



INFORMATION BROCHURE

VALUE ADDED TRAINING PROGRAMMES



NETAJI SUBHASH ENGINEERING COLLEGE

Techno City, Garia, Kolkata-700152

Phone No. 033 2436 1285 / 3333

info@nsec.ac.in Website : nsec.ac.in



Netaji Subhash Engineering College

Netaji Subhash Engineering College (NSEC) is one of the pioneering technical professional self-financed and privately managed institutes established in West Bengal, affiliated to Maulana Abul Kalam Azad University of Technology (MAKAUT) formerly known as West Bengal University of Technology (WBUT) and approved by All India Council for Technical Education. It boasts of adequate infrastructure and well experienced faculty members and has the unique distinction of preparing students in a way so that career follows the students and not the converse. The college is dedicated to the memory of Netaji Subhash Chandra Bose, one of the greatest sons of the Indian soil and follows the ideals of Netaji and his inspiration- Swami Vivekananda who believed that education is the manifestation of perfection already existing in man. Netaji believed that education should provide holistic development of human life.

The institute is expanding its activities by opening newer core disciplines and supporting the existing ones with additional resources and developmental schemes.

Apart from teaching, the institute is engaged in Research and Development (R&D) activities. While adequate faculty development programme does exist in the supervision of expert guidance, individual level development is simultaneously encouraged through research facilities, project management avenues and several career development schemes.

VISION

To strive continuously in pursuit of excellence in Education, Research and Entrepreneurship eventually to become a Global Hub, and offer scientific and technological services to the society.

MISSION

- I. To impart total quality education to develop innovative, entrepreneurial and ethical future professionals fit for globally competitive environment.
- II. To share with stake holders institutional experience in education and knowledge for mutual enrichment in the field of technical education.
- III. To create an ambience in which new ideas, research and scholarship flourish and from which leaders, innovators and entrepreneurs of tomorrow emerge.
- IV. To contribute to the socio-economic development of the society through scientific and technological services.

Location:

The College is located in the south-east fringe (Garia) of Kolkata Metropolis. It is well connected by Rail (both Suburban and Metro services) and Road (Bus & Autoservices) transports. Nearest international airport is around 25km away from the college and is connected by eastern metro politan bypass.

COURSES OFFERED

B.Tech Programme

| | Approved Intake |
|--|------------------------|
| Computer Science and Engineering (CSE) | 120 |
| Electrical Engineering (EE) | 120 |
| Electronics and communication Engineering (ECE) | 120 |
| Information Technology (IT) | 90 |
| Applied Electronics and Instrumentation Department (AEIE) | 60 |
| Mechanical Engineering (ME) | 120 |
| Civil Engineering (CE) | 120 |
| Biomedical Engineering (BME) | 30 |

M.Tech Programme

| | |
|--|-----------|
| Computer Science and Engineering | 18 |
| Communication Engineering | 18 |
| Control and Instrumentation engineering | 18 |
| Power System | 36 |

Others

| | |
|--|-----------|
| Master of Business Management | 60 |
| Diploma in Electrical Engineering | 60 |

VALUE ADDED TRAINING PROGRAMMES

Value added training is a systematic process using a team from a variety of disciplines to improve the value of training through the analysis of its functions. The program is a short-term (minimum 30 hours) intensive non-credit training program to prepare students for entry to quality and mid-level jobs in the core industry of engineering disciplines.

The program aims at evolving a model through which corporate and engineering institutions can partner for competitiveness to enhance the pool of highly capable talent for growth requirements in Core Engineering Sector & Information Technology. It is aimed at creating an effective means of backward integration into the supply chain by going into the college campuses from where the industry gets the people for its growth. The program focuses on preparing “industry-ready professionals” by aligning and enhancing the engineering student skills with the needs of the industry. It is generally recognized by the industry (mostly by IT industry) that the repertoire of competencies that successful entry level employees bring to the workplace have four dimensions: Technical skills, Process skills, Domain skills, and Professional or behavioral skills.

The program curriculum is designed to provide skills necessary to become employed in the areas of Computer science & IT, Electrical & Electronics Engineering, Civil & Mechanical engineering and Biomedical & Instrumentation engineering. For final year students, this training also imparting core business & management skills which is rigorous and detailed enough to get a career progression or get a frontline job or start one’s own new venture on successful completion of the 40-60 hours of training module. The program design & delivery is participant-centered and scalable for enhancing participants’ skills and also transformation of their traits, attitudes and motives, through a special learning process.

The Value added program will have the following objectives:

- Increase value of the knowledge base
- Increase the expertise in hands on technical experiments
- Minimize the curriculum gaps
- Encourage innovation
- Make the student industry ready
- Introduce to the participants some of the latest technologies, industry best practices and methodologies.
- Gain insight by Interaction with subject matter experts.
- Pursue Applied Research/ guidance of student projects.

