



Celebrating
25 years
INSPIRE
INNOVATE
EXCEL

Be the **next** in Engineering & Technology



NSHM Knowledge Campus

Life is full of possibilities. All you need to do is explore them. At NSHM, we provide our students with the perfect environment to explore the world of unlimited possibilities and craft their own success story across multiple disciplines like Business & Management, Media & Communication, Design, Health Sciences, Computing & Analytics, Engineering & Technology and Tourism & Hotel Management.

Today, NSHM has earned a nationwide reputation for its innovative approach to learning. It offers the best industry-integrated learning, internships and top-of-the-line placements. The students are provided with theoretical as well as practical learning, aided with hi-tech labs and infrastructure. Professional and scholarly ambience along with a fulfilling campus life ensures an all-round development of the students.



Our Legacy

Winner of ASSOCHAM India
Award for Best Education Group
in East, 2019

59 Degree
Courses



7 Schools

More than

25,000

alumni working
in India
and abroad

**Experiential
Learning**



Centres of Excellence

The Centres of Excellence at NSHM Knowledge Campus are committed to the holistic development of its students by grooming talented professionals through unique programmes and initiatives.



CENTRE FOR INNOVATION & INCUBATION

Determined to provide team-designed, team-delivered, experience-based and community-based applied learning, NSHM has endeavoured to create this unique platform and has christened it as TAG. This centre inspires, motivates and cultivates the innate human curiosity to bring out the genius in our students, taking them ahead on the path of creation, innovation and entrepreneurship.



CENTRE FOR CREATIVE & PERFORMING ARTS

Aangan is a creative platform where NSHMites learn and showcase their creativity. Aangan features both traditional and contemporary training programmes. A fresh basket of training programmes is offered in every semester by the trainers from various creative disciplines. Aangan works closely with the student community and clubs of NSHM.





NSHM Centre for Language
& Communication

CENTRE FOR LANGUAGE AND COMMUNICATION

NSHM CLC ensures the development of people skills among its students so that they are able to connect with the industry and its people, thereby emerging as successful professionals. Apart from conducting regular English and business communication classes, the centre conducts regular evening classes on the English language, foreign languages & employability skills.



CENTRE FOR SOCIAL ACTION

Outreach is involved in contributing to social causes by mobilising student volunteers to participate in various outreach activities, often in collaboration with charitable organisations and NGOs. It is a platform through which students and individuals can connect with the society and its people.



CENTRE FOR SPORTS & WELLNESS



UDAY aims at contributing to the personal, physical & psychological growth and well-being of students, creating a sporting environment in NSHM. With its state-of-the-art fitness training & gym facilities, UDAY organises regular fitness training programmes and also organises various sports activities and events round the year. The centre is also committed to nurturing young sporting talents through regular training camps and practice.

CBEL

Choice Based Extended Learning

CBEL is Choice Based Extended Learning (CBEL) which is an exciting design to bring NSHM learners across all programmes and levels (UG-to-PG) in a cohort of CBEL programme, as per their choice. NSHM is one of the top education centres in India that offers 50+ CBEL programmes of 20-40 hours duration under 9 baskets.

The baskets are replete with curated multi-disciplinary programmes of useful and productive learning beyond the programmes of study of a learner. Moreover, CBEL will be all about active learning and are intended to extend the joy of learning through engaging activities. The maximum a learner can choose per semester is 4 programmes and the minimum one programme.



CBEL Programmes

- **Business Management**

Course: Brand Management | Sustainable and Ethical Studies | Integrated Marketing Communication | Luxury Brand Management | Marketability of Indian Craftsmanship | Social Entrepreneurship | Managing Workforce Diversity | Logistics and International Supply Chain Management | Lateral Thinking using de Bono Six Thinking Hats | Essentials of Entrepreneurship | Business Plan Formulation & Pitching

- **Communication & Creative Studies**

Course: Cinematography | Set design | History of Art | Aesthetics | Sculpting | Event Management | Press & Public Relation | Product Photography | Design Thinking | Designing a Powerful Presentation | Effective Communication through Theatre | Music, Arts and Acting Appreciation | Monetising Social Media

- **Entrepreneurship**

Course: Organic Product Making - Farm and Non-Farm

- **Health & Wellness Management**

Course: Economic Evaluation of Various Diseases | Legal Issues in Health Care | Health Insurance Management | Ophthalmic Product Development | Self-Practitioner Optometrist | Metrics for Public Health | Clinical Data Management | Health Data Analytics | Pharmacokinetics with Calculations | Pharmaceutical Product Development | Mental Wellness | Yoga for Resilient and Resonant Personality Development | Yoga for Health Management | Wellness through Sports and Fitness Management

- **Hospitality Management**

Course: International Travel Formalities | Tourism Destination Management | Customer Relationship Management in Tourism

- **IT & Analytics**

Course: Research and Data Analysis | Working with Data | Field-survey Project Based Qualitative Analysis of Data | Data Privacy in The Digital Business | Data Analytics with Excel | Industry 4.0

- **Language & Linguistic Studies**

Course: French | German | Sanskrit for Beginners | Phonetics, Linguistics, and Literature Appreciation

- **Professionalism & Skill Enhancement**

Course: Image Development | Professional Attitude for Customer Service | Scientific Writing | Designing Impactful Presence | Emotional Intelligence

- **Socio-cultural Studies**

Course: Universal Human Values | Indian Knowledge System: Introduction to Manuscriptology and Palaeography

Courses

Business & Management

BBA
BBA (Global Business)
BBA (Sports Management)
BBA (Supply Chain Management)
BBA (Accountancy, Taxation & Auditing)
MBA (Full Time)
MBA (Part Time)
M. Philosophy
B.Voc. - Banking, Financial Services
& Insurance

