INFORMATION BROCHURE

(FOR ADMISSION INTO DIPLOMA, B. TECH. AND B.DES. PROGRAMME)

ADMISSION 2023-2024

CENTRAL INSTITUTE OF TECHNOLOGY KOKRAJHAR

(Deemed to be University, MoE, GoI)

www.cit.ac.in

Contents

1 INTRODUCTION

ABOUT THE INSTITUTE

Central Institute of Technology Kokrajhar (CITK), is a '**Deemed to be University**' under De- novo category vide Notification No. F.9-1/2016-U3 (A), dated December 13, 2018. It is administered under the Ministry of Education (MoE), Government of India. It was established as an outcome of the Memorandum of Settlement (MoS) on Bodoland Territorial Council (BTC) signed between the Assam Government, the Union Government and the Bodo Liberation Tigers (BLT), on February 10, 2003, in New Delhi. The foundation stone of CIT Kokrajhar was laid on 10th of February, 2003 by the then Honorable Chief Minister of Assam, Sri Tarun Gogoi in presence of the then Honorable Deputy Prime minister of India Sri L. K. Advani. Consequently, CITK started its academic and administrative functions from December 06, 2006. The Institute is run by an autonomous body registered with the Societies Registration Act 1860 and functions under a Board of Governors (BoG).

CITK was established for the basic objective of fulfilling the aspirations of the Bodo people relating to their cultural identity, language, education and overall economic development of the region. The academic programmes and curriculum lay emphasis on imparting the youth with requisite technological and vocational training to produce the required manpower to give an impetus for economic growth of the area and to integrate the people of Bodoland into the mainstream of technical and vocational Education.

CITK is mandated to impart technical and vocational education such as Information Technology, Bio-Technology, Food Processing Technology, Rural Industries, Business Management, etc. as part of the concerted efforts being made by the Government of India and the Government of Assam to fulfill the aspirations of the people of Bodoland and the entire North-East region.

LOCATION

CITK is located at a serene landscape at about 12 kilometers north from the district headquarter of Kokrajhar District in lower Assam. It is located in a peaceful environment comprising of cultivation lands and villages of various sections of indigenous people. The Institute is easily accessible by Rail and Road. It is at a distance of about 10 km to the south of NH-27 and 10 km to the north from the Kokrajhar Railway Station. The nearest airport is Lokpriya Gopinath Bordoloi International (LGBI) Airport, Guwahati which is about 240 km away from the institute.

INFRASTRUCTURE

CIT Kokrajhar Campus is presently spread over an area of about 200 acres of land. The campus consists of Academic Blocks, Administrative Block, Director's Residence, Central Library Building, Workshop Building, three Boys' Hostels & one Girls' Hostel, Guest House, Faculty and Staff quarters, Heath Centre, Recreational Centre, Gymnasium, Sports Complex and Playgrounds. The constructional activities of more faculty and staff quarters, auditorium, new hostels, new academic blocks etc. are in progress.

ADMINISTRATION

CIT Kokrajhar is administered by the office of the Director under the direct supervision of Board of Governors (BoG) headed by a Chairman. The Board of Governors consists of members appointed as per the norms of Government of India. CITK is a Centrally Funded Technical Institute (CFTI) under Ministry of HRD, Government of India. IIT Guwahati is acting as the mentor of the Institute. The Institute has presently about 200+ employee s including faculty and the non- teaching staff. The academic policies are made through 'Senate 'which is the highest institute level body of all academic matters.

ACADEMICS

CITK is presently offering Diploma, B. Tech, B. Des, M. Tech, M. Des and Ph. D. programs in various disciplines. The core departments are - Electronics and Communication Engineering, Computer Science and Engineering, Instrumentation Engineering, Food Engineering and Technology, Civil Engineering and Multimedia Communication and Design.

Other departments include Basic Science (Mathematics, Physics and Chemistry), Allied Engineering Departments (Electrical and Mechanical Engineering) and Humanities and Social Science which comprises of English, Economics and Sociology.

The estimated student strength of the Institute is about 1500+ and the Institute has more than 100 specialized faculty members from fields of Science, Engineering and Technology, Design and Humanities and Social Sciences.

MEMORANDUM OF UNDERSTANDING (MoU)

The Institute has signed MoU with various reputed academic Institute and Industries for extending collaboration in various educational and professional programmes. Some of the distinguished intuitions and industries are IIT Guwahati, Bodoland University Kokrajhar, Assam Science and Technology University (ASTU), UTP Malayasia, IOCL Bongaigaon, NTPC Salakati etc.

2 VISION AND MISSION

VISION: The Central Institute of Technology, Kokrajhar, has a vision-

- To be a Centre of Excellence in Technical and Vocational Education.

- To build a high-tech campus with all infrastructure and state-of-art facilities, committed to facilitate and promote latest technology, vocational skills and training.

- To encourage innovative teaching, training and learning methodologies and implement target group-specific skill development programmes.

- To foster Institute-Industry participation to build synergies in entrepreneurship, market oriented programmes and employability of participants in technology-intensive enterprises.

- To create a vibrant environment for education with an ethos for research and development.

- To build a Green Campus by emphasizing on adopting energy efficient buildings, power from alternative energies, rainwater harvesting, showcase technology for energy conservation and address climate change issues.

- To contribute to the socio-economic development of the region.

- To create a unique brand name for itself in the field of technical and vocational education in the country.

  MISSION: The Mission of Central Institute of Technology, Kokrajhar, is-

- To establish a world class Institute for education, career, technology and vocational training.

- To promote a two cycle modular structure with the objective to make students free from a single career path by enabling them to opt for alternatives at different stages of their study

- To ensure access to education, training, knowledge and technology for promoting skills and innovations to all.

- To foster skill development with innovative teaching techniques and learning technologies such as e-business and e-learning.

- To address challenges in rapid shifts in the nature of demand for skills by emphasizing on research, development, commercialization and industrialization with necessary thrust to shift from traditional mass approaches to provide more customized training.

- To focus on Institute-Industry partnership to implement innovative strategies to create new entrepreneurs, enterprises and industries with access to leading edge skills and technology.

- To empower the people to fulfill their aspirations by fostering know how in technology and vocational training to produce skilled and trained manpower from the Bodoland area by serving as a link between education, industry and economic self-reliance

3 PROGRAMMES OFFERED BY THE INSTITUTE

Currently the Institute offers the following programmes:

Diploma (3 years) in Electronics and Communication Engineering, Computer Science and Engineering, Control and Instrumentation, Food Processing Technology, Civil Engineering and Animation & Multimedia Technology.

B. Tech.(Direct Entry-4 years) in Electronics and Communications Engineering, Computer Science and Engineering, Instrumentation Engineering, Food Engineering and Technology and Civil Engineering.

B. Tech.(Vertical/Lateral Entry-3 years) in Electronics and Communications Engineering, Computer Science and Engineering, Instrumentation Engineering, Food Engineering and Technology and Civil Engineering.

B. Des. (Direct Entry-4 years) offered by the Department of Multimedia Communication and Design.

B. Des. (Vertical Entry-3 years) offered by the Department of Multimedia Communication and Design.

M. Tech. (2 years) in Computer Science and Engineering, Food Engineering and Technology, Green Energy Technology and Water Resources & Hydraulics Engineering.

M. Des. (2 years) in Multimedia Communication and Design.

Ph.D. in Core Engineering branches, Allied Engineering branches (Electrical Engineering), Basic Sciences (Physics, Chemistry, Mathematics), Humanities & Social Sciences (English, Economics) and Multimedia Communication & Design.

4 FACILITIES OF THE INSTITUTE

HOSTEL FACILITY

The Institute has six hostels, three for boys with total capacity of 588 boarders and one for girls with capacity of 236 boarders inside the campus. Two girls' hostels with total capacity of 150 boarders are located at Kokrajhar town. All the Hostel related matters are looked after by the Hostel Management Committee (HMC) which comprises of Member Secretary, Chief Warden and the Wardens of individual hostels. It is mandatory for all the hostels boarders to abide by the rules and regulations of Hostel Rule Handbook. The Institute endeavors to provide hostel accommodation to all the admitted candidates but does not guarantee one. The Institute provides 24 hour power supply, LAN and internet facilities in all the hostels

LABORATORY FACILITY

The Institute has well established laboratories in all the departments as per the requirements of Diploma, Undergraduate and Post-Graduate Programmes. All the laboratories are equipped with state of art infrastructure with modern facilities including uninterrupted power supply and internet facilities to create an amiable atmosphere for laboratory classes and R&D activities. The Institute gives due emphasis on designing the laboratory classes in accordance with the concepts taught in the theory classes. The Institute is committed to provide best experimental practices to all the students under the expert guidance of faculty members and laboratory staff. Every year, the Institute gives due importance in upgrading its existing laboratories facilities with latest equipment and software tools.

RESEARCH AND DEVELOPMENT FACILITY

The Institute gives due emphasis on enhancing its R&D facilities in the departmental laboratories to facilitate research activities among the faculty members and students of the institute. The faculty members and students of the Institute publish a good number of research papers every year and attend prestigious international and national conferences on diverge topics. The Institute has R&D Cell headed by Dean (Research) to encourage and facilitate

research activities in the Institute.

COMPUTER CENTERS

The Institute has two central computer centers with more than two hundred and fifty nodes with the latest Operating Systems and applications software. The computer centers are connected with wired and wireless LAN and have NKN connectivity (1 Gbps) for internet access. In addition to this, departments like ECE, IE, CSE and AMT have individual computer laboratories with internet access for conducting simulation and design based practical classes.

INTERNET FACILITY

The Institute has campus-wide LAN (both wired and wireless) with NKN connectivity of 1 Gbps fiber line to provide internet access to every blocks/section of the Institute.

VIRTUAL CLASSROOM

The Institute has a well-equipped virtual classroom to organize online conferences, workshops, lectures and seminars. It is capable of transmitting and receiving interactive high-definition video classes across the globe through the internet.

SEMINAR HALL

The Institute has two well-equipped seminar halls to organize seminars, workshops, conferences and interactive programmes which have a capacity of 100 audiences each.

POWER BACKUP

The Institute has already approved for dedicated power supply from APDCL and the work for the same is underway. At present, the Institute has dedicated online UPS for each department/section and various laboratories. In addition, the Diesel Gensets are also available in the institute to provide uninterrupted power supply to various blocks, hostels and staff quarters

LIBRARY FACILITY

The Institute has a separate building for the Central Library spread over 22,000 Sq. feet area and fully digitized with Self Issue-Return System, Web-Opac Terminal, Self-Check System, Anti- Theft Alarming System, Flap Barrier, CCTV Surveillance System, 24 hours backup facility, separate server, more than127377 volumes(reference and text books), 16491 e-books, 1499 e- journals, 2570 printed magazines, 47226 subscribed proceedings / standards/GG videos, 1500 CD/DVD and 1800 Institutional Repository. Library also provides 9 reputed newspapers daily. The services provided by the Central Library are: Lending Services, Reference Service, Current Awareness Service (CAS), Inter Library Loan Service (ILL), Reading Room Service, Separate Digital Library, Faculty Study Corner and User Awareness and Photocopying Services. Library also provides E-library facility and Mobile App facility to its users for remote access of library resources anywhere and anytime. For more information you may visit http:// centrallibrary.cit.ac.in/.

TRANSPORT FACILITY

CIT has 4 buses plying to and fro from Kokrajhar town to facilitate the transportation of the students to the Institute.

TRAINING AND PLACEMENT CELL

The Institute has a separate cell for Training and Placement headed by a Training &

Placement Officer (TPO). The Cell organizes and coordinates Campus Placement Programmes, Industrial visits, implant trainings and projects of industrial relevance to the students, with the sole aim of zeroing down the hiatus between the industry and the academia.

GAMES AND SPORTS FACILITY

Games and sports are encouraged among the students of the institute since it keeps a healthy balance between physique and mind of an individual. The institute provides all the basic sporting facilities to the hostel boarders. The institute has a sports complex with facilities to play Basketball, Volleyball, Lawn Tennis, Badminton etc. Recently, the Institute has modernized the sports complex with new facilities. The institute has a large playground for playing outdoor games like cricket and football. Every year sporting competitions are organized among the students during occasions like "Ecstasy", the annual sports and cultural week of the Institute.

CANTEEN

The Institute has two Canteens inside the campus to cater to the requirements of food and refreshments for the staff and the students. The central canteen is run by the experienced farm selected through the bid while the other canteen is volunteered by women Self Help Group. Both the canteens serve homely food.

MEDICAL AND HEALTH SERVICES

The Institute has a health centre inside the campus. It is equipped with all the primary medical facilities. A medical officer and a staff nurse is in-charge of the health centre to address the medical needs of both staff and students of CIT. An ambulance is available for 24×7 Hrs to provide emergency medical services to both staff and students. Medical insurance facility is available for staff and students

GUEST HOUSE

The institute has a Guest House with A/C and non A/C rooms which is primarily meant for the guests of the institute. A full-fledged Conference Room forms a part of the Guest House.

STUDENT AFFAIRS

Student's affair section conducts various recreational and developmental activities among students and provides necessary guidance while addressing issues of students relating to academics, hostels or other grievances. It is headed by the Dean of Student Affairs and comprises of various clubs namely- Quizz, Photography, Fitness, Robotics etc. under the supervision of faculty members for each club.

RECREATIONAL CENTRE The Institute has a recreation centre which is used for recreational activities like showing of documentaries or movies, invited talks, workshops and other recreational events.

5 PROGRAMMES, DISCIPLINES AND INTAKE CAPACITY

Sl No	Name of Programme	Name of Branches	Intake capacity
1.	Diploma	Electronics and Communication Engg.	30
		Computer Science and Engg.	30
		Control and Instrumentation	30
		Food Processing Technology	30
		Civil Engineering	30
		Animation and Multimedia	30
2.	B. Tech. (Direct Entry)	Electronics and Communication Engg.	45
		Computer Science and Engg.	70
		Instrumentation Engg.	45
		Food Engineering and Technology	45
		Civil Engineering	45
3.	B. Tech. (Vertical + Lateral Entry)	Electronics and Communication Engg.	15+6
		Computer Science and Engg.	20+9
		Instrumentation Engg.	15+6
		Food Engineering and Technology	15+6
		Civil Engineering	15+6
4.	B. Des.(Direct + Vertical Entry)	Multimedia Communication and Design	25+5
5.	M. Tech.	Water Resources and Hydraulics Engineering	18
		Green Energy Technology	18
		Food Engineering and Technology	18
		Computer Science and Engineering	18
6.	M. Des	Multimedia Communication and Design	15
7.	Ph.D.	Core Engineering Branches (ECE, CSE, IE, FET, Civil Engg.)	-
		Basic Sciences (Physics, Chemistry, Mathematics)	
		Humanities and Social Sciences	
		Multimedia Communication and Design	

6   DEPARTMENTAL DETAILS

6.1   ELECTRONICS AND COMMUNICATION ENGINEERING

INTRODUCTION

Electronics and Communication Engineering is an endlessly rising industry in today's digital scenario. Within the last twenty years many improvements and advancements in technology have created a world which relies on electronic services and communication. It is the utilization of science and math applied to practical problems in the field of Electronics & Communication. The Electronics and Communications Engineering programme emphasizes technical skills that are used to design, develop, install, test and maintain various electronic communication systems. Modern communications industry is growing at a phenomenal rate and there is a great demand for trained professionals in this area. All of them have a purpose and many of them are quite necessary in day to day lives of people like cellular telephones, radios and television etc. The students of diploma and degree are qualified for professional practice or to work in several areas of specialization. The department trained students as professional engineers through an education in fundamental principles presented in the context of real applications and design. The program provides a solid background in fundamentals of science & mathematics, Devices & Circuits, Analog & Digital Electronics, Electromagnetics, communications, signal processing etc. The employment avenues for them include data and telecommunications services, computer networking, TV and satellite services, and research & development of electronic communication systems.

VISION

To become an excellent educational hub to impart knowledge, engage in research for new findings, nurture skills relating to ground reality.

To produce dynamic and motivated engineers, technologists and entrepreneurs who can contribute to the development and progress in the field of Electronics and Communication.

MISSION

To adopt innovative teaching-learning methodologies to envisage proper blend of theoretical and practical knowledge in the emerging areas of Electronics &Communication Engineering.

To create proficient professionals who can either work as an individual or in a team with good leadership skill in an amalgamated work area of diverse knowledge.

To help the student to be a prosperous and accountable engineer for the benefit of mankind by inculcating social and ethical values in professional engineering program.