FRESHER'S INDUCTION AND VALUE ADDED PROGRAM: COMMUNICATIVE ENGLISH AND SOFT SKILL

• Fresher's Induction Program

When new students enter an institution; they come with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose. A week long induction program for the UG students entering the institution, right at the start has been introduced in the Odd Semester 2017. Normal classes resume only after the induction program is over. Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature. The time during the Induction Program is also used to rectify some critical lacunas, for example, English background and understanding Technical English.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

❖ Proficiency Modules:

This period can be used to overcome some critical lacunas that students might have in understanding and interacting Technical English. The modules specify some crash courses helping the students in their areas of grey shades, so when the normal courses start after the induction program, the student has overcome his lacunas substantially.

❖ Familiarization to Dept./Branch & Innovations:

The students are told about different method of study compared to coaching that is needed at the college. They are told about what getting into a branch or department means, what role it plays in society. They are also shown the laboratories, workshops & other facilities in their department.

❖ Soft Skill Orientation:

The students are given extensive grooming sessions for corporate exposure and gaining professional brilliance in job fields.

❖ Literary Activities:

Literary activities encompass reading, writing and possibly, debating, enacting a play etc.

The Program is designed to make the newly joined students feel comfortable, sensitize them towards exploring their academic interests and activities, reducing competition and making them work for excellence, promote bonding within them, build relations between teachers and students and give a broader view of life, and building of character.

- **Value-Added Program**

Our Value Added Program is designed for the B.Tech 1st year students who are raring to enter the corporate world and introduce them to the prospective employers according to their aspirations and background. The training programs formulated after a thorough analysis of the requirements of various companies emphasize on the required skills which vary from one company to the other. The value added training program aims to enable our students to gain a competitive edge in the recruitment process, groom their confidence and develop their personality.

Language communication plays a key role in bridging the gap between the steps from the school to corporate exposure. Communicative method for learning languages combines extensive, high-quality content with flexible and interactive multimedia technology. Language Learning Software used in Language Laboratories equips learners' access to multifarious resources for independent and supplemental learning. It acts as a platform for learning, practicing and producing language skills through interactive lessons and communicative mode of teaching. This comprehensive language-learning method acts as a total solution for self-teaching, as well as a teaching support to formal courses. Through a wide range of activities, the language laboratory instills a variety of skills to be developed in a learner. The learner learns to communicate through both verbal (oral) and non-verbal (written) expressions. The learners are trained to use language to communicate in a variety of situations (real or simulated) covering the varied purposes for which they have to interact in the corporate world. Through the wide exposure of the teaching /learning activities practiced extensively in the communicative laboratories the learners acquire strategic competence to use both spoken & written language in the wide range of communication application. The Presentation-Practice-Production (PPP) model followed in the method of lesson execution focuses to attain three central goals: to perform activity-oriented tasks which simulate real life situations; to enhance the presentation skills of the learners, to enable the learner to comprehend and compose written text and speech.

Apart from imparting regular language training modules, the Soft Skill training sessions emphasize on the enhancement of the intra and interpersonal skills of the students. Soft skills pertain to all personal attributes that remain indicative of the high level of emotional intelligence. Unlike hard skills, which describe a person's technical skill set and ability to perform specific tasks, soft skills are broadly applicable across job titles and industries. It is often said that hard skills will get you an interview but you need soft skills to get -- and keep -- the job. Good manners, optimism, common sense, a sense of humour, empathy and the ability to collaborate and negotiate are all important soft skills. Other soft skills include situational awareness and the ability to read a situation as it unfolds to decide upon a response that yields the best result for all involved. Through soft skill training sessions, an individual aims to develop a wide variety of skills starting from communication skills to working in different environments, developing emotional sensitivity, learning creative and critical decision making, developing awareness of how to work with and negotiate with people and to resolve stress and conflict in ourselves and others. The uniqueness of these training sessions lies in how a wide range of relevant issues are raised, relevant skills discussed and tips for integration provided in order to make candidates effective in workplace and social environments. The key areas thus addressed focus conversation

skills, group skills, persuasion skills, presentation skills, critical and creative thinking, emotional skills, positive thinking and vocational skills.

Business leaders across the globe value technologists who have soft skills or people skills because they have an empathetic understanding of people and their surroundings. This enables them to communicate effectively with the audience at hand. Although many individuals inherently possess these abilities, others must work to develop them to acquire and sustain their goals in life. The facilities and programmes provided in the Language Laboratories enable the learners to develop skills that aim to make them competent professionals to face the highly competitive corporate world.

Value Addition Training for Beyond Curriculum Package on Industry Readiness / Placement Assistance: Information Technology

The Information Technology industry is growing at a healthy rate with businesses heavily dependent on Computer Science and IT applications for their operations. More and more enterprises are utilizing IT outsourcing as a strategic means to achieve business goals such as cost reduction, business innovation and competitive advantage. Domain knowledge of any engineering discipline can relate to specific industries such as health, insurance and manufacturing, or business units such as sales, marketing and IT. Business Analysts should be effective at **learning** new business domains and be able to translate that knowledge to eliciting requirements. Business analysis skills are easily transferrable from one domain to another; domain knowledge has to be learnt as the analyst moves from project to project by the addition of value added inputs from emerging technologies and multi-disciplinary research. Value added program is essential to enrich learning and performing business analysis work to define as a set of stages that involve an initial acquisition of facts, comprehension, application, analysis, synthesis and evaluation.