Computing & Data Analytics

B.Sc. - Gaming & Mobile
Application Development
Bachelor of Computer Applications
B.Sc. - Data Science
B.Sc. - Cyber Security
M.Sc. - Data Science & Analytics
M.Sc. - Information & Cyber Security
M.Sc. - Computer Science

Health Sciences

Bachelor of Pharmacy
Bachelor of Optometry
BBA (Hospital Management)
B.Sc. - Psychology
B.Sc. - Medical Lab Technology
B.Sc. - Yoga
B.Voc. - Medical Imaging Technology
Master of Optometry
Master of Pharmacy – Pharmacology
Master of Pharmacy – Pharmaceutics
M.Sc. - Clinical Psychology
Master of Public Health
Master of Hospital Administration
M.Sc. - Dietetics & Nutrition
M.Sc. - Yoga

Tourism & Hotel Management

B.Sc. - Culinary Science
B.Sc. - Hospitality & Hotel Administration
Bachelor of Hotel Management &
Catering Technology
BBA (Travel & Tourism)
M.Sc. - Hospitality Management
Master of Tourism & Travel Management

Media & Communication

B.Sc. - Film & Television
B.Sc. - Media Science
M.Sc. - Film & Television
M.Sc. - Media Science

Design

B.Sc. - Fashion Design & Management
B.Sc. - Interior Designing
B.Sc. - Multimedia, Animation & Graphics
B.Sc. - VFX Film Making
M.Sc. - Fashion Management
M.Sc. - Animation & Graphics

Engineering & Technology

B. Tech. - Mechanical Engineering
B. Tech. - Robotics
B. Tech. - Civil Engineering
B. Tech. - Computer Science Engineering
B. Tech. - Artificial Intelligence &
Machine Learning
B. Tech. - Data Science
B. Tech. - Electrical Engineering
B. Tech. - Electronics &
Communication Engineering
Diploma of Civil Engineering
Diploma of Mechanical Engineering
B.Voc. - Automobile Servicing
B.Voc. - Refrigeration & Air-Conditioning

Engineering & Technology

The Indian engineering sector has witnessed a remarkable growth over the last few years driven by increased investments in infrastructure and industrial production. The engineering sector, being closely associated with the manufacturing and infrastructure sectors, is of strategic importance to India's economy. India on its quest to become a global superpower has made significant strides towards the development of its engineering sector, creating a magnitude of lucrative job opportunities.

NSHM Knowledge Campus aims to impart sound technical knowledge imbued with human values. With state-of-the-art infrastructure, industry integrated curriculum and experienced faculty members, we aspire to make our students creative and globally competent professionals.





NSHM Edge



Eminent and well-experienced faculty.

Central Library:

A well-stocked library housing books, journals, periodicals etc. from all over the world.

Wi-Fi Enabled Campus:

High speed Wi-Fi connection powering the entire campus.

e-Learning:

Interactive, dynamic and intuitive way of improving the learning process through digital resources.

Research & Development Cell:

For conducting research investigations within its academic programmes, under all the departments.

Industry-Institute Partnership Cell:

For developing a close relationship between the industry and various departments of the institute to improve the students' proficiency in a variety of languages.

Training & Placement Cell:

For providing internship and placement opportunities for students in engineering and allied industries.

Student Care Facilities:

Medical unit, cafeteria, reprographics, banking facility (ATM), parking lot, uninterrupted power supply, separate hostels for boys and girls, 24-hour power back-up, sports complex for outdoor and indoor games, amphitheatre, multi-specialty gymnasium, yoga & meditation centre.

Students' Club:

Tech Knights (Science & Technology), N-MEC, Elektronika, Rythms-n-Act, Robotics, Photography, Quiz & Debating, Fine Arts, Music & Dance.

Patent Cell:

Encourages and supports innovative ideas from faculties and students which may be converted to intellectual property.

Seminar & Workshop Cell:

For conducting innovative seminars and workshops featuring industry experts and industry doyens.

Soft Skill & Personality Development Programme:

Special programme to groom the students and make them better communicators.

Entrepreneurship Development Programme:

Special programme to transform the students into entrepreneurs and business leaders.

Departmental Laboratories:

State-of-the-art labs that provide the students with the opportunity to engage in hands-on learning.

Language Lab (in collaboration with IIT-KGP):

Ultra-modern set-up to improve the students' proficiency in a variety of languages

FOSS by IIT Bombay, Academic MOU with CDAC, Nokia Here.



Laboratories

NFET is home to state-of-the-art laboratories for all departments that provide a comprehensive learning environment for all students.

Mechanical Engineering

Mechanical Workshop including Automobile Lab

Manufacturing Technology Laboratories including Foundry and Forging

Engineering Drawing and AutoCAD Lab

Strength of Materials and Applied Mechanics Lab

Fluid Mechanics and Hydraulic Lab

Material Testing Lab

Metrology and Measurement Lab

Internal Combustion Engine Lab

Dynamics of Machinery Lab

Refrigeration and Air Conditioning Lab

Advance Manufacturing Lab including CNC lathe, Electric discharge machining and 6 axis robots

Welding Lab



Civil Engineering

Soil mechanics lab, able to perform Vane Shear test, standard and modified Proctor test, consolidation test, sieve analysis etc.

Strength of material lab having instruments to perform compressive strength test, Brinell hardness test, dynamic impact test, torsion test etc.

Concrete lab to perform flexural strength, measurement of workability of concrete, setting, time of cement, mix design of concrete etc.

