

Designed by Chandan Kumar Baroi(JTS,Dept. of ICD)

# INFORMATION BROCHURE AND APPLICATION FORM

CITEE-2018, CITDEE-2018, CITLET-2018 & CITBDAT -2018  
(FOR ADMISSION INTO DIPLOMA & DEGREE ENGINEERING PROGRAMMES)

# 2018



**CENTRAL INSTITUTE OF TECHNOLOGY**

(A Centrally Funded Institute Under Ministry of HRD, Govt. of India)

Kokrajhar, BTAD, Assam-783370

[www.cit.ac.in](http://www.cit.ac.in)

## **1. INTRODUCTION**

### **1.1 ABOUT THE INSTITUTE**

Central Institute of Technology (CIT), Kokrajhar, is an autonomous Institute under the Ministry of Human Resource Development (HRD), 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, on February 10, 2003, in New Delhi. The foundation stone of CIT Kokrajhar was laid on 10<sup>th</sup> of February, 2003 by the then Honourable Chief Minister of Assam, Sri Tarun Gogoi in presence of the then Honourable Deputy Prime minister of India Sri L. K. Advani. Consequently, CIT 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).

CIT 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.

CIT 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.

### **1.2 LOCATION**

Central Institute of Technology Kokrajhar is located at a serene landscape at about 12 kilometers north from the district headquarter of Kokrajhar District of lower Assam. It is located in a peaceful environment comprising of the cultivation lands and villages of various sections of indigenous people. The Institute is easily accessible by Railway and Highway. It is at a distance of 10 km south of NH-31 and 10km from the Kokrajhar railway station. The nearest airport is LGBI Airport, Guwahati which is about 240 km away from the institute.

### **1.3 INFRASTRUCTURE**

CIT Campus is presently spread over an area of about 250 bighas of land and further procurement of land is in the process. The campus consists of Academic Blocks, Administrative Block, Director's Residence, New Library Building Workshop Building, Four

Hostels, Guest House, Faculty and Staff quarters, Health centre, Recreational Centre, Gymnasium, Sports Complex and Playgrounds. The constructional activities of new faculty and staff quarters, auditorium, new hostels, new academic blocks etc. are in progress.

#### **1.4 ADMINISTRATION**

Central Institute of Technology Kokrajhar is administered by a Board of Governors (BoG). The Board of Governors consists of members appointed as per the norms of Government of India. CIT is a Centrally Funded Technical Institute (CFTI) under Ministry of HRD, Government of India. IIT Guwahati is the mentor of the Institute. Presently, Director and Registrar are in the highest positions of administration and are assisted by various sub-committees.

#### **1.5 ACADEMICS**

CIT is currently following a two structure modular pattern of education with Diploma and Degree Modules. The Diploma and Degree programmes were started in the year 2006 and 2009 respectively. At present, CIT Kokrajhar has seven core departments: Electronics and Communication Engineering, Computer Science and Engineering, Instrumentation Engineering, Food Engineering and Technology, Civil Engineering, Information Technology and Multimedia Communication and Design.

Other departments include Basic Science, Mathematics, Physics and Chemistry, Allied Engineering department comprising of Electrical and Mechanical Engineering and Humanities and Social Science Department comprises of English, Economics and Sociology. The total number of students enrolled in various courses under Diploma, Bachelor of Design and Bachelor of Technology programmes is more than 1400. The Institute has more than 90 faculty members from diverse fields of Science, Engineering and Technology and Humanities and Social Sciences.

#### **1.6 MoU**

The Institute has signed MoUs with IIT Guwahati and Bodoland University, Kokrajhar for extending collaboration in various educational and professional programmes.

## **2. VISION & MISSION**

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.

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:

- (i) **Diploma** (3 years) in Electronics and Telecommunications, Computer Science , Control and Instrumentation Engineering, Food Processing Technology, Construction Technology and Multimedia Technology.
- (ii) **B.Tech.** (4 years) in Electronics and Communications Engineering, Computer Science and Engineering, Instrumentation Engineering, Food Engineering and Technology, Civil Engineering and Information Technology.
- (iii) **B. Des.** (4 years bachelor degree programme in Design).

### **4. RECOGNITION AND AFFILIATION:**

The Diploma courses are approved by AICTE and affiliated to State Council for Technical Education, Assam, B.Tech. courses are approved by AICTE and affiliated to Gauhati University, Guwahati and B. Des. Course is affiliated to Assam Science and Technology University, Guwahati, Assam.

### **5. FACILITIES OF THE INSTITUTE:**

#### **5.1 HOSTEL FACILITY:**

The Institute has six hostels, three for boys' and one for girls' inside the campus and two girls' hostel outside the campus. Currently, two boys' hostels with a capacity of 336 each and one boys' hostel of capacity 252 are being used inside the campus. And one girls' hostel with a capacity of 234 is being used inside the campus. The Hostel Management Committee of CIT Kokrajhar comprising of Member Secretary, Chief Warden and the Wardens of individual hostels look after the overall affairs and administration of the hostels. It is mandatory for all the hostels boarders to obey the hostel rules and regulations. 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 with Wi-Fi in all the hostels.

#### **5.2 LABORATORY FACILITY:**

The institute has well established laboratories in all the departments as per the requirements of Diploma and Degree 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 give 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 staffs. Every year the institute gives due importance in upgrading its existing laboratories facilities with latest equipment and software tools.

### **5.3 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 have published many research papers and attended international and national conferences in the year 2017. The institute has R& D Cell headed by Dean (Research) to assist and guide new research activities in the institute.

### **5.4 COMPUTER CENTRES.**

The institute has two central computer centres with more than two hundred and fifty nodes with the latest Operating Systems and applications software. The computer centres are connected with a 2Mbps leased line for Internet access through a wireless LAN and NKN connectivity of 100 Mbps leased line. In addition to this, departments like ECE, IE, CE, IT and AMT have individual computer centres to cater departmental needs.

### **5.5 LIBRARY FACILITY.**

The Institute has a fully computerized Library with more than 40,000 volumes (reference and text books) and it is in the process of acquiring more numbers of Printed and Online Journals. The Library is a member of AICTE-INDEST consortium through which the Institute can access e-journals of different subjects. The services provided by the Library are: Lending Services, Reference Service, Current Awareness Service (CAS), Inter Library Loan Service (ILL), Reading Room Service, User Awareness and Photocopying Services.

### **5.6 TRANSPORT FACILITY.**

CIT has 7 buses plying to and fro from Kokrajhar town to facilitate the transportation of the students to the Institute.

### **5.7 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, frequent 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.

### **5.8 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 sport complex with facilities to play Basketball, Volleyball, Lawn Tennis, Badminton etc. Recently, the institute has modernized the sport complex with new facilities. The institute playground is under construction and will be ready by the start of new session. Every year sporting competitions are organized among the students during occasions like “Ecstasy”, the annual sports and cultural week of the Institute.

### **5.9 CANTEEN:**

The Institute has a Canteen to cater to the food requirements of both the staffs and the students. A new canteen has been recently introduced in the campus to meet the high quality demands of the staff and the students.

### **5.10 INTERNET FACILITY:**

The institute provides full fledge internet and LAN connectivity to administrative block, academic block, laboratories, workshops, staff quarters, guest house and hostels within the campus. Wi-Fi Connectivity is also available to both the staff and the students inside the campus.

### **5.11 MEDICAL AND HEALTH SERVICE.**

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.

### **5.12 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.

### **5.13 VIRTUAL CLASSROOM:**

A well-equipped virtual class room has been recently inaugurated for attending and interacting e-classes broadcasted from institutes like IITs, IISC etc. and for organizing e-conferences, seminars, invited talks etc.

#### 5.14 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. Student Affairs Cell comprises of faculty members and it holds a strong responsibility in maintaining a cordial atmosphere in the institute.

#### 5.15 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.

### 6. DISCIPLINES AND INTAKE CAPACITY:

Central Institute of Technology presently offers following programmes.

- I. Three year Diploma programme
- II. Four year Bachelor of Technology (B. Tech.) programme and
- III. Four year Bachelor of Design (B. Des.) programme.

#### 6.1 DIPLOMA PROGRAMME:

The details about branches and their intake capacities under Diploma programme are:

DISCIPLINES	Intake Capacity
Electronics and Telecommunication Engineering (ET)	30
Computer Science (Co)	30
Control & Instrumentation Engineering (CAI)	30
Food Processing Technology (FPT)	30
Construction Technology (CT)	30
Animation & Multimedia Technology (AMT)	30

Out of the total number of seats in Diploma Programme, 85% of the seats are offered through Central Institute of Technology Entrance Examination (CITEE) conducted by CIT, Kokrajhar and remaining 15% of the seats are offered through Polytechnic Admission Test (PAT) conducted by State Council of Technical Education, Assam.



## 6.2 B. TECH. PROGRAMME.

Degree offered and intake capacities under various degree programme are given below.

DISCIPLINES	Intake Capacity (Direct Entry)
Electronics and Communication Engineering (ECE)	45
Computer Science and Engineering (CSE)	45
Instrumentation Engineering (IE)	45
Food Engineering and Technology (FET)	45
Civil Engineering (CE)	45
Information Technology (IT)	45

Out of the total seats under Direct Entry Scheme of Degree Programme, 40% of the seats are offered to candidates who have appeared JEE (Main)-2018 and have qualifying marks above the cut-off marks as decided by the Admission Committee of CIT Kokrajhar. The remaining 60% of the seats are filled through Central Institute of Technology Degree Entrance Examination (CITDEE).

