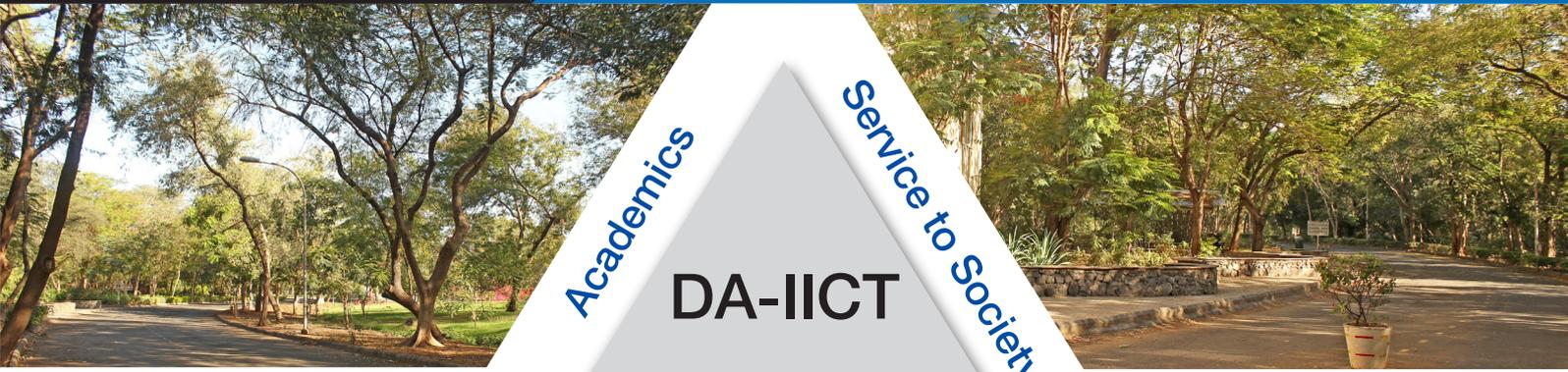




# M.Tech. (ICT) with specialization in Software Systems



Academics

Service to Society

DA-IICT

Research & Innovation





# DA-IICT at a Glance

**DA-IICT** was founded in 2000 as a unique university devoted to the cutting-edge interdisciplinary area of Information and Communication Technology (ICT). ICT was emerging as the technology of the future bringing in the fourth Industrial Revolution. Well known and highly qualified faculty members joined DA-IICT and developed a curriculum and research program steeped in all aspects of ICT, societal, scientific, and technical. This spirit has been nurtured for the last 20 years and DA-IICT wants to continue its excellence in interdisciplinary teaching and research well into the future.

The Act No. 6 of 2003 of the Gujarat Legislature provided for the establishment of the DA-IICT and conferred on it the status of a University. On 30 November 2004, DA-IICT was included in the list of Universities maintained by the University Grants Commission under Section 2(f) of the UGC Act, 1956. DA-IICT is a member of the Association of Indian Universities (AIU) as approved by the AIU at its 84th Annual Meeting held during 12-14 November 2009. The National Assessment and Accreditation Council, Government of India has accredited DA-IICT with an **'A' Grade in 2017**.

## **Vision and Mission**

The vision of the institute is to become a globally recognized institution that offers innovative programs, outstanding faculty, an atmosphere of innovation, a responsive administration, a vibrant campus and a collaborative learning environment that continuously adapts to the changing landscape of research and innovation and the future of work. Toward this, we plan to design and deliver academic programs in both disciplinary and multidisciplinary domains to prepare students for a rapidly evolving work environment.

**Ranked among top 100 Engineering Institution by MHRD, Govt of India (NIRF-2019 rankings)**

**NAAC (Accreditation): A Grade (Year- 2017)  
Annual Student Scholarships: INR 3-4 Crores**

**First Private University** to mentor PPP model based (central, state and industry funded) Institute - IIIT Vadodara (build academics and provided faculty support)

Only **Anchor Institute** in Gujarat to mentor the Faculty members of Engineering Colleges in Gujarat

Awarded the **Best University** in Innovation in Gujarat by Govt. of Gujarat in 2017

