalent statechart representation by introducing hierarchy and concurrency in FSM.

Furthermore, the study includes devising a method to automatically convert an FSM model to an equivalent statechart model. Also, the method results in different statechart representation of an FSM. The structural complexity metrics are used to compare statecharts. This enables one to identify a statechart with the lowest structural complexity. If the resultant statechart is similar to the original FSM, the method can extract statechart from an arbitrary FSM. The method can be applied to not only FSMs of objects but also FSMs used in other modeling applications, and is capable of producing statecharts up to two-level of nesting.

In addition, a prototype tool has been developed to demonstrate the transformation process. The technique has been supplemented by experimental data. FSMs used for experimentation are randomly generated. The experimental evaluation indicates that the technique produces statecharts that substantially improve the complexity of state models.

- Mobile computing
- Data mining including genetic-based systems

In this work, we propose an approach alternative to the standard algorithms used for deriving decision rules. The work also includes experiments with synthetic as well as real life data to demonstrate the working of the genetic based self-learning system.

- Information security

In this work, a solution to the denial of service attack is proposed using Diffie Helman algorithm. The work will also include triple DES algorithm for improved efficiency.

- Framework for executing untrusted programs

The work concerns with models for executing programs in a virtual environment and then decides on the trustworthiness of the programs, starting with the assumption that all untrusted programs are safe until proven otherwise.

- Intelligent vehicular ad hoc Network

In this work, collaborative signal and information processing is utilized to allow higher level information to be generated by collaboration between nodes. The scheme is application specific and requires some knowledge of the topology of the road network. It is assumed that the required information is obtainable from a digital map.

- Mobile operating systems

The study encompasses Symbian system designed for mobile devices with associated libraries, user interface frameworks and reference implementations of common tools

- Spin electronics
- Smart dust-tiny sensors for communication
- Scalable on chip ILP networks for a decentralized architecture
- Controlling computers by human thought

## **Department of Information Technology**

The Department of Information Technology conducts B. Tech course in Information Technology , with an intake of 120 students. The competent faculty with strong theoretical and industrial background impart the right combination of theoretical and practical training to students. Well-equipped laboratories furnished as per AICTE standards have been made available for the use of students. The course is accredited by National Board of Accreditation (NBA) of All India Council for Technical Education (AICTE), in 2007. Around 160 state-of-the-art computers with configuration that can support very demanding applications are available for use by the students of the Department round the clock. All the computers have an access to the Internet through a dedicated 2 Mbps RF link.

### **LABORATORIES**

Some of the laboratories of this department are:

- Computer Graphics Lab
- Programming Lab
- Multimedia Lab
- Networking Lab
- Linux Lab
- Internet Lab
- Project Lab

## Research (Information and Technology)

### The Department carries out research in the following areas

- Extended geocast adaptive mesh environment for routing  
In this work, a routing creation oriented protocol is proposed, namely, extended geocast adaptive mesh environment for routing) is proposed. The protocol is useful when the nodes move quickly in the Network space.
- A Knowledge-Based Expert System Shell for Preliminary Engineering Design  
Engineering design process at the preliminary stage usually requires making a selection from different possible elements. This selection is restricted by certain preconditions that exist at the beginning of the design process. The selection is further constrained by certain combinations that cannot possibly co-exist in the design. This selection process grows in complexity, as the number of preconditions, combination constraints, and the elements to be selected gets large.  
To specifically automate the preliminary design phase we have implemented an expert system shell that envisages the selection process into different levels of abstraction. Each level represents possible elements from which the selection is to be made. The knowledge about the problem domain is represented in the form of preconditions, constraints, and elements at various levels. The shell performs synthesis by employing a constraints directed search while keeping preconditions in mind to form all possible design alternatives. These design alternatives are then evaluated.
- A Review Proposal of Extended Geocast Adaptive Mesh Environment for Routing (EGAMER)  
A mobile ad hoc network (MANET) is a network consisting of a set of mobile nodes capable of communicating each other without the assistance of base station. This article concerns a variation on multicasting broadcasting, called as geocasting for mobile adhoc network. The goal geocasting routing protocol is to deliver a packet to a group of nodes that are within a specified geographic area, i.e., geocast region. Location Based Multicast (MLB) and Geocast Adaptive Mesh Environment for Routing (GAMER) are the protocols used for geocasting. In this article a geocasting, routing creation oriented protocol is proposed on the basis of (GAMER) which is named as Extended Geocast Adaptive Mesh Environment for Routing (EGAMER). That obtained many routes between the source and the geocast region. It is useful when nodes are moving quickly in the Network space.
- Analysis for the enhancement of system lifetime of wireless sensor Network