CIT offers direct admission to second year (third semester) of Degree Course through Lateral and Vertical Entry scheme for diploma holder students. The details about the intake capacity are given below.

DISCIPLINES	Intake Capacity		
	Vertical	Lateral	Total
Electronics and Communication Engineering (ECE)	15	6	21
Computer Science and Engineering (CSE)	15	6	21
Instrumentation Engineering (IE)	15	6	21
Food Engineering and Technology (FET)	15	6	21
Civil Engineering (CE)	15	6	21
Information Technology (IT)	15	6	21

Under the Vertical Entry scheme, 15 seats in each branch are reserved for eligible candidates of CIT, Kokrajhar and in Lateral Entry scheme, 6 seats in each branch are open for candidates from any other AICTE/UGC recognized institutes.

## 6.3 B. Des. Programme.

CIT Kokrajhar has started the Bachelor of Design (B. Des) programme from the year 2016 with an intake capacity of 20 seats. Since last year the intake capacity has been increased to 45 seats.

Programme	Intake Capacity		
	Direct	Vertical	Total
B. Des.	45	15	60

Under the Vertical Entry scheme, the candidates who have completed 3 years diploma in and Multimedia from CIT Kokrajhar are eligible to apply to the Bachelor of Design (B. Des.) programme. There will be no lateral entry scheme in 3<sup>rd</sup> semester as the programme has a specialized course structure and one has to enter from 1<sup>st</sup> semester to complete the programme.

## 7. ELIGIBILITY CRITERIA

### 7.1 Diploma Programme.

**Educational Qualifications:** Candidates must have passed HSLC or equivalent with 45% marks in aggregate and 50% of marks in Science, Mathematics (or Advanced Mathematics) and English taken together for GEN/OBC candidates (relaxed upto 5% of marks for ST/SC/PWD candidates).

**Age limit:** The age of the candidates as on 01-08-2018 must not exceed the following age limit for different categories- (i) GEN/OBC-19 years; (ii) SC/ST/PWD-24 years; (iii) Female Candidates-22 years.

### 7.2 B. Tech. Programme.

#### **Educational Qualification.**

(i) **Direct Entry:** 10+2 (Science) with 45% marks in aggregate and 50% of marks in Physics, Chemistry and Mathematics taken together for GEN/OBC candidates (relaxed upto 5% for ST/SC/PWD candidates).

(ii) **Vertical Entry :** Diploma in the concerned branch of Engineering/Technology from CIT with 65% marks for GEN/OBC (relaxed upto 5% for SC/ST/PWD)

(iii) **Lateral Entry (CITLET):** Diploma in AICTE recognized related branch of Engineering/Technology with 60% marks or equivalent CGPA for GEN/OBC (relaxed upto 5% for SC/ST/PWD) or B.Sc. (with Mathematics as one of the compulsory subjects) with a minimum of 55% marks or equivalent CGPA for GEN/OBC (relaxed upto 5% for SC/ST/PWD)

**Age limit.**

- (i) **Direct Entry.** Candidates must not be above 21 years, or below 17 years of age as on 01-08-2018. The upper age limit is relaxed to 3 years for Schedule Caste and Schedule Tribe candidates.
- (ii) **Lateral Entry.** 40 years (45 years for SC/ST/PWD and 43 years for OBC and female candidates) as on 01-08-2018

**7.3 B. Des. Programme.**

**Educational Qualification.**

- (i) **Direct Entry:** 10+2 (Science/Arts/Commerce) with 50% marks in the aggregate for GEN/OBC candidates (relaxed upto 5% for ST/SC/PWD candidates).
- (ii) **Vertical Entry:** Diploma in Animation and Multimedia from CIT with 65% marks for GE/OBC (relaxed upto 5% for SC/ST/PWD)

**Age limit.**

**Direct Entry:** Candidates must not be above 21 years, or below 17 years of age as on 01-08-2018. The upper age limit is relaxed to 3 years for Schedule Caste and Schedule Tribe candidates.

**Vertical Entry:** 40 years (45 years for SC/ST/PWD and 43 years for OBC and female candidates) as on 01-08-2018.

**7.4 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 Govt. Hospital for the purpose. Necessary fees as prescribed by the medical officer shall have to be paid by the candidates for such test.

**8. RESERVATION POLICY:**

In filling up of the available seats, the institute shall follow the following reservation policy.

- (i) 60% from BTAD (60% ST, 5% SC, 15%OBC and 20% General)
- (ii) 20% from North–East region excluding BTAD.
- (iii) 17% from All India excluding North–East Region.
- (iv) 03%for physically handicapped candidates irrespective of region.

The selection through serial no. (ii), (iii) & (iv) will follow the reservation policy for SC, ST, OBC and General as laid down by the Government of India. In case the seats as

mentioned in (ii), (iii) & (iv) are not filled up by respective candidates, the seats will be filled up by candidates from the BTAD region.

### 8.1 Lateral Entry Seat Distribution Scheme

REGION	CATEGORY	IT	ECE	CSE	IE	FET	CE	TOTAL
<b>BTAD (22)</b>	ST (13)	3	2	2	2	2	2	<b>13</b>
	SC(1)	1						<b>1</b>
	OBC(3)			1	1	1		<b>3</b>
	GEN(5)		1	1	1	1	1	<b>5</b>
<b>NE (7)</b>	ST (1)						1	<b>1</b>
	SC(1)		1					<b>1</b>
	OBC(2)				1	1		<b>2</b>
	OPN(3)		1		1		1	<b>3</b>
<b>AI (6)</b>	ST (1)			1				<b>1</b>
	SC(1)	1						<b>1</b>
	OBC(2)					1	1	<b>2</b>
	OPN(2)	1	1					<b>2</b>
<b>PH</b>	OPN(1)			1				<b>1</b>
<b>TOTAL</b>	<b>36</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>36</b>

## 9. ADMISSION PROCEDURE:

**9.1 Diploma.** A candidate may be admitted into the Diploma programme of CIT in two ways. The candidate has to clear the CITEE-2018 entrance examination followed by counseling at CIT, Kokrajhar. The second way is to appear in Polytechnic Admission Test (PAT) 2018 conducted by Director, State Council for Technical Education (SCTE), Guwahati, Assam. The candidates appearing in PAT are to attend counseling called by SCTE whereby their eligibility would be verified and their admission forwarded to CIT, Kokrajhar. Out of the total seats, 85% of seats shall be filled up by the candidates qualified by CITEE-2018 and remaining 15% of seats shall be filled up by the candidates through PAT-2018 conducted by SCTE, Assam.

**9.2 B. Tech. (Direct).** A candidate may be admitted into the first semester of B. Tech. programme of CIT in two ways. The candidate has to clear the CITDEE-2018 entrance examination followed by counseling at CIT, Kokrajhar. The second way is by applying and appearing in JEE (Main)-2018 conducted by CBSE, New Delhi. The JEE (Main)-2018 candidates should separately apply to CIT, Kokrajhar and submit the JEE (Main) score cards to the Member Secretary, Admission Committee, within ten days of the declaration of the JEE (Main) results. A separate selected list will be prepared for JEE

(Main) qualified candidates depending on the cutoff marks decided by the Admission Committee of the Institute. Candidates appearing for CITDEE-2018 may also submit their JEE (Main) scores to the Member Secretary, Admission Committee, CIT, mentioning CITDEE-018 Roll No/Application No. for consideration of their candidature for selection under the JEE (Main) qualified list. Out of the total seats, 60% of seats shall be filled up by the candidates qualified by CITDEE-2018 and remaining 40% of seats shall be filled up by the candidates through JEE (Main) 2018 conducted by CBSE, New Delhi.

**9.3 B. Tech. (Vertical/Lateral).** Candidates who have passed from CIT in the current year having requisite qualifying marks should submit their application and would be admitted without any entrance examinations. Those candidates who have passed from CIT and did not get the qualifying marks for Vertical Entry and has qualifying marks for Lateral Entry should apply and appear in the CITLET-2018. Candidates who have passed Diploma from other AICTE/UGC recognized institutions have to apply and appear in CITLET-2018 for consideration of their candidature for admission into the third semester (second year) of B. Tech. programme under the Lateral Entry scheme.

**9.4 B. Des. (Direct).** A candidate may be admitted into the first semester of B. Des. programme of CIT in two ways. The candidate has to clear the CITBDAT-2018 entrance examination followed by counseling at CIT, Kokrajhar. The second way is by applying and appearing in UCEED-2018 conducted by IIT BOMBAY. These candidates should also separately apply to CIT, Kokrajhar and submit the UCEED-2018 score cards to the Member Secretary, Admission Committee, within ten days of the declaration of the UCEED-2018 results.

**9.5 B. Des. (Vertical).** Candidates who have passed 3 years diploma in Animation and Multimedia from CIT 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 programmes'.

## **10. 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 single merit/ranking list would be prepared based on the performance of the candidates in the Entrance examination. The ranking for CITEE-2018 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 cases whereby the total marks obtained is same. The ranking for CITDEE-2018 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 cases whereby the total marks obtained is same. The ranking for CITLET-2018 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.

Those candidates who have already appeared in CITDEE-2018 and are seeking admission through JEE Main 2018 scores must submit their score cards to Member Secretary by Speed Post/Email (scanned copy) within 10 days of declaration of JEE Main 2018 results mentioning clearly the CITDEE-2018 Roll No/Application Form number.