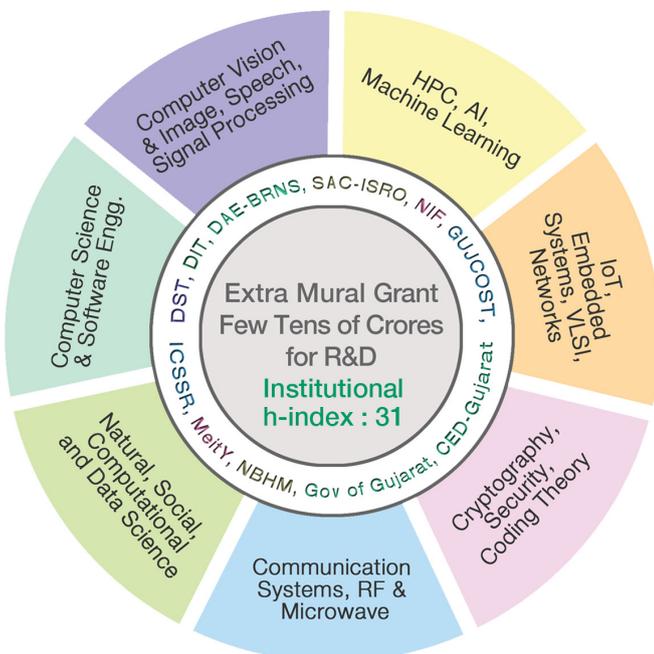




# Academics and Research at DA-IICT

Interdisciplinary and Multidisciplinary Research Oriented Academic Programs

Program Level	Name of the Program	Duration	Unique Features
Doctoral	PhD	4-6 years	- Entry through national level entrance test & interview
PG	<b>MTech</b> (ICT)	2 years	- Stipend for GATE qualified students
	<b>MTech</b> (CS & ML)	2 years	- In collaboration with <b>C R Rao Inst.</b>
	<b>MTech</b> (CS-DS and CS-IS)	2 years	- In collaboration with <b>IIT Jammu</b>
	<b>MSc</b> (IT)	2 years	- Industry oriented IT program
	<b>MDes</b> (CD)	2 years	- Fusion of ICT and Design
	<b>MSc</b> (Data Science)	2 years	- SAS Global Certification
UG	<b>BTech</b> (ICT)	4 years	- 1st institute in India to offer <b>unique program</b> in ICT in 2001
	<b>BTech</b> (Hons in ICT; minor in Computational Science)	4 years	- 1st institute in India to offer UG program in Computational Science
	<b>BTech</b> Mathematics and Computing (MnC)	4 years	- Intersection of Computer Science & Applied Mathematics to solve complex problems



## International Projects

NSF-USA, Indo-French, Indo-Spain

## Industry / Consultancy Projects

nVIDIA (USA), FactSet (UK), Vista (India), ISRO Amnax Technology, GoG (Climate Dept.)

## Major MOUs / LOUs

Univ. of Oregon (USA), Univ. of Auckland (NZ), Univ. of Swaziland (UoS), Univ. of Dayton (USA), Univ. of Hildesheim (Germany), Univ. Mara (Malaysia), Univ. of Evora (Portugal), ISEP (France), ISRO, Indian Navy, ISI Kolkata, TCS, Samsung R&D, IIT Gandhinagar, IIT Jammu, IIIT Vadodara, C R Rao AIMSCS, EDII



# Specialization Overview

## MTech in ICT

We witnessed in this century the convergence of computing technology and communication technology. A new discipline has emerged as Information and Communication Technology (ICT). Dhirubhai Ambani Institute of Information and Communication Technology (DA-IICT) since its inception is committed to impart knowledge in the domain of ICT which is one of the most sought-after disciplines in the current era. Towards this goal, Institute introduced MTech in ICT. Postgraduate programs such as MTech require more in-depth study in a vertical. Hence, we have introduced many specializations under the MTech (ICT) program. One such relevant specialization introduced from this academic session is System Software.

## Software Systems

Software, in its most general sense, is a set of instructions or programs instructing a computer to do specific tasks. Alan Turing first proposed the theory of software in 1935 in his essay "Computable numbers with an application to the Entscheidungsproblem". System software serves as a base for application software. It controls the basic (and invisible to the user) functions of a computer and comes usually preinstalled with the machine. System software includes device drivers, operating systems, compilers, text editors, and utilities helping the computer to operate more efficiently. It is also responsible for managing hardware components and providing basic non-task-specific functions.