In this work, a two-tiered wireless sensor Network (WSN) is considered, consisting of sensor clusters deployed around strategic locations and base stations (BSs) whose locations are relatively flexible. The primary focus of the work is on the topology control process for application nodes (ANs) and base stations, which constitute the upper tier of a two-tiered WSN. The approach followed is to maximize the topological network lifetime of WSN, by arranging BS location and inter-AN relaying optimally. The secondary focus is on node scheduling. The work suggests the reduction of overall energy consumption of the system and the consequent increase in system lifetime, by turning off some redundant nodes. The coverage-based off-duty eligibility rule and the back-off-based node-scheduling scheme guarantee that the original sensing coverage is maintained after turning off redundant nodes.

- Analysis for the prevention of black hole attack in ad hoc on-demand distance vector routing protocol for mobile ad hoc Network

In this work a watchdog mechanism is proposed to detect the black hole nodes in a mobile ad hoc Network. The method comprises two phases. In the first phase, a black hole attack is detected. In the next phase, a new route is suggested, bypassing the black hole node.

- Analysis of system lifetime using topology control and node scheduling algorithm for wireless sensor network.
- Intelligent vehicular ad hoc Networks
- Intrusion detection system in mobile ad hoc Networks

# Department of Electronics and Communication Engineering

The Department of Electronics and Communication Engineering was established in the year 2002. The Department offers B. Tech course with the intake of 120 students. The course is accredited in the year 2007 by National Board of Accreditation of All India Council for Technical Education (AICTE).

The Department has a building of its own with adequate rooms for theory and laboratory classes, library, seminar etc. The laboratories are well equipped. The teachers are encouraged to present their papers at conferences as well as arrange conferences in the areas of relevance to the Department. Students are encouraged to take up projects of practical relevance. The teachers of the Department have to their credit the publication of papers, in peer-reviewed journals, and books. They have been sponsored for higher studies and research through programmes like sequential/modular programme, study leave with pay, as well as for collaborative research abroad. A DRDO-sponsored project of Armament Research Board is being executed in the Department. The Department has very successfully established collaborative links with national laboratories and national and foreign universities.

The Department strives to remain one of the best centres for imparting education and carrying out meaningful research of national relevance in the area of Electronics and Communication Engineering.

The Department aims at providing students, with the help of analysis, simulation, and laboratory experiments, the background and understanding of the key areas of the subject such as:

|                         |                              |
|-------------------------|------------------------------|
| Artificial Intelligence | Optoelectronics              |
| Automatic Control       | Photonics                    |
| Communication           | Power Electronics            |
| Computers               | Radar Engineering            |
| Electromagnetics        | Remote Sensing               |
| Image Processing        | Robotics                     |
| Information Processing  | Signal Processing            |
| Laser Technology        | Solid State Devices          |
| Medical Electronics     | Terahertz Engineering        |
| Microwave Engineering   | Very Large Scale Integration |

## **LABORATORIES**

Some of the important laboratories of this Department are:

- Basic Electronics & Electronics Lab
- Analog and Digital Communication Lab
- Analog and Digital Circuit Lab
- Microwave & Optical Communication Lab
- Microprocessor Lab
- Microwave Lab
- CAD Lab
- Electrical Machines Lab
- Control Lab
- Measurement Lab