Those candidates who have not appeared CITDEE-2018 and are seeking admission through JEE Main scores must buy the application form of CIT or apply online and print the filled up form and submit it along with their JEE Main score cards to Member Secretary by Speed Post/Email (scanned copy) within 10 days of declaration of JEE Main results. Online application form must accompany with the fess receipt paid through SBI E-Collect.

## **11. HOW TO APPLY:**

**OFFLINE MODE:** The application form should be properly filled in original and submitted to "THE MEMBER SECRETARY, ADMISSION COMMITTEE, CIT, KOKRAJHAR, BTAD, ASSAM-783370", by registered/speed/general post on or before 18th April, 2018. However, the duly filled application form may also be submitted to the ADMISSION CELL, CIT, KOKRAJHAR by hand on or before the last date. Application forms received or submitted after the last date shall be rejected. Application form can be obtained from the selling centres by paying Rs 1000/- (Rupees one thousand only) for GEN/OBC candidates and Rs 500/- (Rupees five hundred only) for SC/ST/PWD.

**ONLINE MODE.** For Online Mode, candidates may fill the application form through our online portal by visiting the website: [www.cit.ac.in](http://www.cit.ac.in). Candidates need to print and send a hard copy of the online application form to “THE MEMBER SECRETARY, ADMISSION COMMITTEE, CIT, KOKRAJHAR, BTAD, ASSAM-783370”, by registered/speed/general post on or before 25th April, 2018. The form should accompany with the entrance examination fees receipt paid through SBI, E-Collect.

**The admit card shall be issued online by the institute in the first week of May 2018. The admit card can be downloaded from the CIT admission website by entering the application form no. & the registered mobile number**

## **12. ENTRANCE EXAMINATION FEES:**

The candidates applying for the Entrance Exam through Offline Mode need not submit any entrance examination fees (*the price of Information Brochure is inclusive of entrance Examination fees*). However, the candidates applying through Online Mode from CIT website must submit an e-payment receipt of Rs.1000/- (One thousand only) for GEN/OBC candidates and Rs. 500/- (Four hundred only) for SC/ST/PWD. Printed E-payment receipt should be sent along with the application form.

**N. B.: The Institute will not be responsible for postal delay and incomplete application form will be summarily rejected. Application fees are non-refundable.**

**While filling up the Application Form, refer to the Guidelines for filling the Application Form.**

**PLEASE NOTE CANVASSING IN ANY FORM FOR ADMISSION IN CIT, KOKRAJHAR SHALL LEAD TO DISQUALIFICATION OF CANDIDATURE.**

## **13. DEPARTMENTAL PROFILES:**

### **13.1 ELECTRONICS AND COMMUNICATION:**

#### **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.

#### **COURSES**

The department offers Diploma and Degree Program in Electronics & Telecommunication Engineering and Electronics & Communication Engineering.

##### **B. Tech in ECE**

B.Tech course started in the year of 2010. Course Duration of B. Tech in ECE is 4 (Four) years & the Scheme of Examination is Semesters basis. Intake capacity of B. Tech course is 60.

##### **Diploma in ECE**

Diploma course started in 2006. Course Duration of Diploma in ECE is 3 (Three) years & the Scheme of Examination is Semesters basis. Intake capacity of Diploma course is 30.



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

## PROGRAMME EDUCATIONAL OBJECTIVES

- 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.

## PROTRAMME OUTCOMES

**Electronics and Communication Engineering graduates will be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **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.

4. **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.
5. **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.
6. **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.
7. **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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **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.

## **INFRASTRUCTURE**

The Department has classrooms equipped with modern teaching aids, laboratories departmental computer laboratory and staff rooms. All the laboratories are well-established as per the requirements of Diploma and Degree Program with excellent infrastructure related to the field of Engineering. The laboratories are well equipped laboratories with modern and sophisticated equipment, laboratory trainers and software

tools. All laboratories provide every possible assistance to undergraduate and diploma students to learn Electronics Engineering from the basic level.

Some of the laboratories as per curriculum are:

- 1) **Basic Electronics Laboratory:** It is equipped with a number of analog trainer kits, all required discrete 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.
- 2) **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.
- 3) **Microprocessor and Microcontroller Laboratory:** It is equipped with 8085 microprocessor and 8051 Microcontroller trainer kit. Experiments on Programming and interfacing with microprocessor and microcontroller are conducted in this laboratory.
- 4) **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.
- 5) **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.
- 6) **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.
- 7) **Project and Research Laboratory:** It is equipped with tools i) TCAD ii) ATLAS iii) Tanner iv) Optimism. These tools are used for device simulation for a broad range of applications, Data acquisition and analysis etc.

## SCOPE

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. 2<sup>nd</sup> 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, WBPDCCL etc. Students willing for higher studies are eligible to take admission in M.Tech in any institution all over India.

## **13.2 COMPUTER SCIENCE & 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 (45 Direct entries +15 Vertical + 06 Lateral entries. The department is has 10 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.

## 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

## PROTRAMME OUTCOMES

- a. **Basic Knowledge.** Ability to demonstrate knowledge of Mathematics, Science & Engineering in development, Computer fundamentals and programming.
- b. **Discipline Knowledge.** Ability to draw flowcharts of compiling a program and perform C programming experiments, analyse and interpret data.
- c. **The Engineer and society.** Ability to design Programming based tools that meets desired specification and requirements for society and its safety.
- d. **Experiments and practice.** Ability to conduct various types of lab experiments on Computers subjects and related areas.
- e. **Engineering Tools.** Ability to use programming languages and software to analyze problems in Computer Engineering.
- f. **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.
- g. **Environment and sustainability.** Ability to examine the impact of Computer Engineering solutions in global and environmental contexts and utilize the knowledge for sustained development.
- h. **Ethics.** Ability to observe professional ethics and norms and take responsibility while carrying out problem solving in Computer Engineering practice.
- i. **Communication.** Ability to communicate effectively in both verbal and written form through Programming concepts, coding and analysis.
- j. **Life-long learning.** Engage in life-long learning and adapt to rapidly changing technologies.

## INFRASTRUCTURE

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.

## **SCOPE**

Computers have become an 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.

## **13.3 FOOD ENGINEERING 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 centre 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.

## **PROGRAMME EDUCATIONAL OBJECTIVES**

PEO 1: 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.

PEO 2: 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.

PEO 3: To develop students for their life-long endeavors by improving their technical and intellectual capabilities, which may include professional career and/or postgraduate education. This may enable them to successfully adapt to technological and cultural changes for their proper evolution in society.

PEO 4: They will be able to work as an individual, as a team leader or as a member of a team in multicultural global environment.

PEO 5: To fulfill 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

## **PROTRAMME OUTCOMES**

- PO 1: 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
- PO 2: Ability to design and develop system components for practical engineering problems related to industries that meet specified needs
- PO 3: 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
- PO 4: 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
- PO 5: Ability to understand and apply knowledge on laws and regulations of food and allied areas
- PO 6: 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
- PO 7: Ability to function effectively as an individual, and as a member or leader in diverse teams in multi-disciplinary settings
- PO 8: Ability to recognize the need for independent and life-long learning, and have the preparation and ability to engage in the same

## **INFRASTRUCTURE**

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 (06) 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.



## **SCOPE**

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.

## **13.4 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. degree program in Civil Engineering with an annual intake of 66students (45 Direct entries + 15 Vertical + 06 Lateral entries

### **VISION:**

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

### **MISSION:**

- **M1:** To impart technical education in Civil engineering and related interdisciplinary fields for fulfilling local, national and global economic and social needs in sustainable manner.
- **M2:** To facilitate integrated personality development of students suited for the era of converging technologies and skills.
- **M3:** To create an environment for research into technical pursuits for capacity-enhancement through development of new tools and technologies.
- **M4:** To promote entrepreneurship development in various sectors of Civil Engineering.
- **M5:** To promote industry- academia interaction in the field of Civil engineering

### **PROGRAMME EDUCATIONAL OBJECTIVES**

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

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

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

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

### **PROGRAMME OUTCOMES**

- a. An ability to apply knowledge of mathematics, science and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data
- c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety
- d. An ability to function on multi-disciplinary teams
- e. An ability to identify, formulate, and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### **FACULTY:**

The Department has 13 faculty members (01 Professor, 01 Associate Professor and 11 Assistant Professor) and 3 Lab Technician. The faculty has teaching expertise in various specializations like Design of Structures, Environmental Engineering, Geotechnical Engineering, Structural Engineering, Hydraulics Engineering, Solid Mechanics and Transportation Engineering etc.

### **INFRASTRUCTURE.**

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, Geoinformatics Lab, Computational Lab.

**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.

**13.5 INSTRUMENTATION ENGINEERING****VISION OF THE DEPARTMENT:**

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

**MISSION OF THE DEPARTMENT:**

**M1.** To impart technical knowledge and imbibe skills in students to meet the industrial needs and research & development activities.

**M2.** 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.

**M3.** 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.

**PROGRAM 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.

### **PROGRAM SPECIFIC OUTCOMES (PSOs)**

The Instrumentation Engineering (IE) graduates will be able to

**PSO1.** 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 the instrumentation engineering and its allied fields.

**PSO2.** 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.

**PSO3.** 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.

### **INFRASTRUCTURE**

At present the department has five laboratories and one seminar hall.