6.1.1 PROGRAMME EDUCTIONAL OBJECTIVES (PEOs)

PEO1	To prepare students with a solid foundation in engineering, science and technology for a successful career in Electronics and communication Engineering
PEO2	To prepare students to undertake innovative and/or collaborative R&D activities to meet the technical and engineering challenges.
PEO3	To prepare students to engage in professional development through self-study so that they can excel in engineering carrier as well as entrepreneurship.
PEO4	To equip students with ethical and synergetic values in order to make the become responsible engineers

6.1.2 PROGRAMME OUTCOMES

Electronics and Communication Engineering graduates will be able to:

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

6.1.3 LABORATORY FACILITIES

Basic Electronics Laboratory: It is equipped with a number of analog trainer kits, all required desecrate components, analog IC's, Variable DC power supply, Analog and Digital meters, DSO, CRO, function generators, etc. Experiments on Basic Electronics, Analog Electronics, Linear Integrated Circuits (LIC), Electronic Devices and Circuits (EDC), Power Electronics lab, Electronic Workshop, Electronic Circuit troubleshooting are conducted in this laboratory.

Digital Electronics Laboratory: It is equipped with a number of digital trainer kits, Digital IC's of basic logic gates, IC's Combinational and Sequential logic circuits, Variable DC power supply and digital multi-meter. Experiments on Design and implementation of Digital Circuits are conducted in this laboratory.

Microprocessor and Microcontroller Laboratory: It is equipped with 8085 microprocessor and 8051 Microcontroller trainer kit. Experiments on Programing and interfacing with microprocessor and microcontroller are conducted in this laboratory.

Software Simulation Laboratory: It is equipped with PCs connected to the internet and DCN Trainer kit. There are up-to-date Circuit Simulators like Multisim-V14, Visim and etc. Experiments on Circuit Simulation, VLSI modeling simulation, Data and Computer Networks (DCN) are conducted in this laboratory.

Communication Laboratory: It is equipped with Analog communication Trainer kit, Digital Communication Trainer Kit, Digital Signal Processing Trainer Kit, PCs loaded with MATLAB,CRO, DSO, function generator, spectrum analyzer etc. Experiments on Analog Communication, Digital Communication, Control System and Digital Signal Processing are conducted in this laboratory.

Microwave Laboratory: It is equipped with different microwave frequency generators such as Gunn Diode and Klystron tube, VSWR meter, different Couplers, CRO, Antenna Trainer kit with different kinds of Antenna, Transmission Line trainer kit for different microwave experiments. Experiments on Microwave engineering are conducted in this laboratory.

Project and Research Laboratory: It is equipped with tools i) TCAD ii) ATLUS iii) Tanner iv) Optimism. These tools are used for device simulation for a broad range of applications, Data acquisition and analysis etc.

6.1.4   SCOPES

After completing 3 years diploma in this department student may join in any company/academia related to electronics and communication or may take admission in the B.Tech. 2nd year of Electronics and Communication engineering (lateral entry). In CIT 30 seats are reserved for diploma students.

After completing 4 years degree in Electronics & Communication Engineering students will get opportunity to do job in software based company or hardware based company like: Bharti Airtel Ltd, Tata Indicom, Reliance Infocomm, Videocon, AT&T, Texas Instruments, Nokia India, Siemens, Honeywell India, Wipro technologies, TCS, CTS, Infosys, Cadence, and INTEL etc.

Students may join in government sector like: Indian railway, Metro railway, DRDO, ISHRO, Bank, Defense services, Door Darshan, radio station, BHEL, BEL, ONGC, GAIL, SAIL, NTPC, WBPDCL etc. Students willing for higher studies are eligible to take admission in M.Tech in any institution all over India.

6.2   COMPUTER SCIENCE AND ENGINEERING

INTRODUCTION

The Department of Computer Science and Engineering was established in the year 2007 offering 3 Years Diploma in Computer Science with an annual intake of 30 Students. From 2009, the department offers 4 years B.Tech Degree program in Computer Science and Engineering with an annual intake of 66 Students (70 Direct entries +20 Vertical + 09 Lateral entries. The department has 15 faculty members and 3 technical staff members.

VISION

To become a centre of excellence in the field of Computer Science in the region as well as in the nation, produce highly competitive technical human resource by imparting technical knowledge and skill, develop entrepreneurship and cater the needs of the industry and society.

MISSION

To provide exposure to students to the latest tools and technologies in the area of computer hardware and software.

To promote research based projects/activities in the emerging areas of technology convergence.

To contribute to the socioeconomic development of the region as well as the nation through varied computer applications, including ICT and contribute in the "Digital India" initiative of the government.

To promote entrepreneurship development in Computer Science & Engineering.

6.2.1 PROGRAMME EDUCATIONAL OBJECTIVES

PEO1	To achieve the skilled graduates on providing better fundamentals of Computer Science and Engineering
PEO2	To prepare engineering graduates to become effective collaborators innovators for addressing social, technical and engineering challenges.
PEO3	To equip engineering graduates with a high integrity and ethical values to make responsible engineers for society.

6.2.2 PROGRAMME OUTCOMES

Basic Knowledge: Ability to demonstrate knowledge of Mathematics, Science & Engineering in development, Computer fundamentals and programming.

Discipline Knowledge: Ability to draw flowcharts of compiling a program and perform C programming experiments, analyse and interpret data.

The Engineer and society: Ability to design Programming based tools that meet desired specifications and requirements for society and its safety.

Experiments and practice: Ability to conduct various types of lab experiments on Computer subjects and related areas.

Engineering Tools: Ability to use programming languages and software to analyze problems in Computer Engineering.

Individual and team work: Ability to communicate as an individual and as a member or a leader in a diverse team and in a multidisciplinary setting.

Environment and sustainability: Ability to examine the impact of Computer Engineering solutions in global and environmental contexts and utilize the knowledge for sustained development.

Ethics: Ability to observe professional ethics and norms and take responsibility while carrying out problem-solving in Computer Engineering practice.

Communication: Ability to communicate effectively in both verbal and written form through Programming concepts, coding and analysis.

Life-long learning: Engage in life-long learning and adapt to rapidly changing technologies.

6.2.3 LABORATORY FACILITIES

The Department is well equipped with labs exclusively for the department. All computers in the lab have wireless LAN facility connected with NKN of 100 Mbps and BSNL of 2 Mbps. The classrooms are equipped with modern teaching aids. The laboratories include programming with C/C++, Data Structure, Java programming, Compiler design, Operating System/Linux,

PC System Technology, Computer Network Lab, Information Security etc. Softwares used are JDK open source, Visual Studio 2010, Fedora Core 12 open source, I-security Simulator, Embarcadero, Turbo C++.Recently, Robotics and Image Processing, IOT and other Labs are developed for doing related projects also.

6.2.4 SCOPES

Computers have become a ubiquitous part of modern life, and new applications are introduced every day. The use of computer technology is also a common place in all types of organizations, academia, research, industry, government, private and business organizations. As computers become even more pervasive, the potential for computer-related careers will continue to grow and the career paths in computer-related fields will become more diverse.

The career opportunities for computer science graduates can be classified into seven categories: programming and software development, information systems operation and management, telecommunications and networking, computer science research, web and Internet, graphics and multimedia, training and support, and computer industry specialists. Some careers require additional formal training or study, and experience working in the field. Graduates find opportunities in many IT sector companies like TCS, Infosys, Accenture, CTS Cognizant Technology Solutions, Computer Associates, Cordys, Cybage Software, Dell, DST Global Solutions, Google, HCL, HP ,IBM, IGATE Global Solutions, Infosys, Larsen &Toubro Ltd, NUT Ltd, Microsoft, Oracle, Yahoo etc.

6.3 INSTRUMENTATION ENGINEERING

INTRODUCTION

The Instrumentation Engineering Department of CIT Kokrajhar was established in the year 2007. It initially started with Diploma programme in Control and Instrumentation with an annual intake of 30 students. The Degree programme was introduced in the year 2009 with an annual intake of 66 students (45 Direct entry +15 Vertical entry + 06 Lateral entry).

The department incorporates the modern facilities with well-established laboratories and sophisticated instruments to provide latest technological know-hows to the future technocrats. The faculties and the staff are involved in dedicated learning, teaching, and research and in pursuit of excellence following the current trend in the industry and research. The department is committed to the overall development of the institute as well as the region. The objective of the department is to produce quality personnel who can fulfil the ever increasing demand of skilled professionals in the area of Instrumentation and Control Engineering.

VISION

To become a center of excellence in the field of Instrumentation Engineering that will produce competitive human resource for serving the society.

MISSION

To impart technical knowledge and imbibe skills in students to meet the industrial needs and research & development activities.

To emphasize on ethics, human values, tolerance, professionalism, leadership and entrepreneurship qualities among students with a vision towards betterment of the society and region at large.

To create an environment for the students, staffs and faculty members to enhance their skills and expertise in teaching and learning, research and consultancy services

6.3.1   PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1	To develop in students the ability to understand the basic concepts of Instrumentation Engineering that will help them in understanding the existing as well as new and emerging technologies.
PEO2	To make the students imbibe the sense of ethics, professionalism, creativity, leadership and management with good communication skills and give exposures to latest trends in technology and its industrial applications through adequate training, projects, seminars and industrial visits to meet the demands of the industry.
PEO3	To inculcate the students with the habit and passion of lifelong learning and paving the way for technical prowess.

6.3.2   PROGRAMME OUTCOMES

The Instrumentation Engineering (IE) graduates will be able to apply the knowledge and skills of basic sciences, engineering mathematics, electronics, electrical, computer science and managerial attitude efficiently for analyzing the causes and effects in instrumentation engineering and its allied fields.

Model, design and develop the different instrumentation and control systems for various process industries like power plants, petrochemical, oil & natural gas, etc. as well as medical, electronic & electrical industries using both hardware & software and other sophisticated modern tools.

Work professionally, effectively and also ethically with the contextual knowledge of instrumentation engineering as a member or leader in a team to manage different projects and in multidisciplinary life-long learning environments.

6.3.3   LABORATORY FACILITIES

At present the department has five laboratories and one seminar hall. The details are as follows:

IE LABORATORY-I: Electronics Devices and Embedded Systems Laboratory

This laboratory deals with the study and practical implementation of electrical and electronic circuits. The lab is equipped with most of the basic instruments like DSO, Function Generator, Multi-meter, Microprocessor and Microcontroller development boards, various types of analog and digital integrated chips, Trainer Kits for various experiments, soldering station etc. The lab can accommodate with capacity of sixty students.

The Practical for following core subjects are conducted in this laboratories:-

- Basic Electrical Circuits.

- Electronic Circuits and Devices.

- Digital Electronics.

- Microprocessor & Microcontrollers.

- Power Electronics.

- Network Theory.

IE LABORATORY 2: Transducer and Instrumentation Laboratory

This lab is dedicated for study of various sensors and transducers included in the syllabus of Instrumentation Engineering. This lab includes facilities such as- Instrumentation Bridge trainer kit (like Schering, Maxwell bridge etc.), Biomedical Instrumentation Trainer kit (includes ECG, Filter, NI DAC etc.), various types of transducers (includes RTD, Thermocouple, Strain gauge, LVDT etc.), high resolution multimeter (Agilent 3458A), Thermal Imager, FBG Sensor, Mixed Domain Oscilloscope 1 GHz Spectrum Analyser, data acquisition system etc.

The Practicals for following Instrumentation engineering subjects are conducted in this lab:-

- Transducer and Signal Conditioning.

- Electronics Instrumentation.

- Measurement and Instrumentation

- Principles of Instrumentation

- Biomedical Instrumentation

IE LABORATORY 3: Computer Laboratory

The Department of Instrumentation Engineering has its own Computer Lab equipped with the latest versions of Desktop computers along with high speed Internet facility and most updated licensed versions of various simulation Softwares. The Softwares currently available in this lab are, LabVIEW, MatLAB, MultiSIM, PSim etc... Besides, the students can also work on projects related to simulation based semiconductor fabrication in the Computer Lab with the help of TCAD Software, from our Electronics and Communication Department.

The Practicals of following Computer application subjects are conducted in this lab:-

- Virtual Instrumentation.

- Circuit Simulation.

- Digital Signal Processing.

IE LABORATORY 4: Process Control Laboratory

This lab has been set up to provide practical insight akin to industrial set up to students in the area of Process and Control with the help of Industrial based application trainer kits. This Lab facilitates study and practice of real time Industrial friendly environment for Calibration, Measurement and Controlling, based on SCADA, PLC, DCS, etc... The lab is equipped with trainer Apex Innovation Series 311A, 312A, 313A, 314A, 326A etc

The Practical for following Instrumentation and Process Control subjects are conducted in this lab:-

- Instrumentation and Process control

- Control System

IE LABORATORY 5: Project and Research Lab

The objective of this Lab is to provide a dynamic environment to students to carry out project and research related works that is not limited to the normal official working hours. Students can carry out their individual projects beyond the normal working hours and during the weekends in this Lab. This lab is equipped with a 3-axis CNC-PCB Engraving Machine, various types of microcontroller development boards, Robotics module, various Sensor Modules etc...

The inter-disciplinary subjects covered under this lab:-

- Robotics

- Alternative and smart Sensing

- e-Yantra

- Mechatronics

DEPARTMENTAL SEMINAR ROOM

The department seminar hall is used for conducting students' seminars and project and thesis presentations. The department periodically invites experts from academics and industry to deliver lectures, expert talks, workshops etc. for the students and faculty members.

The department has a vision to expand its infrastructure to start new courses as well as to introduce new facilities and equipment for facilitating research and consultancy activities.

6.3.4   SCOPES

Instrumentation Engineers are required in Process industry, manufacturing, EPC industries and research organizations for the design, development, ENGINEERING, PROCUREMENT, INSTALLATION, AND COMMISSIONING, maintenance, calibration, operation and troubleshooting of all kind of instruments. Instrumentation Engineers also play the role of Control and Automation Engineer in industries or manufacturing units to control and monitor the industrial processes or operations IN REAL TIME by using STATE OF THE ART TECHNOLOGY USING automated systems like PLC, SCADA and DCS.

Instrumentation Engineers are mostly employed in industries such as Refinery, Oil and Gas, Petrochemicals, Power plant, Steel, Cement, Fertilizers, Chemical, Medical, Aerospace, Pharmaceuticals, Pulp and Paper, Glass, Defence etc. There are well known industries to name a few reputed PSUs i.e. BHEL, NPCIL, HZL, HCL, ONGC, NTPC, IOCL, OIL India Ltd, SAIL,GAIL, BCPL,

EIL, Reliance Petrochemicals, ESSAR , BPCL, HPCL, HINDUSTAN, PAPER MILLS, State Public Sector Industries, Central PSUs, etc. Instrumentation engineers are also recruited in telecommunication sectors like BSNL, Reliance Jio, Vodafone etc. and software industries like TCS, CTS, Infosys, WIPRO, etc. As a Biomedical Engineer, instrumentation engineers find employment in industries like GE, Philips, Siemens, Schneider etc.

Instrumentation Engineers find employment as a Technical Officer in various Government research and Educational establishments.

Instrument engineers find suitable employment with the MANUFACTURERS OF INSTRUMENTATION PRODUCTS EG. SIEMENS, EMERSON, YOKOGAWA, ENDRESS & HAUSER, ABB, INSTRUMENTATION LTD, PALAKKAD, INVENSYS, METSO, GE, HITACHI, TOSHIBA, SCHNEIDER ELECTRIC, ALLEN BRADLEY/ROCKWELL, FUJI, ELECTRIC, HONEYWELL, MIL, KSB. There are numerous industries in MSME sector situated in India and abroad who are manufacturers of small scale instrumentation products, hires Instrumentation Engineers and technicians.

Instrumentation Engineers also find employment in LEADING Consulting and EPC organizations like MECON, EIL, TCE, L&T, PDIL, DESEIN, FLOUR DANIEL, SCHLUMBERGER, HYUNDAI, SNAMPROGETTI etc.

6.4   FOOD ENGIEERING AND TECHNOLOGY

INTRODUCTION

Food processing is one of the sunrise sectors in our country. To meet the growing demands of processed / partially processed foods, processing industries are striving for technical personnel. The Department of Food Engineering and Technology at CIT Kokrajhar started Diploma in Food Processing Technology from the academic session 2006-07, and B. Tech. Degree program in Food Engineering and Technology from the academic session 2009-10. The objectives of these programs are to train students on various areas of Food Science and Technology in order to provide valuable support base of skilled personnel / professionals for the country's food

sector. The syllabus is framed to enable students achieve a comprehensive understanding of the whole gamut of food science scenario worldwide, including the emerging areas. The academic and research activities in the department focus on the frontier areas of food process engineering such as food properties and prediction, post-harvest operations, food quality analysis and safety issues, application of nanotechnology in food processing, transport process and kinetics, product development and ingredients innovation, food packaging and storage engineering.

VISION

To be a center of excellence in food technology education and research for developing highly skilled professionals capable of continuous improvement.