Transportation lab to perform impact, abrasion value test, flakiness and elongation test of aggregates; penetration, softening pt., flash and fire pt. of bitumen, Marshall mix design, CBR value test of subgrade material etc.

Survey lab to perform chain surveying, compass surveying, plane table surveying, levelling, theodolite traversing, total station surveying etc.

AutoCAD lab having analytical and design based software (STAAD.Pro)



Electrical Engineering

Basic Electrical Lab

Measurement Lab

Circuit Theory Lab

Electrical Machines Lab

Power Systems Lab

Control Systems Lab

Power Electronics Lab



Electronics & Communication Engineering

Basic Electronics Lab

Analog Electronics Lab

Solid State Device Lab

Signal and Systems Lab

Digital Electronics Lab

EM Theory & Antenna Lab

Analog Communication Lab

Microprocessor & Microcontroller Lab

Control Systems Lab

Digital Communication Lab

Digital Signal Processing

VLSI Design Lab and Design Lab



Computer Science & Engineering

Basic Computing & Internet Technology Lab

Visual Basic & Computer Architecture Lab

DBMS & Object Oriented Programing Lab

Internet Lab

AI Lab

Project & Software Engineering Lab

Operating System & Networking Lab



Department of Basic Sciences

Physics Lab

Chemistry Lab

Numerical Analysis Lab

Nutrition Science Lab

Language Lab





Placements & Internships

Placements and internships are our forte. Our placement cells create internship and placement opportunities in major brands, ensuring a great start to a student's career.



Cognizant

IFB



IndianOil

LAFARGE



usha martin



BANKURA MUNICIPALITY
বাঁকুড়া পৌরসভা



Engineering & Technology

B. Tech.

Mechanical Engineering

Robotics

Civil Engineering

Computer Science Engineering

Artificial Intelligence & Machine Learning

Data Science

Electrical Engineering

Electronics & Communication Engineering

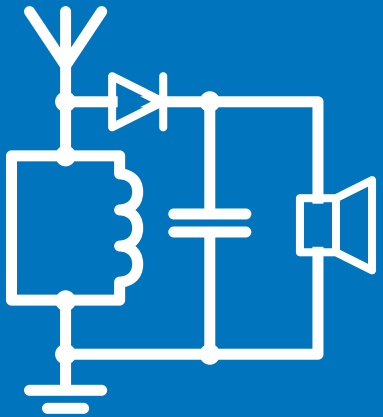
Diploma

Civil Engineering | Mechanical Engineering

B. Voc.

Automobile Servicing

Refrigeration & Air-Conditioning





Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B. Tech. - Mechanical Engineering	
Duration	4 years	
Location	Durgapur	
Programme Objective: To prepare the students with strong fundamental knowledge in Mathematics, Science, English and Engineering Sciences so as to enable them to analyse the Mechanical Engineering related problems with requisite core competencies and professionalism. Besides, they will acquire technical knowledge in the subjects and technical skills in classical software packages, applying the same for design, fabricate and install the machines and to work in all related fields of engineering in different industrial environments and multidisciplinary setting involving continuous learning, research and development with high moral and ethical values.		
Core Areas	Key Learning	Brief Description
Design	Engineering Drawing	Technical drawing fundamentals, systems thinking, Engineering the imagination and ability, engineering drawing skills, Computer aided engineering design and systems development, Machine design drawing, AutoCAD.
	Engineering Mechanics	Applied knowledge of mathematics and physics, Strength of Materials, design of system, machine components, realistic constraints, process, and engineering practices, solving real world problems.
Manufacturing	Metrology & Measurements	Various Methods of measurements using various instruments, various machine tools and mechanism of operations.
	Manufacturing Processes	Various production processes, industrial manufacturing, advanced manufacturing, CNC, EDM, and Robotics for automated manufacturing.
Electric Traction	IC Engines	Various heat engines used for propulsion.
	Fluid Mechanics & Hydraulic Machinies	Importance of fluid flow measurement and its applications in Industries.
	Heat Transfer	Analyse and develop solutions related to heat exchangers, pipes , and associated engineering problems.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B.Tech. - Robotics
Duration	4 years
Location	Durgapur

Programme Objective: To prepare students strong fundamental knowledge in engineering and automation so as to enable them to analyse and solve the Robotics engineering problems by applying core competence and professionalism and upgrading of technical skills in classical software packages, for design, fabrication and installation of the automated systems. Besides, they will be able to seek opportunities in all related fields of engineering in different industrial environments and multidisciplinary settings with continuous learning, research and development, moral and ethical values.

Core Areas	Key Learning	Brief Description
Design & Manufacturing	Machine Design	Engineering drawing, AutoCAD, Engineering Mechanics, Engineering Mathematics, Engineering Physics, real-world problem solving, applications, machine system, constraints, system design, component design, process design.
	Manufacturing Science	Material Science, Materials for Manufacturing - Components, Nanomaterials, Industrial Manufacturing, Modern manufacturing.
Control Systems	Electrical, Electronics and Communication Systems	Basic electrical and electronics science, powering the robots, micropocessors, microcontrollers, embedded systems, programming the robots, robot comminucation systems.
	Drives and Control Theory	Study, analysis, and application of various drives, propell the Robots, control systems, fabrication of control system, error control, robot control operations.
Robot Programming	Low & High Level Programming	Machine languages, assembler, high level programming, languages, compiler, interpreter, memory management, hybrid programming languages.
	Intelligence System	AI & ML through programming, IoT, Industry IoT, Cloud based control of Robots.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B. Tech. - Civil Engineering
Duration	4 years
Location	Durgapur

Programme Objective: To prepare the students with knowledge and skills of structural, geotechnical, and transportation engineering for superior vocations and careers as civil engineer in planning, regional development, construction, water resources management, etc in diverse and multi-disciplinary settings. Besides, they will be able to pursue lifelong learning in fundamental areas related to structural analysis, design of RC and Steel structures, soil mechanics, highway and environmental engineering, etc. and will be able to contribute towards sustainable development.