India has become a global hub for IT services export and has witnessed exponential growth of employment opportunities. The IT services industry is, by nature, ‘people-centric’ and the demand for quality manpower is rising continuously. Quality manpower is essential to remain ahead of competition in the global market place. It is not uncommon that each of the major players is recruiting over 10,000 entry level engineers each year in the recent years. IT service majors have noticed certain skill gaps in fresh recruits from engineering colleges. The need for this training program has been strongly felt and this is required to enhance knowledge enrichment of engineering students of various disciplines. It is also provide a unique set of teaching aids, consolidated training material to make the students “industry ready”.

COMPUTER SCIENCE & ENGINEERING DEPARTMENT

• Machine Learning Approach using Python

The main goal of this course is to help students learn, understand, and practice machine learning approaches, which include the study of modern computing and scaling up machine learning

techniques focusing on industry applications. Machine learning can be an incredibly beneficial tool to uncover hidden insights and predict future trends. This machine learning with Python course will give students all the tools they need to get started with supervised and unsupervised learning.

After successful completion the students will be able to implement machine learning techniques and computing environment that are suitable for the applications under consideration. This course dives into the basics of machine learning using an approachable and well-known programming language i.e. Python. Students will learn about supervised vs unsupervised learning, look into how statistical modeling relates to machine learning and do a comparison of each.

- **Advance Java and J2EE**

The objective is to equip the students with the advanced feature of contemporary Java technologies which would enable them to handle complex programs relating to managing data and processes over the network. The major objective of this course is to provide a sound foundation to the students on the concepts, precepts and practices, in a field that is of immense concern to the industry and business.

After successful completion of the course students will be able to identify advance concepts of Java programming with database connectivity, familiarity with different classes and interfaces of collection framework designing, development of platform independent applications using a variety of component based frameworks and able to implement the concepts of servlet, JSP, MVC, HTTP, XML & EJB for building enterprise applications.

- **Mobile Application Development using Android Studio**

Android application development course is designed to quickly get students up to speed with writing apps for Android devices. It can be an incredibly beneficial tool to uncover hidden insights and predict modern trends. This Android course will give students almost all the tools they need to get started with real time apps. The student will learn the basics of Android platform and get to understand the application lifecycle.

By the end of the course, student will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and dives into the advance programming of Android using an approachable and well-known, programming algorithms. Besides these, students will interact with industry renowned experts to receive an unparalleled education on the art of building apps.

- **Cyber Security and Ethical Hacking**

This course provides the student with an overview of common methods and techniques used by attackers to penetrate and exploit a network or information system. Also featured in this course are the protocols and technologies used to build networked systems along with the methods and controls which can be used to protect them.

Upon successful completion, the student will be able to describe the concepts of ethical hacking, explain the stages of a cyber attack, cyber law, security & hacking using C programming, penetration testing & reporting of a web application describe and perform basic reconnaissance exercises, scan and enumerate a network and a computer system, describe various types of malware and cyber attack vectors and players, execute basic attacks against network and computer systems, describe and perform various methods for evading security controls, describe and perform vulnerability and pen testing assessments and exercises.

- **Web Development using PHP and MySQL**

The course provides the student with an overview of web development today to become a web developer tomorrow. The students will learn to create their own applications using PHP & MySQL from scratch with practical examples. It will also help to create a dynamic website using PHP and MySQL in least possible time.

This course covers basic programming and object oriented techniques used in PHP. It teaches them the fundamentals of PHP language and syntax, introduction to CSS, MySQL database handling using PHP, PHP control structure, introduces them to web development with most used web development language. It will help them to develop applications with different technologies and database driven applications.

- **Professional C programming with Hardware Interactions and Graphics Programming**

The course is designed to provide professional knowledge of C language. Students will be able to develop logics which will help them to create programs and applications using C. Also by learning the basic programming constructs they can easily switch over to any other language in future and this C course will give students all the tools they need to get started with real time apps.

After the completion of this course, the students will be able to develop small applications using C language. The focus is to cover up the programming skill development in the areas of hardware programming and geometrical figures, virus programming, windows and graphics programming especially because these areas are not touched in the university curriculum.

INFORMATION TECHNOLOGY DEPARTMENT

- **Cloud Computing**

Course Objectives: Participants should be able to understand cloud computing essentials with a view of information technology paradigm that enables ubiquitous access to shared pools of configurable system resources and higher-level services rapidly provisioned with minimal management effort, often over the Internet.

