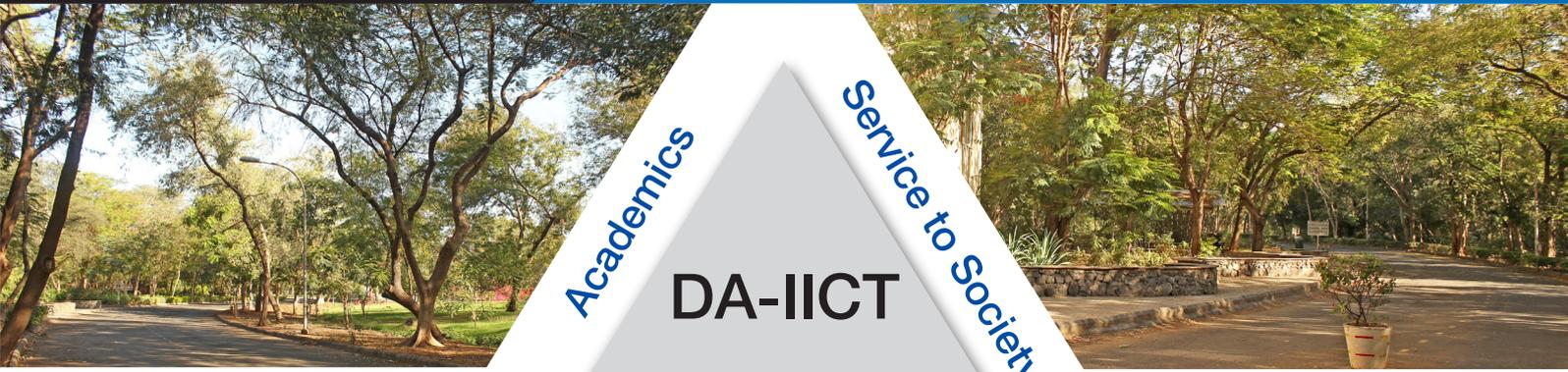




M.Tech. (ICT) with specialization in Machine Learning



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 18 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, the 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

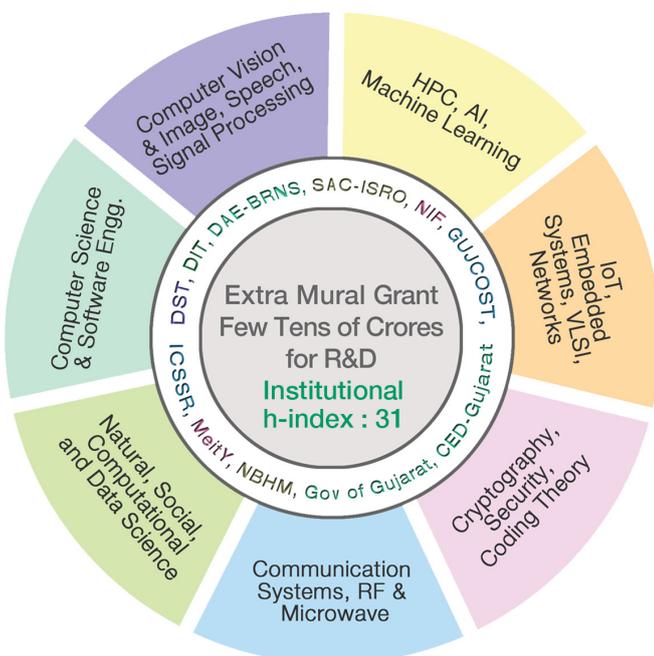




Academics and Research at DA-IICT

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	MTech (ICT)	2 years	- Stipend for GATE qualified students
	MTech (CS & ML)	2 years	- In collaboration with C R Rao Inst.
	MTech (CS-DS and CS-IS)	2 years	- In collaboration with IIT Jammu
	MSc (IT)	2 years	- Industry oriented IT program
	MDes (CD)	2 years	- Fusion of ICT and Design
	MSc (Data Science)	2 years	- SAS Global Certification
UG	BTech (ICT)	4 years	- 1st institute in India to offer unique program in ICT in 2001
	BTech (Hons in ICT; minor in Computational Science)	4 years	- 1st institute in India to offer UG program in Computational Science
	BTech 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