### **Research (Electronics and Communication Engineering)**

The Department has established active collaborative research link with national and foreign universities/laboratories such as Central Electronics Engineering Research Institute, Pilani (CSIR); National Physical Laboratory, New Delhi (CSIR); Microwave Tubes Research and Development Organisation, Bangalore (DRDO); Centre of Research in Microwave Tubes, Banaras Hindu University, Varanasi; Indian Institute of Technology, Roorkee, Microwave Electronics and Terahertz Laboratory, Seoul National University, Korea; and University of Electronic Science and Technology (UEST), Chengdu, China, as evidenced by joint execution of projects/publication of research papers with the scientists/faculty of the collaborating organisations. The Department has also played a key role in advising a DST-sponsored multi-institutional project on the development of the first ever gyrotron in the country for the Institute for Plasma research, Gandhinagar. The research work of the Department has been published in per-reviewed journals.

The Department has organized a prestigious and strategically relevant Workshop on High Power RF Devices and Applications in the year 2007, jointly with Central Electronics Engineering Research Institute, Pilani (CSIR) and Centre of Research in Microwave Tubes, Banaras Hindu University, Varanasi. Eminent scientists of national laboratories and faculty of prestigious academic institutions participated in the Workshop.

The different areas of research of the Department are as follows.

- Gas sensors

The Department executes, in this area, a DRDO-sponsored project titled "Studies on odour sensors and discrimination techniques – an approach to E-nose." In this project, experimental as well as theoretical and simulation research facilities have been created for the study of gas sensors/array of sensors (tin oxide based), such as paste preparation, screen printing, drying, and firing, oxygen plasma treatment, sensor characterization, hardware electronics for signal conditioning, data acquisition and discrimination techniques using various software tools. The study includes the sensing/recognition of LPG, CNG as well as that of flue gases such as  $\text{NO}_x$ , CO, and  $\text{SO}_2$ , pattern recognition, and non-invasive neural network diagnostics of asthma, etc.

- Microwave tubes

Conventional travelling-wave tubes addressing the problems such as dispersion control for wide bandwidths, asymmetry of dielectric helix-support rods, modelling of structure losses, etc. as well as unconventional microwave tubes such as gyrotrons for large beam transport and mode selectivity, using azimuthally periodic interaction structures, and gyro-travelling-wave tubes for wide bandwidths, using axially periodic interaction structures.

- Transport phenomena in semiconductors

The investigation concerns with gallium arsenide and aluminium gallium arsenide, including the studies on various, mobility in concerned energy bands, various Hall effects, etc.

- VLSI application

- Automated test-rig for solar cookers

- Audio-visual speech recognition:

The study is made with reference to audio-visual speech recognition using such techniques as combined hidden Markov-segmental dynamic model, for fusing the fast 'audio' with the slow 'video'.

- Modelling, design and characterization of active microstrip antennas

- Implementation of network analysis tools for the calibration of microwave measurement instruments

- Turbo decoding with imperfect channel estimates for Rayleigh fading channels for improved reliability

## Department of Biotechnology

The Department of Biotechnology was established in 2003 with a vision to impart the much-needed biotechnology education. The syllabus covers the major areas of Biotechnology. The faculty members are well qualified having expertise in modern areas of Biotechnology. The Department has established collaborative links with national laboratories and universities such as Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow; Indian Veterinary Research Institute (IVRI) (Izatnagar, Bareilly); Central Drug Research Institute (CDRI) (Lucknow); Alberg Hospital & Research Centre, Moradabad; Department of Biochemistry & Biotechnology, Lucknow University, Lucknow; Department of Pathology, CSM Medical University, Lucknow; PGI Medical Education and Research, Chandigarh; Central JALMA Institute for Leprosy and Other Mycobacterial Diseases, Agra; Biobranz Institute, Lucknow. Besides, the Department has collaborated with institutions abroad such as National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan; and University of Antioquia, Medellin, Colombia, Latin America.