Course Outcomes: (i) Introduce the broad perceptive of cloud architecture and model. (ii) Apply different cloud programming model as per need. (iii) Explore some important cloud computing

driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

- **C++**

Course Objectives: Participants should be able to understand & learn the following: (i) How C++ improve C with object-oriented features. (ii) How to write inline functions for efficiency and performance. (iii) The syntax and semantics of the C++ programming language. (iv) How to design C++ classes for code reuse. (v) How to design and implement different aspects of C++ using templates, exception handling, and polymorphism.s

Course Outcomes: This course provides in-depth coverage of object-oriented programming principles and techniques using C++. Topics include classes, overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, templates, exceptions, container classes, and low-level language features.

- **Advanced Java**

Course Objectives: Participants should be able to understand & use the following: (i) Fundamentals of object-oriented programming in Java such as variables, conditional and iterative execution, methods, etc. (ii) Java SDK environment to create, debug and run simple Java programs.

Course Outcomes: Outcomes of this course for creating sophisticated applications are as follows: (i) Explore exception handling (ii) Work with streams and file input/output (iii) Manipulate dynamic data structures (iv) Use recursion (v) Manipulate window interfaces using swing objects (vi) Explore applets and HTML (vii) Program with swing objects (viii) Program with graphics objects

- **Python**

Course Objectives: The learning objectives of this course are as follows: (i) To understand why Python is a useful scripting language for developers. (ii) To learn how to design and program Python applications. (iii) To learn how to build and package Python modules for reusability.

Course Outcomes: To study and create programs that perform various tasks, including text and file manipulation, internet scripting, data structures, testing, and practical problems solving with examples.

- **Big Data (Hadoop)**

Course Objectives: The main objective of big data related course is to tell a story with numbers. With this technology, an organization or individual can obtain, store, transform and analyze large amounts of data to solve specific problems.

Course Outcomes: Big Data Analytics is a topic of great national importance. This course is necessary to drive scientific and technological progress, industrial productivity, and defense.

Value Addition Training for Beyond Curriculum Package on Industry Readiness / Placement Assistance: Core Engineering

ELECTRICAL ENGINEERING DEPARTMENT

• PLC training Course

Course Objectives: The objective of the course is to impart training in field of automation. As in this age industrial automation is growing more and more rapidly. The objective is to introduce the students with the application of PLC as a part of the automation in various sectors of industry like Textile, Cement, Fertilizer, Chemical, Petrol Chemical and Manufacturing Industry as well as in domestic and commercial sectors.

Course Objectives: On completion of the course, the students will be able to (i) Understand Concept & Tools of Automation, (ii) Explain PLC Hardware Structure And Power Supply Along With Input & Output, (iii) Explain Operating Principles & Programming Languages As Well As Bit, Byte & Word Concept, (iv) Create Ladder diagrams from process control description, (v) Generate ladder logic to realize D,RS,JK and T Flipflop and (vi) Design PLC programs for small Electrical System.

• SCADA training Course

Course Objectives: The objective of the course is to impart knowledge in field of automation. As in this age industrial automation is growing more and more rapidly. The objective is to introduce the students with the background of SCADA and its applications.

Course Objectives: On completion of the course, the students will be able to (i) Understand background to SCADA Control, (ii) Understand how sensors and field devices are connected, (iii) Explain the capabilities and wide applications of Industrial Colour Graphics Systems, (iii) Explain how SCADA is applied to real world applications, (iv) Analyze The set up a SCADA configuration and (v) Generate Communication With SCADA Software.

• AC Drive training course

Course Objectives: The main objective of the training course is to familiarize the students with Variable Voltage Variable Frequency (VVVF) AC drives which are nowadays extensively used in all types of industrial plants requiring variable speed drive system with precise speed and torque control facility. Course schedule includes necessary exposure to installation, start-up, operation and testing/maintenance aspects which are essential for proper application and effective utilization of the drive. In addition to this, the course also imparts the necessary technical knowhow for interfacing the AC drive with the external controllers (e.g. PLC) or other sensing/actuating devices.

Course Objectives: On completion of the course, the students will be able to (i) Understand What an AC Drive is and how it works, (ii) Demonstrate Safe handling of the AC drive system, (iii)

Appraise Correct interfacing to the drive control panel and power board connections, (iv) Explain Basic programming features to modify the operational characteristics of the drive as per application requirement, (v) Test Trouble shooting the fault codes triggered in the drive and (vi) Control Drives control from external controllers or sensing/actuating devices.

ELECTRONICS & COMMUNICATIN ENGINEERING DEPARTMENT

- **Advanced C++**

Students should have the basic concept of object oriented programming language. To start with that, we introduced C++ in the training programme as they don't have this subject in their curriculum. We are preparing them to pursue their carrier in IT industry.

- **Basics of PYTHON**

Python is the latest trend in IT industry mentioned by our IT partners and Alumnus. So learning Java is very essential for the students, who are on the verge of passing out. That is why; this training has been organized for 3rd year students. In the global market, knowing Python will help them to compete with confidence.

- **Advanced PYTHON**

Advance Python is also the latest trend in IT industry mentioned by our IT partners and Alumnus. So learning this is very essential for the students, who are on the verge of passing out. That is why; this training has been organized for 3rd year students. In the global market, knowing Advance Python will help them to compete with confidence.