Program Overview

Since the beginning of this century we witnessed the convergence of computing technology and communication technology. The new discipline 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 we introduced MTech in ICT. Now PG programs such as MTech require more in-depth study in a vertical. Hence we have many specializations under the MTech ICT Program. One such most popular specialization is Machine Learning.

Data is the most important information available in the current digital era. The data are available in the form of image, video, text and speech. All together these are called multimedia data. The collection, storage and analysis of such data is the key to success in today's world. At the same time the development of computing devices makes data analysis more and more challenging and attractive. Towards this goal researchers are working towards making the computing device more capable of resolving real life problems in all domains of our society including business, industry and daily human life. Nowadays the term artificial intelligence (AI) is present in every corner of our society. The discipline machine learning (ML) is a subset of AI and many times they come hand in hand known as AIML.

Eventually for the last many decades, the discipline called decision support system made the road for using mathematical and statistical methods to help human beings taking meaningful decisions out of the available information or data. The decision support system is recently enriched by the use of AI and ML. This has been possible with the advancement of computing technology that can process bulk data within a very short time and enable human beings to make meaningful decisions out of this data processing. As we already mentioned that data could be of any form such as image, video, speech and text hence the application of such data processing through machine learning techniques has a wide spectrum. So the main question comes what is the basic definition of machine learning (ML). Machine

Learning concern with designing and developing of algorithms that allow machines, essentially computing device, to evolve realistic or human like behavior based on the empirical data available. As it is based on empirical data and hence some knowledge about the domain is required. Hence, Machine learning can be applied in different domain such as medical, fashion, informatics and so on. Based on the application and domain knowledge the algorithms that are to be used would be modified by the help of expert. The main essence of ML is combining advanced technologies to trace the intrinsic conventional behavioral pattern of the system and thereby suggesting realistic/intelligent/robust decisions about the system which is under concern.

The broad topics which are included in the curriculum of ML program are listed as image processing, computer vision, pattern recognition, information retrieval, natural language processing and speech processing, natural language processing with fundamentals in linear algebra, probability and random variables. Some more advanced topics which also included are deep neural networks, deep learning, convolution neural networks and so on. Students are expected to have complete knowledge of the main domain area such as image processing, pattern recognition, computer vision and natural language processing. It is also important that students get to know about hardware and software to handle large scale data. Towards this the curriculum includes lab course and a course on accelerated computing by which students will have more hands on experience to handle many hardware and software required to implement advanced domain of machine learning. With such a complete curriculum which will be delivered by the well competent faculty, students are expected to join various research and development organizations as an employee after completion of the program. The program is well supported by placement process through a centralized placement cell of the institute. In the recent past graduated students have also joined in higher studies such as phd in many well recognized organizations in India and abroad. Many joined the research organizations for doing cutting edge research. So far the scenario of placement after completion of the program is very satisfactory.



Program Structure

SEMESTER-1

<u>Course Name</u>	<u>Credit Structure</u>
Programming Lab	1-0-4-3
Communication Skills and Technical Writing	2-0-0-2
Three Specialization Core Courses	3-0-0/2-3/4

SEMESTER-2

<u>Course Name</u>	<u>Credit Structure</u>
Three Specialization Core Courses	3-0-0/2-3/4
One Elective Course	3-0-0/2-3/4

SEMESTER-3

<u>Course Name</u>	<u>Credit Structure</u>
Two Specialization Core Courses	3-0-2-4
Thesis	0-0-12-6

SEMESTER-4

Thesis (continuation)	0-0-26-13
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Total Credits **30-0-52/54-56/57**

1 lecture hour contributes 1 credit; 1 tutorial hour contributes 1 credit; 2 laboratory hours contribute 1 credit

Representative list of Specialization core courses: Linear Algebra and Optimization, Probability and Random Variable, Accelerated Computing, Pattern Recognition, Advanced Image Processing, Information Retrieval, Deep Learning, Computer Vision, Brain Cognitive Science.