### LABORATORIES

The Department has the following clean and environment-controlled laboratories:

- Plant and Animal Tissue Culture Lab
- Enzyme Technology Lab
- Genetic Engineering Lab
- Fluid Flow Lab
- Heat Transfer Lab
- Biochemistry Lab
- Microbiology Lab
- Molecular Biology Lab
- Immunology Lab
- Environmental Biotechnology Lab
- Fermentation and Bio-Process Engineering Lab

## Research (Biotechnology)

The ongoing projects of the Department are on “Animal Reproductive Biotechnology” and “Biochemical and Biotechnological Aspects of Apoptosis,” taken up with the objective of proving new insights in establishing certain hypotheses in favour of bio-technocrats, researchers, and society at large. Some of the research areas of the Department are:

- Utilization of existing genetic variability by developing molecular aided selection
- Exploitation of heterosis
- Generation of new variability by tissue culture route
- Management of biotic and abiotic stresses
- Quality improvement by genetic engineering and biological nitrogen fixation
- Proteomics and genomics
- Bioinformatics
- Molecular Diagnostics
- Drug Designing
- Protein Modelling, and evaluation for discovery of new nutraceuticals and designer food in reference to human welfare

## Department of Mechanical Engineering

Mechanical Engineering is one of the traditional and core branches of Engineering. Well-qualified, dedicated and experienced faculty and staff support the Department. This Department has well equipped laboratories and workshops. The Department has provided consultancy to a leading industry, namely, Birla Power Solutions under a formal MOU with respect to their product range on generator sets. The Department has organized "Workshop on trigeneration of energy by biomass" in the year 2007. The Department has established a collaborative link with IIT-Delhi by jointly executing a project on "Multiple effect water distillation system for rural micro enterprises."

The Department aims at providing our students, with the help of analysis, simulation, and laboratory experiments, the background and understanding of the key areas of the subject such as:

|                              |                            |
|------------------------------|----------------------------|
| Automobile Engineering       | Material Science & Testing |
| Applied Thermodynamics       | Manufacturing Science      |
| Computer Aided Design        | Measurement & Metrology    |
| Computer Aided Manufacturing | Machine Design             |
| Dynamics of Machine          | Mechanical system Design   |
| Fluid Mechanics              | Operation Research         |
| Fluid Machinery              | Power Plant Engineering    |
| Heat and Mass Transfer       | Project Management         |
| Industrial Engineering       | Refrigeration & AC         |
| Internal combustion Engines  | Robotics                   |
| Strength of Materials        | Kinematics of Machine      |

## LABORATORIES / WORKSHOPS

Some of the major laboratories/workshops of the Department are:

- Engineering Graphics Lab
- Workshop consisting of Fitting, Carpentry, Welding, Foundry and Smithy
- Metallurgical and Material Testing Lab
- Fluid Mechanics Lab
- Heat and Mass Transfer Lab
- Machine Design Lab
- Refrigeration & Air Conditioning Lab
- Dynamics of Machines Lab
- CAD Lab
- CAM Lab

## Research (Mechanical Engineering)

The Department has made research contribution in the various areas of Mechanical Engineering as follows:

- Multiple effect water distillation system for rural micro enterprises

The work has been undertaken under a collaborative project with IIT-Delhi. A dedicated set up has been fabricated under the project with the accessories such as baby boiler, reciprocating pump, mist eliminator, vertical tube heat exchangers, water tank, distillate and brine withdrawal system, condenser, temperature indicators, and pressure gauges