The System Software research group of the ICT department in DA-IICT provides knowledge about writing software that makes use of the programming abstractions supported by modern operating systems. It also aims to cover the fundamentals of algorithm design to enhance the problem-solving skills necessary for developing efficient software systems in various applications. The main objective of this course is to understand and learn how complexity and change are engineered during large software development. And also, to divide the problems into various complexity classes based on the resources required to solve them. This will focus on the methodologies (processes), techniques (methods), and tools that can be used to successfully design and validate large software systems. This will also introduce the different attacks and threats in computer networks including network mapping, port scanning, sniffing, DDoS, reflection attacks, attacks on DNS, and leveraging P2P deployments for attacks. Basics of blockchain and cryptocurrencies will

also be introduced.

The core research areas and on-going projects are in the areas of

- Algorithm design technique
- Software development methodologies
- Applications of ML and AI in analyzing software products
- Modern distributed data storage
- Architectures of various distributed systems
- Secure networking protocols
- Introduction to communication complexity
- Distributed database design
- Bitcoin blockchain and bitcoin exchange
- Verification and testing of software systems
- AI and ML for security testing

The DA-IICT research group has led to various publications in Book chapters, Journals and Conferences of repute, bringing several funded projects and incubation of many start-ups. The department has strong research group, relevant curriculum, expertise faculties and dedicated labs for supporting various Ph.D and M.Tech. students in System Software specialization. The department provides wide range of core System Software subjects together with many electives from other domains such as machine learning, cryptography, IoT, computational theory to make the program more comprehensive and dynamic. The department is committed in delivering both excellences in teaching and highquality research. Research in System group at DA-IICT is focused on providing ICT based solutions to the problem, which are of national importance. And also enable the students to build highly scalable and implementable solutions which will benefit the industry.

The MTech course in Software System is beneficial for the students in:

- Acquiring the strong foundation in the basics of software system
- Research aspects of software testing
- Problem solving skills for efficient software system
- Architectures of various distributed systems
- The complexity analysis of algorithm design
- Learning the security aspects of a model
- To successfully design and validate large software systems
- Building of own start up
- Research on the topics related with national importance
- Succeed in highly scalable and implementable solutions related jobs



# Program Structure

**Characterization of Program:** Programming, Security, Distributed Systems, Networks, Software Lifecycle, Blockchain.

**Uniqueness of the Program:** Practice Oriented and case study based program

The program primarily aims to cater to the following audience:

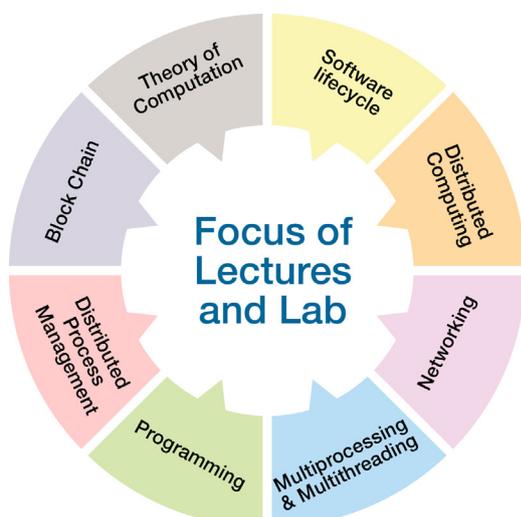
1. Traditional Science, Engineering Graduates with understanding the complexity analysis of an algorithm, basic programming skills and inclination towards software lifecycle.
2. Professionals who are thinking about enhancing their skills in Software testing, Networking, Security and building up their position in industry as well as outreach in research area.

## Program Structure and Objectives

The primary objective of the MTech in System Software which is an exceptional program that empowers working experts to have some expertise to address the increasing needs in the rapidly expanding area of software development, distributed systems, network, security. The growth of companies in digital space has led to a huge demand for requirement of a robust system which can help the company to grow. This has led to an increase in demand for experts in the field of network, security and cloud-based computing. Hence, it is absolutely necessary nowadays, to develop manpower with such skills in order to develop and maintain such robust systems.

As students come from different academic backgrounds, it is important to get everybody up to speed and on the same level. To do so, we offer several foundation levels courses in the first semester. In subsequent semesters, pedagogical approach focused on learning by doing is incorporated in the form of mini-projects and case-studies in addition to advanced courses. The program relies on a wide range of teaching methods including lectures, tutorials, case study analysis, lab exercises, projects as well as extras throughout the year.

The one-year thesis is designed to facilitate students to do research. A thesis gives the student a valuable opportunity to delve into interesting research for greater depth of learning in their career area. The students do their thesis under the guidance of faculty member(s) and they are able to perform research on a cutting-edge topic related to system software's. The objective is to provide students with a complete research experience in relation to their thesis.