- **Optimization Technique**

This is a technique which is used to solve inter disciplinary problems. It has got a very wide application. Mostly for students doing 4th year projects it is very helpful. Further if they want to pursue their career in research work, using image processing, this training will help them a lot.

- **Satellite Communication**

Students have this subject in their 8th semester curriculum, but we want them to learn this subject more from application point of view from an expert. They can apply this knowledge in communication field (research/job).

- **Embedded System Design & Introduction to VLSI**

Embedded System Design and VLSI is cutting edge trend of electronics. Students should know modern applications of them which are not included in their syllabus; hence we have arranged

this training programme for 3rd year ECE students. They will be able to flourish themselves in this field.

- **Electronic Circuit Design**

The students of ECE should identify different active/passive components and should know the basic design process using them. After this training they will acquire the knowledge of designing circuits which will help them in the labs as well as in job interviews.

- **C and Data Structure**

These days the main requirement in software industries is the basic knowledge of C and Data Structure. Keeping it in mind, we have designed this programme for 2nd year students so that they can learn and practice from very early days. We are preparing them to pursue their carrier in IT industry.

- **Development of Coding Skill using C**

These days the main requirement in software industries is the basic knowledge of C and Data Structure. Keeping it in mind, we have designed this programme for 3rd year students so that they can learn and practice more vigorously. They will be compatible to pursue their carrier in IT industry.

- **Advanced Java**

Java is the latest trend in IT industry mentioned by our IT partners and Alumnus. So learning Java is very essential for the students, who are on the verge of passing out. That is why; this training has been organized for 3rd year students. In the global market, knowing Java will help them to compete with confidence.

- **Quantitative Aptitude**

The compassing process for any company starts with an aptitude test. Many of our students fail them because they are not aware of this type of quantative aptitude test. That is why; we find out the requirement and arranged this training programme. It will increase the success rate in compass recruitment.

- **Overview of NET framework and programming language**

NET framework is the latest trend in IT industry mentioned by our IT partners and Alumnus. So it is very essential for the students, who are on the verge of passing out. That is why, this training has been organized for 3rd year students. In the global market, knowing .NET framework and programming language, will help them to compete with confidence.

- **Value addition training program on android app development**

These days, smart phones have taken over the market of mobile telephony. Android is the mostly used operating system in smart phones. Most of the software's used in PC or Laptops have their

android versions which are called apps. Students should have the knowledge of designing this app as this will give them a very good job opportunity.

- **Workshop on C, C++ and data structure**

These days the main requirement in software industries, is the basic knowledge of C , C++and Data Structure. Keeping it in mind, we have designed this programme for 2nd year students so that they can learn and practice from very early days. We are preparing them to pursue their carrier in IT industry.

- **Data structure and JAVA**

Data Structure and Java are the latest trends in IT industry mentioned by our IT partners and Alumnus. So learning Java and data Structure is very essential for the students, who are on the verge of passing out. That is why, this training has been organized for 3rd year students. In the global market, knowing Java, will help them to compete with confidence.

- **Python Programming Language**

Python is the latest trend in IT industry mentioned by our IT partners and Alumnus. So learning Java is very essential for the students, who are on the verge of passing out. That is why, this training has been organized for 3rd year students. In the global market, knowing Python, will help them to compete with confidence.

- **IOT and Cloud Computing**

Solving bigger problems using low cost micro-controller boards is the basic objective of IOT. The concept is very new and has uprising market. Students can venture in this direction also. Cloud Computing is also very emerging field where students can excel.

- **Multi – Technique Remote Sensing of Tropical Atmosphere**

Students have the subject of Radar in their 8th semester curriculum, but we want them to learn about remote sensing more from application point of view from an expert. They can apply this knowledge in communication field (research/job).

- **Satellite Navigation System**

Students have this subject in their 8th semester curriculum, but we want them to learn this subject more from application point of view from an expert. They can apply this knowledge in communication field (research/job).

- **IOT Workshop**

Solving bigger problems using low cost micro-controller boards is the basic objective of IOT. The concept is very new and has uprising market. Students can venture in this direction also.

- **Fiber Optic Technology**

In the era of modern communication, Optical fibre is mostly used medium. So the students will be pursuing the career in the field of communication, should learn the basic concept of fibre optics technology. This will ultimately help them to crack job interviews in this field.

- **Recap session on “Advanced Electronics and VLSI “**

VLSI is cutting edge trend of electronics. Students should know modern applications of them which are not included in their syllabus, hence we have arranged this training programme for 3rd year ECE students. They will be able to flourish themselves in this field.

- **Real Time Task Scheduling For Embedded Systems and Reconfigurable Targets**

Embedded System Design is cutting edge trend of electronics. Students should know modern applications of Real time task scheduling which are not included in their syllabus, hence we have arranged this training programme for 3rd year ECE students. They will be able to flourish themselves in this field.