The details are as follows:

#### **IE Laboratory 1, Electronic 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.
- Principle 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 interdisciplinary 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.

### **MAJOR EQUIPMENT PRESENT IN THE DEPARTMENT OF INSTRUMENTATION ENGINEERING:**

- Digital Storage Oscilloscope,DX-1102 60MHz, 1GSa/s
- MSO6012A, 100 MHz, 2Ga/s
- Multiple Power Supply, 30 V,  $\pm 15$  V, 5 A in Max.
- DX-4050 Function Generator
- 3,3/4 Digital Multimeter
- 8,1/2 Digital Multimeter
- LCR meter
- PCB Engraver
- Anderson, Maxwell, and Schering Bridges
- LVDT Trainers
- RTD, Thermistor and Thermocouple trainers
- Piezo Electric Transducer trainers
- Transducer and Instrumentation trainers
- PLC Training systems
- DCS Training modules
- Pressure Control Trainer
- Temperature Control Trainer
- Flow Control Trainer
- Multi-process Trainer
- PID Controller Trainer
- Recorders–Strip Chart and X–Y
- ECG,EEG,EMG Simulators
- Filters trainers
- Blood Pressure Monitoring
- Biomedical Trainers
- Microprocessor Trainer, Dyna–8085L(LCD)

- Microcontroller Trainer, 8081 Dynalog
- ARM Development tools
- Power Electronics Trainer Kit(SCR,DIAC,MOSFET,UJT)
- LAB VIEW
- Matlab 13
- Multisim 10.0
- PCSIM

## SCOPE

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 ie. 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.

## 13.5 INFORMATION TECHNOLOGY

### INTRODUCTION

The Department of Information Technology was established in the year 2011 offering 4 year B.Tech Degree program in Information Technology with an annual intake of 66 students (45 Direct entries +15 Vertical + 06 Lateral entries affiliated to Gauhati University).

### VISION:

The vision of the department is to become a centre of excellence and impart technical education in the field of Information Technology in a direction that would inspire and encourage students to be technically competent, self-disciplined, skilled, conscientious and creative to serve and lead the nation.

### MISSION:

- M1: To empower the students into innovative and high quality IT professionals to meet the global challenges.
- M2: To provide need based and customized quality training in the field of Information Technology with emphasis on research.
- M3: To provide an atmosphere for students and faculty for continuous learning to investigate, analyze, apply and transfer knowledge.

### PROGRAMME EDUCATIONAL OBJECTIVES

- **Successful Careers** - Graduates of IT will be in software industry as experts by providing various software solutions with proper plan, analysis, design, testing, implementation and validation.
- **Lifelong Learning** - Graduates of IT will emerge as innovative researcher or developer by engaging in lifelong learning.
- **Leadership** - Graduates of IT will exhibit leadership capability in an organization and/or on teams.
- **Teamwork** - Graduates of IT will demonstrate a commitment to **teamwork**.
- **Entrepreneur** - Graduates of IT can start their own firms and provide IT solutions.

### PROTRAMME OUTCOMES

- a. Apply the knowledge of mathematics, science and computing in the core information technologies.
- b. Design, implement and evaluate a computer-based system, or process component, to meet the desired needs within the realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- c. Review literature and indulge in research using research based knowledge and methods to design new experiments, analyze, and interpret data to draw valid conclusions.
- d. Select and apply current techniques, skills, and tools necessary for computing practice and integrate IT-based solutions into the user environment effectively.
- e. Apply ethical principles and responsibilities during professional practice.
- f. Function effectively as a team member or a leader to accomplish a common goal in a multidisciplinary team

#### **FACULTY:**

The Department has 04 members of faculty (04 Assistant Professors) and 1 Lab Technician. The faculty has teaching expertise in various specializations like Network security, Computer Networking, Sensor networks, Distributed Computing, Web design etc.

#### **INFRASTRUCTURE:**

The Department is equipped with excellent infrastructure. The laboratories include Information Security lab, Network lab, Multimedia lab, Software lab, and Hardware lab etc. The software available in the lab are Redhat Linux, i-security simulator, Oracle 11g, Visual Studio 12, adobe CS6, LAN-trainer simulator, IBM Rational Rose, IBM DB2, IBM AIX server etc.

#### **SCOPES:**

Broad categories of career options in the IT field are Information Technology- Hardware, Information Technology- Software, IT enabled Services (ITeS), Business Process Outsourcing (BPO) and Knowledge Process Outsourcing(KPO) etc., Typical designations/roles of jobs available in IT field are Business Analyst, Database Administrator (DBA), Database Architect/ Designer, ERP, Graphic Designer/ Animator, Game designer ,Web administrator, Network Administrator, Project Leader/ Project Manager ,Quality Assurance – Manager, Software Engineer/ Programmer , Software Test Engineer, System Administrator, System Analyst, Tech Architect, Team Leader/ Technical Leader, Technical Support Engineer and Quality Assurance etc. Job opportunities in software engineering are available in many software companies in India which include Accenture, ADP, Apps

Associates, Birla soft, Broad ridge, Cap Gemini, Capital IQ, Caritor, CMC Ltd, Cognizant Technology Solutions, Computer Associates, Cordys, CSC, Cybage Software, Dell, DST Global Solutions, Google, HCL, HP ,IBM, IGATE Global Solutions, Infosys, Larsen & Toubro Ltd, NUT Ltd, Microsoft, Oracle, Tata InfoTech Ltd, Polaris, Tata Consultancy Services, Yahoo etc.

### **13.6 DEPARTMENTAL PROFILES OF 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. The Bachelor of Design programme is affiliated to Assam Science and Technology University (ASTU), Guwahati and the Diploma programme is affiliated to State Council of Technical Education, Govt. of Assam.

The Department also plans to introduce Masters in Design and PhD in Design with specialization in the field of Multimedia Communication and Design very soon.

#### **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.

### **PROGRAMME EDUCATIONAL OBJECTIVES**

1. 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.
2. Graduates will be able to apply their creative skills, problem solving skills and exhibiting critical thinking in professional practice to tackle social, aesthetic, technical and business challenges.
3. Graduates will be able to adopt ethical attitude and exhibit effective skills in communication, management, teamwork and leadership qualities.

### **PROGRAMME OUTCOMES**

1. Apply the fundamental knowledge of design concepts in solving design problems.
2. Identify and define design problems, conduct design practices and investigate to analyze to arrive at substantial conclusions.
3. Propose an appropriate solution for design problems complying with functional constraints such as economic, environmental, societal, ethical, safety and sustainability.
4. Perform investigations, design and conduct practices, analyze and interpret the results to provide valid conclusions.
5. Demonstrate professional skills and contextual reasoning to assess environmental / societal issues for sustainable development.
6. Demonstrate Knowledge of professional and ethical practices.
7. Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary situations.
8. Communicate effectively among design community, being able to comprehend and write effectively reports, presentation and give / receive clear instructions.
9. Demonstrate and apply design & management principles in their own / team projects in multidisciplinary environment.
10. Recognize the need for, and have the ability to engage in independent and lifelong learning.

## **INFRASTRUCTURE**

The department has a dedicated space for Design Studios/Laboratory in the 1<sup>st</sup> 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.

### **2D 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.

### **3D Lab1 (Production)**

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

### **Maya 3D Lab2 (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).

## **SCOPE**

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 2<sup>nd</sup> year/3<sup>rd</sup> 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.

### **13.7 ALLIED ENGINEERING BRANCHES**

The allied engineering branches include Mechanical and Electrical Engineering. At present Mechanical Engineering branch is manned by 3 Assistant Professors and 2 Lab technicians. The Electrical Engineering branch has 2 Assistant Professors and 1 Lab technician.

### **13.8 BASIC SCIENCES**

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

### **13.9 HUMANITIES & SOCIAL SCIENCES**

The Department consists of English, Economics and Sociology. At present it is manned by 3 Assistant Professors from English, 2 from Economics and 1 from Sociology.

## **14. GENERAL ACADEMIC REGULATIONS**

### **14.1 GENERAL CONDUCT & DISCIPLINE.**

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

- (i) Willfully damage or steal or remove property/belongings of the Institute/Hostel or fellow students
- (ii) Indulge in possession, consumption or distribution of alcoholic drinks and drugs.
- (iii) Take part in noisy and unseemly behaviour and disturb studies of fellow students.
- (iv) Resort to ragging fresher/fellow students.
- (v) Take recourse to unfair means in examinations.
- (vi) Use Mobile Phones/I-Phones etc. in the academic buildings, library, laboratories & workshops.

### **14.2 LEAVE OF ABSENCE (DEGREE/DIPLOMA):**

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 Principal 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 65%. In other words no consideration in attendance will be made once a student's attendance falls below 65% in a subject.

### **14.3 CHANGE OF BRANCH (DEGREE/DIPLOMA):**

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

1. 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.
2. The selection of applicants will be based on merit. Students in Diploma module who have secured at least 60% marks in aggregates in both 1<sup>st</sup> and 2<sup>nd</sup> semester are only eligible for branch change. In case of degree module, students who have secured at least 7.0 CGPA in aggregates in both 1<sup>st</sup> and 2<sup>nd</sup> semester are only eligible for branch change. No applicant with back paper(s) will be considered for change of branch.
3. Students who passed 1st and 2nd semester examinations in one sitting can only eligible for branch change.