MISSION

To produce trained technical manpower competent in the field of food engineering and technology.

To ensure a synergistic focus on skill developments through curricular and co-curricular program(s) to develop well-rounded food technology professionals.

To serve the north-eastern region including BTAD and the society at large in food and agriculture sector.

6.4.1 PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

PEO1	To provide technical knowledge, skill and competence to identify, comprehend and solve problem in industry, research and academics in the area of food engineering & technology and related disciplines.
PEO2	To prepare the students to successfully work in various public and private sector organizations at regional, state, national and international levels, with professional competence and ethical administrative acumen.
PEO3	To develop students for their life-long endeavours by improving their technical and intellectual capabilities, which may include professional career and/or post-graduate education. This may enable them to successfully adapt to technological and cultural changes for their proper evolution in society.
PEO4	They will be able to work as an individual, as a team leader or as a member of a team in multicultural global environment.
PEO5	To fulfil the needs of the locality (North Eastern region of India) and the society at large by solving relevant problems using engineering principles, tools and practices in an ethical and responsible manner. As prepared by the department.

6.4.2 PROGRAMME OUTCOMES

Ability to apply principles and hypotheses of mathematics, natural science, and engineering science to identify, comprehend, analyze, and formulate substantiated solution of practical food engineering and technology problems.

Ability to design and develop system components for practical engineering problems related to industries that meet specified needs.

Ability to design engineering processes and products to meet the needs of the locality and that of the society at large, within realistic constraints such as economic, environmental, ethical, cultural, health and safety, feasibility, and sustainability.

Ability to create, select, and apply appropriate techniques, resources, and modern engineering and computational tools to different engineering activities with an understanding of the limitations.

Ability to understand and apply knowledge on laws and regulations of food and allied areas

Ability to communicate effectively on professional activities with the scientific community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions, and to enhance awareness in relevant fields.

Ability to function effectively as an individual, and as a member or leader in diverse teams in multi-disciplinary settings.

Ability to recognize the need for independent and life-long learning, and have the preparation and ability to engage in the same.

6.4.3 LABORATORY FACILITIES

The Department of Food Engineering & Technology has classrooms, each having a sitting capacity of eighty (80) students. All the classrooms are equipped with state-of-the-art facilities for teaching-learning process. The Department is equipped with six (6) laboratories namely Food Analysis & Quality Control Lab, Food Chemistry Lab, Food Engineering Lab, Food Packaging Lab, Food Microbiology Lab, and New Product Development Lab. Some of the sophisticated laboratory instruments such as Texture Analyzer, UV-Vis Spectrophotometer, HPLC, Chroma Meter (Colorimeter), RVA StarchMaster2, Milk Analyzer, Lyophilizer, Cold Centrifuge, Kjeldahl Apparatus, Soxhlet apparatus, Crude Fibre analyzer, Dietary Fibre analyzer, FFS Packaging machine are available in the Department for academic programmes and research.

6.4.4 SCOPES

Food Technology students have a numerous opportunities in private and public sectors for professional establishment and development. Increased consumer's preference for safe, healthy, and convenient food choices are further enriching and expanding such opportunities in food manufacturing and service sector. At the same time, as India gradually gains market share

among the global food business and trade, tremendous research opportunities are generated for budding scholars, who want to pursue higher education and/or research career in this area.

6.5   CIVIL ENGINEERING

INTRODUCTION

The Department of Construction Technology was established in the year 2009 offering 3 Years Diploma in Construction Technology with an annual intake of 30 students. From 2011, the department offers 4 years B.Tech. The degree program in Civil Engineering with an annual intake of 66 students (45 Direct entries +15 Vertical + 06 Lateral entries).

VISION

To become a centre of excellence in Civil Engineering by producing high quality human and knowledge recourses to address the current and emerging social and environmental needs.

MISSION

To impart technical education in Civil engineering and related interdisciplinary fields for fulfilling local, national and global economic and social needs in sustainable manner.

To facilitate integrated personality development of students suited for the era of converging technologies and skills.

To create an environment for research into technical pursuits for capacity-enhancement through development of new tools and technologies.

To promote entrepreneurship development in various sectors of Civil Engineering.

To promote industry- academia interaction in the field of Civil engineering.

6.5.1   PRORAMME EDUCATIONAL OBJECTIVES (PEOs)

To impart science based technical education to develop professional skills that will prepare the students for employment in Civil Engineering based industries and organizations.

To develop the design and analytical capability among students so that they can perform tasks with creativity and integrated approach.

To develop communication skills, ethics, professionalism, team-work, leadership qualities, entrepreneurship skills and overall personality of the students.

To create curiosity, desire and ability to undertake research and innovate in civil engineering fields among the students.

6.5.2   PROGRAMME OUTCOMES

An ability to apply knowledge of mathematics, science and engineering

An ability to design and conduct experiments, as well as to analyze and interpret data

An ability to design a system, component, or profess to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety

An ability to function on multi-disciplinary teams

An ability to identify, formulate, and solve engineering problems

An understanding of processional and ethical responsibility

An ability to communicate effectively

The broad education necessary to understand the impact of engineering solutions in a global economic, environmental, and societal context

A recognition of the need for, and an ability to engage in life-long learning

A knowledge of contemporary issues

An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

6.5.3 LABORATORY FACILITIES

The Department is equipped with 10 Labs exclusively for the department, one departmental computer centre, and departmental library, classrooms equipped with modern teaching aids and staff rooms. The laboratories include the Surveying Lab, Geotechnical Lab, Concrete Technology, Pavement lab, Traffic and transportation planning Lab, Water resource Lab, Environmental Lab, Geology and Seismic Lab, Geo-informatics Lab, Computational Lab.

6.5.4 SCOPES

Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including works like bridges, roads, canals, dams, and buildings in both public and private sectors. It focuses on the infrastructure of the world which may include Water works, Sewers, Dams, Power Plants, Transmission Towers/Lines, Railroads, Highways, Bridges, Tunnels, Irrigation Canals, River Navigation, Shipping Canals, Traffic Control, Mass Transit, Airport Runways, Terminals, Industrial Plant Buildings, Skyscrapers, etc. Indian Railways, BEML, NHPC, PWC, NTPC, DVC, ONGC, BHEL, Jaypee, L&T, Reliance Infra Pvt etc. are some of the private and public sector companies recruits Civil engineers.

6.6 MULTIMEDIA COMMUNICATION AND DESIGN

INTRODUCTION

The Department of Multimedia Communication and Design (MCD) is one of the six departments in Central Institute of Technology, Kokrajhar. The department was set up with a vision to create a holistic academic environment and creative contribution to the Society.

Department envisions to enkindle the finest creative minds, a passion for innovation in technology, driven by a firm understanding, appreciation of design.

The department was started in the year 2009. Since its inception the department offers 3 year diploma programme in Animation and Multimedia Technology to prepare students to make a career in the field of Animation and other allied industries. The department has been upgraded in 2015 to widen up its scope and started its Under Graduate Bachelor of Design programme from July 2016. The department currently offers under graduate programme of 4 year / 8 semester Bachelor of Design (B. Des.) in Multimedia Communication and Design and diploma programme of 3 year / 6 semester Diploma in Animation and Multimedia Technology.

The focus of the program is to explore the creative use of technologies to build effective and enjoyable experiences in the field of multimedia communication and design. The programme is designed to meet the growing industry need as well as nurture the students to be an independent creative problem solver to the society.

VISION

Department of Multimedia Communication and Design envisions a holistic academic environment for creative contribution to the Society.

MISSION

To contribute locally and globally in various creative and educational programmes and help the region to excel in the creative field.

The Diploma programme is meant to provide a skill-based curriculum.

The Degree programme is meant to develop Knowledge, Skills, Abilities and Aptitude among students to become creative problem solvers and to bring about innovative ideas in the multimedia communication and design.

To set up itself as one stop solution point to the creative demand of the industry as well as society as a whole.

6.6.1 PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Graduates will be able to engage in ongoing learning and professional development through self-study, continuing education in creative design as well as in other allied fields.

Graduates will able to apply their creative skills, problem solving skills and exhibiting critical thinking in professional practice to tackle social, aesthetic, technical and business challenges.

Graduates will be able to adopt ethical attitude and exhibit effective skills in communication, management, teamwork and leadership qualities.

6.6.2 PROGRAMME OUTCOMES

Apply the fundamental knowledge of design concepts in solving design problems.

Identify and define design problems, conduct design practices and investigate to analyze to arrive at substantial conclusions.

Propose an appropriate solution for design problems complying with functional constraints such as economic, environmental, societal, ethical, safety and sustainability.

Perform investigations, design and conduct practices, analyze and interpret the results to provide valid conclusions.

Demonstrate professional skills and contextual reasoning to assess environmental / societal issues for sustainable development.

Demonstrate Knowledge of professional and ethical practices.

Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary situations.

Communicate effectively among design community, being able to comprehend and write effectively reports, presentation and give / receive clears instructions.

Demonstrate and apply design & management principles in their own / team projects in multidisciplinary environment.

Recognize the need for, and have the ability to engage in independent and lifelong learning.

6.6.3   LABORATORY FACILITIES

The department has a dedicated space for Design Studios/Laboratory in the 1st floor of the academic building-II of the institute. The Multimedia Communication and Design Studios/Laboratory is currently equipped with 80 up-to-date High End Workstations including 10 iMacs for the students to work on 3D Modeling, Texturing, Rigging, Animation, Lighting, Dynamics, Audio and Video Editing with the latest versions of the 3D Software installed and with Internet Connectivity.

2-D LAB (Pre-production)

This lab is well equipped with 10 no's of Light boxes to carry out 2D Classical animation (Cell animation). Also a system to digitize the hand drawn animations is allotted to line test their animations.

3-D LAB-I (Production)

This is where the students start their lab sessions on Flash Animation, Web Design, Photoshop, Modeling, Texturing and Rigging using Autodesk.

MAYA 3-D LAB-II (Post-production)

The students in the Final year work on their post productions in this lab, which is equipped with more advanced hardware capable of running any dynamics or simulation thrown at it. This is where they learn on advanced topics such as animation, texturing, lighting, rendering, compositing, and conduct VFX & simulation experiments.

CHROMA STUDIO

This lab is where the students get to experiment on VFX shots. A green screen stage with lights and up to date cameras enable our students to learn the fundamentals of VFX and composition. It also acts as a room for them to work on their acting and performance.

AUDIO AND VIDEO EDITING LAB

In this lab, the students get to learn Audio & Video editing on a different platform other than Windows. 10 iMac's with Final cut pro enable them to learn about the process of NLE (Non Linear Editing).

6.6.4   SCOPES

The Diploma in Animation and Multimedia at MCD strikes a beautiful balance between technology and art, allowing young artists to understand the nuances of animation. The Diploma graduates with enhanced skills in the areas of animation, image and graphics, text, audio and motion video can find jobs in the animation and entertainment Industry spread all over the country and also in abroad. The students after completion of diploma can opt for

higher studies at CIT Kokrajhar and get direct entry into the 2nd year/3rd Semester of B. Des. Programme through the Vertical Entry scheme of the Institute, provided the candidate fulfils the minimum eligible criteria.

The graduated Students with enhanced knowledge, Abilities, Aptitude and skills in the areas of animation design, graphics design, audio and video and Visual Effects design, Game design, Web and Digital Design have a wide range of career options which a students can choose industry sectors, such as Advertising, Film and VFX, Animation, Gaming, Entertainment, Television, Print production and so on, as well as other industries such as Web development, IT, Mobile phone, Software, Digital media industry and other such engineering and technology areas etc.

The students who wish to be in academic and research field can go for Post Graduate programme and then PhD at various premier institutes spread all over the country as well as abroad.

6.7 ALLIED ENGINEERING BRANCHES

The allied engineering branches include Mechanical and Electrical Engineering. Both the departments have separate and up-to-date laboratory facilities to fulfil the practical skills in the field.

6.8 BASIC SCIENCES

The Department of Basic Sciences includes faculties from Mathematics, Physics and Chemistry. All these departments are fully equipped with laboratories.

6.9 HUMANITIES AND SOCIAL SCIENCES

The Department consists of English, Economics and Sociology. Humanities and Social Sciences is a part and parcel of the curriculum and fulfills the major needs such as Communication Skills, Soft Skills, Knowledge of Entrepreneurship and Universal Human value to name a few amongst the prescribed study topics.

7 ELLIGIBILITY CRITERIA

7.1 DIPLOMA PROGRAMME

Educational Qualifications: Candidates must have passed HSLC or equivalent with 40% of marks in aggregate and 40% of marks in Science, Mathematics (or Advanced Mathematics) and English taken together (5% relaxation for ST/SC/PWD candidates).

Age limit: The age of the candidates as on 01-08-2023 must not exceed the following age limit for different categories- (i) OPEN/OBC-19 years; (ii) SC/ST/PWD-24 years; (iii) Female Candidates-22 years.

7.2   B.TECH. PROGRAMME

EDUCATIONAL QUALIFICATION:

Direct Entry: Passed 10+2 examination with Physics/ Mathematics / Chemistry/ Computer Science/Electronics/Information Technology/ Biology/Informatics Practices/ Biotechnology/ Technical Vocational subject/ Agriculture/ Engineering Graphics/ Business Studies/Entrepreneurship (Any of the three). Obtained at least 45% marks (40% marks in case of candidates belonging to reserved category) in the above subjects taken together.

Vertical Entry: Diploma in the concerned branch of Engineering/Technology from CIT with overall 65% marks (5% relaxation for SC/ST/PWD).

Lateral Entry: Diploma in AICTE recognized related branch of Engineering /Technology with overall 60% marks or equivalent CGPA or B.Sc. (with Mathematics as one of the compulsory subjects) with a minimum of 55% marks or equivalent CGPA (5% relaxation for ST/SC/PWD candidates).

AGE LIMIT

Direct Entry: Candidates must not be above 21 years, or below 17 years of age as on 01- 08-2023. The upper age limit is relaxed to 3 years for SC/ST/PWD.

Lateral Entry: Candidates must not be above 40 years of age as on 01-08-2023 (45 years for SC/ST/PWD and 43 years for OBC and female candidates).

7.3   B.DES. PROGRAMME

EDUCATIONAL QUALIFICATION

Direct Entry: 10+2 (any stream) or equivalent with 45% marks in aggregate (5% relaxation for ST/SC/PWD candidates).

Vertical Entry: Diploma in Animation and Multimedia Technology from CITK with 60% overall marks (5% relaxation for SC/ST/PWD).

AGE LIMIT

Direct Entry: Candidates must not be above 21 years, or below 17 years of age as on 01- 08-2023. The upper age limit is relaxed to 3 years for SC/ST/PWD candidates.

Vertical Entry: Candidates must not be above 40 years of age as on 01-08-2023 (45 years for SC/ST/PWD and 43 years for OBC and female candidates)

8   MEDICAL FITNESS

Admission into any of the diploma/degree programme of the institute is subject to the candidates being declared medically fit by the Institute Medical Officer or a Medical Officer of a Govt. Hospital for the purpose. Candidates should also separately submit an Eye fitness Certificate issued by an Eye specialist.

9 RESERVATION POLICY

In filling up of the available seats, the Institute shall follow the following reservation policy-

- 60% from BTAD (60% ST, 5% SC, 15% OBC and 20% Open)

- 20% from North-East region excluding BTAD.

- 17% from All India excluding North-East Region.

- 03% for person with disability candidates

The reservation policy for serial No.s (ii) (iii) & (iv) will be as per the policy of Government of India. In case the seats as mentioned in (ii), (iii) & (iv) are not filled up by candidates from respective region, the seats will be filled up by candidates from BTAD region.

10 LATERAL ENTRY SEAT DISTRIBUTION SCHEME FOR 2023

REGION	CATEGORY	CSE	ECE	IE	FET	CE	TOTAL
BTAD	ST	4	2	2	2	2	12
	SC	1					1
	OBC	1	1		1		3
	OPEN		1	1	1	1	4
NE	ST					1	1
	SC			1			1
	OBC		1		1		2
	OPEN		1			1	2
AI	ST	1					1
	SC			1			1
	OBC				1	1	2
	OPEN	1		1			2
PWD	OPEN	1					1
Total		9	6	6	6	6	33

11 ADMISSION PROCEDURE

11.1 DIPLOMA

A candidate may seek admission into Diploma programme of CITK either by qualifying the Central Institute of Technology Kokrajhar Entrance Examination (CITKEE) -2023 for Diploma

conducted by CIT Kokrajhar or may request Admission through submission of Qualifying Score of the Polytechnic Admission Test (PAT) - 2023 conducted by State Council for Technical Education (SCTE), Guwahati, Assam. The submission of Score Card of PAT-2023 should be considered within ten days from the declaration of PAT-2023 result or ten days before the declaration of CITKEE-2023 for Diploma whichever is earlier. A maximum of 15% of seats can be filled by the candidates qualifying PAT-2023.