APPLIED ELECTRONICS & INSTRUMENTATION ENGINEERING DEPARTMENT

- **Behavioral Skills & Technical Skills-IT**

Course Objectives: To provide value added courses in order to equip students to enhance their curriculum and also to develop their academic and mental strength to perform successfully in any type of competitive exams for software industry as well as core industry.

Course Outcomes: Students should be able to (i) Learn and enhance their communication skills in English, (ii) Enrich and develop their software technical skills required in the software industry, (iii) Promote ethical values and inculcate organizational behavior, (iv) Enrich their technical knowledge beyond their course curriculum, (v) Recognize and practice the academic and professional aspects of engineering education & (vi) Prepare themselves for any kind of government or private job.

BIOMEDICAL ENGINEERING DEPARTMENT

- **Medical electronics: Fundamental and Applications**

Course Objectives: The main objectives is to (i) Introduce students the theory and applications of power electronics systems, (ii) Know the characteristics of different power electronics switches, drivers and selection of components for different applications, (iii) Describe the switching behavior and design of power electronics circuits such as DC/DC, AC/DC, DC/AC and AC/AC converters, (iv) Learn and practice the modeling, simulation and implementation of a physical of a dynamical system & (v) Expose the electrical modeling of a first order and second order system and analyze different time response of the system.

Course Outcomes: On completion of the course, the students will be able to understand bioelectric potentials from the human body, role of transducers in measuring bioelectric potentials, various types of electronic instrumentation and role of electrical grounding.

- **Design & Evaluation of Power supply and filters for medical applications**

Course Objectives: The main objectives are to (i) Understand the components of a medical instrument, (ii) Gain knowledge of the different biopotential characteristics, (iii) Develop an understanding of the non-electrical parameters & (iv) Study the measurement techniques used for measurement of biochemical parameters

Course Outcomes: On completion of the course, the students will be able to (i) Describe various Power Electronics devices such as SCR, TRIAC, DIAC, IGBT, GTO etc, (ii) Identify application of aforesaid Power Electronics devices in Choppers, Inverters and Converters etc., (iii) Determine the stability of an Electrical, Electronics and other physical systems, (iv) Draw inference of the words Transient & Steady State Performance of a system & (v) Formulate their concepts regarding basics of Inductor and Capacitor will be enhanced, as the response of R-L circuit, R-L-C circuit is a part of this subject.

- **Lab View and Medical application**

Course Objectives: The main objectives are to (i) Familiarize the student in introducing and exploring MATLAB & LABVIEW softwares, (ii) Enable the student on how to approach for solving Engineering problems using simulation tools, (iii) Prepare the students to use MATLAB/LABVIEW in their project works & (v) Provide a foundation in use of these softwares for real time applications.

Course Outcomes: On completion of the course, the students will be able to (i) Express programming & simulation for engineering problems, (ii) Find importance of this software for Lab Experimentation, (iii) Articulate importance of software's in research by simulation work, (iv) Have in-depth knowledge of providing virtual instruments on LabVIEW Environment, (v) Write basic mathematical, electrical, electronic problems in MATLAB, (vi) Simulate basic electrical circuit in Simulink & (vii) Connect programming files with GUI Simulink.

CIVIL ENGINEERING DEPARTMENT

- **Total Station and GPS system of Survey**

Value Added Training on “Total Station and GPS system of Survey” is designed for 2nd year students of Civil Engineering. The objective is to provide basic skills on “all operations of Total Station”, the much needed surveying instrument used in almost all the engineering projects. Scope of training includes imparting knowledge on operations of total station, performing road survey, area calculation, determination of height of any remote object and demonstration of GPS.

These are highly useful for enriching their knowledge in practical field. Students were involved in practice session on all training days. Preparation of Detailed Project Report (DPR) for a live road project was demonstrated to the students. This will enable the students to prepare DPR for major Civil engineering projects which are very much required in Govt./Private Jobs.

- **Revit along with Autodesk user certification**

Value Added Training on “Revit along with Autodesk user certification” is designed for 3rd year students of Civil Engineering. The main aim is to provide basic skills on “Building Information Modeling (BIM)” and thus is quite effective in enriching the knowledge of students in the domain of engineering drawing and planning of engineering projects. Using Revit, one can create 3D model of the building and at the same time, 2D views also can be generated. The Expert person from Smart Brain had strong command on the said domain and was highly interactive with the trainee students. Structural drawing using Revit also demonstrated in detail to the students.

- **Various areas of Civil engineering, their objectives, scopes and prospects**

Value Added Training on “Various areas of Civil engineering, objectives and scopes” is designed for 2nd year students of Civil Engineering. Eminent faculties from reputed institutes and industry experts were invited to deliver talks on various domains of civil engineering. Topics of interaction were “water pollution & its remedy”, “objectives and applications of survey”, “various career prospects in civil engineering”, “elements of environmental pollution”, “use of steel in structural applications” and “materials and man management in civil engineering”.