#### **14.4 RENEWAL REGISTRATION FOR CONTINUING STUDENTS (DEGREE/DIPLOMA):**

A student has to register for continuation of study every Semester. Registration Fees will be fixed and announced by the Registrar's Office from time to time. Dis-Collegiate students will have to re-register for the semester they are re-admitting to and such fees will also be duly notified from time to time.

### **15. REGULATIONS FOR DIPLOMA**

*(The following rules and regulations are taken from the Examination Rules and Regulations (2006-2007) Amended issued by SCTE, Assam.)*

#### **15.1 ATTENDANCE, EXAMINATION & MOBILITY RULES:**

Rule 4.10 states 'An internal student of an institute shall be permitted to appear in semester examinations as regular student who has attended at least 75% of classes held in each of the theory and practical subject individually.'

Rule 4.15: The head of the institute shall be competent to disallow a candidate from appearing in the whole or part of the examination if the candidate is found to be:

- (i) Deficient in the attendance of requisite number of classes held and/or deficient in securing the minimum pass marks in the sessional.
- (ii) Showing misconduct or ill behavior to any of the Institute staff member, invigilating officer, examiner or any member of the examination cell of the Institute.



- (iii) Resorting to strike and/or adopting unfair means in examination in any paper of any subject and/or violating the rules of examination.

Rule 5.2: A student has to attain a minimum attendance in each subject and secure the minimum pass marks prescribed for a pass in the sessional of each subject.

Rule 5.3: A student failing to attain the minimum attendance and sessional even in a single subject will not be allowed to appear in the semester end examination and he/she has to repeat the semester again by attending classes.

Rule 5.4: Such type of candidate will not be allowed to move to the higher semester without sitting in the previous semester end examination.

Rule 5.7: A student will be allowed to appear altogether in 11 subjects only in end semester examinations including all subject of the regular semester with five arrear back subjects to be cleared.

Rule 5.9: A student must clear all back subjects of 1<sup>st</sup> semester for promotion to 5<sup>th</sup> semester, similarly must clear all back subjects of 2<sup>nd</sup> semester for promotion to 6<sup>th</sup> semester.

Rule 5.10: Those students who are not promoted and cannot take admission in 5<sup>th</sup> and 6<sup>th</sup> semester can appear in back subject of the lower semesters.

Rule 5.11: To pass in a subject a candidate must secure pass marks in both theory and practical/viva component individually.

Rule 5.12: A student failing in any one component of a subject (either theory or practical) will have to reappear in that component only as back candidate in which he/she has failed.

Rule 5.13: Total marks and pass marks of a subject will be as per curriculum structure and scheme of examination.

## **15.2 DURATION FOR COMPLETION OF DIPLOMA COURSE.**

Rule 5.14: Maximum permissible period for completion of Diploma course by a student shall be 6 academic calendar years from the date of admission.

### 15.3 RE-EXAMINATION & RE-EVALUATION OF ANSWER SCRIPTS.

Rule 7.6: Re-examination of answer scripts may be allowed provided the candidates concerned apply with a re-examination fee as prescribed per paper within 21 days from the date of publication of result of the respective examination to the Secretary of Examination Committee of SCTE, Assam. Re-examination means re-totaling of marks and scrutiny of any answer not valued already. No re-evaluation or re-examination of practical and sessional works of any examination shall be permitted.

### 15.4 AWARD OF DIPLOMA/CLASS/DIVISION:

Rule 8: A student is eligible for award of Diploma only if he/she passes in all subjects. The award of class shall be based on the marks obtained in the 4<sup>th</sup>, 5<sup>th</sup> & 6<sup>th</sup> semester examinations. However, the division will be (i) First class with Hons. – 60% and above and passing all the subjects of all the six semester examinations in single sitting (ii) First class – 60% and above (iii) Second class – less than 60%.

### 15.5 DIPLOMA EVALUATION SCHEMES.

Theory		Practical	
Sessional	End Semester Exam	Sessional	End Semester Exam
Mid Semester Exam: 10 marks Other Evaluations: 10 marks Attendance: 10 marks Total = 30 marks (Pass Mark: 30% for Humanities & Basic Sciences; 40% for Core Engg. papers)	70 Marks (Pass Mark: 30% for Humanities & Basic Sciences; 40% for Core Engg. Papers; 50% for Project Seminar etc.)	25 Marks (Pass Mark: 13)	25 Marks (Pass Mark: 12)

## 16. REGULATIONS FOR B.TECH. PROGRAMME

### 16.1 ATTENDANCE.

Attendance in all classes (lectures, tutorials, laboratories, practical, workshops, etc.) must be at least 75% of the total classes. Students with shortage of attendance will not be allowed to write the semester examinations and will be awarded an F grade (i.e. Fail) in that subject. Such students have to reregister and go through the entire course once again (Sessional & Semester End Examinations).

## 16.2 DURATION FOR COMPLETION OF B.TECH. PROGRAMME.

The normal duration for completion of B.Tech. Programme is 8 Semesters. However a student may be allowed up to 16 consecutive semesters from the first semester registration.

## 16.3 B.TECH. EVALUATION SCHEME

Theory		Practical	
Sessional	End Semester Exam	Sessional	End Semester Exam
Mid Semester Exam: 25 marks	60 marks (Pass Mark: 18)	30 marks (Pass Mark: 09)	70 marks (Pass Mark: 21)
Other Evaluations: 10 marks			
Attendance: 5 marks			
Total = 40 marks (Pass Mark: 12)			

Students must pass all the above four components separately. Students failing in sessional will not be allowed to register for the higher semester.

## 16.4 THE GRADING SYSTEM IN FORCE AS PER GAUHATI UNIVERSITY IS AS UNDER.

Range of Marks	Letter Grade	Grade Point	Description
90 – 100	A	10	Excellent
75–89	B	08	Good
55–74	C	06	Fair
40–54	D	04	Average
30–39	E	02	Poor
Below 30	F	00	Fail
Attendance < 75%	FA	00	Fail

Conversion Formulae: For GPA below 9.0 : % of marks = 10\*CGPA – 5  
For GPA above 9.0 : % of marks = 15\*CGPA – 50

For Class I : Minimum CGPA must be 7.0

For Class II : Minimum CGPA must be 5.0

## 16.5 RE-EVALUATION OF ANSWER SCRIPTS.

Revaluation for B.Tech. Programme will be as per Gauhati University Guidelines and students are required to follow the same.

## 17. EXAMINATION RULES AND REGULATIONS

- I. The Institute follows a continuous evaluation system and all assessments made during the semester carry weightage to the final marks obtained by a student in a particular course/subject.
- II. Attendance in lectures, tutorials and practical is compulsory. A student has to secure minimum 75% attendance separately in lectures, tutorials and practical in order to be able to sit for the final semester examination which is held at the end of every semester.
- III. Performance in attendance will be made known to the students at the end of every month. Warnings will be issued to those students who have less attendance and such students will be asked for their reason(s) of absence by the respective Course Instructors.
- IV. Students who fail in attendance (in more than 2 subjects) are not allowed to sit for the semester examination. Such students will be declared “Dis-Collegiate” and will not be promoted to the higher semester. They will have to re-register and repeat the whole semester with a junior batch.
- V. However, concession in attendance will be made in the following cases:
  - (a) Illness of the student;
  - (b) Natural calamity at home;
  - (c) The student has represented the Institute in such events which are important to the Institute.
  - (d) Application with valid reasons of absence has been submitted to the respective Course Instructors/ Head of Departments within a week of re-joining classes in case of (a) above and prior application has been granted by the Head of the Institute through the respective HoD in cases (b) & (c).
  - (e) No applications for leave will be accepted once the final attendance has been declared by the Examination Branch even if they are forwarded by Course Instructors or HoDs.
- IV. Under no circumstances students’ attendance below 65% will be considered. In other words, if a student’s attendance comes below 65% in any course(s) then concessions for attendance will not be made unless otherwise approved by the Head of the Institute on extraordinary grounds.
- V. At least one assessment (class test/assignment/quizzes/surprise test/open book test etc.) will be made before the mid semester examination and marks obtained by the students will be displayed by the respective Course Instructor(s).
- VI. A student must clear all back subjects of 1<sup>st</sup> semester for promotion to 5<sup>th</sup> semester, similarly must clear all back subjects of 2<sup>nd</sup> semester for promotion to 6<sup>th</sup> semester

- VII. Mid Semester examination will be centrally conducted by the respective departments and the time schedule will be notified by the Examination Cell of the Institute.
- VIII. At least one more assessment (class test/assignment/quizzes/surprise test/open book test etc.) will be made after the mid semester examination and displayed to the students.
- IX. Evaluations made in Sl. No. VII, VIII & IX along with marks allotted for attendance constitute the Sessional component of a subject. A student is to secure the minimum passing mark in Sessional of all the subjects of a semester otherwise he/she will be declared “Dis-Collegiate” and not promoted to the higher semester. Such students will not be allowed to sit the semester examinations of all subjects. They will have to re-register and repeat the whole semester. This will apply for both theory and practical components of a paper. Pass marks in Sessional are different for different components: **30% of total marks for B.Tech.** & it varies from **30% – 50% for Diploma** depending on the nature of the course(s). Information may be obtained from the Course Structures available with the Examination Cell/Institute’s website or from the various Departments.