- Extended design of multiple effect water distillation system for rural areas

A small-scale distillation unit has been developed with sub-units such as vertical evaporator, heat exchanger for preheating feed water, and steam condenser for six-effect and ten-effect unit. A software program in FORTRAN has been developed to incorporate design calculations of the unit. The manufacturing and testing details of the unit have also been discussed. The cost analysis of the system is also carried. The unit is capable of producing 90 kg of water by using 20 kg of primary steam. The work is being further extended to develop a system encompassing rural micro enterprises making use of the locally available materials. The system developed was tested for its operation and performance for three effects and six effects using parallel, forward and mixed feed configurations. The unit is capable of delivering 150 liters of distilled water per hour. The

total dissolved solids content in the product water was found to be less than 20 parts per million (ppm). The scale formation, pre-treatment aspects of feed water and techno-economic viability of the MEWD system are also being studied.

- Extended design of solar still for increased output

The objective of the work is to review the various distillation techniques, fabrication of multiple effect water distillation unit, and the fabrication of double slope solar still.

- Optimisation of truck loading time

This work concerns with the optimization of truck loading time conducted in the packinghouse of a continuously operating process industry producing cement with the aim of finding out the optimum number of service points needed to load cement. The relevant data collected were analyzed for the suitable probability distribution with the help of MINITAB software package. The work leads to the prediction of the optimum number of service points with due consideration to the waiting cost per truck, the service time per truck, and the total service cost, etc.

- Analysis of hydrodynamics of sinter forming processes

The work encompasses the various technological aspects of hydrodynamics effect of sinter perform. The dependence of the shear stress at interfaces on the process variables has been studied. The analysis of the estimation of pressure for extrusion by equilibrium method has been carried out. Analytical data for lubricant used during process have been collected. For forging, the programming for pressure distribution and surface deformation in the analysis of hydrodynamics of sinter perform has been done.

- A study on Anti Wear and Anti friction Behavior of Commercially Available Lubricants with Additives

The objective of the proposed work is to study the different types of commercially available lubricants for their properties such as flash point, fire point, viscosity, Coefficient of Friction, other tribological behaviors as a result of addition of Anti Wear and Anti friction additives to these lubricants.

For this work, different types of commercially available automotive lubricants will be studied for these properties and behaviors when added with some additives. Equipments like Viscometer, journal bearing test rig, Extreme pressure lubricant tester, etc will be used.

- Mechanical and thermal characterization of low grade wood polyacrylonitrile composite

The work focuses on modifying of low-grade woods such as poplar, eucalyptus and baikain for improved mechanical and thermal properties that degrade by microorganism, thermo oxidation and mechanical stress due to various weather conditions. A series of wood polyacrylonitrile composites (WPCs) were synthesized through impregnation polymerization of acrylonitrile (AN) into poplar, eucalyptus and baikain wood in methanol

(20-60% v/v) in the presence of benzoyl peroxide (1.0% w/v) in benzene medium at 70°C. This has afforded corresponding WPCs with polyacrylonitrile loading of 15.5-20. The extent of loading of polyacrylonitrile into wood was ascertained through scanning electron microscopy. With the loading, the impact, compression, static bending strengths and hardness and resistance against thermo oxidation of WPCs were in general increased.

## **DEPARTMENT OF APPLIED SCIENCES & HUMANITIES**

Applied Science is the application of knowledge from one or more natural scientific fields to solve practical problems and is important for technology development. Fields of engineering are closely related to applied sciences and their use in industrial settings is usually referred to as research and development (R & D).

Due to the unclear perceptions of the engineering profession as being “hard hat” and highly technical in nature, a perception which is at odds with the realities of the world of engineering practice, where the application of broad knowledge and an understanding of the human dimension of engineering enterprise is required.

Earlier, there was excessive emphasis on highly technical matters in engineering curricula, which excludes not only greater technical diversity but also the skills and knowledge of human affairs necessary in engineering practice. Therefore, now a day, greater emphasis is given on the inclusion of social sciences and humanities in engineering curricula.