- **STAAD.PRO & MX ROADS, Soil exploration, testing and preparation of bore logs**

This training program is designed for final year students of Civil Engineering. The training includes hands on practice for the students on basic structural analysis and design using STAAD.PRO. Scope of the training also includes demonstration of MX.ROADS, a highway design software to the students. Steel and concrete designs are also demonstrated. Geometric design of roads, flexible and rigid pavement design also demonstrated in detail. Soil exploration and testing are performed at some location of NSEC Play Ground. Also demonstrate how to prepare a bore log from soil testing results thus is quite effective while preparing soil report for any civil project.

MECHANICAL ENGINEERING DEPARTMENT

- **MATLAB**

- a) MATLAB is an essential asset for scientists, researchers, and engineers. From quick code prototyping to full blown deployable applications, MATLAB stands as a de facto development language and environment serving the technical needs of a wide range of users. In mechanical engineering field MATLAB plays a vital role in simulation. Below points will give the glimpse of the need for MATLAB for the mechanical engineers.

- b) Many engineering disciplines rely on various kinds of math to ensure that the results of any design process or new theory of how the universe works actually make sense. A new building isn't much use if it can't hold up to the stresses placed on it.
- c) MATLAB places a strong emphasis on education. Even if the organization that employs students doesn't use MATLAB, the principles to learn by working through problems with MATLAB follow standards that apply equally well to other products.
- d) Numerical analysis relies on approximation rather than the precision you see in symbolic math. Performing certain building construction tasks is impossible without applying numerical analysis, and astronomy seems to require heavy use of it as well.
- e) MATLAB is likely to be used to explore new theories. When applied to science, MATLAB helps you perform "what if" analysis that helps to confirm the viability of a theory.
- f) MATLAB verifies the answer and verify that it does, in fact, work as the researcher suggests. After an answer is proven, the researcher can use MATLAB further to define precisely how the answer is used.
- g) Using a simulation rather than a real-world counterpart is a low-cost approach to testing that is an essential part of any sort of scientific or engineering endeavor today, for these reasons:
- h) Saves human lives, Saves time, Enhances the ability of the people involved to try various solutions, Reduces costs, Improves the chances of a new technology succeeding, Increases the security surrounding a new technology
- i) Demonstrate the workflow for a technology using animation techniques so that even less-skilled stakeholders can see the technology at work
- j) Image processing is the act of managing the pixels in an image using math techniques to modify the matrix values. Techniques such as adding two matrices together are common when performing image processing.
- k) MATLAB, with its rich toolbox, can be used to rapidly prototype an algorithm before committing the development resources to implementing the algorithm in another language, such as C++ or Java. Programmers commonly depend on MATLAB to enhance their productivity.

- **AUTOCAD**

Mechanical engineering is a broad field that encompasses industry, business, medicine and even law. Planning and designing mechanical objects is the primary focus of mechanical engineers, whether they are producing engine and motor components or complete devices like refrigerators and robots. Drawing is the language for engineers; it helps to communicate from design phase to end production. Design programs like AutoCAD help mechanical engineers do their jobs by helping them create preliminary designs and spot flaws before production, saving time and resources.

- a) CAD stands for "Computer Aided Design." AutoCAD is a line of two-dimensional and three-dimensional design software produced by the Autodesk Company. It includes a powerful suite of features to improve workflow and create true-to-life maps, diagrams, structures and schematics. CAD software is equal part design and analysis. The design is needed to produce models and prepare component production, and the analysis helps calculate stress levels, the influence of forces and the influences of finite elements in a

design. According to a General Electric survey, 60 percent of manufactured parts errors were related to incomplete, ambiguous or impossible drafts -- problems easily corrected with the support of software like AutoCAD.

- b) At the earliest stages of a design project, mechanical engineers can use AutoCAD to start sketching ideas and analyzing them to determine the best solution for a given problem. The software makes the process quick and easy; it eliminates the need to draw new blueprints for each version of an idea and simplifies redesigns. The software additionally helps interpret these designs, locating flaws, errors and inconsistencies the mechanical engineer might miss. Alternatively, the mechanical engineer can use AutoCAD to determine the source of a malfunction in an existing product by putting in the specifications and allowing the software to find the problem, allowing the engineer to be more efficient by going straight to the problem and finding a fix.
- c) One of the most useful functions of AutoCAD is its ability to provide a graphic simulation of how a constructed machine will function. Once a design prototype is complete in the software, AutoCAD can generate a simulated version of the prototype and show it in action. This is a function impossible for the mechanical engineer to otherwise reproduce without investing the time and resources in developing a real-life prototype. With the help of this simulation, mechanical engineers can determine if the machine will work as intended and make any necessary tweaks or fixes before it goes into production.
- d) AutoCAD also helps in Quality Assurance and Control for maintain the proper quality of the products in every stage.
- e) Mechanical engineers can simulate a variety of environments and stresses upon a prototype. This allows them to determine the functionality of a part or machine in extreme environments or under high-stress conditions difficult to test outside simulation. These simulations also provide a demonstration of a prototype's expected performance over time, allowing accurate estimates to be made on a machine's functional life span before requiring maintenance or replacement. AutoCAD allows mechanical engineers to produce useful specifications and give clients exactly what they need in an efficient time frame.

