



ENGINEERS WITH
SOCIAL RESPONSIBILITY

M.Tech. (ICT)

with specialization in
Machine Learning



Academics

Service to Society

DA-IICT

Research & Innovation





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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 23 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 2023**.

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- 2023)
Selected for Center of Excellence award
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



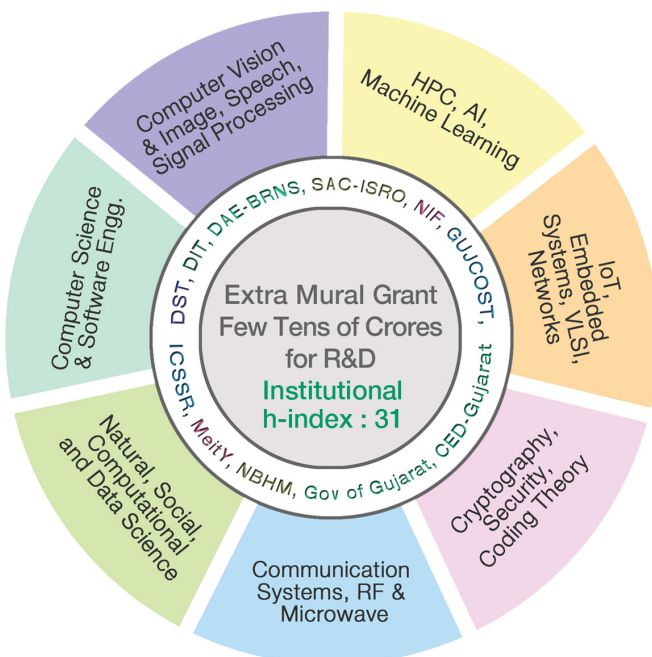


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Academics and Research at DA-IICT

Interdisciplinary and Multidisciplinary Research Oriented Academic Programs

Level	Name of the Program	Duration	Unique Features
Doctoral	PhD	4-6 years	<ul style="list-style-type: none"> - Entry through national level entrance test & interview - Fellowship (PM) INR 35000 - 40000
PG	MTech (ICT)	2 years	<ul style="list-style-type: none"> - Four specializations: ML, SS, VLSI & ES and WCSP
	MSc (IT)	2 years	<ul style="list-style-type: none"> - Industry oriented IT program
	MSc (Data Science)	2 years	<ul style="list-style-type: none"> - Hands-on & case study-based program
	MSc (Agriculture Analytics)	2 years	<ul style="list-style-type: none"> - In collaboration with AAU, IIRS
UG	MDes (CD)	2 years	<ul style="list-style-type: none"> - Fusion of ICT and Design
	BTech (ICT)	4 years	<ul style="list-style-type: none"> - 1st Institute in India to offer unique program in ICT in 2001
	BTech (Hons in ICT; minor in Computational Science)	4 years	<ul style="list-style-type: none"> - 1st Institute in India to offer UG program in Computational Science
	BTech (Mathematics and Computing (MnC))	4 years	<ul style="list-style-type: none"> - Intersection of Computer Science & Applied Mathematics to solve complex problems
	BTech (EVD) Electronics & VLSI Design	4 years	<ul style="list-style-type: none"> - 1st Institute in Gujarat to offer



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



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Program Overview

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

Machine learning (ML) provides computers the ability to learn from data and experience, and to act without being explicitly programmed. It brings together Computer Science, Statistics and Mathematics to harness predictive power. Computer algorithms for ML work by detecting patterns from historical data and using them to predict future data and outcomes in applications of interest. It is at the heart of several important applications such as "Searching the Internet" with other popular uses being Social Networks, Recommendation systems, Stock Market analysis and Medical Diagnostics.

Data is the most important information available in the current digital era. Data is 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 devices 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.

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 with fundamentals in linear algebra, probability and random variables. Some more advanced topics which also included are deep neural networks, deep learning, adversarial machine learning and so on. It is also important that students get to know about hardware and software to handle large scale data. Towards this the curriculum includes lab courses. 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. The scenario of placement after completion of the program is very satisfactory.

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

- Bio-medical image segmentation including MRI, CT- scan data; Histopathological image enhancement and classification
- Object identification and tracking in dynamic environment; image segmentation with limited training data
- Person re-identification in surveillance video; anomaly detection in videos



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Program Overview

- Content based video retrieval; multimedia data content labelling; cross-modal remote sensing image retrieval; SAR image classification
- Forecasting time series data with the help of sophisticated machine learning algorithms; wave height prediction
- Analysing adversarial attacks on neural networks; targeted adversarial attack generation; attacks on network traffic classification
- Image dehazing; real world image denoising; single image super-resolution using deep learning; shadow detection and removal from images
- Text detection and automatic text translation; text summarization

In summary, the M.Tech. (ICT) with specialization in Machine Learning program will help students in several aspects including the following:

- Academic foundations in Machine learning and Deep Learning with underlying mathematics
- Gives industry-ready technical skills in modern Machine Learning frameworks
- Develop analytical and problem solving skills
- Strong programming expertise for solving real life problems