## **Laboratories**

In addition to adequate number of classrooms and faculty rooms, there are three laboratories in the Department for undergraduate engineering courses as follows:

- Engineering Physics Lab
- Engineering Chemistry Lab
- Professional Communication/Language Lab.

Besides, the faculty of the Department has an access to the research facilities of the research laboratories of the five engineering departments of CET.

## **DEPARTMENT OF MANAGEMENT STUDIES**

This Department was established in the year 2008 and the Department is affiliated to Uttar Pradesh Technical University, Lucknow. It has now become one of the most reputed centres of education in the field of management studies. The Department has a well-developed infrastructure including a modern computer laboratory, networked to a central server and Internet facility at 2 Mbps. The Department has established an effective industry-institution interaction and executes projects of practical relevance. It organizes workshops and seminars on a regular basis.

### **LABORATORIES**

The Department emphasizes on exposing practical problems to students, and as such takes special care to provide the state-of-the-art computing facilities to students in a well-equipped, air-conditioned Computer Lab, spread over an area of 400 square meters with corporate ambience, equipped with more than 150 Net enabled machines, based on Linux, Windows XP and Windows NT Servers, configured with Software such as C, C++, Visual Studio 6.0, JDK 1.3 and SQL Server.

## TRAINING AND PLACEMENT CELL

Since inception, the Institute has remained focused on developing Human Resources of the highest quality, capable of holding their rightful place in today's intensely competitive world. Hence, the Cell has been created and is now under the stewardship of the Director (Corporate Relations) of the Institute. In particular, the Cell provides assistance and guidance to students in their practical training and suitable employment in leading companies/organisations through campus and off-campus interviews. The various services provided by the Cell help students in finding a career, commensurate with their respective skills and interests.

The institute strictly believes in the survival of the fittest and raises the slogan 'keep pace or get replaced.' The Cell maintains a constant liaison with the various departments of the Institute so that the students receive quality teaching, focused on the emerging trends and technologies, by highly qualified and competent faculty. Further, the centre creates opportunities to the students and teachers of the departments for an extensive interaction with the who's who of the industries and arranges their exposure to the industrial sector, with a view to ensuring that the students receive all-round education and training so that they can adapt with ease to any environment within the country and abroad.

The Cell is aware that the students come to the Institute from varied educational and cultural backgrounds. Hence, the Cell takes special care in interacting with them and helping them develop tolerance and understanding towards each other, making them better team players.

The programmes of the Cell are designed to develop the students' analytical skills, instil inquisitiveness in them to gain new insights, and increase their appetite to explore new frontiers of their field of work. Innovation, leadership and teamwork, extensive research and a global focus, are the foundation on which our students thrive.

The institute has an excellent placement record, with a large number of our alumni/students of the final/pre-final year being picked up by leading MNCs, Indian corporations, academic institutions, and research organisations. While it would be naïve on our part to claim 100 per cent placement as yet, it is our endeavour to achieve this landmark within the next couple of years. Given the intrinsic strength and focused approach of the Cell, we are confident that we will succeed in this goal.

The Cell creates an environment in which both the recruiters and out-graduating students come together on the common platform of the Cell and get the best out of each other. Thus, the Cell arranges the visit of all corporations and organizations to evaluate our young talents, and create a synergy that will drive our Nation to greater achievements.

## Corporate Relations

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## THE CELL

Constitution of the Committee:

For smooth functioning of the Cell the following Placement Committee of the Cell has been constituted:

- i) Director (Corporate Relations).
- ii) Additional Director (Corporate Relations).
- iii) Professor In charge (Corporate Relations)
- iv) One faculty member each from each Department of the Institute.
- v) One student representative each from the graduating batch of each Department of the Institute.