11.2 B.TECH. (DIRECT ENTRY)

A candidate may seek admission into the first semester of B. Tech. programme of CITK either by qualifying the Central Institute of Technology Kokrajhar Entrance Examination (CITKEE) -2023 for B.Tech. (Direct Entry) conducted by CITK or by qualifying the JEE (Mains)-2023 conducted by NTA. **Candidates from BTAD and NE Region applying only through JEE (Mains)-2023 need to submit the Score Card of JEE (Mains)-2023 within ten days from the day of declaration of JEE (Mains)-2023 result**. Candidates from AI Region seeking admission through JEE (Mains)-2023 need to participate in the central counselling conducted by Central Seat Allocation Board (CSAB). Out of the total seats, 60% of seats shall be filled up by the candidates qualifying CITKEE-2023 for B.Tech. (Direct Entry) and remaining 40% of seats shall be filled up by the candidates applying through JEE (Mains)-2023. However, if the seats allocated for admission through JEE (Mains)-2023 are not filled, then those seats will be filled through CITKEE-2023 for b.Tech. (Direct Entry).

11.3 B.TECH. (LATERAL/VERTICAL)

Vertical Entry: Candidates who have passed from CITK in the current year having requisite qualifying marks should submit their application and would be admitted without any entrance examinations.

Lateral Entry: Candidates who have passed Diploma from any AICTE/UGC recognized institutions including CITK may seek admission to 3rd semester of B. Tech. programme under the Lateral Entry scheme by qualifying the Central Institute of Technology Kokrajhar Entrance Exam (CITKEE) -2023 for B.Tech (Lateral Entry).

11.4 B.DES. (DIRECT ENTRY)

A candidate may seek admission into the first semester of B. Des. Programme either by qualifying the Central Institute of Technology Kokrajhar Entrance Exam (CITKEE) -2023 for B.Des. (Direct Entry) conducted by CITK or by qualifying the Undergraduate Common Entrance Examination of Design (UCEED) - 2023 conducted by IIT BOMBAY. Candidates seeking admission only through UCEED also need to submit the scorecard of UCEED-2023 within ten days from the declaration of UCEED result. Out of the total seats, 60% of seats shall be filled up by the candidates qualifying CITKEE-2023 for B.Des. (Direct Entry) and remaining 40% of seats shall be filled up by the candidates applying through UCEED- 2023.

However, if the seats allocated for admission through UCEED-2023 are not filled, then those seats will be filled through CITKEE-2023 for B.Des. (Direct Entry).

11.5   B.DES. (VERTICAL ENTRY)

Candidates who have passed 3 years diploma in Animation and Multimedia Technology from CITK in the current year having requisite qualifying marks should submit their application and would be admitted without any entrance examinations.

N. B.: The Admission Committee shall determine from time to time the percentage of marks/CGPA and other requirements for admission into various courses offered by the institute and are incorporated in the information brochure for admission into different diploma/degree programmers

12   HOW TO APPLY

ONLINE MODE ONLY: Candidates may fill the application form through our online portal by visiting the website: http://admission.cit.ac.in or www.cit.ac.in/admission. Candidates need to print and retain a hard copy of the online application form for own reference.

13   ENTRANCE EXAMINATION FEES

The Application Fee for various Entrances Schemes are as given below-

Programme	Application Form Fee
Diploma	Rs1200/-(600/- for SC/ST/PWD)
B. Tech (Direct/Lateral/Vertical)	Rs1200/-(600/- for SC/ST/PWD)
B. Des (Direct/Vertical)	Rs1200/-(600/- for SC/ST/PWD)
Diploma + B. Tech (Direct)	Rs1800/-(900/- for SC/ST/PWD)
B. Tech (Direct) + B. Des (Direct)	Rs1800/-(900/- for SC/ST/PWD)

14   IMPORTANT INFORMATION

Candidates should not send any photocopy of the certificates except the certificate claiming the reservation category (Caste Certificate/PWD certificate) in case he/she belongs to any.

The appearing/appeared candidates are also eligible to appear in the Entrance Examination provisionally. However, he/she must produce the original certificates at the time of counseling. In case a candidate fails to submit the same or fails to fulfil the eligibility criteria, the candidature will be rejected.

The candidate must select the correct option (wherever applicable) and mention the appropriate Code and Code name for Region of Permanent Residence. The selection list will be

prepared on the basis of region of Permanent Residence and in case the candidate intentionally or unintentionally choose the wrong option, his/her seat may be forfeited during counseling

15   ISSUE OF ADMIT CARD

The admit card will be available for download at least fifteen days ahead of schedule of the Entrance Examination from the CIT admission portal. To download the Admit Card the candidate will have to login with the registered login e-mail ID and password.

16   DATE OF ENTRANCE EXAMINATION

The CITK Entrance Examination-2023 (**CITKEE-2023**) will be conducted as per following schedule-

Entrance Exam	Date	Time
DIPLOMA	18.06.2023	09.00 AM-12.00 PM
B.TECH. (DIRECT)	18.06.2023	01:30 PM–04:30 PM
B.DES. (DIRECT)	18.06.2023	09:00 AM–12:00 PM
B.TECH. (LATERAL)	18.06.2023	01:30 AM–04:30 PM

17   DECLARATION OF RESULT

The Results of the CITK Entrance Examination and the selected list of the eligible candidates for admission will be declared for all on 12th July, 2023 at 5:00 PM. The Results and selected list will be available on the Notice Board of the Institute and the Institute website. The candidates may also log on to CIT website: `admission.cit.ac.in` to check for the result.

N.B.-In case of unavoidable circumstances, the date and time for the declaration of result may be rescheduled

18   SELECTION PROCESS

The selection of aspiring candidates for admission shall be based on their performance in the respective Entrance Examinations. However, the candidates must fulfill the eligibility criteria of essential Educational Qualification and Age Limit. The selection will be based on merit separately for all regions and reservation categories. Candidates who fail to furnish the proofs for their claims in respect of reservation of seat pertaining to region and category shall not be considered.

A merit/ranking list would be prepared based on the performance of the candidates in the Entrance examination separately according to their region and category. The ranking scheme for the qualifying candidates will be as following –

The ranking for CITKEE-2023 (DIPLOMA) will depend on the total marks obtained in the Entrance exam, then in the order of individual marks obtained in Mathematics, Physics, Chemistry, Biology and English, in case the total marks obtained by two or more candidates are same.

The ranking for CITKEE-2023 (B.TECH. (DIRECT)) will depend on the total marks obtained in the Entrance exam, then in the order of individual marks obtained in Mathematics, Physics, Chemistry and English in case the total marks obtained by two or more candidates are same.

The ranking for CITKEE-2023 (B.TECH. (LATERAL)) will depend on the total marks obtained in Paper I and Paper II, then in the order of marks obtained in Paper II and Paper I. Again, for Paper I, the order of preference will be as- Mathematics, Physics, Chemistry and English.

The ranking for CITKEE-2023 (B.DES.(DIRECT)) will depend on the total marks obtained in the Entrance exam, then in the order of individual marks obtained in Mathematics, Physics, Chemistry and English in case the total marks obtained by two or more candidates are same.

For candidates from BTAD or NE region seeking admission through PAT or JEE Mains, the merit list/ranking list will be prepared based on their Scores. The merit list/ranking list will also be based on their region and category.

19 COUNSELLING AND ADMISSION

The tentative schedule of the counselling and admission for various programme is as given below-

1st ROUND Counselling and Admission:	Diploma	July 18, 19, 2023
	B.TECH./B.DES.	July 20, 21, 22, 2023
2nd ROUND Counselling and Admission		Aug 01 – 05, 2023
Special ROUND Counselling and Admission		September 01 – 07, 2023

Qualifying Candidates shall have to participate in the Online Counseling Process as per the schedule as specified for each candidate to be notified along-with the declaration of result. The verification of the certificates/documents in support of the eligibility criteria, age limit and other credentials will be notified after the confirmation of admission.

Candidates selected for admission must have to pay the Admission Fees on the day/within two (2) days from the date of counseling, failing which their seat shall automatically be treated as cancelled.

During counseling, the candidates have to apply for the available branches separately in the Counseling Form which will be made available in the admission portal before the start of counseling. Candidates are advised to fill the counseling form and fill the relevant information before attending for counseling and admission on a notified date. Branches will be allotted by the Chairperson of the Admission Committee on fulfillment of the requisite eligibility criteria.

Discrepancies found in the information furnished in the Counseling Form and that in the Application Form may result in the cancelation of admission.

The presence of the candidate is compulsory during counseling. Under exceptional cases, a parent/guardian may be permitted to attend the counseling process.

All the qualified candidates (i.e., mark those scoring above a minimum cutoff) would be called for counseling. However, all candidates called for counseling are not guaranteed a seat.

The candidates must possess the original and photo copies of all the relevant certificates during the day of verification/counseling. The following is the list of essential certificates/documents

To be submitted during the day of counselling/Admission	Age Proof Certificate
	All mark-sheets
	Category Certificate (SC/ST/OBC/P-WD/EWS)
To be submitted within thirty (30) days from the day of counselling/Admission	Permanent Residential Certificate (PRC)
	Conduct/Character Certificate from the institution last attended.
	Gap Certificate (if applicable)
	Migration Certificate in original
	Anti-ragging affidavit

Permanent Residence Certificate (PRC): All the candidates have to produce a Permanent Residence Certificate (PRC) issued by a competent authority. It is on the basis of this that admission would be granted and placed in the appropriate region which consists of BTAD, NE (Outside BTAD) or All India (Outside BTAD & NE). If discrepancies are found in the region quoted by the candidate in the application form and that furnished in the certificate then the admission will stand cancelled. This certificate is a must and without it admission will not be done.

Caste Certificate: The candidates belonging to Scheduled Tribe (ST), Scheduled Caste (SC) and Other Backward Classes (OBC) must produce a Caste Certificate issued from such a competent authority as District Magistrate, SDO (Civil), etc. This certificate is a must during the counselling and without it admission will not be done.

PWD Certificate: The candidates belonging to this category must submit a certificate issued by Government Medical Officer in support of their claim.

EWS Certificate: Candidates who are not covered under the reservation scheme of SCs, STs and OBCs and identified as belonging to EWS category may submit a certificate issued by the competent Authority in support of their claim.

Certificate: The medical certificate is to be obtained from a govt. medical officer after a general checkup which should state that the candidate is fit to undergo a rigorous technical education and training and that there is no serious illness which would impede the normal attendance and study. A separate medical certificate from an eye specialist is to be obtained who would certify the fitness of the candidate with regards to eye sight.

Gap Certificate: If there is a gap period between the year of passing of qualifying examination and the year of admission then the candidate has to show a Gap Certificate issued by a competent authority in which the candidate was engaged during this period of stay. Such an authority may be the head of an institution if the candidate was doing a course, head of an organization if employed or a court affidavit mentioning the reasons for the gap period.

20   FEE STRUCTURE FOR ADMISSION

The summary of fee structure for fresh admission into various programme of the institute for the current academic year-2023 is as given below:

Programme	Category	Admission Fee	Hostel Admission Fees	Mess Fee (for ONE semester)
DIPLOMA	GE/OBC	19000	8000	12500
	SC/ST/PWD	13000	8000	12500
B. TECH/B. DES (All Entries)	GE/OBC	30500	8000	12500
	SC/ST/PWD	18500	8000	12500
M. TECH/M. DES	GE/OBC	28000	8500	12500
	SC/ST/PWD	20000	8500	12500
PHD	GE/OBC	21500	11000	12500
	SC/ST/PWD	19000	11000	12500

N.B.: The institute reserves the right to review the fee structure from time to time. The detailed breakup of fees structure can be obtained from the institute's website

21   ADMISSION WITHDRAWAL RULE

Withdrawal of Admission is allowed till 30 days from the date of admission. Candidates can withdraw his/her admission from the Institute by submitting an application form available in the CIT admission website. Refund of Fees after deducting processing fees of Rs.2000/-will be refunded after the thorough verification of transaction details. The refund process normally takes 30-45 days from the dateline of Application withdrawal application submission. No request for refund of fees would be entertained thereafter. The details of documents to be submitted along with withdrawal application form is given in the admission web portal.

22   ATTENDANCE IN CLASS AFTER ADMISSION

Attendance on the first day of class of the semester is compulsory. Absence from class

without proper intimation during the first 15 days would be treated as withdrawal of admission and such a student would not be allowed to join the classes.

23   GENERAL ACADEMIC REGULATIONS

23.1   GENERAL CONDUCT & DISCIPLINE

All students must conduct themselves as responsible people (as ladies & gentlemen). Students are not allowed to:

Willfully damage or steal or remove property/belongings of the Institute/Hostel or fellow students.

Indulge in possession, consumption or distribution of alcoholic drinks and drugs.

Take part in noisy and unseemly behavior and disturb the studies of fellow students.

Resort to ragging fresher/fellow students.

Take recourse to unfair means in examinations.

Use Mobile Phones/I-Phones etc. in the academic buildings, library, laboratories & workshops.

23.2   LEAVE OF ABSENCE (DIPLOMA/B.TECH./B.DES.)

All leave applications have to be submitted to the concerned Course Coordinators/HoDs stating fully the reasons and supported with documents. Leave of absence will be accepted only within a week of the student's rejoining of classes after ailments or other granted leaves. If a student will be away from the Institute for more than one week then prior application has to be submitted to the Dean of Academic Affairs through the concerned HoD and such leaves will have to be sanctioned in advance. If a student is absent from the Institute for more than 06 (six) weeks without permission then that will result in his/her name being struck off from the Institute's Rolls. Under no circumstances should a student's attendance fall below 75%. In other words no consideration in attendance will be made once a student's attendance falls below 75% in a subject

23.3   CHANGE OF BRANCH (DIPLOMA/B.TECH./B.DES.)

Depending on the availability of seat, changing of branch in 3rd Semester is allowed based on the performance of the student during the first two semesters.

A maximum of 10% of the total number of seats in a Branch may be offered to applicants for change of branch subject to availability of seats in that branch.

The selection of applicants will be based on merit. Students in Diploma module who secure at least 6.5 CGPA from 1st and 2nd semester are only eligible for branch change. In case of UG module, students who have secured at least 7.0 CGPA from 1st and 2nd semester are only

eligible for branch change. No applicant with back paper(s) will be considered for change of branch.

Students who passed 1st and 2nd semester examinations in one sitting only are eligible for branch change.

However, the students from Animation and Multimedia Technology will not be eligible for change of branch to any other branches.

23.4 RENEWAL REGISTRATION FOR CONTINUING STUDENTS (DIPLOMA/B.TECH./B.DES.)

A student has to register to the next higher semester for continuation of study at the end of every Semester as per the Academic Calendar, failing which, the student will be treated as year drop and he/she will not be allowed to attend the regular classes.

23.5 MEDIUM OF INSTRUCTION

The medium of instruction in class room and laboratory is **English**.

24 HOSTEL ADMISSION AND GENERAL HOSTEL RULES

For hostel Admission, a candidate has to apply separately with Hostel Application Form, issued on the day of counseling to the Member Secretary, Hostel Committee. The selected list will be finalized by 'Hostel Admission Committee' and approved by 'The Head of Institution'. **All the admitted candidates to the hostels have to furnish an undertaking of not resorting to ragging in the hostels and the Institute**. A student must remember that the hostel is the home of the students in the Campus and so is expected to behave in such a manner as to bring credit to oneself and to the Institution.

The following rules have to be followed by all students residing in the hostels and institute campus as a whole. Violation of hostel rules will make students liable for disciplinary actions including expulsion from the hostel/institute.

Each student must occupy the room allotted to him/her for the session by the warden and no change of room shall be made without his/her permission.

No student shall keep any unauthorized person in his/her room.

In the event of mischief/foul play or accident etc. the warden can break open the room for investigation.

Whenever the student proposes to leave the station or to remain outside the hostel for the night, he/she should obtain prior permission of the warden.

No female visitor is allowed to enter the boys' hostel and male visitor in girls' hostel without the written permission of the respective warden.

Students are forbidden to utilize the hostel staff as privates or abuse them in any way.

Electric stoves, room heaters or other electric appliances are not allowed in the hostel. Strictly forbidden in the hostel are:

- Possession or use of alcoholic beverages.

- *Possession or use of addictive or hallucinogenic drugs.

- *Possession or use of firearms/explosives or any lethal weapons.

- *Gambling

- *Playing cards

- *Loitering around unnecessarily

Ragging in any form is strictly prohibited in the hostel room and compound. Ragging is a symbol of immaturity. To eliminate such incidents students of the first year are urged not to visit other hostels without the Warden's permission.