Core Areas	Key Learning	Brief Description
Structural Engineering	Solid Mechanics	Mechanics of solids, stress and strain, direction of the Beam, truss analysis, principle stress, hoop stress.
	Concrete Technology	Concrete cement and its properties, strength tests- fresh concrete, admixtures, special concrete.
	Structural Analysis	Structural analysis- determinate & indeterminate structures, strain of energy, deflection of structural elements, analysis of statically indeterminate arches, beams & trusses, influence line diagram of beams, bridges, concept of settlement of indeterminate structures.
	Design of RC Structure	RC structure design methods, working & limit state of design against bending moment, shear forces for balanced, over & under reinforced sections, bond length, development length, L&T Beams and use of IS-456 & SP-16, design detailing of slabs, staircase, columns, process of designing the shallow foundation.
	Construction Engineering & Management	Regulations, construction plants & equipments, planning & scheduling of construction projects, departmental procedures.
	Design of Steel Structure	Design for steel structure, various connection like bolted, rivetted, welded or structural steel sections, design of Tensile, compressive, beam, column members, gantry girders.
Geotechnical Engineering & Transportation Engineering	Soil Mechanics	Concept of soil mechanics, physical and index properties of soil, identification & classification of soil, effective stress of soil, compressibility and consolidation of soil.
	Highway Engineering	Fundamentals of highway engineering, highway alignment, design of tensile, compressive, beam, column members, highway geometric design, pavement design, pavement construction techniques, traffic engineering, road materials & testing.
Water Resources	Environmental Engineering	Fundamentals of Environmental Engineering, Public health engineering, underground and ground water systems, water from air, environmental considerations and impact on water use, recharging, waste water recycling, water pollution and control, conservation, and water harvesting.
	Water Resource Engineering	Source of water, demand of water, water quality, water conveyance, water treatment & analysis, design of sewer and sewage disposal system, characteristics and treatment of waste water.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B. Tech. - Computer Science Engineering
Duration	4 years
Location	Durgapur

Programme Objective: To prepare the students on the basics of engineering, computer science, problem-solving, computing environment, Data structure & Algorithms, C, Python, Shell, NLP, AI/ML, Operating Systems, Architecture, hardware and software engineering, Image processing, Networking, Security, etc for superior careers in IT/ ICT and all other industries and services at the global level. Besides, they will be able to advance their learning on a continuous basis as per the changing and emerging demands/disruptions and will be able to engineer meaningful solutions to complex problems in an ethical and just manner, as part of a team, or entrepreneur, or as a Technology leader in national and international organizations.

Core Areas	Key Learning	Brief Description
Programming for Problem Solving	Programming Fundamentals	Program structure, algorithms, flowcharts, programming system, compiler, interpreter, programming with C and Python, applications in problem solving.
	Object Oriented Programming	Software design around data, attributes and behaviour, OOPS, object-oriented programming in Java: defining classes, invoking methods, libraries, etc., encapsulation, abstraction, inheritance, and polymorphism.
	Shell Programming	Shell types - Bourne, C Shell, Korn Shell, Shell programming and scripting in UNIX/LINUX/Windows.
Data Algorithm	Data Structure & Algorithm	Computational efficiency of the principal algorithms - sorting, searching, hashing, Identify appropriate data structure & algorithmic methods.
	Design & Analysis of Algorithms	Analyze the asymptotic performance of algorithms, Synthesize efficient algorithms in common engineering design situations.
	Data Base Management	Analyze database requirements, determine relationships of entities, logical design of the database, DBMS/RDBMS and big data modeling and management.
Design & Architecture	Computer Architecture and Organization	Structure, function and characteristics of computer systems, architecture design, RISC and CISC, components of computers design, controls, central processing, interfaces, etc.
	Software Engineering	Traditional, Agile and Lean project management, Automata, software development lifecycle - Waterfall, Rapid Application Development, Extreme Programming, Iterative development - portability, scalability, maintainability.
Network Security	Operating System	Components of a computer operating system, interactions, scheduling, deadlocks, memory management, synchronization, system calls, and file systems.
	Computer Networks	Data communication, computer networks, communication protocols be exposed to the TCP/IP protocol suite and OSI.
	Cryptography & Network Security	Fundamentals of cryptography, Network security, Applied mathematics, secure a message over insecure channel, Confidentiality, Integrity and 'anytime-anywhere' safe-access to data.
	Cyber law & Ethics	Critical understanding Cyber Law, Competencies for dealing with frauds and deceptions (Confidence Tricks, Scams), other Cyber crimes etc.

Cont.

Core Areas	Key Learning	Brief Description
Computer Applications	Image Processing	Image fundamentals, mathematical transforms for image processing and enhancement techniques.
	Cloud Computing	Foundations of the Cloud Computing, Cloud network topology, Client-Server cloud technology, Cloud computing in their real life scenarios.
	Artificial Intelligence	Artificial intelligence (AI) principles and approaches, building blocks of AI intelligent agents: Search, Knowledge representation, inference, logic, and learning, AI/ML applications with business and scientific data.
	Speech & Natural Language Processing	Concepts of morphology, syntax, semantics and pragmatics of the language, speech recognition, computational linguistics, machine learning, NLP using python.
	Ecommerce & ERP	Fundamentals of e-Com, m-Com systems, supply chain, logistics, intra/extranet resources management, data and decision systems.
Admission Helpline: 95472 77739		

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B. Tech. - Artificial Intelligence & Machine Learning
Duration	4 years
Location	Durgapur

Programme Objective: To prepare the students with knowledge and skills of computing and database environments, Networking, OOPS, C, C++, Python, Java, MATLAB, NLP, AI/ML, languages, and related 4.0 and onward technologies for superior roles and careers in the realm of AI across all sectors of Health, Education, Research, Development, Industry, Automation, and Intelligent systems. Besides, they will be able to continuously advance their learning and practice and apply those in ethical and socially responsible ways.