Responsibility:

The responsibilities of the Corporate Relation Cell are:

- i) Imparting soft skills training, to include personality development (PD), communication skills, group discussions, IQ development and interview techniques to all eligible students
- ii) Preparing 'Placement Brochures' for each graduating batch and despatching them to corporate houses
- iii) Interacting with the corporate houses for the placement of graduating students and Summer Industrial Training of all effected students
- iv) Maintaining a constant liaison with the concerned HR personnel of the corporations visiting the campus and with other institutes in the region for 'off-campus' placements
- v) Keeping all effected students abreast with the latest placement related information
- vi) Regular counselling of students
- vii) Ensuring all necessary arrangements for placement interviews including the readiness of seminar halls and interview rooms, the accommodation, transport and hospitality for company representatives, the office and clerical assistance (computer, photocopier, stationery, etc.) Sending a letter of thanks to all corporations visiting the campus for placement immediately on the completion of the placement interviews
- viii) Sending a letter of thanks to all corporations visiting the campus for placement immediately on the completion of the placement interviews
- ix) Maintaining a record of all students placed in various corporations.

## PLACEMENT RULES AND GUIDELINES

- Each student will be allowed a maximum of two offers, until all eligible students are placed.
- Once a student has received two offers, he/she will have to give up one of the offers within 24 hours of receipt of the second offer in writing.
- The company whose offer has been rejected will be informed of the same by the concerned student and the Placement Committee. The company will be requested to make a fresh offer to one of the other students short listed/put in place.

### Our Recruiters

|                        |                     |                                    |                      |
|------------------------|---------------------|------------------------------------|----------------------|
| Infosys                | BirlaSoft           | TCS                                | Polaris              |
| Religare Securities    | Sansera Engineering | Mahendra & Mehndra Ltd.            | Biotech Park Lucknow |
| A.C Brother Lakhani    | Ganesh Polytex Ltd  | Indian Institute of Job & Training | Pasupaty Acrylon Ltd |
| ACME Tele Power        | HariHar Biotech     | Jenrich, Karvey                    | Raunaq Automotive    |
| Amcure Pharmaceutical  | HCL Infosystem      | Securities Ltd                     | Reliance Money       |
| Birla Power Solns. Ltd | Hunter Electronic   | Kortek Electronics                 | VHB Lifesciences     |
| 4C Plus                | ICICI               | Kotak Securities                   | Sanik Enterprises    |
| Convergys              | IDBI                | L&T Infotech                       | Sarvesh Chemical     |
| Daksh Enterprises      | India Infoline      | Marina, Dubai                      | SNS Solutions        |
| Galaxy Overseas        | India Mart          | Nagar Communication                | U.S Foods & Oxygen   |
| Videocon               | Win Medicare        | Yes Bank                           | Valle Soft           |
| Satyam India Ltd       | Airvana Networks    | Computer Sciences Corp.            | Coca Cola Pvt. Ltd   |

## **ALUMNI ASSOCIATION**

The College has an Alumni Association since the inception of the College. Over the last 7 years, more than 500 professional technocrats and entrepreneurs have been inducted into the Association and have rendered active support to it. This number will continue to grow. (The alumni and other bodies can register online with the Alumni Association).

The college recognizes its alumni as important stakeholders. The College immensely benefits from the enormous support it receives from its alumni.

The alumni advise and extend financial and technical support to the college, suggest emerging research areas to focus on, and offer relevant career advice. They also provide support to the training and placement of students, fund R&D projects and extend technical advice in executing projects funded by other agencies.

## Contact

Dr. Aditya Sharma

Additional Director (Corporate Relations)

Institute of Foreign Trade and Management

IFTM Campus, Lodipur Rajput, Delhi Road

Moradabad-244001 (UP) India

Cell: 09760075801

Phone: +91-591- 2223068

+91-591-2360712

Fax: +91-591-2360818

email:dtp.iftm@gmail.com

## Admission

Mr. K P Singh

Institute of Foreign Trade and Management

IFTM Campus, Lodipur Rajput, Delhi Road

Moradabad-244001 (UP) India

Cell: 09411029918

Phone: +91-591- 2360817

+91-591-2360817

Fax: +91-591-2360818