Cleanliness of the rooms is to be maintained by the student himself.

Hostel students are not allowed to use motorized vehicles inside the Campus.

Students should carry their Identity Card all the time and produce the same whenever demanded by the authority.

Parents are especially requested to guide their ward so that their ward doesn't indulge in any physical violence.

Any point/issue not covered by these rules shall be decided by the Director.

All the students admitted into the hostels have to submit an anti-ragging affidavit within one month from the date of hostel admission.

25   ANTI-RAGGING

Ragging in any form is banned in CIT and any one indulging in ragging during the entire period of his/her study in CIT is likely to be punished appropriately which may include expulsion from the Institute, suspension from the Institute or classes for a limited period, or fined with a public apology. The punishment may also take the shape of:

1. Withholding Results

2. Withholding Scholarships or other benefits

Suspension or expulsion from the Hostel or Mess or Collective Punishment if the individual committing or abetting ragging is not identified, and/or an entry in the conduct certificate mentioning the act of ragging indulged in by the students concerned.

Admitted students shall have to submit an affidavit on a non-judicial stamp paper duly notarized by the Oath Commissioner by the student and the parent/guardian separately in a format that is available in the website http://www.

26 FORMAT AND SYLLABI FOR CITK ENTRANCE EXAMINATION (CITKEE-2023)

26.1 Diploma

The Central Institute of Technology Entrance Examination (CITKEE)-2023 for Diploma will be conducted in three hours of duration with a total of 150 marks. The question paper will consist of five (5) sections: A, B, C, D & E. Section-A consists of twenty five questions in Physics carrying one mark each, Section-B of twenty five questions in Chemistry carrying one mark each, Section-C of twenty five questions in Biology carrying one mark each, Section-D of fifty questions in Mathematics carrying one & two marks & Section-E twenty five questions in English carrying one mark each. The questions will be multiple choices with four options of answers.

26.1.1 SECTION-A PHYSICS 25 - MARKS

Units and Measurement of Physical Quantities: Fundamental and Derived units, System of Units, Accuracy of measurement, measuring instruments.

Force and Motion: Uniform and non-uniform motion, Scalar and vector quantities, Graphical representation, Vector addition and subtraction, Speed and velocity, Distance-time, speed-time and velocity-time graph, Uniform acceleration, Equations of motions and their applications, Force and acceleration , Newton's laws of motion, mass and inertia, Concept of momentum, relation between force and momentum.

Gravitation: The universal laws of gravitation, Newton's third law and gravitation, acceleration due to gravity, Concept of mass and weight, Laws of freely falling bodies under gravity, centre of gravity and its determination for a regular body.

Vibration and Waves: Elementary ideas of periodic and simple harmonic motion, time-period and frequency of the simple harmonic motion, Simple pendulum and restoring force, Graphical representation of waves, Wavelength, frequency and velocity of the waves, Longitudinal and transverse waves, Sound waves, Application of ultra sound waves.

Work, Power and Energy: Work done by a constant force, Kinetic and potential energy, Power and its units.

Heat and thermometry: Concept of temperature, measurement of temperature using thermometer, Fahrenheit and Celsius scales of temperature, Heat energy, specific heat, mechanical equivalent of heat, Change of state and concept of latent heat, Humidity of air.

Magnetism: magnet and its property, poles of a magnet, magnetic lines of force, different kinds of magnet, Magnetic domains.

Light: Laws of reflection and refraction, reflection and refraction of light at plane and curved surfaces, spherical mirrors, Refraction by spherical lenses, Ray diagram for locating images by lenses and mirrors, Lens and mirror formula and their uses, Linear magnification , Human eye and defects of vision.

Basic Electricity: Charges, Electric lines of force, potential due to a charge, Motion of charges and electric current, Ohm's law, Series and parallel combination of resistances, Electric current and transfer of energy, Electromagnetism and effect of current, Elementary ideas of electromagnetic induction, Electric motor, Generation and domestic uses of electricity.

Solar system and the Universe: Stars and galaxy, the sun and the solar system, planets and their motion, the origin of the universe, Artificial Satellites.

Nuclear Energy: Concept of nucleus of an atom, nuclear fission and fusion, Nuclear reactor.

26.1.2 SECTION-B CHEMISTRY 25 - MARKS

Atomic structure: Dalton's atomic theory, elements, compounds, cathode ray, X-ray, radio-active radiations, Rutherford model of atomic structure, Bohr's model of atomic structure and electronic configurations, Electronic configuration of the elements up to Atomic No. 18, Radioactivity and properties of , and rays, Radio-isotopes and their uses, Nuclear fission and fusion reactions.

Classification of Elements: Mendeleev and modern periodic table, Electronic configuration of each group, periodic trend of metallic and non-metallic character, atomic size, nature of bonding, ionization potential and electron affinity, prediction of properties of an element and their compounds.

Chemical bonding: Octet rule and inert gas configuration as criteria of stability, ions, atoms and valency, Ionic bonds , covalent bonds (in simple cases), shape of molecules of H_2O, NH_3, CH_4, CCl_4, C_2H_4, SF_6, PCl_5.

Chemical reactions: Decomposition, displacement reactions, Isomerization reaction, combination reactions, chemical formula and equations, Atomic and molecular masses, Mole concept, gram atomic mass, Determination of formula of unknown compounds and balancing of equations.

Energetic: Bond energy, Energy involved in a reaction, Photo-chemical reactions and generation of free radicals, Electrolysis of water and NaCl, Electrochemical cells (Galvanic cell), Dry cells, Storage cells, metallic corrosion.

Metals: Physical and chemical properties, Metal reaction with O_2 , dil acid, Cl_2, Electrochemical series and displacement of metals from the solutions, Elementary metallurgy of Fe, Al and uses of metals, Washing soda, Baking soda , lime, preparation of Bleaching Powder, Plaster of Paris. Non-metals: Physical and chemical properties, reaction with O_2, acid, Cl_2, H_2,Manufacture of NH_3 and its reaction with O_2, HCl & CuO, Extraction of Sulpur and its reaction with O_2, conc.HNO_3 and conc.H_2HO_4, Carbon and its compounds, Allotrophes of carbon, hydrocarbon, alkanes, isomerism in alkanes, Petroleum, Preparation and properties of

CH3OH, C2H2OH, general methods of preparation, properties of organic acids-COOH group, esters, Nylon, Polyester, Rubber, Soap, detergents, Biomass as fuel, fossil fuel, coal, petroleum, Natural gas, classification of fuels, Calorific value of fuel, Ignition of temperature, combustion of fuel, Ideal fuel. Coal deposits on earth, constituents of lithosphere, Greenhouse effect, Oceans, composition and its important function.

Practical: Carbon, Nitrogen and O_2 cycles on earth, Solubility and saturated solutions, solutions and suspension, distillation, hard and soft water, To show the presence of CO_2, water vapor and dust particle in atmosphere, To identify the combustion product of fuels(CO_2 and H_2O only), condition of rusting, effect of heating on Sulphur, Primary air pollutant, Solubility of ionic and covalent compounds in any given solvent, electrical conductivity of ionic and covalent compounds, Determination of m.p., b.p. of ionic and covalent compounds, Heat change during melting of solid or freezing of liquids. Physical change and chemical changes, (Fe+S mixing and heating), Heat of reaction and Heat of dissolution, Construction of Voltaic cells, Relationship between current, time and metal deposited during electrolysis of copper.

26.1.3 SECTION-C BIOLOGY 25-MARKS

Ways of living Habitats: Living places and programme, the habitat, Micro-habitats, Interdependence, Land, Water and Air as habitats, Adaptation, Terrestrial and Aquatic habitats, Adaptation in plants and animals.

Organization in the living world: Level of organization, species and population, General basis of organization, Discovery of Cell, Cell Theory, Prokaryotic and Eukaryotic cell, Ultra-structure of cell, Cell organelles and their function, Cell Division, Amitosis, mitosis and meiosis, linkages and crossing over and its importance, mutation, Genetic Disorders.

Life Process-I: Nutrition: autotrophic, heterotrophic, mode of nutrition, Photosynthesis, Respiration, Transpiration, Transport of materials, Essential elements and its deficiency symptoms, Blood circulation, Lymph, Excretion, Chemosynthesis, Plant growth and Movement.

Life Process-II: Reproduction: asexual and sexual, Control and Coordination, Chemical coordination in plant and animals, the nervous systems, Pollination and fertilization in flowering plants, fertilization, embryo development, Development of seeds and fruits.

Human Beings: Structure of human body, Digestion and absorption, Breathing and respiration, Body fluids and circulation, excretory products and elimination, Locomotion and movement, Control and coordination, Impact of human on environment.

Nutrition: Energy requirement of the body, Balance diet, Components of our food, Deficiency diseases, Factors leading to deficiency in nutrition, Excessive intake of food.

Food Production: Agriculture task in food production, Food production trends in our country, Food derived from animals, Trends in food production from animals, Animal husbandry, fish as a source of animal food.

Health: Community and personal health, Factors affecting health, Food poisoning, Organic or metabolic diseases, Pollution related diseases, Diseases related to habitat forming substances, Preventive measures, Reproductive health, birth control, contraception and sexually transmitted diseases, Health education, Health and development.

Biosphere: Structure and function of ecosystem and biosphere, Food chain, Food web, Flow of energy, Cycling of material, Ecological succession, Natural Resources and their conservation, Environmental pollutions, global Environmental changes, Biotic Resources, Environmental ethics and legislation, Botanical garden and herbaria, Zoological parks and Museum.

Man and his environment: Human activity, Abiotic and biotic component of environment, Interrelationship between man and his environment, Natural resources, Overexploitation, conservation , management and replenishment, Industrialization, Recycling of waste materials.

26.1.4 SECTION-D MATHEMATICS-50 MARKS

Algebra: Sets, their representation and notation, equivalent and equal sets, Finite and infinite sets, Subset, Null set, universal set of a set, Venn Diagrams, set theory operations and their algebra(union, intersection and complement).

Natural numbers, Integers, Rational and Irrational numbers, Surds (Quadratic surds only) Polynomials and their operations, factorization of polynomials, First Degree equations and in- equations and their solutions including graphical solution for two variables, Solutions of simultaneous equations, Rational expressions, Quadratic equations and their solutions, Laws of indices, logarithms, Arithmetic progression(A.P.), Generation of an A.P., Sum of n terms of an AP and simple problems.

Geometry: Point, Line, Collinear Points, Intersecting and non-intersecting lines in a plane, Family of lines Triangles, Congruence Relation in the Set of all triangles; Basic proportionality theorem, Parallelogram & their properties, Pythagoras' theorem and its converse. The concept of a circle as a set of points in a plane, Interior and exterior of a circle. Diameter and circumference of a circle. Arc and sector of a circle. Chord and segment of a circle. Cyclic Quadrilateral. Secant and tangent of a circle. Family of concentric circles. Family of circles through a given point, con cyclic points, circles and common tangent. Direct and transverse common tangents.

Co-ordinate Geometry: Distance between two points, Section formula, Problems related with mid-point & Centroid of triangles.

Trigonometry : Trigonometrical ratios sin x, cos x, tan x, Cot x , cosec x , for $0°$ $30°$, $45°$, $60°$, $90°$. Simple trigonometrical identities, Trigonometrical ratios of complementary angles. Problems on height and distances (Problems should not involve more than two right triangles).

Mensuration: Concept of perimeter, Area of triangle, square, rectangle, rhombus, trapezium, parallelogram, quadrilateral, circle and circular ring. Volume of cure, Problems on finding volumes and surface areas of combinations of right circular cone, right cylinder, hemisphere & sphere, conversion of solids (not more than two solids).

Statistics & Statistical Data: Introduction of Statistics, Primary & Secondary data, Raw/Ungrouped and grouped data (in case of raw data, the number of observations should not exceed 30). Frequency Table: Class marks, Class intervals, frequency, frequency table, cumulative frequency, cumulative frequency table (in grouped data only equal intervals should be taken).

Measures of Central Tendency: Mean of raw and ungrouped data, Median and Mode of raw data, Properties of mean, median & mode and their significance, relation of mean median & mode.

26.1.5 SECTION-D ENGLISH COMMUNICATION-25 MARKS

GRAMMAR: The Sentences: Types, Question Tags/Tags Questions, Nouns, Use of Tenses, Non Finite Verbs, The Agreement of verbs with subjects, Adverbs- Position and its Special Use, Comparisons, Prepositions, Co-ordinations and Sub-ordination, Conditionals, Transformation of Sentences, Voice-Active and Passive, Joining of Sentences (Synthesis), Direct and Indirect Speech, The Sequence of Tenses, The Same Word used as Different parts of Speech, Punctuation and Capital Letters.

Vocabulary and Usage: Diminitives, Synonyms, Antonyms, One Word Substitutes, Making Verbs from Nouns and Adjectives, Making Adjectives from Nouns, Making Nouns from verbs, Words followed by Appropriate Prepositions, Proverbs, Verbal Phrases, Miscellaneous Idiomatic expressions, Legal terms, terms used in technology, Words Often Confused/Misused, Common Errors.

Comprehension

26.2 Diploma: Animation and Multimedia

Marks Breakup of Question Paper
NOTE:

For Part – A, conventional MCQ type question will be asked and evaluated through computer. For Part – B, drawing based evaluation test will conducted by providing drawing paper with a detailed question paper. Evaluation will done through manual mode.

Complete syllabus:

The Central Institute of Technology Kokrajhar Entrance Examination (CITKEE-2023) for Diploma in AMT Admission will be conducted in a duration of Three (03) hours with a total of 150 marks. The question paper will consist of two (2) parts: PART - A PART - B. The question papers will carry 100+4 questions in total.

PART - A comprises of four (4) sections with total of 100 questions. All questions are objective type and of multiple choices with four (4) options of answers. Below are the details of all the Sections.

Section-1: General Knowledge. Questions will come from - basic general knowledge, current affairs, basic history knowledge, sports, music, art entertainment, etc.

Section-2: English Communication. Questions will come from - Word Formation, Vocabulary extension. Elements of Grammar: Sentence elements, parts of speech, static and dynamic, Preforms, question and negation, tag question. Verbs and the verb phrases, appropriate preposition. Articles and determiners, Revision of Present, Past and future tenses, Punctuations, Types of sentences, Structure of sentences, word order.

Section-3: Computer Fundamentals. Questions will come from - basic computer knowledge, computer parts, functions, input-output devices, basic MS office, typing, printing etc.

Section-4: Creative Ability. Questions will come from – simple puzzles, image/symbol identification, basic general knowledge of art, design and creative field etc.

All questions carry equal marks of one (1) and total is Hundred (100).

Question Specific instruction:					
Part	**Contents**	**# of Qs**	**Marks**	**Total Marks**	Remarks
Part-A	General knowledge	30	Each question will carry one (1) mark. 1 x 100 = 100	100	Evaluation through computer.
	Computer fundamentals	15			
	English communication	15			
	Culture and Creativity ability	40			
Part-B	1 each Question on Drawing skill = 15 marks creative ability test = 15 marks analytics = 10 marks creative explanation = 10 marks	4	2 questions with 15 marks each And 2 questions with 10 marks each	50	**IMP
			Total marks	150	

Table 1: Marks Breakup of Question Paper.

**IMP: Evaluation will be based on overall concept, approach to the question, meaningfulness, drawing skill, Identification of the unique problems or solving, Quality of presentation or detailing and appeal. Candidates also need to explain/express the idea behind the concept drawings they made in clear language.

NOTE: There is no negative marking.

PART - B comprises of two (2) sections with total of 04 questions:

SECTION-1 will have questions related to these topics: Drawing skill based: A basic illustration will be shown in the question which need to be drawn in a space given on the answer paper. Evaluation will be done based on drawing skill and quality of the illustration.

Creative ability based: Guidelines or reference lines of certain objects will be given which need to be complete creatively by drawing around the lines.

Section – 2: will have questions related to these topics: Analytical question: Theme of a subject line will be given based on which an illustration needs to be made fulfilling the subject line.

Creative explanation based: A short story board will be shown which should be written based understanding.

26.3   B. Tech (Direct Entry)

The Central Institute of Technology Kokrajhar Entrance Examination (CITKEE)-2023 for B.Tech Direct Entry will be conducted in a duration of three hours with a total of 125 marks. The question paper will consist of four (4) sections: A, B, C & D. Section A consists of twenty-five questions in Physics carrying one mark each, Section B consists of twenty-five questions in Chemistry carrying one mark each, Section C consists of twenty-five questions in English carrying one mark each and Section D consists of fifty questions in Mathematics carrying one

or two marks each. The questions will be of multiple choices with four options of answers.