• CREO

Creo, formerly known as Pro/ENGINEER, is 3D modeling software used in mechanical engineering, design, manufacturing, and in CAD drafting service firms. It was one of the first 3D CAD modeling applications that used a rule-based parametric system. Using parameters, dimensions and features to capture the behavior of the product, it can optimize the development product as well as the design itself.

- a) The name was changed in 2010 from Pro/ENGINEER Wildfire to Creo. Parametric Technology Company (PTC) suite of design products that includes applications such as assembly modeling, 2D orthographic views for technical drawing, finite element analysis and more.
- b) PTC Creo says it can offer a more efficient design experience than other modeling software because of its unique features including the integration of parametric and direct modeling in one platform. The complete suite of applications spans the spectrum of product development, giving designers options to use in each step of the process. The

software also has a more user friendly interface that provides a better experience for designers. It also has collaborative capacities that make it easy to share designs and make changes.

- c) The biggest advantage of Creo is the increased productivity because of its efficient and flexible design capabilities. It was designed to be easier to use and have features that allow for design processes to move more quickly, making a designer's productivity level increase.
- d) Part of the reason productivity can be increased is because the package offers tools for all phases of development, from the beginning stages to the hands-on creation and manufacturing. Late stage changes are common in the design process, but PTC Creo can handle it. Changes can be made that are reflected in other parts of the process.
- e) The collaborative capability of the software also makes it easier and faster to use. One of the reasons it can process information more quickly is because of the interface between MCAD and ECAD designs. Designs can be altered and highlighted between the electrical and mechanical designers working on the project.
- f) The time saved by using PTC Creo isn't the only advantage. It has many ways of saving costs. For instance, the cost of creating a new product can be lowered because the development process is shortened due to the automation of the generation of associative manufacturing and service deliverables.
- g) Learning this Creo software in student phase can save businesses by eliminating the need to give the additional training by the new employer after hiring. This helps the students for better adaptability in their professional life. PTC also has 10 unique languages which can be changed based on the requirement.
- h) The developed 2D drawing from the 3D geometry can be altered by changing the 3D drawing or vice-versa depending on the modification required based on analysis or customer feedback. This helps the students to learn and monitor the 3D model and drawing simultaneously.

• ANSYS

Finite element Analysis for the mechanical components is an essential part of design and analysis of the new components. ANSYS Mechanical Enterprise is the flagship mechanical engineering software solution that uses finite element analysis (FEA) for structural analysis using the ANSYS Mechanical interface. It covers an enormous range of applications and comes complete with everything you need from geometry preparation to optimization and all the steps in between. With Mechanical Enterprise you can model advanced materials, complex environmental loadings and industry-specific requirements in areas such as offshore hydrodynamics and layered composite materials.

- a) Structural Analysis: ANSYS structural analysis software enables you to solve complex structural engineering problems and make better, faster design decisions. With the finite element analysis (FEA) tools available in the suite, you can customize and automate solutions for your structural mechanics problems and parameterize them to analyze multiple design scenarios. You can connect easily to other physics analysis tools for even greater fidelity. ANSYS structural analysis software is used throughout the industry to enable engineers to optimize their product designs and reduce the costs of physical testing.

- b) Structural analysis for all experience levels: From designers and occasional users looking for quick, easy and accurate results, to experts looking to model complex materials, large assemblies and nonlinear behavior, ANSYS has you covered. The intuitive interface of ANSYS Mechanical enables engineers of all levels to get answers fast and with confidence.
- c) Reliable, high quality, automated meshing: ANSYS Mechanical has intelligent meshing technology, enabling you to rapidly obtain optimal meshing on every model. Automatic, intelligent algorithms ensure that high quality meshes are generated, and it's easy to add controls for fine-tuning as needed.
- d) Complete structural analysis solution: A complete range of analysis tools is available to analyze single load cases, vibration or transient analysis; you can also examine linear and nonlinear behavior of materials, joints and geometry. Advanced solver technology with Autodyn and LS-DYNA enables you to carry out drop, impact and explosion simulations. AQWA, along with the offshore simulation capabilities in ANSYS Mechanical, provide industry specific capabilities for engineers designing for marine environments customer feedback. This helps the students to learn and monitor the 3D model and drawing simultaneously.
- e) Thermal and structural analysis helps the engineers to predict the accurate data even before the actual components engaged its application and before manufacturing the actual part of drawing.
- f) Vibration, Fatigue, Analysis also helps the advanced feature of the components.
- g) Different optimization technique helps to optimize the best DOE from the available zone of design.
- h) Therefore ANSYS MULTIPHYSICS is a must tool to learn for the design engineers.

N.S. Engg. College



Netaji Subhash Engineering College
Techno City, Garia, Kolkata-700152