# Course Curriculum

## Autumn Semester (Semester-I)

Course Name	Credits (L-T-P-C)
Communication Skills	1-0-0-1
Programming Lab	1-0-4-3
Probability and Random Variables	3-0-0-3
Advanced Software Engineering	3-0-2-4
Advanced Algorithm	3-0-0-3

## Winter Semester (Semester-II)\*

\* Three courses from specialization and one technical elective

Course Name	Credits (L-T-P-C)
Distributed Systems	3-0-2-4
Distributed Databases	3-0-2-4
Computing & Complexity	3-0-0-3
Advanced Computer networks	3-0-0-3
Technical Elective-I	3-0-0/2-3/4

## Autumn Semester (Semester-III)

Course Name	Credits (L-T-P-C)
M.Tech. Research 1	0-0-6-3
M.Tech. Research 2	0-0-6-3
Technical Writing	1-0-0-1
Blockchain and Crypto-Currencies	3-0-0-3
Software Testing and Verification	3-0-2-4

## Winter Semester (Semester-IV)

Course Name	Credits (L-T-P-C)
M.Tech. Research 3	0-0-6-3
M.Tech. Research 4	0-0-6-3
M.Tech. Research 5	0-0-6-3
M.Tech. Research 6	0-0-6-3
M.Tech Thesis	0-0-2-1

## Technical elective in the area of:

- Security Protocol
- Information Security
- Pattern Recognition and Machine Learning
- Information Retrieval



# Admissions

**Total Seats: 26,** 20 Seat through GATE and 6 Seat through NON-GATE

## Eligibility Criteria

### GATE Qualified candidates

- A candidate with a qualifying degree in any one of the following:  
BE/BTech (CS/IT, ECE, Electrical, Instrumentation), MSc (CS), MCA with 1st class  
M.Sc. degree in Computer Science / Electronics / Mathematics / Physics / Statistics  
M.S./M.Sc. degree of DA-IICT  
M.C.A. degree (3-year program)
- The aggregate marks in the qualifying degree should not be less than 60% or equivalent as per the norm set by the degree awarding Institute/University.

### Non-GATE Qualified candidates

- M.Sc. (CS), M.C.A., BE/BTech (CS, IT, CSE) with 1st class (min 65%)
- The aggregate marks in the qualifying degree should not be less than 65% or equivalent as per the norm set by the degree awarding Institute/University.

## Selection Process

Admission to M. Tech. (ICT) with specialization in Software System is open to those who have a valid GATE score in the disciplines of Electronics & Communication Engineering (EC), Electrical Engineering (EE), Instrumentation Engineering (IN) only. Selection of the candidates will be based on the GATE score and performance in the interview. For Non-GATE candidate's selection will be based on their qualifying degree and performance in the interview. For Non-GATE candidate's weightage will be as follow: 40% weightage for qualifying degree and 60% weightage for the interview. The candidates can give up to two preferred specializations based on their eligibility conditions. Counseling for allotment of the specialization will be done online. Applicants are advised, from the date of announcement of first merit list, to check for e-mail communications from the Institute to learn about the admission status and steps they need to take to continue with the counseling process.

**How to Apply,** Candidates submit an online application by clicking on the link given on the Institutes website.

## Admission Offer

Final merit list of confirmed and wait-list candidates based on their performance in the entrance examination/interview is posted in the website of the institute.

## Important Dates

Online application website opens	February-March
Last date for submission of online applications	April-May
Interview for Non-Gate Applicants	June-July
Announcement of Merit List	June-July
Commencement of Classes	July

**Fees Structure\*** Tuition and Registration Fees: Rs. 67, 000 per Semester

## Education Loan

The Institute will facilitate the students to avail educational loan from selected Banks. The bank officials will be present on campus at the time of registration of admitted students so as to enable the students to obtain details on procedures and terms and conditions of the loan. The students can also avail loan from banks of their choice and in either of the case; the Institute will extend support in completing the loan documentation process.

## Financial Assistance

All GATE admitted students would be eligible for a monthly stipend of Rs. 12400/- in the form of Teaching Assistants in the first semester. In subsequent semesters, the continuation would depend on their satisfying the academic requirements.