26.3.1 SECTION-A PHYSICS-25 MARKS

UNIT-1: Units and Measurement

Physics, technology and society, SI units, Fundamental and derived units. Least count, accuracy and precision of measuring instruments, Errors in measurement, Significant figures. Dimensions of Physical quantities, dimensional analysis and its applications.

UNIT-2: Kinematics

Frame of reference. Motion in a straight line: Position-time graph, speed and velocity. Uniform and non-uniform motion, average speed and instantaneous velocity uniformly accelerated motion, velocity-time, position- time graphs, and relations for uniformly accelerated motion. Scalars and Vectors, Vector addition and Subtraction, Zero Vector, Scalar and Vector products, Unit Vector, Resolution of a Vector. Relative Velocity, Motion in a plane, Projectile Motion, Uniform Circular Motion.

UNIT-3: Laws of Motion

Force and Inertia, Newton's First Law of motion; Momentum, Newton's Second Law of motion; Impulse; Newton's Third Law of motion. Law of conservation of linear momentum and its applications, Equilibrium of concurrent forces.

Static and Kinetic friction, laws of friction, rolling friction. Dynamics of uniform circular motion: Centripetal force and its applications

UNIT-4: Work, Energy and Power

Work done by a constant force and a variable force; kinetic and potential energies, work energy theorem, power. Potential energy of a spring, conservation of mechanical energy, conservative and non-conservative forces; Elastic and inelastic collisions in one and two dimensions.

UNIT-5: Rotational Motion

Centre of mass of a two-particle system, Centre of mass of a rigid body; Basic concepts of rotational motion; moment of a force, torque, angular momentum, conservation of angular momentum and its applications; moment of inertia, radius of gyration. Values of moments of inertia for simple geometrical objects, parallel and perpendicular axes theorems and their applications. Rigid body rotation, equations of rotational motion.

UNIT-6: Gravitation

The universal law of gravitation. Acceleration due to gravity and its variation with altitude and depth. Kepler's laws of planetary motion. Gravitational potential energy; gravitational potential. Escape velocity. Orbital velocity of a satellite. Geo-stationary satellites.

UNIT-7: Properties of Solids and Liquids

Elastic behaviour, Stress-strain relationship, Hooke's Law, Young's modulus, bulk modulus, modulus of rigidity. Pressure due to a fluid column; Pascal's law and its applications. Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, Reynolds number. Bernoulli's principle and its applications. Surface energy and surface tension, angle of contact, application of surface tension - drops, bubbles and capillary rise. Heat, temperature, thermal expansion;

specific heat capacity, calorimetry; change of state, latent heat. Heat transfer- conduction, convection and radiation, Newton's law of cooling.

UNIT-8: Thermodynamics

Thermal equilibrium, zeroth law of thermodynamics, concept of temperature. Heat, work and internal energy. First law of thermodynamics. Second law of thermodynamics: reversible and irreversible processes. Carnot engine and its efficiency.

UNIT-9: Kinetic Theory of Gases

Equation of state of a perfect gas, work done on compressing a gas. Kinetic theory of gases - assumptions, concept of pressure. Kinetic energy and temperature: rms speed of gas molecules; Degrees of freedom, Law of equipartition of energy, applications to specific heat capacities of gases; Mean free path, Avogadro's number.

UNIT-10: Oscillation and Waves

Periodic motion - period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (S.H.M.) and its equation; phase; oscillations of a spring -restoring force and force constant; energy in S.H.M. - kinetic and potential energies; Simple pendulum - derivation of expression for its time period; Free, forced and damped oscillations, resonance.

Wave motion. Longitudinal and transverse waves, speed of a wave. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves, Standing waves in strings and organ pipes, fundamental mode and harmonics, Beats, Doppler's effect in sound.

UNIT-11: Electrostatics

Electric charges: Conservation of charge, Coulomb's law-forces between two point charges, forces between multiple charges; superposition principle and continuous charge distribution.

Electric field: Electric field due to a point charge, Electric field lines, Electric dipole, Electric field due to a dipole, Torque on a dipole in a uniform electric field

Electric flux, Gauss's law and its applications to find field due to infinitely long uniformly charged straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell. Electric potential and its calculation for a point charge, electric dipole and system of charges; Equipotential surfaces, Electrical potential energy of a system of two point charges in an electrostatic field.

Conductors and insulators, Dielectrics and electric polarization, capacitor, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, Energy stored in a capacitor.

UNIT-12: Current Electricity

Electric current, Drift velocity, Ohm's law, Electrical resistance, Resistances of different materials, V-I characteristics of Ohmic and non-ohmic conductors, Electrical energy and power, Electrical resistivity, Colour code for resistors; Series and parallel combinations of resistors; Temperature dependence of resistance.

Electric Cell and its internal resistance, potential difference and emf of a cell, combination of cells in series and in parallel. Kirchhoff's laws and their applications. Wheatstone bridge, Metrebridge. Potentiometer - principle and its application.

UNIT-13: Magnetic Effects of Current and Magnetism

Biot-Savart law and its application to current carrying circular loop. Ampere's law and its applications to infinitely long current carrying straight wire and solenoid. Force on a moving charge in uniform magnetic and electric fields. Cyclotron.

Force on a current-carrying conductor in a uniform magnetic field. Force between two parallel current-carrying conductors-definition of ampere. Torque experienced by a current loop in uniform magnetic field; Moving coil galvanometer, its current sensitivity and conversion to ammeter and voltmeter.

Current loop as a magnetic dipole and its magnetic dipole moment. Bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements. Para-, dia- and ferro- magnetic substances.

Magnetic susceptibility and permeability, Hysteresis, Electromagnets and permanent **magnets.**

UNIT-14: Electromagnetic Induction and Alternating Currents

Electromagnetic induction; Faraday's law, induced emf and current; Lenz's Law, Eddy currents. Self and mutual inductance. Alternating currents, peak and rms value of alternating current/ voltage; reactance and impedance; LCR series circuit, resonance; Quality factor, power in AC circuits, wattless current. AC generator and transformer.

UNIT-15: Electromagnetic Waves

Electromagnetic waves and their characteristics. Transverse nature of electromagnetic waves. Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays). Applications of e.m. waves.

UNIT-16: Optics

Reflection and refraction of light at plane and spherical surfaces, mirror formula, Total internal reflection and its applications, Deviation and Dispersion of light by a prism, Lens Formula, Magnification, Power of a Lens, Combination of thin lenses in contact, Microscope and Astronomical Telescope (reflecting and refracting) and their magnifying powers.

Wave optics: wavefront and Huygens' Principle, Laws of reflection and refraction using Huygens'principle. Interference, Young's double slit experiment and expression for fringe width, coherent sources and sustained interference of light. Diffraction due to a single slit, width of central maximum. Resolving power of microscopes and astronomical telescopes, Polarisation, plane polarized light; Brewster's law, uses of plane polarized light and Polaroids.

UNIT-17: Dual Nature of Matter and Radiation

Dual nature of radiation. Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation; particle nature of light. Matter waves-wave nature of particle, de Broglie relation. Davisson-Gerner experiment.

UNIT-18: Atoms and Nuclei

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum. Composition and size of nucleus, atomic masses, isotopes, isobars; isotones. Radioactivity-alpha, beta and gamma particles/rays and their properties; radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number, nuclear fission and fusion.

UNIT-19: Electronics Devices

Semiconductors; semiconductor diode: I-V characteristics in forward and reverse bias; diode as a rectifier; I-V characteristics of LED, photodiode, solar cell and Zener diode; Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor; transistor as an amplifier (common emitter configuration) and oscillator. Logic gates (OR, AND, NOT, NAND and NOR). Transistor as a switch.

UNIT-20: Communication Systems

Propagation of electromagnetic waves in the atmosphere; Sky and space wave propagation, Need for modulation, Amplitude and Frequency Modulation, Bandwidth of signals, Bandwidth of Transmission medium, Basic Elements of a Communication System (Block Diagram only).

UNIT-21: Experimental Skills

Familiarity with the basic approach and observations of the experiments and activities:

Vernier callipers-its use to measure internal and external diameter and depth of a vessel.

Screw gauge-its use to determine thickness/diameter of thin sheet/wire.

Simple Pendulum-dissipation of energy by plotting a graph between square of amplitude and time.

Metre Scale - mass of a given object by principle of moments.

Young's modulus of elasticity of the material of a metallic wire.

Surface tension of water by capillary rise and effect of detergents

Co-efficient of Viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body

Plotting a cooling curve for the relationship between the temperature of a hot body and time.

Speed of sound in air at room temperature using a resonance tube.

Specific heat capacity of a given (a)solid and (b) liquid by method of mixtures.

Resistivity of the material of a given wire using metre bridge.

Resistance of a given wire using Ohm's law.

Potentiometer –(a) Comparison of emf of two primary cells. (b) Determination of internal resistance of a cell.

Resistance and figure of merit of a galvanometer by half deflection method.

Focal length of: (a) Convex mirror (b) Concave mirror, and (c) Convex lens.

Using parallax method plot angle of deviation vs angle of incidence for a triangular prism.

Refractive index of a glass slab using a travelling microscope.

Characteristic curves of a p-n junction diode in forward and reverse bias.

Characteristic curves of a Zener diode and finding reverse break down voltage.

Characteristic curves of a transistor and finding current gain and voltage gain.

Identification of Diode, LED, Transistor, IC, Resistor, Capacitor from mixed collection of such items.

Using multimeter to: (a) Identify base of a transistor (b) Distinguish between npn and pnp type transistor (c) See the unidirectional flow of current in case of a diode and an LED. (d)

Check the correctness or otherwise of a given electronic component (diode, transistor or IC).

26.3.2   SECTION-B CHEMISTRY-25 MARKS

UNIT 1: Some basic concepts in Chemistry
Matter and its nature, Dalton's atomic theory; Concept of atom, molecule, element and compound; Physical quantities and their measurements in Chemistry, precision and accuracy, significant figures, S.I. Units, dimensional analysis; Laws of chemical combination; Atomic and molecular masses, mole concept, molar mass, percentage composition, empirical and molecular formulae; Chemical equations and stoichiometry.

UNIT-2: States of Matter
Classification of matter into solid, liquid and gaseous states.

Gaseous State: Measurable properties of gases; Gas laws - Boyle's law, Charle's law, Graham's law of diffusion, Avogadro's law, Dalton's law of partial pressure; Concept of Absolute scale of temperature; Ideal gas equation, Kinetic theory of gases (only postulates); Concept of average, root mean square and most probable velocities; Real gases, deviation from Ideal behaviour, compressibility factor, van der Waals equation, liquefaction of gases, critical constants.

Liquid State: Properties of liquids - vapour pressure, viscosity and surface tension and effect of temperature on them (qualitative treatment only).

Solid State: Classification of solids: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea); Bragg's Law and its applications; Unit cell and lattices, packing in solids (fcc, bcc and hcp lattices), voids, calculations involving unit cell parameters, imperfection in solids; Electrical, magnetic and dielectric properties.

UNIT-3: Atomic Structure
Discovery of sub-atomic particles (electron, proton and neutron); Thomson and Rutherford atomic models and their limitations; Nature of electromagnetic radiation, photoelectric effect; Spectrum of hydrogen atom, Bohr model of hydrogen atom - its postulates, derivation of the relations for energy of the electron and radii of the different orbits, limitations of Bohr's model; Dual nature of matter, de-Broglie's relationship, Heisenberg uncertainty principle. Elementary ideas of quantum mechanics, quantum mechanical model of atom, its important features, *
and *2, concept of atomic orbitals as one electron wave functions; Variation of * and * 2 with r for 1s and 2s orbitals; various quantum numbers (principal, angular momentum and magnetic quantum numbers) and their significance; shapes of s, p and d - orbitals, electron spin and spin quantum number; Rules for filling electrons in orbitals – Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of elements, extra stability of half-filled and completely filled orbitals.

UNIT-4: Chemical Bonding and Molecular Structure
Kossel - Lewis approach to chemical bond formation, concept of ionic and covalent bonds. Ionic Bonding: Formation of ionic bonds, factors affecting the formation of ionic bonds; calculation of lattice enthalpy.

Covalent Bonding: Concept of electronegativity, Fajan's rule, dipole moment; Valence Shell Electron Pair Repulsion (VSEPR) theory and shapes of simple molecules.

Quantum mechanical approach to covalent bonding: Valence bond theory - Its important features, concept of hybridization involving s, p and d orbitals; Resonance.

Molecular Orbital Theory - Its important features, LCAOs, types of molecular orbitals (bonding, antibonding), sigma and pi-bonds, molecular orbital electronic configurations of homonuclear diatomic molecules, concept of bond order, bond length and bond energy.

Elementary idea of metallic bonding. Hydrogen bonding and its applications

UNIT-5: Chemical Thermodynamics

Fundamentals of thermodynamics: System and surroundings, extensive and intensive properties, state functions, types of processes.

First law of thermodynamics - Concept of work, heat internal energy and enthalpy, heat capacity, molar heat capacity; Hess's law of constant heat summation; Enthalpies of bond dissociation, combustion, formation, atomization, sublimation, phase transition, hydration, ionization and solution.

Second law of thermodynamics- Spontaneity of processes; DS of the universe and DG of the system as criteria for spontaneity, DGo (Standard Gibbs energy change) and equilibrium constant.

UNIT-6: Solutions

Different methods for expressing concentration of solution - molality, molarity, mole fraction, percentage (by volume and mass both), vapour pressure of solutions and Raoult's Law - Ideal and non-ideal solutions, vapour pressure - composition, plots for ideal and non-ideal solutions; Colligative properties of dilute solutions - relative lowering of vapour pressure, depression of freezing point, elevation of boiling point and osmotic pressure; Determination of molecular mass using colligative properties; Abnormal value of molar mass, van't Hoff factor and its significance.

UNIT-7: Equilibrium

Meaning of equilibrium, concept of dynamic equilibrium.

Equilibria involving physical processes: Solid -liquid, liquid - gas and solid - gas equilibria, Henry's law, general characterics of equilibrium involving physical processes.

Equilibria involving chemical processes: Law of chemical equilibrium, equilibrium constants (Kp and Kc) and their significance, significance of DG and DGo in chemical equilibria, factors affecting equilibrium concentration, pressure, temperature, effect of catalyst; Le Chatelier's principle.

Ionic equilibrium: Weak and strong electrolytes, ionization of electrolytes, various concepts of acids and bases (Arrhenius, Brensted - Lowry and Lewis) and their ionization, acid - base equilibria (including multistage ionization) and ionization constants, ionization of water, pH scale, common ion effect, hydrolysis of salts and pH of their solutions, solubility of sparingly soluble salts and solubility products, buffer solutions

UNIT-8: Redox Reactions and Electrochemistry

Electronic concepts of oxidation and reduction, redox reactions, oxidation number, rules for assigning oxidation number, balancing of redox reactions. Electrolytic and metallic conduction, conductance in electrolytic solutions, specific and molar conductivities and their variation with

concentration: Kohlrausch's law and its applications. Electrochemical cells - Electrolytic and Galvanic cells, different types of electrodes, electrode potentials including standard electrode potential, half - cell and cell reactions, emf of a Galvanic cell and its measurement; Nernst equation and its applications; Relationship between cell potential and Gibbs' energy change; Dry cell and lead accumulator; Fuel cells; Corrosion and its prevention.

UNIT-9: Chemical Kinematics

Rate of a chemical reaction, factors affecting the rate of reactions: concentration, temperature, pressure and catalyst; elementary and complex reactions, order and molecularity of reactions, rate law, rate constant and its units, differential and integral forms of zero and first order reactions, their characteristics and half - lives, effect of temperature on rate of reactions - Arrhenius theory, activation energy and its calculation, collision theory of bimolecular gaseous reactions (no derivation).

UNIT-10: Surface Chemistry

Adsorption- Physisorption and chemisorption and their characteristics, factors affecting adsorption of gases on solids - Freundlich and Langmuir adsorption isotherms, adsorption from solutions.

Catalysis - Homogeneous and heterogeneous, activity and selectivity of solid catalysts, enzyme catalysis and its mechanism.

Colloidal state - distinction among true solutions, colloids and suspensions, classification of colloids - lyophilic, lyophobic; multi molecular, macromolecular and associated colloids (micelles), preparation and properties of colloids - Tyndall effect, Brownian movement, electrophoresis, dialysis, coagulation and flocculation; Emulsions and their characteristics

UNIT-11: Classification of Elements and Periodicity in Properties

Modem periodic law and present form of the periodic table, s, p, d and f block elements, periodic trends in properties of elements atomic and ionic radii, ionization enthalpy, electron gain enthalpy, valence, oxidation states and chemical reactivity

UNIT-12: General Principles and Processes of Isolation of Metals.