Core Areas	Key Learning	Brief Description
Programming Language	Programming in C	Programming fundamentals, C , and applications in C.
	Object Oriented Programming	Model of object oriented programming, abstract data types, encapsulation, inheritance and polymorphism, Java: object classes and interfaces, exceptions and libraries of object collections.
	Problem Solving using Python	Python Programming: intended for software engineers, systems analysts, program managers and user support personnel.
	Artificial Intelligence & Functional Programming Lab	AI functional experience with a high level language (C/C++, Java, MATLAB, python).
Algorithm	Data Structure and Algorithm	Program performance enablers - data structures and algorithm design methods, solve problems using linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs.
	Design Analysis and Algorithm	Rigorous correctness proofs for algorithms, working with major algorithms and data structures, algorithmic design paradigms, methods of analysis, efficient algorithms in common engineering design situations.
AI & ML	Introduction to AI	Artificial intelligence (AI) principles and approaches, building blocks of AI, intelligent agents: Search, Knowledge representation, inference, logic, and learning, NLP fundamentals.
	Introduction to ML	Concepts and techniques of Machine Learning, machine learning softwares for solving practical problems, independent study and research with data sets.
	Algorithm for Intelligent Systems and Robotics	Advanced algebraic tools for the description of motion, matrix algebra and Lie algebra for computing the kinematics of robots, software tools for analysis and design of robotic systems.
	Application of machine learning in industries	Machine learning concepts applicable to robotics, principles of artificial intelligence, thinking and decision making by robots.
Database System	DBMS	Database management systems, RDBMS, collection, storage, organization, processing, maintenance, and retrieval, data networks.
	Big Data Analysis	Hadoop ecosystem, big data analytics and machine learning approaches, volume, variety, and velocity, modern computing big data technologies and scaling up machine learning techniques, industry applications.
	Data Mining	Fundamentals of data mining, tools and techniques, relevant models and algorithms, spatial and web data mining.
Networking	Data Communication and Computer Networks	Fundamentals of data communication and computer networks, TCP/IP, inter-working of various layers of OSI.
	Neural Networks and Deep Learning	Basics of -- CNN, RNN, ANN, deep learning algorithms, and some applications of neural networks.
	Cryptography & Network Security	Basics of Cryptography and Network Security, mathematical foundations, vulnerability control, secure a message over insecure channel by various methods.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B. Tech. - Data Science	
Duration	4 years	
Location	Durgapur	
Programme Objective: To prepare the students with knowledge and skills of computing and data environments, object oriented technology, data structure & algorithm, Operating systems, programming, problem-solving, statistics and mathematics, data analysis, analytics, data mining, web mining, warehousing, soft computing, AI/ML, NLP, deep learning, Block chain, and other related and advanced data science and human-computer interactions for superior vocations and careers as data scientist, data engineer, data analyst, business analyst, big data analyst, security head, developer, entrepreneur, consultant, chief data officer, etc. in a diverse and multi-disciplinary settings in national and international organizations. Besides, they will be able to adapt to modern and emerging technologies through lifelong learning and practice in an ethical and just manner.		
Core Areas	Key Learning	Brief Description
Programming Languages	Programming for Problem Solving	Programming system, structure, numerical method problems, function, pointers, array structures and files handling process, compiler, interpreter, shell, problem solving using C and/or R and/or python.
	Object Oriented Tecghnology	OOPS, object oriented programming language and apply programming conept to create class & its objects for solving inheritance,polymorphism,applets, swing programming etc.
Design Analysis and algorithms	Data Structure & Algorithm	Computational efficiency of the principal algorithms - sorting, searching, hashing, Identify appropriate data structure & algorithmic methods.
	Design & Analysis of Algorithms	Analyze the asymptotic performance of algorithms, Synthesize efficient algorithms in common engineering design situations.
	Database Management	Analyze database requirements, determine relationships of entities, logical design of the database, DBMS/RDBMS and big data modeling and management.
Statistics for Data Science	Statistics for Data Science	Statistical analysis of data, build and assess data-based models, execute statistical analyses with professional statistical software.
	Linear Algebra	Matrix analysis, numerical methods of linear algebra, elements of functional analysis, mathematical statistics, modern machine learning and data analysis.
	Data Analysis and Visualization	For presenting data to others, aspiring to be a business analyst or data scientist then the most effective with visualization tools used is table.
	Business Analytics	For presenting data from the point of view of a business analyst.
	Big Data Analysis	Learners are expected to apply principles of statistical analytics to solve problems and inform decision making.
Data mining	Data Base Management System	To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
	Data Mining	To analyze data, choose relevant models and algorithms for espective applications and evaluate different data mining techniques like classification, prediction, clustering and association rule mining.
	Data Warehousing	Design data warehouse with dimensional modelling and apply OLAP operations - Relational, Multidimentional, Hybrid.
	Web Mining	Acquire statistical techniques to analyze complex information and social networks.

Cont.