Representative list of Elective courses: Natural Language Processing, Human Computer Interaction, Adversarial Machine Learning, Information Security.

Industry Speaks

I am reminded of this quote from Mark Cuban that he made in 2019.

“There’s nothing that AI won’t impact. So, having been around a while, I saw the impact of PCs. Then I saw the impact of the local area networks. Then I saw the impact of wide area networks. Then I saw the impact of the internet. Then I saw the impact of mobile. Then I saw the impact of wireless. Now I’m seeing the impact of artificial intelligence. And it dwarfs any of those things.”

In industry we are seeing strong validation for this thought. AI/ML is permeating diverse application areas. This means we are having to hire more and more people trained in AI/ML. I believe this program will create the right entry level workforce that can hit the ground running.

I wish you all the best with this new program.

Dr. L V Subramaniam

IBM India Research Laboratory (AI Science)



Admissions

Total Seats: 32

Seats through GATE : 24 and Seats through Non-GATE : 8

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

Visit the Institutes website:

www.daiict.ac.in/admissions/post-graduate/m-tech-ict-admissions/

How to Apply

Candidates submit an online application by clicking on the link given on the Institutes website.

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.

NON-GATE candidates will not be eligible for TAship and stipendiary benefits.

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 specialisation in Machine Learning (ML) is a unique fusion of foundation courses in Machine Learning (ML) and Deep Learning (DL) with underlying Mathematics and Statistics and exposure to the techniques, tools used in ML & DL to solve problems in Computer Vision, Image Processing and other related areas.

The primary goal of this programme is to produce Industry ready quality human resources with strong Analytical Skills to take up challenges in data handling, processing using ML & DL.

Dr. K. S. Dasgupta
Director

The MTech program with specialization in Machine Learning offered by DAIICT Gandhinagar is one of finest programs where the blend of mathematics, statistics and computer science is well balanced and supported by advanced courses on machine learning and deep learning. I am teaching the course pattern recognition and machine learning as a specialization course. I truly enjoy teaching the course and imparting hands on knowledge to students through real life problems as part of lab assignments. A term paper presentation is also included in the course. The graduated students are getting good placement in many research industries. Many of the graduates are also joining PhD programs in India and abroad. I wish all the best to students of new batch.

Dr. Suman K Mitra
Former Dean (Academic Programs)

Machine Learning has found a unique place across all the disciplines, where innovative research findings and insightful hands-on experience play around machines, data and inference logic. The MTech program with Machine Learning specialization provides a strong foundation in the field, impart knowledge in industry relevance courses and a compulsory thesis training. I welcome all aspirants to take part of the journey of this fascinating program.

Dr. Maniklal Das
Dean (Academic Programs)

We at DAIICT train the students to develop critical thinking skills and to understand the fundamental concepts. The theoretical concepts covered in the class are demonstrated by lab experiments. Hence, I feel DAIICT can be the right choice for you to learn.

Dr. Manjunath Joshi
Dean (Research & Development)

At DA-IICT, our M.Tech (specialization in ML) students not only learn the necessary AI & ML skills but they are also exposed to the state of the art technologies. For example, I teach a course on Accelerated Computing where students learn about GPU programming. For MTech thesis, students get opportunities to work on diverse research areas such as Computer Vision, NLP, Data Science, Natural and Computational Sciences as well as Behavioral and Social Sciences. This gives an unique opportunity to the students to explore future and emerging domains where there is a shortage of skilled AI workforce. I would like to extend a warm welcome to the new MTech Batch.

Dr. Bhaskar Chaudhury
Associate 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.





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