Modes of occurrence of elements in nature, minerals, ores; steps involved in the extraction of metals - concentration, reduction (chemical. and electrolytic methods) and refining with special reference to the extraction of Al, Cu, Zn and Fe; Thermodynamic and electrochemical principles involved in the extraction of metals.

UNIT-13: Hydrogen

Position of hydrogen in periodic table, isotopes, preparation, properties and uses of hydrogen; Physical and chemical properties of water and heavy water; Structure, preparation, reactions and uses of hydrogen peroxide; Classification of hydrides - ionic, covalent and interstitial; Hydrogen as a fuel.

UNIT-14: S-Block Elements (Alkali and Alkaline Earth materials) Group-1 &2 Elements

General introduction, electronic configuration and general trends in physical and chemical properties of elements, anomalous properties of the first element of each group, diagonal relationships.

Preparation and properties of some important compounds - sodium carbonate, sodium chloride, sodium hydroxide and sodium hydrogen carbonate; Industrial uses of lime, limestone, Plaster of Paris and cement; Biological significance of Na, K, Mg and Ca.

UNIT-15: P- Block Elements

Group-13 to Group-18 Elements

General Introduction: Electronic configuration and general trends in physical and chemical properties of elements across the periods and down the groups; unique behaviour of the first element in each group.

Group-wise study of the P-Block elements

Group-13: Preparation, properties and uses of boron and aluminium; Structure, properties and uses of borax, boric acid, diborane, boron trifluoride, aluminium chloride and alums.

Group-14: Tendency for catenation; Structure, properties and uses of allotropes and oxides of carbon, silicon tetrachloride, silicates, zeolites and silicones.

Group-15: Properties and uses of nitrogen and phosphorus; Allotrophic forms of phosphorus; Preparation, properties, structure and uses of ammonia, nitric acid, phosphine and phosphorus halides, (PCl_3, PCl_5); Structures of oxides and oxoacids of nitrogen and phosphorus. Group-16: Preparation, properties, structures and uses of dioxygen and ozone; Allotropic forms of sulphur; Preparation, properties, structures and uses of sulphur dioxide, sulphuric acid (including its industrial preparation); Structures of oxoacids of sulphur.

Group-17: Preparation, properties and uses of chlorine and hydrochloric acid; Trends in the acidic nature of hydrogen halides; Structures of Interhalogen compounds and oxides and oxoacids of halogens.

Group-18: Occurrence and uses of noble gases; Structures of fluorides and oxides of xenon.

UNIT-16: d and f -block elements

Transition Elements - General introduction, electronic configuration, occurrence and characteristics, general trends in properties of the first row transition elements - physical properties, ionization enthalpy, oxidation states, atomic radii, colour, catalytic behaviour,

magnetic properties, complex formation, interstitial compounds, alloy formation; Preparation, properties and uses of $K_2Cr_2O_7$ and $KMnO_4$.

Inner Transition Elements Lanthanoids - Electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction.

Actinoids - Electronic configuration and oxidation states.

UNIT-17: Coordination Compounds

Introduction to co-ordination compounds, Werner's theory; ligands, co-ordination number, denticity, chelation; IUPAC nomenclature of mononuclear co-ordination compounds, isomerism; Bonding-Valence bond approach and basic ideas of Crystal field theory, colour and magnetic properties; Importance of co-ordination compounds (in qualitative analysis, extraction of metals and in biological systems).

UNIT-18: Environmental Chemistry

Environmental pollution - Atmospheric, water and soil.

Atmospheric pollution - Tropospheric and stratospheric

Tropospheric pollutants - Gaseous pollutants: Oxides of carbon, nitrogen and sulphur, hydrocarbons; their sources, harmful effects and prevention; Green house effect and Global warming; Acid rain;

Particulate pollutants: Smoke, dust, smog, fumes, mist; their sources, harmful effects and prevention.

Stratospheric pollution- Formation and breakdown of ozone, depletion of ozone layer - its mechanism and effects.

Water Pollution - Major pollutants such as, pathogens, organic wastes and chemical pollutants; their harmful effects and prevention.

Soil pollution - Major pollutants such as: Pesticides (insecticides,. herbicides and fungicides), their harmful effects and prevention.

Strategies to control environmental pollution

UNIT-19: Purification and Characterization of Organic Compounds

Purification - Crystallization, sublimation, distillation, differential extraction and chromatography - principles and their applications.

Qualitative analysis - Detection of nitrogen, sulphur, phosphorus and halogens. Quantitative analysis (basic principles only) - Estimation of carbon, hydrogen, nitrogen, halogens, sulphur, phosphorus.

Calculations of empirical formulae and molecular formulae; Numerical problems in organic quantitative analysis.

UNIT-20: Some basic principles of Organic Chemistry

Tetravalency of carbon; Shapes of simple molecules - hybridization (s and p); Classification of organic compounds based on functional groups: - C = C - , - C ? C - and those containing halogens, oxygen, nitrogen and sulphur; Homologous series; Isomerism - structural and stereoisomerism. Nomenclature (Trivial and IUPAC)

Covalent bond fission - Homolytic and heterolytic: free radicals, carbocations and carbanions; stability of carbocations and free radicals, electrophiles and nucleophiles.

Electronic displacement in a covalent bond - Inductive effect, electromeric effect, resonance and hyperconjugation.

Common types of organic reactions - Substitution, addition, elimination and rearrangement.

UNIT-21: Hydrocarbons

Classification, isomerism, IUPAC nomenclature, general methods of preparation, properties and reactions.

Alkanes - Conformations: Sawhorse and Newman projections (of ethane); Mechanism of halogenation of alkanes.

Alkenes - Geometrical isomerism; Mechanism of electrophilic addition: addition of hydrogen, halogens, water, hydrogen halides (Markownikoff's and peroxide effect); Ozonolysis, oxidation, and polymerization.

Alkynes - Acidic character; Addition of hydrogen, halogens, water and hydrogen halides; Polymerization.

Aromatic hydrocarbons - Nomenclature, benzene - structure and aromaticity; Mechanism of

electrophilic substitution: halogenation, nitration, Friedel – Craft's alkylation and acylation, directive influence of functional group in mono-substituted benzene.

UNIT-22: Organic Compounds containing Halogens

General methods of preparation, properties and reactions; Nature of C-X bond; Mechanisms of substitution reactions.

Uses; Environmental effects of chloroform, iodoform, freons and DDT.

UNIT-23: Organic Compounds containing Oxygen

General methods of preparation, properties, reactions and uses. ALCOHOLS, PHENOLS AND ETHERS:

Alcohols: Identification of primary, secondary and tertiary alcohols; mechanism of dehydration. Phenols: Acidic nature, electrophilic substitution reactions: halogenation, nitration and sulphonation, Reimer - Tiemann reaction.

Ethers: Structure.

Aldehyde and Ketones: Nature of carbonyl group; Nucleophilic addition to $>C=O$ group, relative reactivities of aldehydes and ketones; Important reactions such as - Nucleophilic addition reactions (addition of HCN, NH3 and its derivatives), Grignard reagent; oxidation; reduction (Wolff Kishner and Clemmensen); acidity of ? - hydrogen, aldol condensation, Cannizzaro reaction, Haloform reaction; Chemical tests to distinguish between aldehydes and Ketones.

CARBOXYLIC ACIDS:

Acidic strength and factors affecting it.

UNIT-24: Organic Compounds containing Nitrogen

General methods of preparation, properties, reactions and uses.

Amines: Nomenclature, classification, structure, basic character and identification of primary, secondary and tertiary amines and their basic character.

Diazonium Salts: Importance in synthetic organic chemistry

UNIT-25: Polymers

General introduction and classification of polymers, general methods of polymerization - addition and condensation, copolymerization; Natural and synthetic rubber and vulcanization; some important polymers with emphasis on their monomers and uses - polythene, nylon, polyester and Bakelite.

UNIT-26: Biomolecules

General introduction and importance of biomolecules.

CARBOHYDRATES - Classification: aldoses and ketoses; monosaccharides (glucose and fructose), constituent monosaccharides of oligosacchorides (sucrose, lactose, maltose) and polysaccharides (starch, cellulose, glycogen).

PROTEINS - Elementary Idea of - amino acids, peptide bond, polypeptides; Proteins: primary, secondary, tertiary and quaternary structure (qualitative idea only), denaturation of proteins, enzymes.

VITAMINS - Classification and functions.

NUCLEIC ACIDS - Chemical constitution of DNA and RNA. Biological functions of nucleic acids.

UNIT-27: Chemistry in Everyday Life

Chemicals in medicines - Analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamins - their meaning and common examples. Chemicals in food - Preservatives, artificial sweetening agents - common examples.

Cleansing agents - Soaps and detergents, cleansing action.

UNIT-28: Principles related to Practical Chemistry

Detection of extra elements (N,S, halogens) in organic compounds; Detection of the following functional groups: hydroxyl (alcoholic and phenolic), carbonyl (aldehyde and ketone), carboxyl and amino groups in organic compounds.

Chemistry involved in the preparation of the following: (a) Inorganic compounds: Mohr's salt, potash alum. (b) Organic compounds: Acetanilide, p-nitroacetanilide, aniline yellow, iodoform. Chemistry involved in the titrimetric excercises - Acids bases and the use of indicators, oxalic-acid vs $KMnO_4$, Mohr's salt vs $KMnO_4$.

Chemical principles involved in the qualitative salt analysis: Cations - Pb^{2+}, Cu^{2+}, AI^{3+}, Fe^{3+}, Zn^{2+}, Ni^{2+}, Ca^{2+}, Ba^{2+}, Mg^{2+}, NH^{4+}. Anions- $CO32$-, S^{2-}, $SO42$-, NO^{2-}, NO^{3-}, CI^-, Br, I. (Insoluble salts excluded). Chemical principles involved in the following experiments:

Enthalpy of solution of $CuSO_4$, Enthalpy of neutralization of strong acid and strong base, Preparation of lyophilic and lyophobic sols, Kinetic study of reaction of iodide ion with hydrogen peroxide at room temperature.

26.3.3 SECTION-C MATHEMATICS-50 MARKS

UNIT-1: Sets, Relations and Functions

Sets and their representation; Union, intersection and complement of sets and their algebraic properties; Power set; Relation, Types of relations, equivalence relations, functions;. one-one, into and onto functions, composition of functions.

UNIT-2: Complex Numbers and Quadratic Equations

Complex numbers as ordered pairs of reals, Representation of complex numbers in the form a+ib and their representation in a plane, Argand diagram, algebra of complex numbers, modulus and argument (or amplitude) of a complex number, square root of a complex number, triangle inequality, Quadratic equations in real and complex number system and their solutions. Relation between roots and co-efficients, nature of roots, formation of quadratic equations with given roots.

UNIT-3: Matrices and Determinants

Matrices, algebra of matrices, types of matrices, determinants and matrices of order two and three. Properties of determinants, evaluation of determinants, area of triangles using determinants. Adjoint and evaluation of inverse of a square matrix using determinants and elementary transformations, Test of consistency and solution of simultaneous linear equations in two or three variables using determinants and matrices.

UNIT-4: Permutations and Combinations

Fundamental principle of counting, permutation as an arrangement and combination as selection, Meaning of P (n,r) and C (n,r), simple applications.

UNIT-5: Mathematical Induction

Principle of Mathematical Induction and its simple applications.

UNIT-6: Binomial Theorem and its Applications

Binomial theorem for a positive integral index, general term and middle term, properties of Binomial coefficients and simple applications.

UNIT-7: Sequence and Series

Arithmetic and Geometric progressions, insertion of arithmetic, geometric means between two given numbers. Relation between A.M. and G.M. Sum upto n terms of special series: Sn, Sn^2, Sn^3. Arithmetico - Geometric progression.

UNIT-8: Limit, Continuity and Differentiability

Real - valued functions, algebra of functions, polynomials, rational, trigonometric, logarithmic and exponential functions, inverse functions. Graphs of simple functions. Limits, continuity and differentiability. Differentiation of the sum, difference, product and quotient of two functions. Differentiation of trigonometric, inverse trigonometric, logarithmic, exponential, composite and implicit functions; derivatives of order upto two. Rolle's and Lagrange's Mean Value Theorems. Applications of derivatives: Rate of change of quantities, monotonic - increasing and decreasing functions, Maxima and minima of functions of one variable, tangents and normal.

UNIT-9: Integral Calculus

Integral as an anti - derivative. Fundamental integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integration by substitution, by parts and by partial fractions. Integration using trigonometric identities.

Evaluations of the Integrals of the types:

$$\int \frac{dx}{x^2 \pm a^2}, \quad \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \quad \int \frac{dx}{a^2 - x^2}, \quad \int \frac{dx}{\sqrt{a^2 - x^2}}, \quad \int \frac{dx}{ax^2 + bx + c}$$

$$\int \frac{dx}{\sqrt{ax^2 + bx + c}}, \quad \int \frac{(px+q)dx}{ax^2 + bx + c}, \quad \int \frac{(px+q)dx}{\sqrt{ax^2 + bx + c}}$$

$$\int \sqrt{a^2 \pm x^2}\, dx \quad \int \sqrt{x^2 - a^2}\, dx$$

Integral as limit of a sum. Fundamental Theorem of Calculus. Properties of definite integrals. Evaluation of definite integrals, determining areas of the regions bounded by simple curves in standard form.

UNIT-10: Differential Equations

Ordinary differential equations, their order and degree. Formation of differential equations. Solution of differential equations by the method of separation of variables, solution of homogeneous and linear differential equations of the type: $dy/dx + p(x) = q(x)$.

UNIT-11: Coordinate Geometry

Cartesian system of rectangular co-ordinates in a plane, distance formula, section formula, locus and its equation, translation of axes, slope of a line, parallel and perpendicular lines, intercepts of a line on the coordinate axes.

Straight Lines: Various forms of equations of a line, intersection of lines, angles between two lines, conditions for concurrence of three lines, distance of a point from a line, equations of internal and external bisectors of angles between two lines, coordinates of centroid, orthocentre and circumcentre of a triangle, equation of family of lines passing through the point of

intersection of two lines.

Circles and Conic Sections: Standard form of equation of a circle, general form of the equation of a circle, its radius and centre, equation of a circle when the end points of a diameter are given, points of intersection of a line and a circle with the centre at the origin and condition for a line to be tangent to a circle equation of the tangent. Sections of cones, equations of conic sections (parabola, ellipse and hyperbola) in standard forms, condition for $y = mx + c$ to be a tangent and point (s) of tangency.

UNIT-12: Three Dimension Geometry

Coordinates of a point in space, distance between two points, section formula, direction ratios and direction cosines, angle between two intersecting lines. Skew lines, the shortest distance between them and its equation. Equations of a line and a plane in different forms, intersection of a line and a plane, coplanar lines.

UNIT-13: Vector Algebra

Vectors and scalars, addition of vectors, components of a vector in two dimensions and three dimensional space, scalar and vector products, scalar and vector triple product.

UNIT-14: Statistics and Probability

Measures of Dispersion: Calculation of mean, median, mode of grouped and ungrouped data. Calculation of standard deviation, variance and mean deviation for grouped and ungrouped data. Probability: Probability of an event, addition and multiplication theorems of probability, Baye's theorem, probability distribution of a random variate, Bernoulli trials and Binomial distribution.

UNIT-15: Trigonometry

Trigonometrical identities and equations. Trigonometrical functions. Inverse trigonometrical functions and their properties. Heights and Distances

UNIT 16: Mathematical Reasoning

Statements, logical operations and, or, implies, implied by, if and only if. Understanding of tautology, contradiction, converse and contrapositive.

26.3.4   SECTION-D ENGLISH COMMUNICATION-25 MARKS

Word Formation, Vocabulary extension.

Elements of Grammar: Sentence elements, parts of speech, stative and dynamic, Pro-forms, question and negation, tag question.

Verbs and the verb phrases, appropriate preposition.

Articles and determiners, Revision of Present, Past and future tenses, Punctuations, Types of sentences, Structure of sentences, word order.

26.4   B. Des (Direct Entry)

The Central Institute of Technology Kokrajhar Entrance Examination (CITKEE-2023) for B.Des Direct Entry will be conducted in a duration of Three (3) hours with a total of 200

marks. The question paper will consist of two (2) parts: PART - A & PART - B. The question papers will carry 107 questions in total.

PART - A comprises of four (4) sections with total of 100 questions. All questions are objective type and of multiple choices with four (4) options of answers. Below are the details of all the Sections.

Section-1: General Knowledge. Questions will come from - basic general knowledge, current affairs, basic history knowledge, sports, music, art & entertainment, etc.

Section-2: English Communication. Questions will come from - Word Formation, Vocabulary extension. Elements of Grammar: Sentence elements, parts of speech, static and dynamic, Preforms, question and negation, tag question. Verbs and the verb phrases, appropriate preposition. Articles and determiners, Revision of Present, Past and future tenses, Punctuations, Types of sentences, Structure of sentences, word order.