Core Areas	Key Learning	Brief Description
Artificial Intelligence & Human computer Interaction	AI/ML	Introduction to artificial intelligence, machine learning, current trends and characterization of knowledge-based systems, Search, knowledge representation schemes, production systems, and expert systems.
	Soft Computing	Fundamentals of Soft Computing, Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms, optimization associated with neural network learning.
	Neural Network and Deep Learning	Fundamentals of deep learning, computer learning model, perform classification tasks directly from images, text, or sound, Model training, testing, large set of labeled data, and multiple layers in neural network architectures.
	Natural Language Processing	Natural Language Processing (NLP) develops statistical techniques and algorithms to automatically process natural languages (such as English). It includes a number of AI areas, such as text understanding and summarization, machine translation, and sentiment analysis.
	Human Computer Interaction	HCI design principles, standards and guidelines, analyze and identify user models, user support, socio-organizational issues, stakeholder requirements of HCI systems.
Distributed Systems	Computer Organization and Architecture	Computer organization & parallel architecture , interconnected networks, distributed system architecture, Cloud architecture and computing.
	Operating System	Mechanisms of OS, Network OS, Distributed OS, handle processes and threads, memory magagement, process management, exception handling.
	Block Chain Technology	Individual components of the Bitcoin protocol, whole system work: transactions, script, blocks, and the peer-to-peer network.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B. Tech. - Electrical Engineering	
Duration	4 years	
Location	Durgapur	
Programme Objective: To lay a strong foundation in Electrical and Electronics Engineering where the students will be able to gain solid technical knowledge to analyze, design, develop, optimize, and implement complex electrical systems that will be of use to enterprise and society. Besides, they will be prepared for lifelong learning, values and ethics development, leadership, social and environmental responsibilities, technical communication, related professional skills to invent and and sustain novel technology and innovative solutions to electrical engineering problems in a multidisciplinary, inclusive and diverse work environment.		
Core Areas	Key Learning	Brief Description
Circuit Design	Electric Circuit	Different types of circuits, circuit elements and sources – AC and DC.
	Electric Field Theory	Fundamentals of electromagnetism works, various processes, use in daily lives.
	Electrical & Electronics Measurement	Holistic approach towards electrical measurements, related instrumentation, Lab experiments.
Power system operation & control	Electric Machine	Principle of operation and performance of Induction Machine, Synchronous Machines and Fractional kW Motors.
	Power System	Over-voltages due to lightening and switching surges, protection using surge arresters and the insulation coordinatio, manufacturing modern tools.
	Control System	Concept of time domain, frequency domain, domain analysis, physical behavior of systems using these analysis.
Electric Traction	Power Electronics	Rotating electrical machines and their application, power electronic converters and their application in electrical motor.
	Electric Drives	Handle common load models for electrical motor, control principles for electrical motor.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B. Tech. - Electronics & Communication Engineering	
Duration	4 years	
Location	Durgapur	
Programme Objective: To prepare the students with knowledge and skills about signals & systems, microprocessors, microcontrollers, digital communication and system design, linear algebra, block codes, wireless communication, integrated devices, nano/electronic devices, renewable energy devices, etc. for superior roles and careers in electronics, communication, and allied industries. Besides, they will be able to pursue lifelong learning and attend to complex problem solving using modern and emerging techniques and technologies in an ethical and just manner.		
Core Areas	Key Learning	Brief Description
Signals and Systems	Signal Classification and Transformation	Classification of Different types of Continious and Discrete time signals and Systems, Analyze different types of signals and Systems, continuous and discrete systems in time and frequency domain using different transforms , Characterization of causality and stability of linear shift invariant systems and concept of Transfer Function.
	Advanced Digital Signal Processing	Discrete-time signals, LTI Systems, Z-Transform, Discrete Fourier Transform, Fast Fourier Transform, Digital filter design, Digital signal processor, Sampling and reconstruction of a signal.
Error control coding	Description of a digital communication system	Information theory, Channel performance, Cause of errors and need for error control coding, Broad classes of error, classes of error correcting codes, Determination of general expression of the probability of error in a binary symmetric Gaussian channel, Principle of maximum likelihood decoding.
	Linear algebra and Block Codes	Groups- definition, order of a group, modulo-m addition and multiplication tables, modulo-m subtraction and division, Fields- Definition, binary field, Galois field, Polynomials- polynomial expression, addition/subtraction/multiplication/division of polynomials over GF, Determination of Irreducible polynomials, primitive polynomials, Linear block codes for error correction.
	Codes for Error Correction	Linear block codes for error detection and correction, Design BCH & RS codes for Channel performance improvement against burst errors, Apply convolution codes for performance analysis & cyclic codes for error detection and correction.
Microprocessor & Microcontroller	Architecture	Knowledge of microprocessor & microcontroller, different peripheral devices and their interfacing to microcontrollers, design aspects of microprocessors & microcontrollers.
	Programming	Assembly language programs of microprocessors & microcontrollers for various applications, Interfacing of various peripheral devices to microprocessors & microcontrollers.
Wireless Communication	Wireless network	Planning and design of wireless networks, wireless sensor network architecture and the protocol stack and WSN applications, Sensor network architecture,traffic related protocols,transmission technology, emerging technologies like Bluetooth, zigbee, Wimax, etc.
	Protocols & Network management	Middleware protocol and network management, channel allocation techniques in wireless communication, models to find the loss in the signal strength, multipath propagation effects.

Cont.