## 18. DECLARATION OF RESULT:

The Results of Entrance Examination and the selected list of the eligible candidates for admission will be declared on 12<sup>th</sup> June, 2018 at 5:00 pm for CITEE-2018 (Diploma), CITDEE-2018 (Degree) and CITLET-2018 (Degree Lateral). The Results and selected list will be available on the Notice Board of the Institute. The candidates may also log on to CIT website: [www.cit.ac.in](http://www.cit.ac.in) to check their status.

## 19. COUNSELING AND ADMISSION:

The counseling and admission for Diploma courses will be conducted on 26<sup>th</sup> June 2018 for CITEE-2018 and that for Degree Courses will be on 27<sup>th</sup> June 2018 for CITDEE-2018, 28<sup>th</sup> June 2018 for CITBDAT and 18<sup>th</sup> July 2018 for CITLET-2018 qualified candidates. Subsequent counseling dates would be notified later in the website.

- Candidates selected for admission must get themselves admitted by payment of the fees on the date of counseling failing which their selection shall automatically be treated as cancelled.
- During counseling, the candidates have to apply for the available branches separately in the Counseling Form to be issued before the start of counseling and the branches

will be allotted by the Chairperson of the Admission Committee after thorough verification of requisite eligibility criteria by the Counseling Committee.

- Discrepancies found in the information furnished in the Counselling 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 may be permitted to stand in lieu of the candidate.
- All the qualified candidates (i.e., those scoring above a minimum cut off mark) would be called for counseling on a single day. However, all candidates called for counseling are not guaranteed a seat. Admission depends on fulfillment of eligibility and availability of seat.
  
- The candidates should not forget to bring the original and photo copies of all the relevant certificates during the day of counseling. At the time of counseling and admission the selected candidates must provide the following certificates:
  1. Four passport size photos
  2. Age proof certificate
  3. Marksheet of HSLC or equivalent
  4. 3 attested Mark Sheets of 10+2 (Sc) or equivalent.
  5. Permanent Residential Certificate (PRC)
  6. Caste Certificate (in case of SC/ST/PH)
  7. Physically Handicapped (PH) Certificate (if applicable)
  8. Conduct/Character Certificate from the institution last attended.
  9. Gap Certificate (if applicable)
  10. Transfer Certificate in original
  11. Migration Certificate in original.
  12. A photo copy of Registration Card of HSSLC (10+2)

The certificates listed from (2) to (12) are compulsory for counseling and the rest must be submitted within 15 days from the date of admission otherwise the admission stands cancelled.

## **20. MEDIUM OF INSTRUCTION:**

The medium of instruction is English.

## **21. 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:

- a. Withholding Results
- b. Withholding Scholarships or other benefits
- c. 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.antiragging.in/Site/Affidavits\\_Registration.aspx](http://www.antiragging.in/Site/Affidavits_Registration.aspx) within one month from the date of admission otherwise the admission stands cancelled. Further all the students admitted into the hostels have to submit a separate affidavit provided in CIT admission website.

### 23. FEE STRUCTURE FOR ADMISSION:

The fee structure for admission (excluding hostel fees) to the institute of the current year is as given below:

1 <sup>st</sup> Year	Diploma	Degree		
		Assam (DTEA,AHSEC)	Assam (CBSE)	Outside Assam
GEN/OBC	Rs. 9928/-	Rs.17770/-	Rs.18730/-	Rs. 23880/-
SC/ST/PH	Rs. 9680/-	Rs. 14020/-	Rs. 14980/-	Rs. 20120/-

N.B.: The institute reserves the right to review the fee structure. (The Council/University fees may change as notified by them). The detailed breakup of fees structure can be obtained from the institute's website.

### 24. ADMISSION WITHDRAWAL RULE:

Withdrawal of Admission is allowed till 30 days from the date of admission. Candidate can withdraw his admission from the Institute by submitting an application form available in the CIT admission website. Refund of Fees after deducting processing fees would be done within this date. No request for refund of fees would be entertained after this period.

## 25. 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.

## CIT ENTRANCE EXAMINATIONS -2018 (CITEE – 2018)

### 26. FORMAT AND SYLLABI OF CITEE-2018:

The Central Institute of Technology Entrance Examination (CITEE)-2018 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.

### 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.

## 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 At. No. 18, Radioactivity and properties of  $\alpha$ ,  $\beta$  and  $\gamma$  rays, Radio-isotopes and their uses, Nuclear fission and fusion reactions.

**Classification of Elements:** Mendeleef 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 Sulphur and its reaction with  $O_2$ , conc.  $HNO_3$  and conc.  $H_2SO_4$ , Carbon and its compounds, Allotropes of carbon, hydrocarbon, alkanes, isomerism in alkanes, Petroleum, Preparation and properties of  $CH_3OH$ ,  $C_2H_5OH$ , 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, Green house 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.

## 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.

## 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 inequations 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 A.P., 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  $\sin x$ ,  $\cos x$ ,  $\tan x$ ,  $\cot x$ ,  $\operatorname{cosec} x$ , for  $0^\circ$   $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ ,  $90^\circ$ .

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.

## SECTION –E

### ENGLISH (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.**

## CIT DEGREE ENTRANCE EXAMINATIONS –2018 (CITDEE–2018)

### 27. FORMAT AND SYLLABI OF CITDEE 2018

The Central Institute of Technology Degree Entrance Examination (CITDEE)–2018 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.

#### Section–A

##### Physics (25 marks)

###### Unit 1. Physics 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, 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 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 nonohmic 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 applications.

### **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: wave front 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. Electronic 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.

1. Vernier callipers-its use to measure internal and external diameter and depth of a vessel.
2. Screw gauge-its use to determine thickness/diameter of thin sheet/wire.
3. Simple Pendulum-dissipation of energy by plotting a graph between square of amplitude and time.
4. Metre Scale - mass of a given object by principle of moments.
5. Young's modulus of elasticity of the material of a metallic wire.
6. Surface tension of water by capillary rise and effect of detergents.
7. Co-efficient of Viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body
8. Plotting a cooling curve for the relationship between the temperature of a hot body and time.
9. Speed of sound in air at room temperature using a resonance tube.
10. Specific heat capacity of a given
  - (i) solid and
  - (ii) liquid by method of mixtures.
11. Resistivity of the material of a given wire using metre bridge.
12. Resistance of a given wire using Ohm's law.
13. Potentiometer -



- (i) Comparison of emf of two primary cells.
- (ii) Determination of internal resistance of a cell.
- 14. Resistance and figure of merit of a galvanometer by half deflection method.
- 15. Focal length of:
  - (i) Convex mirror
  - (ii) Concave mirror, and
  - (iii) Convex lens.
- 16. Using parallax method plot angle of deviation vs angle of incidence for a triangular prism.
- 17. Refractive index of a glass slab using a travelling microscope.
- 18. Characteristic curves of a p-n junction diode in forward and reverse bias.
- 19. Characteristic curves of a Zener diode and finding reverse break down voltage.
- 20. Characteristic curves of a transistor and finding current gain and voltage gain.
- 21. Identification of Diode, LED, Transistor, IC, Resistor, Capacitor from mixed collection of such items.
- 22. Using multimeter to:
  - (i) Identify base of a transistor
  - (ii) Distinguish between npn and pnp type transistor
  - (iii) See the unidirectional flow of current in case of a diode and an LED.
  - (iv) Check the correctness or otherwise of a given electronic component (diode, transistor or IC).

## 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,  $\psi$  and  $\psi^2$ , concept of atomic orbitals as one electron wave functions; Variation of  $\psi$  and  $\psi^2$  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;  $\Delta S$  of the universe and  $\Delta G$  of the system as criteria for spontaneity,  $\Delta G^\circ$  (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 characteristics of equilibrium involving physical processes.

Equilibria involving chemical processes: Law of chemical equilibrium, equilibrium constants ( $K_p$  and  $K_c$ ) and their significance, significance of  $\Delta G$  and  $\Delta G^\circ$  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, Bronsted – 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 Kinetics**

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**

Modern 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 and 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.

#### **Groupwise 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; Allotropic forms of phosphorus; Preparation, properties, structure and uses of ammonia, nitric acid, phosphine and phosphorus halides, ( $\text{PCl}_3$ ,  $\text{PCl}_5$ ); 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. Co-ordination 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:  $C=C$ ,  $C\equiv C$  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,  $NH_3$  and its derivatives), Grignard reagent; oxidation; reduction (Wolff Kishner and Clemmensen); acidity of  $\alpha$  – 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 oligosaccharides (sucrose, lactose, maltose) and polysaccharides (starch, cellulose, glycogen).

**PROTEINS** – Elementary Idea of  $\alpha$  – 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:

Inorganic compounds: Mohr's salt, potash alum.

Organic compounds: Acetanilide, p-nitroacetanilide, aniline yellow, iodoform.

• Chemistry involved in the titrimetric exercises – Acids bases and the use of indicators, oxalic-acid vs  $\text{KMnO}_4$ , Mohr's salt vs  $\text{KMnO}_4$ .

• Chemical principles involved in the qualitative salt analysis:

Cations –  $\text{Pb}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Al}^{3+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{NH}_4^+$ .

Anions–  $\text{CO}_3^{2-}$ ,  $\text{S}^{2-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ . (Insoluble salts excluded).

• Chemical principles involved in the following experiments:

1. Enthalpy of solution of  $\text{CuSO}_4$
2. Enthalpy of neutralization of strong acid and strong base.
3. Preparation of lyophilic and lyophobic sols.
4. Kinetic study of reaction of iodide ion with hydrogen peroxide at room temperature.