Section-3: Computer Fundamentals. Questions will come from - basic computer knowledge, computer parts, functions, input-output devices, basic MS office, typing, printing etc.

Section-4: Creative Ability. Questions will come from – simple puzzles, image/symbol identification, basic general knowledge of art, design and creative field etc.

All questions carry equal marks of one (1) and total is Hundred (100).

NOTE: There is no negative marking **PART − B** Comprises of two (2) sections with total of 07 questions:

SECTION-1 will have questions related to these topics:

Visual Perception & spatial ability: Understanding of transformation and manipulation of 2D shapes and 3D objects and their spatial relationship.

Illustration and decoration: Understanding of the image/picture and creation of new drawing on the basis of basic concept of drawing and beautification of the drawing.

Problem Identification and Analysis: Understanding of the design problem and solution. Observation and design sensitivity: Ability to observe daily life related properties and thinking of them critically for aesthetic outcomes through illustration or drawing.

SECTION-2 will have questions related to these topics:

Drawing & Creativity: Ability to think of new concept and draw with good line quality, products, people or scenes in proportion with good composition, proportion, perspective, shading.

Visual Communication Skills: Understanding of the given topic or theme and creation of new drawing, Illustration, Image, Logo, Poster etc. and communication of the idea or concept in writing.

Evaluation criteria: Evaluation will be based on overall concept, approach to the question, meaningfulness, drawing skill, Identification of the unique problems or solving, Quality of presentation or detailing and appeal. Candidates also need to explain/express the idea behind the concept drawings they made in clear language. Marks Breakup of Question Paper is given below.

	Contents	No. Qs	Marks	Total Marks	Remarks
Question Specific instruction:					
Part-A	General knowledge	30	Each question will carry one (1) mark. (1x100)	100	Evaluation through computer.
	Computer fundamentals	20			
	English communication	30			
	Culture and Creativity ability	20			
Part-B	**Section-I**				Evaluation will be based on overall concept, approach to the question, meaningfulness, drawing skill, Identification of the unique problems or solving, Quality of presentation or detailing and appeal. Candidates also need to explain/express the idea behind the concept drawings they made in clear language.
	Visual Perception and spatial ability	4	Each question will carry ten (10) marks. (10x4)	40	
	Sensitivity,				
	Illustration and decoration,				
	Problem				
	Identification and Analysis,				
	Observation and design sensitivity				
	Section-II				
	Drawing and Creativity	3	Each question will carry twenty (20) marks. (20x3)	60	
	Visual Communicati on Skills				
	60				

26.5 B. Tech (Lateral Entry)

Central Institute of Technology Kokrajhar Entrance Examination CITKEE-2023 for B. Tech (Lateral Entry) consists of Common Paper and a Branch Paper.

26.5.1 COMMON PAPER

Common Paper (Marks – 60, Time – 1 hour 30 mins): Common Paper will be compulsory and consists of the subjects: (a) Physics – 10 marks (b) Chemistry – 10 marks (c) Mathematics – 20 marks (d) Graphics – 10 marks (e) Computer and General Awareness – 5 marks and (f) English – 5 marks. The standard of the paper will be that of 1st year of the B.Tech course. **Physics:** Work, Power, Energy, Friction, Viscosity, Electricity, Hydrostatics, Basics of optics, Laws of motion, Heat.
Chemistry: Gas Laws, Thermodynamics, Electro Chemistry, Chemical Kinetics, Benzene and derivatives, Aldehydes and Ketens, Hydro carbons, Acids & Alcohols
Mathematics: Matrices, Determinants, Differential & Integral Calculus, Inverse Trigonometric Functions, Binomial Theorem, Probability, Statics, Plane Coordinate Geometry, ordinary Differential Equations.
English: Grammar & Composition.
Graphics: Scale, Orthographic projection including sectional view, Isometric view, free hand sketch.

26.5.2 BRANCH PAPERS

26.5.2.1 ELECTRONICS AND COMMUNICATION ENGINEERING

Materials and Components: Structure and properties of Electrical Engineering materials: Conductors, Semiconductors and Insulators, Magnetic, Ferroelectric, Piezoelectric, Ceramic, Optical and Super conducting materials. Passive components and characteristics Resistors, Capacitors and Inductors; Ferrites, Quartz crystal Ceramic resonators, Electromagnetic and Electromechanical components.

Physical Electronics Electron Devices and ICs: Electrons and holes in semiconductors, Carrier Statistics, Mechanism of current flow in a semiconductor, working principle and basic structure of BJTs and FETs.

Network Theory: Network analysis, Loop Analysis, Mesh Analysis; Network Theorems, Superposition Theorem, Thevenin's Theorem, Notron's Theorem, Reciprocity Theorem, Millman's Theorem, Star-Delta Connections, Two port networks.

Electronic Measurements and Instrumentation: Basic concepts, standards and error analysis; Measurements of basic electrical quantities and parameters; Electronic measuring instruments and their principles of working; analog and digital, comparison, characteristics, application Transducers; Electronic measurements of non-electrical quantities like temperature, pressure, humidity, etc.

Analog Electronic Circuits: Transistors biasing and stabilization, small signal analysis, power amplifiers, frequency response, wide banding techniques, feedback amplifiers, Tuned amplifiers, Oscillators, Rectifiers and power supplies, Op Amp.

Digital Electronic Circuits: Binary number system, Octal, Hexadecimal and BCD numbers system, Boolean algebra, simplification of Boolean functions, Karnaugh map and applications, IC logic, Combination logic circuits, Half adder, Full adder, Digital comparator, Multiplexer, Demultiplexer, Flip Flops, R-S, J-K, D and T flip-flops, different types of counters and registers, A/D and D/A converters, semiconductor memories.

Control Systems: Types of Control system, Open Loop and Closed Loop Control system, Effect of feedback on stability and sensitivity; Block Diagram Reduction Technique, Signal Flow Graph, Stability Analysis, Routh's Stability Criterion.

Communication System: Basic Mathematical Tools like Fourier Series, Modulation and detection in analogue and digital system; Sampling and data reconstructions; Propagation of signals at HF, VHF, UHF and microwave frequency.

Computer Engineering: Number system, Data representation; Programming; Elements of a high level programming language PASCAL/C; Use of basic data structures, Fundamentals of computer architecture, processor design, control unit design, memory organization, I/O system organization, microprocessors, architecture and instruction set of microprocessors 8085, Assembly language programming.

26.5.2.2   COMPUTER SCIENCE AND ENGINEERING

Programming Languages C, C++: Data types, variables, operators, expressions, input- output operators, control structure, functions, storage classes, array, pointers, structures, Unions, file handling, concepts of OOP, Data types, Operators, Functions, Classes, Objects, Constructor, Destructor Operator overloading, Function overloading, Inheritance, Polymorphism.

Digital Structure and Operating Systems: Time and space complexity, Array, String, Stack, Queue, Linked List, Tree, Graph, Different sorting and searching techniques, Concepts regarding Batch systems, Multi-programmed system, Time sharing systems, distributed systems, Real time system, Process, CPU scheduling, Synchronization Dead Lock, Memory management, Virtual memory,

Digital Electronics & Microprocessor: Numbering system, different coding methods, Boolean algebra, logic gates, minimization techniques, combinational logic design, Flip flops, sequential logic design i.e. counter & shift registers, Pin Diagram and Block Diagram of 8085 microprocessors, Timing diagram, Instruction set Addressing modes, Assembly language programming, Interfacing peripheral devices.

Computer Organization& Architecture: Basic organization of computer, classification of computer, Introduction to compiler, Interpreter, Loader, Linker, Design of functional units like ALU & CU, Memory organization – Types of memory, RAM, ROM, Cache memory, Mapping functions, secondary memory, Virtual memory. Input-output organization. Methods of interfacing. Address-space partitioning, Data transfer technique, Interrupts

Computer Network and DBMS: OSI Reference Model, TCP/IP Model, Network Topologies, Transmission media, Switching, Multiplexing, Error Detection & Correction, IEEE LAN standards, Routing methods. Introduction to database, Advantages of database, Different models – Relational, Hierarchical, Network, E-R models, Relational algebra, Calculus, Normal forms, SQL query.

26.5.2.3 INTRUMENTATION ENGINEERING

Network Theory: Network analysis techniques, Nodal Analysis, Loop Analysis, Mesh Analysis; Network Theorems; Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Mollman's Theorem, Star-Delta Connections, Two port networks.

Electronic Measurements and Instrumentation: Basic concepts, standards and error analysis; Measurements of basic electrical quantities and parameters; Electronic measuring instruments and their principles of working; analog and digital, comparison, characteristics, application Transducers; Electronic measurements of non-electrical quantities like temperature, pressure, humidity, etc.

Analog Electronic Circuits: Transistorsbiasing and stabilization, small signal analysis, power amplifiers, frequency response, wide banding techniques, feedback amplifiers, Tuned amplifiers, Oscillators, Rectifiers and power supplies, Op Amp.

Digital Electronic Circuits: Binary number system, Octal, Hexadecimal and BCD numbers system, Boolean algebra, simplification of Boolean functions, Karnaugh map and applications, IC logic, Combination logic circuits, Half adder, Full adder, Digital comparator, Multiplexer, Demultiplexer, Flip Flops, R-S, J-K, D and T flip-flops, different types of counters and registers, A/D and D/A converters, semiconductor memories.

Control Systems: Types of Control system, Open Loop and Closed Loop Control system, Effect of feedback on stability and sensitivity; Block Diagram Reduction Technique, Signal Flow Graph, Stability Analysis, Routh's Stability Criterion.

Microprocessors: Number systems, Data representation; microprocessors; Architecture and Instruction set of Microprocessors 8085, Assembly language programming

26.5.2.4 FOOD ENGINEERING AND TECHNOLOGY

Engineering Thermodynamics: Zeroth law, first law, second law. Concepts of enthalpy, internal energy, entropy and absolute temperature. Properties of pure substances and mixtures, reversibility and irreversibility. Thermodynamics cycles. Refrigeration and air conditioning: Refrigeration cycles, heat pump. Application of refrigeration in food processing and preservation. Food freezing systems. Steam: steam generation, steam properties and application. Psychrometrics: properties of air water vapour mixer; psychrometric properties, charts and relations and psychro-metric calculations.

Heat and Mass Transfer: Principles of heat and mass transfer to heat, different methods of heat transfer, Fourier's Law, Steady state heat transfer through plain and composite slabs, cylindrical and spherical surfaces. Natural and forced convection, concept of overall heat

transfer coefficient, LMTD, heat exchangers in food processing, effectiveness of heat exchanger. Fick's Law of diffusion and basic concepts of convective mass transfer.

Basic Fluid Mechanics: Physical properties of fluids, classification of fluid flow, continuity equations, Bernoulli's equation and its application, steady state flow equation, concept of viscosity, Newtonian and non-Newtonian fluids. Poiseuille's equation. NavierStoke's equation, flow through parallel plates and circular pipes. Concept of Reynold's number and its application. Pipe and pipe flow, fittings. Pumps, types of pumps and their application and selection.

Food Engineering Operations: Materials and introduction energy balance for food engineering processes. Size reduction, mechanical expression, mechanical separation, mixing and agitation, emulsification and homogenization. Filtration, membrane separation, sedimentation, centrifugation, crystallization, extraction, distillation, absorption, humidification and dehumidification. Thermal processing of foods, Food concentration: Evaporation, equipments, their selection and calculation. Freeze concentration. Drying and dehydration methods, different kinds of dryers, their selection and design.

Food Microbiology: Microbiology and reproduction of bacteria. Pure culture technique: serial dilution, pour plate, streak plate, spread plate, slant, broth and enrichment culture, lyophilization. Microbial Growth: Definition, Growth curve, account of different phases, synchronous growth, doubling/ generation time. Relationship between number of generations and total number of microbes. Disinfecting agents and its dynamics. Enzymes, specificity of enzymes, coenzymes, cofactors, Enzymes inhibitors and activators. Applications of enzymes in food industry, immobilized enzymes. Definition, scope and present status of Biotechnology and its applications, Microbial propagation and production of SCP, Fermentation: Fermented and non-Fermented food, cereal fermentation.

Food Chemistry: Importance of different food constituent, Carbohydrate and its classification and functions. Proteins, classification and properties of amino acids. Lipids structure, physical and chemical properties. Vitamins and minerals in food. Food spoilage: Types and factors, Food enzymes,

Food preservation techniques: Addition of salt, sugar, oil, spices, preservative, drying, evaporation, heat treatment, irradiation, refrigeration, freezing, plant physiology: Transpiration, Ripening, Senescence, Post-Harvest technology and its importance, Climacteric and non-climacteric fruits.

Food Product technology: Parboiling, Milling of rice, wheat, malting, storage atmospheres: Quality control and quality assurance, different quality attributes: qualitative, hidden and sensory, HACCP and its application, Food adulteration: types, Estimation of moisture, crude, fat, proteins, crude fibre, ash, sampling and its types, BIS, AGMARK, FPA, PFA, FA

26.5.2.5 CIVIL ENGINEERING

Construction Materials: Bricks: Manufacturing processes, classification and tests. Flooring and roofing tiles. Production, properties and uses of lime; cement and sand- mortar. Concrete: Plain and reinforced, Timber: types and methods of preservation, plywood,

Iron, and structural steel, Types and uses of paints, varnishes and distemper. Sound and heat insulting materials; Glasses; plastics and asphaltic material.

Surveying: Introduction to surveying, chain surveying, Compass surveying, Leveling, Contouring, Theodolite, Traversing, Total Station Survey, Tacheometry, Curves, Plane Table Surveying, Trigonometrical leveling.

Strength of Materials: Concept of Stress & Strain, normal & shearing stress and strains, stress-strain relationship, torsion of circular shafts. Column's-Euler formula, Rankine and Secant formulae, Relationships between load, shearing force and bending moment, shear force and bending moment diagrams, Theory of simple bending stresses in beams, Bending and shear stress distribution over cross-sections of determinate beams. Principal stress and strain, principal planes, Mohr's circle of stresses and strain and related problems.

Structural Analysis: Three Hinged Arch, Cables and Suspension Bridges, Influence Line Diagram for Reaction, Shear, Bending Moment and their maximum & minimum values for determinate beams, arches and trusses, Deflections by moment- area, conjugate beam and energy methods. Degree of indeterminacy and stability, Principles of superposition, Betti's law, Castigliano's theorems, Analysis of indeterminate beams by strain- energy and virtual work methods.

Concrete Technology: Concrete: Importance, Production of concrete, operations involved, grades, Ingredients, yield of concrete, Aggregates, Cement, Water, Properties of green and hardened concrete, Rheology and mix proportioning, Admixtures, Quality Control.

Geotechnical and Transportation Engineering: Introduction, definitions and relationships; Index properties of soils, Soil classification, Soil compaction, Permeability and Seepage, Effective stress, Stress distribution in soil mass, One dimensional consolidation, Shear strength of soils and shear tests.

Roads: Introduction, Classification of road pattern; Geometric design, Traffic control devices; Railways – Rails, sleepers, ballast; Geometrics for broad gauge, cent deficiency; points and crossing, station yard, Construction of WBM, Black top and concrete pavements including grade and base courses. Equipment used for road construction.

Design of RCC Structures: Introduction of Design Concepts, Working Stress Method of Design, Design of Rectangular and Flanged Beams for Flexure, Design of rectangular and flanges beams for bond, shear and torsion. One-way, Two Way and Continuous slabs.
Axially and Eccentrically Loaded Short Columns, axially and eccentrically loaded long columns, Isolated Footings, Limit State Method of Design for flexure, shear, torsion and compression.

Design of Steel Structures: Properties of steel and rolled steel sections, Design of riveted connections, Design of welded and bolted connections, Design of tension and simple compression members, Design compression members with splicing, lacing, and battening. Design of Beam-Column connections, Design of laterally supported beams, Column bases and foundations and Roof trusses.

Fluid Mechanics: Properties of fluid, Fundamentals of fluid flow, two dimensional and three dimensional flows, Streamline, stream tube, equation of continuity. Energy equation and its applications, Fluid flow in pipes - Reynolds number, critical velocity, laminar flow, turbulent

flow, shearing stresses at pipe wall, velocity distribution, loss of head for laminar flow, steady incompressible flow through simple pipe systems, Darcy - Weisbach equation, Moody diagram, simple pipe flow problems, losses of head for sudden expansion and sudden contraction, various fittings. Fluid measurements - velocity measurement, Pitot tube, coefficient of discharge, coefficient of velocity, coefficient of contraction, orifices, orifice meter, Venturimeter, time to empty tanks, weirs and notches.

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