Core Areas	Key Learning	Brief Description
Artificial Intelligence & Human computer Interaction	Introduction to nanotechnology	Aspects of nano-technology, nano components and material, Quantum Mechanics postulate on the physical systems, Classify solids on the basis of band theory and to calculate conductivity of semiconductors, shrink down approach, analysis and design of fundamental CMOS Analog and Mixed signal Circuits.
	Introduction to Nano Electronics	Concept of quantum interference, formation of quasi-bound states, operation of a Resonant Tunneling Diode, Carbon nanotube electronics, band structure, transport devices, 2D semiconductors, electronic devices, Atomistic simulation.
	Working with Electronics	Energy bands & Current Carriers, Bonding Forces in Solids, Energy Bands theory in crystals - conductors, semiconductors and insulators, Generation and recombination of carriers; Poisson and continuity equation, Physical Description and fabrication of p-n junction and its characteristics, Basic Construction and characteristics of Bipolar Junction Transistor, Basic Construction and characteristics of MOSFET, Optical effects on semiconductors and application, Fabrication process of Integrated circuit.
Digital System Design	Logic and design	Number Systems:Decimal,Binary,Octal,Hexadecimal, representation of Signed Numbers, Binary Arithmetic in Computers, Logic simplification and Combinational logic design- Minimizing Booleans functions by using various techniques like Boolean Algebra, K-Map,De Morgan's Theorem etc., Flip- Flops, Register types, Counters, etc synchronous circuits like Synchronous Counter, Pulse train generator,etc., sequential logic design.
	Integrated devices	Design and analyze combinational logic circuits and modular combinational circuits like Comparators, Multiplexers, Encoder, Decoder etc., Memory organization and operation, expanding memory size, classification and characteristics of different kinds of memories, ADC and DAC blocks required for data conversion, analog and digital CMOS circuits, Understand the fabrication process of IC technology, Analysis and Design of Adders, Multipliers and memories, etc.
	Integrated devices	Statistical theory, Performance of digital communication system, Error control codes, Spread Spectrum modulation, Digital modulators, Demodulator, Bit error, digital representation of signals.
Working and Application	Classification of Energy Sources and Conversion	Conventional energy resources, classification, Energy conversion using magnetic fields, MHD cycle and Electric generators.
	Working and Application	Renewable energy resources, technologies for harnessing, framework of state-of the-art advanced energy systems, Working and applications - Wind energy, Hydel Energy, Bio Energy, Bio Diesel, Tidal energy, Wave Energy, Geo-thermal energy.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	Diploma of Civil Engineering	
Duration	3 years	
Location	Durgapur	
Programme Objective: To prepare the students to professionally undertake various vocations of Civil Engineering and allied areas by employing the skills of basic science, mathematics and Civil engineering in a small, medium, large scale industrial, green-field, or any related project in multidisciplinary, diverse, and changing technological settings with utmost regard to lifelong learning, ethical conduct and social responsibility in managing teams in local, national, and global organizations.		
Core Areas	Key Learning	Brief Description
Construction	Surveying	Set out alignments for roads, railways, canals, pipelines, tunnels etc.
	Building Material & Construction	Basic properties of material being used in the construction of the building.
	Concrete Technology	Survey of different types of materials used in building construction.
	Estimating & Costing	Study of project financials, budget and costing of building construction.
	Geotechnical Engineering	Different methods in use to improve the strength of foundation soil, basics of geology, soil science.
Design	RCC Structure	Select proper materials, calculate the design values for the materials, read and interpret structural drawing.
	Steel Structures	Prepare the detailed working drawing of steel roof truss, showing section section and connections.
	Mechanics of Structures	Calculate stresses in simple and composite sections.
	Auto-Cad	Develop drawing on Autocad software, estimations, and measures.
Water Engineering	Hydraulics	Basic propereties of fluid,concept of fluid flow.
	Hylrrigation Engineering	Morphological nature of land, hydrological pressure, fundamentals of irrigation engineering.
	Water Resource Management	Understand water resource potential in India, water maps, water resource conservation, management of water supply.
	Environmental Engineering	Fundamentals of environmental science, environment sustainability, pollutants and their effects on construction and environment.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	Diploma of Mechanical Engineering
Duration	3 years
Location	Durgapur

Programme Objective: To Prepare the Students with strong fundamental knowledge in Mathematics, Science and Engineering Sciences along with thermal engineering, manufacturing, and design skills and enable them to deal with Mechanical Engineering related problems with engineering solutions in different industrial environments in multidisciplinary settings with utmost regard to environment, ethics, and social responsibility.