**For Inquiries: Voice Call: 080 66 91 91 80**



# The Faculty

## Blending academic excellence, research eminence & professional experience

DA-IICT successfully attracts the best teaching and research talents who have completed their doctoral studies at premier institutes in India (such as IISc, ISI, IPR, PRL, IITs, IIITs, NITs, HBNI, Central Universities etc.) or international institutes of repute (in USA, Canada, Europe, Australia, Korea, Singapore etc). All our faculty members are active researchers in their respective fields. Most of our faculty members have significant international exposure in terms of research and industry experience, and are involved in national/ international collaborative research projects. They are an exceptional group of academicians

in Mathematics, Statistics, Computer science, Physics, Data Science, Computational Science, Communication, Signal Processing, Electronics, Design, Humanities and Social Sciences who are determined to push the frontiers in research and technology. They conduct advanced research and the new knowledge they create routinely benefits classroom learning.

The complete list of our faculty members and their research interests can be found at:

<https://www.daiict.ac.in/people/faculty/>

## Message to Prospective Students

The Post Graduate programme – MTech (ICT) with specialization in Software Systems is an integrated course combining different aspects of this domain such as AI and ML for security testing, distributed computing and block chain technology to solve challenging problems in the industry as well as academia. I hope you will have a strong foundation in the related areas after graduating from this course and develop strong analytical skills to take up the challenging real-life problems.

### **Dr. K. S. Dasgupta**

Director

Software Systems graduates use their computing knowledge to solve real-life problems. They can become leaders in broad areas of computer science such as software architecture, software analysis and design etc. I feel DAIICT should be the right place for you to gain the much needed knowledge in software systems.

### **Dr. Manjunath Joshi**

Dean (Research & Development)

The MTech(ICT) program with specialization in Software Systems provides a strong foundation, industry relevant specialized courses in the domain and a year long thesis training in the area of students' interest. The Software Systems specialization is mentored by a highly experienced faculty pool in the field. The graduate outcomes of this specialization have established a proven track-record of our alumni in industry and research establishment. I welcome all aspirants to take part of the journey of this specialized program at DA-IICT.

### **Dr. Maniklal Das**

Dean (Academic Programs)





# The Right Career Where the Degree can Take you

## Placements

The Placement Cell at DA-IICT works professionally with the Industry to explore opportunities for DA-IICT graduates for placements. The Cell makes its best efforts to reach out to all sub-sectors of the industry in order to ensure that DA-IICT graduates spread across the industry. DA-IICT has hence contributed to the industry by successfully delivering fresh recruits who have contributed continuously to the growth of the industry by being a part of the top-notch organizations.

<http://placement.daiict.ac.in/>

### Placement Statistics (Last 3 years)

**Median Salaries in INR**  
 PG: 5.5 Lakhs, 6 Lakhs, 7 Lakhs  
 UG: 9 Lakhs, 10.5 Lakhs, 14 Lakhs  
**Highest Salaries in INR**  
 52.5 Lakhs, 39 Lakhs, 43 Lakhs

### Students opting for Higher Studies (For MS & PhD)

CMU, Georgia Tech, MIT, ASU, Cornell Univ,  
 Maryland, Colorado Boulder, Univ. of California,  
 Texas A&M, Univ. Oxford UK,  
 John Hopkins, Ecole Polytechnic de  
 Montreal Canada, ISEP France,

## Alumni Network

The DA-IICT Alumni Association exists to create and maintain a life-long association between the Institute and its alumni. The Association works to connect alumni, support students and build an extraordinary Institute experience through a diversity of events and celebrated traditions. The mission of the Association is to cultivate strong bonds between alumni, students and the Institute, to keep alumni acquainted, and create a network enabling them to remain involved with their alma mater.

<https://daiict.almaconnect.com/>





# Campus Life

DA-IICT is spread over 50 acres of land in Gandhinagar, Capital City of Gujarat. The DA-IICT campus is carefully planned and designed as an environmentally conscious campus in the country. The architecture of DA-IICT is functional, but what surrounds it is a fascinating garden. The entire design is oriented towards preserving the environment. The campus with trees, lawns and bushes bearing green leaves and exotic flowers surrounding the buildings and pathways instils environment consciousness among students and enrich their learning. The campus also has a herb garden with species of rare medicinal plants.

The landscape was planned and developed in a manner that no rainwater is lost. The irrigation for campus garden and lawns is carried out with recycled water. Its solid waste management system churns out organic fertilizer out of dry leaves, vegetable and food waste generated from food courts.

The campus is a haven for bird-watchers, with a variety of species of birds being spotted.

DA-IICT can be reached in about 30 minutes from Sardar Vallabhai Patel International Airport and the Central Railway Station located in Ahmedabad.





**Dhirubhai Ambani  
Institute of Information and Communication Technology**

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