## 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:  $S_n$ ,  $S_n^2$ ,  $S_n^3$ . 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 normals.

#### 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.

**Evaluation of simple integrals of the type**

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

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

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

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:  $\frac{dy}{dx} + p(x)y = q(x)$

**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, 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.

## Section-D

### ENGLISH (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.

## CIT BECHALOR OF DESIGN ADMISSION TEST – 2018 (CITDAT-2018)

The Central Institute of Technology Bachelor of Design Admission Test –2018 (CITBDAT-2018) will be conducted in a duration of Three (03) 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

**Marks Breakup of Question Paper.**

<b>Question Specific instruction.</b>					
	<i>Contents</i>	<i>Number of Questions</i>	<i>Marks</i>	<i>Total Marks</i>	<i>Remarks</i>
Part-A	General knowledge	30	Each question will carry one (1) mark. (1x100)	100	<b>Evaluation</b> through computer.
	Computer fundamentals	20			
	English communication	30			
	Culture and Creativity ability	20			
Part-B	Section-I				
	<ul style="list-style-type: none"> <li>• Visual Perception and spatial ability</li> <li>• Sensitivity,</li> <li>• Illustration and decoration,</li> <li>• Problem Identification and Analysis,</li> <li>• Observation and design sensitivity,</li> </ul>	04	Each question will carry ten (10) marks. (10x4)	40	<b>Evaluation</b> 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.
	Section-II				
<ul style="list-style-type: none"> <li>• Drawing and Creativity</li> <li>• Visual Communication Skills</li> </ul>	03	Each question will carry twenty (20) marks. (20x3)	60		

## CIT LATERAL ENTRANCE TESTS 2018 (CITLET-2018)

### 28. FORMAT AND SYLLABI OF CITLET2018

#### FIRST 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 1<sup>st</sup> 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.

#### SECOND PAPER.

Branch Papers (Marks – 40, Time – 1 hour): The Branch papers will be separate for the six branches of Engineering of the Institute. This paper will be of the standard of Diploma Course of the concerned branch. The syllabi for branch papers for the six branches are given below.

#### A. ELECTRONICS AND COMMUNICATION ENGINEERING

1. **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.
2. **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.
3. **Network Theory:** Network analysis, Loop Analysis, Mesh Analysis; Network Theorems, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Millman's Theorem, Star-Delta Connections, Two port networks.
4. **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.

5. **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.
6. **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.
7. **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.
8. **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.
9. **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.

## B. COMPUTER SCIENCE ENGINEERING

1. **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.
2. **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.
3. **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.
4. **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

5. **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.

### C. INSTRUMENTATION ENGINEERING

1. **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.
2. **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.
3. **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.
4. **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.
5. **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.
6. **Microprocessors.** Number systems, Data representation; microprocessors; Architecture and Instruction set of Microprocessors 8085, Assembly language programming.

### D. FOOD PROCESSING TECHNOLOGY

1. **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 psychrometric calculations.



2. **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.
3. **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.
4. **Food Engineering Operations:** Materials and introduction energy balance for food engineering processes. Size eduction, 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.
5. **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.
6. **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,
7. **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.
8. **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, FAO

## **E. CIVIL ENGINEERING (CONSTRUCTION TECHNOLOGY)**

- 1. 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 insulating materials; Glasses; plastics and asphaltic material.
- 2. Surveying.** Introduction to surveying, chain surveying, Compass surveying, Leveling, Contouring, Theodolite, Traversing, Total Station Survey, Tacheometry, Curves, Plane Table Surveying, Trigonometrical leveling.
- 3. 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.
- 4. 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.
- 5. 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.
- 6. 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.
- 7. 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.

8. **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.
9. **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.

## F. INFORMATION TECHNOLOGY

1. **Fundamentals of Computer.** History, generation, classification, von Neumann architecture, Functions of the different units of computer, hardware and software, peripherals, ASCII, Unicode standards etc.
2. **Digital Electronics.** Binary, Octal and hexadecimal number system, Binary addition, subtraction, multiplication and division, Boolean algebra, Logic Gates, DE Morgan's Theorems, K-Map, BCD, Arithmetic circuits, Decoders, Multiplexers and De-Multiplexers, flip flops, Counters, Types of RAM/ROM.
3. **Programming Language C.** Constants, variables and data types, Operators and Expressions, Control Structures, Functions, Arrays, Pointers, Strings, Structure and Unions, File Handling.
4. **Introduction to Databases.** Architecture and structure of Database Management System, data independence, ER Diagrams, Introduction to network, hierarchical and relational model, Domain, Attributes, Tuples and Relations, Entity and referential integrity, keys, Normalization, First, Second and Third normal forms, Boyce/Codd normal form, Structured Query Language: DDL and DML statements.
5. **Data Structure.** Basics, Arrays, Operations on arrays with Algorithms (searching, traversing, inserting, deleting), Traversing a linked list, Searching linked list, Insertion and deletion into linked list, Application of linked lists, Doubly linked lists, Stacks, Queues, Binary Trees, Search algorithm (Linear and Binary), Sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Selection Sort, Merge Sort, Heap Sort) and their comparisons.
6. **Computer Architecture and Organization.** Instruction Code, Instruction Cycle, Instruction types, Design of basic computer, Register Organization, Addressing modes, Introduction to RISC, CISC architecture, Control Unit – Hard wired and Micro programmed, Pipeline processing, Memory Hierarchy, associative memory, cache memory, virtual memory, I/O organization.

7. **Data Communication and Computer Networks.** LAN, MAN and WAN, OSI Model, Topologies, Basic access protocols: CSMA/CD, Token Passing, Ethernet, Error Detection, Network connectivity Devices, NICs, Hubs, Repeaters, Multiplexers, Modems, Routers and Protocols, Firewall, ATM, Different classes of IP addressing, Protocol Suites.
8. **Operating System (OS).** System Software: Compiler, Assembler, Loader, linker, debugger. Definition, types and importance of Operating Systems, Memory organization, Process Management Functions, Process Scheduler, scheduling algorithms, Process synchronization, Memory Management Function, Segmentation, deadlock, Swapping, Simple Paging System, Virtual Memory, I/O Management Functions.
9. **Multimedia.** Multimedia hardware, sound cards, CD ROMS, full motion Digital Video.
10. **Internet.** Introduction to FTP, TELNET, E-mail, web browser and web servers.

## **28. HOSTEL ADMISSION AND GENERAL HOSTEL RULES:**

For hostel Admission, the candidate has to apply separately in the Application Form, issued on the day of counseling and submit it 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. Violation of hostel rules will make students liable for disciplinary actions including expulsion from the hostel.

- 1) 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.
- 2) No student shall keep any unauthorized person in his/her room.
- 3) In the event of mischief/foul play or accident etc. the warden can break open the room for investigation.
- 4) Whenever the student proposes to leave station or to remain outside the hostel for the night, he/she should obtain prior permission of the warden.
- 5) No female visitor is allowed to enter the boys' hostel and male visitor in girls' hostel without the written permission of the respective warden.
- 6) Students are forbidden to utilize the hostel staffs as privates or abuse them in any way.
- 7) Electric stoves, room heaters or other electric appliances are not allowed in the hostel.
- 8) 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.
- 9) 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.
  - 10) Cleanliness of the rooms is to be maintained by the student himself.
  - 11) Hostel students are not allowed to use motorized vehicles inside the Campus.
  - 12) Students should carry their Identity Card all the time and to produce the same whenever demanded by the authority.
  - 13) Parents are especially requested to guide their ward so that their ward doesn't indulge in any physical violence.
  - 14) 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 affidavit provided in CIT admission website within one month from the date of hostel admission.*

## **29. IMPORTANT INFORMATION:**

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

**29.2** The appearing /appeared candidates are also allowed 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, the candidature will be rejected.

**29.3 Entrance examination fees payment:** Candidates who apply through the online Application Form from the CIT website: [www.cit.ac.in](http://www.cit.ac.in) must submit the system generated filled form along with a e-payment receipt of Rs.1000/- (one thousand only) for GEN/OBC and Rs.500/- (five hundred only) for SC/ST/PWD candidates. The online payment procedure is given in Annexure-I. Candidates who apply offline need not pay fees separately; the cost of the prospectus is inclusive of the entrance examination fees. The fees are not refundable.

### **30. GUIDELINES FOR FILLING OF APPLICATION FORM.**

Please read carefully the instructions given in this section before filling in the Application Form. To avoid mistakes and overwriting you may complete the entries item first on a plain paper, and after proper scrutiny, transfer the same onto the Application Form. The Application Form must be filled in English only. Use Capital letters except the signature. Note that only one application form is admissible. Any violation of the instruction may make your application invalid. Incomplete application form will be rejected. While filling up information in the boxes, always leave a blank between two words.

#### **30.1 Important Terms.**

**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. 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.

**Medical Certificate**: The medical certificate is to be obtained from a govt. medical doctor 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.