Core Areas	Key Learning	Brief Description
Thermal Engineering	Energy Sources	Understand the concept of energy, work, heat & their conversion.
	Thermodynamics	Understand the concept of thermodynamics and study of various thermodynamic laws with their applications.
	Steam Power Generation	Study the Steam Power Cycles and their application in actual power generation.
	Heat Transfer	Study the basics of Heat transfer and its application.
	IC Engine	Study the various parts and working function of different Engines.
	Refrigeration & Air Conditioning	Understand the fundamentals of Refrigeration and Air-Conditioning.
Manufacturing	Machine Tools & Machine	Operate & control different machines and equipments
	Foundry Technology	Know and identify basic manufacturing processes for manufacturing different components.
	Metrology & Measurment	Analyze and interpret the data obtained from the different measurements processes.
	Production	Study various types of basic production processes, select, operate and control the appropriate processes for specific applications and production processes, surface finishing processes and plastic processes.
	Cnc Machine Tools	Develop the mindset for modern trends in manufacturing and automation.
Design	Strength Of Materials	Analyze various types of stresses & strains along with main causes of failure of machine parts.
	Engineering Mechanics	Calculate moment of force & couple and thus support reactions of statically determinate beams under different load conditions.
	Machine Design	Analyze the various modes of failure of machine components under different load patterns, Design and prepare part and assembly drawings, Use design data books and different codes of design.
	Autocad	Develop drawings on CAD software for various estimations and measures.
	Machanism Of Machines	Understand Kinematics and Dynamics of different machines and mechanisms.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B.Voc. - Automobile Servicing	
Duration	3 years	
Location	Durgapur	
Programme Objective: To prepare students for successful vocations in automobile servicing in alignment with the industry needs of Indian and multinational companies through a sound foundation in mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyse engineering problems. Besides, they will be able to exhibit strong independent learning, practical learning & problem solving skills, effective communication and team working skills on multidisciplinary projects with ethical, environmental, and social responsibilities.		
Core Areas	Key Learning	Brief Description
Automobile concept	Engine Theory & Diagnosis	Vocations in the automotive industry, shop safety, shop equipment, Identification & proper usage of automotive hand tools, Identification & proper usage of fasteners, basic automotive measuring tools.
	Engine Theory & Diagnosis	Perform and analyze results from compression, oil pressure, vacuum, cylinder leakage, fuel pressure and cooling system checks, Inspect engine assembly and repair wear, noise, leaks from oil, coolant and fuel and determine necessary action for repair, proper engine disassembly and reassembly methods.
	Auto Brake System	Understand mechanical and hydraulic brake system theory, brake system diagnosis, brake system repair, antilock and traction control systems, antilock and traction control diagnosis.
	Auto Suspension/ Alignment	Proper tool usage, proper disposal of material waste, base tire, wheel and suspension theory, base steering theory, servicing suspension and steering components, principals of alignment, vibration/noise diagnosis principles, and safe work habits.
Electrical Components & Maintenance	Auto Basic Electrical	Electrical terminology, schematic diagrams, laws of electricity and magnetism, theory of operation, identification of all components related to the charging system and starting system - fault diagnosis, perform repairs, Identify types of batteries, discuss theory of operation, safety test and service batteries, basic automotive lighting and wiring - diagnose its faults and perform repairs.
	Auto Electrical II	Electrical diagrams for performing tests on electrical components and electronic systems, Diagnose malfunctioning sensors and actuators using various tools and workshop manual instructions, test electrical components and electronic systems, and determine root cause of failure.
	Auto Electrical III	Understand how to read and use electrical diagrams for performing tests on electrical components and electronic systems. Diagnose malfunctioning sensors and actuators using various tools and workshop manual instructions. Be able to test electrical components and electronic systems and determine root cause of failure. Diagnose and repair interior lighting systems. Diagnose and repair power door locks and windows. Diagnose and repair module controlled accessories.

Cont.

Core Areas	Key Learning	Brief Description
Automobile Maintenance	Auto Fuel & Emissions	Diagnose fuel related non starting and hard starting problems, Inspect, test and replace fuel pumps and fuel pump/pressure control systems, Inspect and test operation of exhaust systems and related parts, Diagnose emission control input sensors and output actuators for proper operation and determine necessary action, Retrieve Diagnostic Trouble Codes and take necessary action to repair vehicle, Prepare, use and interpret results of 5 gas analyzer and determine probable cause of emission failure, Prepare, use and locate cause of evaporative emissions failure using appropriate diagnostic equipment.
	Auto Engine Performance	Diagnose ignition related engine performance problems and determine necessary action, Diagnose electronic engine control systems problems with appropriate diagnostic tools such as scan tools, oscilloscope and ignition diagnostic equipment, Check for module communication errors with scan tool and diagnose with digital volt ohm meter, Diagnose input sensors and output actuators for proper operation with scan tool, oscilloscope and determine necessary action, Diagnose engine performance no code scenarios and determine the root cause of failure using appropriate diagnostic tools and workshop manuals, use workshop manual information to diagnose engine performance related issues.
	Automobile Practicals	Supervised workplace experience in selected industry settings, knowledge and practice to achieve competencies in basic automotive skills.

Admission Helpline: 95472 77739

Programme-Detail Structure

Affiliated to MAKAUT and approved by AICTE, as applicable

Name of the Programme	B.Voc. - Refrigeration & Air-Conditioning
Duration	3 years
Location	Durgapur

Programme Objective: To prepare the students for Air Conditioning and Refrigeration system maintenance, technologies and tools sets to work as facility manager, Commissioning manager project manager, service manager, contractor, and entrepreneur in the vocation of Air Conditioning and Refrigeration in multidisciplinary and diverse settings with utmost regard to ethics, human values and social responsibility.

Core Areas	Key Learning	Brief Description
Refrigeration and Air-conditioning Concept	Basics of Refrigeration	Fundamental principles and different methods of refrigeration, various refrigeration cycles, performance evaluation using Mollier charts.
	Basics of Airconditioning	Fundamental principles and different methods of air conditioning, basic air conditioning processes on psychometric charts, calculate cooling load for its applications in comfort and industrial air conditioning.
Refrigeration and Air-conditioning material	Refrigerant	Comparative study of different refrigerants with respect to properties, applications and environmental issues.
	RAC Pipes	Various equipment-operating principles, operating and safety controls employed in refrigeration air conditioning systems, Operate and analyze the refrigeration and air conditioning systems.
Air conditioning Systems	Automobile Air conditioning	Perform engine cooling system maintenance, diagnosis, and repairs as related to heating and air conditioning with limited supervision.
	AC System Installation & Maintenance	Refrigeration and Air Conditioning technicalities - install, maintain and repair indoor air quality systems, such as air conditioners.
	Recirculating Air conditioning system	Vapour compression and vapour absorption system.
Electrical and Electronics Engineering	Basic Electrical	Basic knowledge of electrical quantities such as current, voltage, power, energy and frequency.
	Basic Electronics	Working knowledge for the analysis of basic DC and AC circuits used in electrical and electronic devices.

Admission Helpline: 95472 77739

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