### 30.2 Important Codes and Code numbers

#### (i) Entrance Test/Entry Scheme.

Entrance	Code	Code Number
Diploma	CITEE	1
Diploma (PAT)	PAT	2
B. Tech. (Direct)	CITDEE	3
JEE Main	JEE	4
B. Tech. (Lateral)	CITLET	5
B. Tech. (Direct)	CITDEE & JEE	6
B. Tech. (Lateral/Vertical)	CITLET & CITVAD	7
B. Des. (Direct)	CITBDAT	8
B. Des. (Direct)	CITBDAT & UCEED	9

#### (ii) Examination Centre.

Examination Centre	Code	Code Number
For candidate applying for admission through JEE or UCEED score	N/A	0
KOKRAJHAR	KOK	1
GUWAHATI	GUW	2
UDALGURI	UDL	3
BARAMA	BAR	4
KAJALGAON	KAJ	5
JORHAT	JOR	6

If the number of applicants is less than 75 for a particular Examination Centre, then the candidates will be shifted to their next choice of Examination Centre. **THE CITBDAT-2018 WILL BE HELD ONLY IN KOKRAJHAR AND GUWAHATI**

#### (iii) Region of Permanent Residence

Region	Code	Code Number
All India (excluding NE & BTAD)	AI	1
North Eastern (excluding BTAD)	NE	2
Bodoland Territorial Autonomous Districts	BTAD	3

(vi) Reservation Category

Reservation Category	Code	Code Number
General	GEN	1
Other Backward Classes	OBC	2
Scheduled Castes	SC	3
Scheduled Tribes	ST	4
Person with Disability	PWD	5

(v) Nationality

Nationality	Code	Code Number
Indian	IND	1
Non-Indian	NIN	2

**30.2 The following are the instructions.**

The box for Roll No is not to be filled by the candidate. (It will be filled by office)

**Para 2.** Tick the appropriate programme for which the admission is sought.

**Para 3.** Write your name neatly in block letters leaving one space between two words.

**Para 4.** Write your father's/guardian's name in the space provided leaving one blank space between two words.

**Para 5.** Write your mother's name in the space provided leaving one blank space between two words.

**Para 6.** Write your date of birth in the format dd-mm-yy in the boxes provided. (e.g. 1<sup>st</sup> August 2018 as 01-08-18).

**Para 7.** Write your active E-mail id and your valid mobile number

**Para 8.** Enter the appropriate code corresponding to appropriate entrance test /entry scheme.

**Para 9.** Enter the appropriate code according to your choice of entrance examination centre. Change of examination centre is usually not allowed. For candidates applying through JEE/UCEED score, enter examination code as '0' (Zero).

**Para 10.** Enter the appropriate code corresponding to your region of permanent residence. This must be supported by a Permanent residence certificate to be produced during counseling.

**Para 11** Enter the appropriate code corresponding to the category through which you claim to be admitted. Candidates seeking admission through the reserved category must produce the certificate obtained from competent authority.

**Para 12.** Enter the appropriate code according to your nationality.

**Para 13.** Enter the appropriate code according to your status of eligibility.



**Para 14.** Tick the appropriate box corresponding to your gender.

**Para 15.** Fill your correspondence address clearly in capital letters.

**Para 16.** Fill your permanent address clearly in capital letters.

**Para 17.** Fill and put your signature. Your parent/guardian should do the same.  
Unsigned applications are automatically rejected.

Paste a recent colour passport size photograph in the appropriate place of the application form and send one identical photograph of the candidate along with the application form. Also, retain one identical photograph for affixing in the admit card which can be download from the CIT admission website in the 1<sup>st</sup> week of May 2018 by entering the application form no. and the registered mobile number as given in the application form.

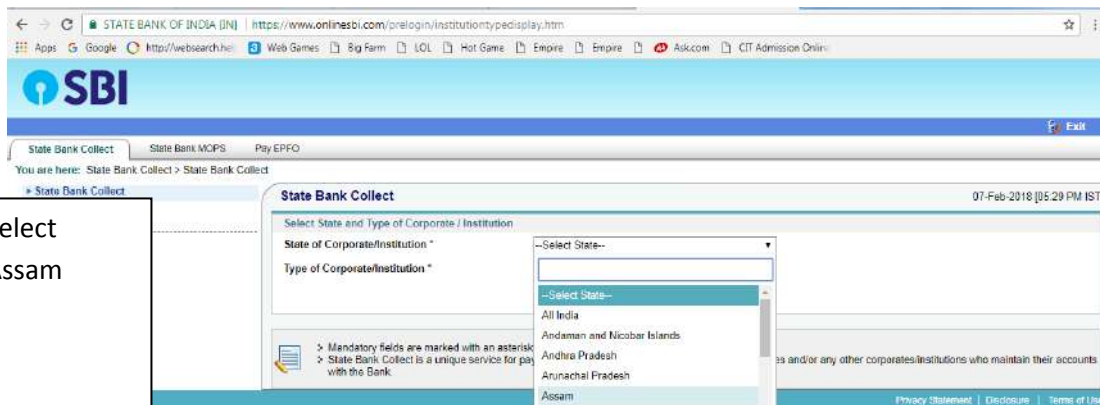
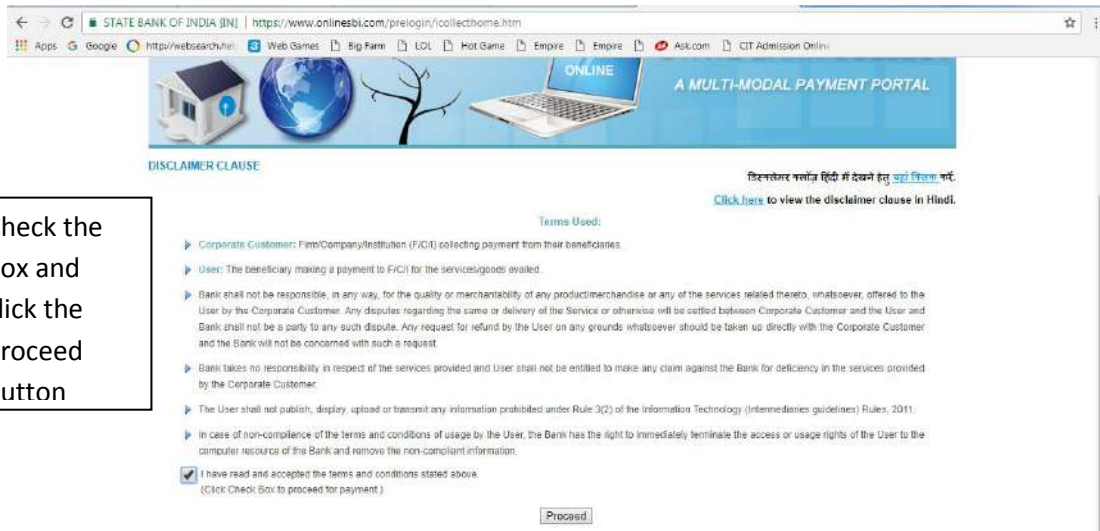
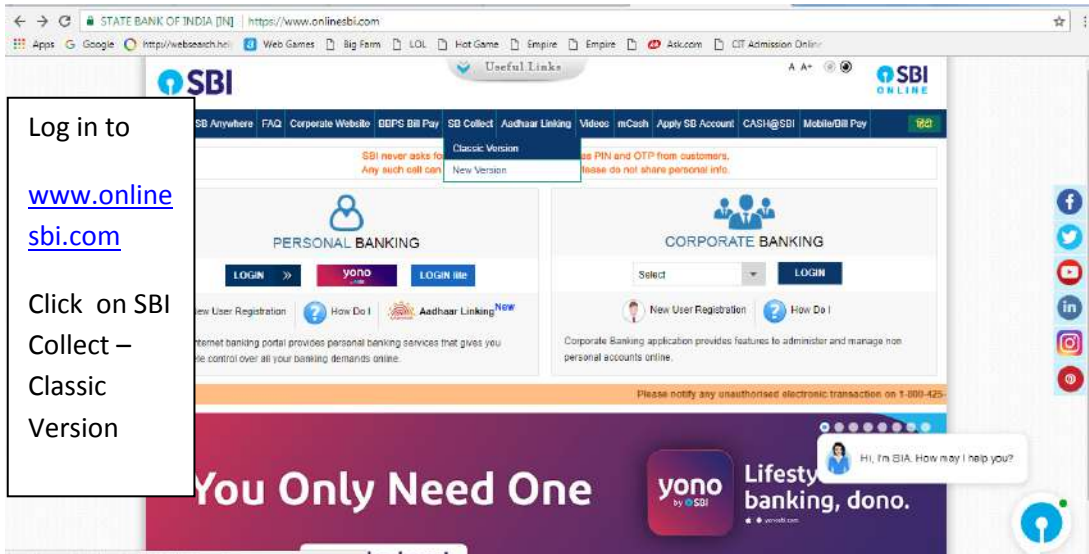
### 31. CHECK LIST:

After filling up the Application Form, check carefully that:

1	You have filled up all Para 2 to 17 of the Application Form.	
2	You have enclosed the certificate for claiming your Reservation category.	
3	You have pasted photograph on the Application Form	
4	You have enclosed an unattested identical photograph with your application form number written on the back side.	
5	You have enclosed SBI e-payment entrance examination fees receipt (who had applied online) of Rs 1000/- for GEN/OBC or Rs 500/- for SC/ST/PWD candidates.	

***Note. Candidate will receive a sms or email from Admission Cell, CIT, Kokrajhar as confirmation of receive of application form***

**Annexure-I : (SBI E-Collect online payment procedure)**



Select Educational Institution

Select Central Institute of Technology Kokrajhar

Enter the Details in the field given, make payment and exit

*Note. Do not forget to print the e-payment receipt, this needs to be sent along with the application form.*