The important takeaways of the M.Tech. program in Machine Learning are as follows:

Choice based curriculum: Flexibility to register for courses of your choice along with other compulsory courses:

- To strengthen the foundation of ML through courses listed under Specialization Core and Specialization Electives

- To broaden knowledge through courses listed under General Electives

Hands-on Exposure through Minor Project-I:

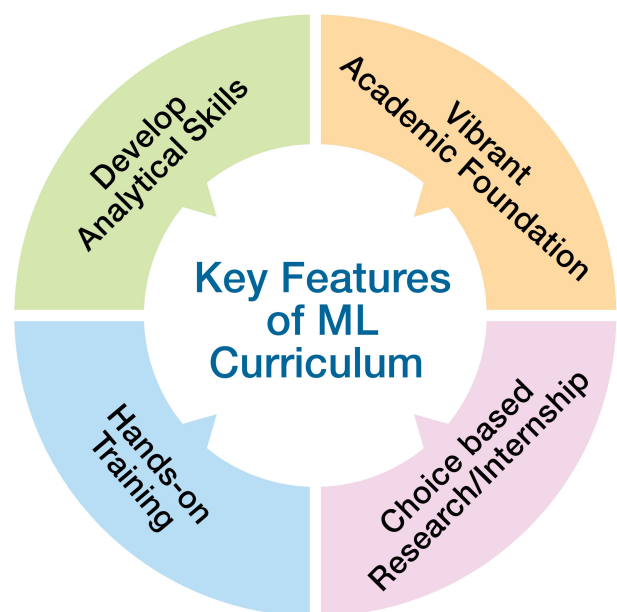
Equips students to be ready for contesting job positions in industry.

Research Exposure through Major Project-I:

Allows students to get an exposure on how to handle a project through a systematic approach based on the principles of carrying out a formal research assignment.

Flexibility in Semester-IV to prioritize Research Track through Major Project-II (for higher studies) over exclusive Industry Internship or vice versa:

Students may extend their research progress culminating into a thesis, or may choose to pursue industry internships depending upon their inclination.





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Program Structure

The key attractive features of **ML** curriculum at DA-IICT Gandhinagar are as follows:

To build a vibrant academic foundation:

Courses in the PG curriculum enable the students to get a fine grip over the foundation courses of Machine Learning.

Develop analytical skills: The knowledge gained through coursework is further exemplified through extensive programming related to ML applications.

Familiarization with state-of-the-art skill sets:

Both Minor and Major projects are developed as part of the curriculum to enable students gain hands-on training of applying their theoretical knowledge to practice, thereby

- Increasing the scope of employability in industry
- Equipping students better to pursue higher studies

Uniqueness of the program:

- The fourth semester is made available for students to pursue internship in industry/academia, or to extend their research work from the previous semesters
- Encourage students to enrich their curriculum knowledge with hands-on experience using Python including Keras, Tensorflow and PyTorch
- Foundation course on Mathematics made compulsory in Semester-I to empower and broaden the knowledge spectrum and fulfill the current information technology demands

Program Structure and Objectives

Coursework Specific Details:

The coursework subjects are categorized under 3 broad headings:

Specialization Core: Courses in this basket are designed to build a strong foundation on ML specific courses

General Elective: Courses in this basket are designed to broaden the knowledge spectrum in ML

Specialization Elective: Courses in this basket shall enable to delve into the deeper realms of the curriculum, and aid in specializing across different sub-domains

Project Specific Details:

Minor Project (Hands-on experiments): ML coursework knowledge gathered in Semester-I are translated to hands-on experiments in minor project of Semester-II for enhancing the analytical capabilities of the students

Major Project I (Summer) (Research exposure): Comprises completion of literature survey, finalizing problem definition, and clearly defining the motivation, objective and scope of the project during the summer (after completion of the first year)

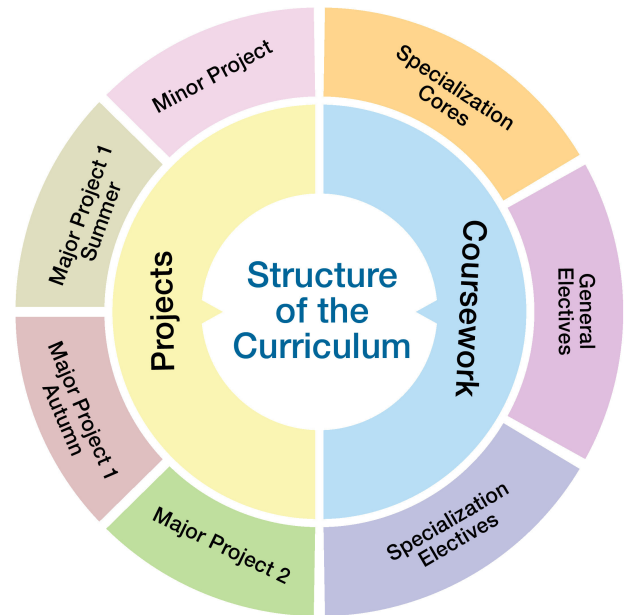
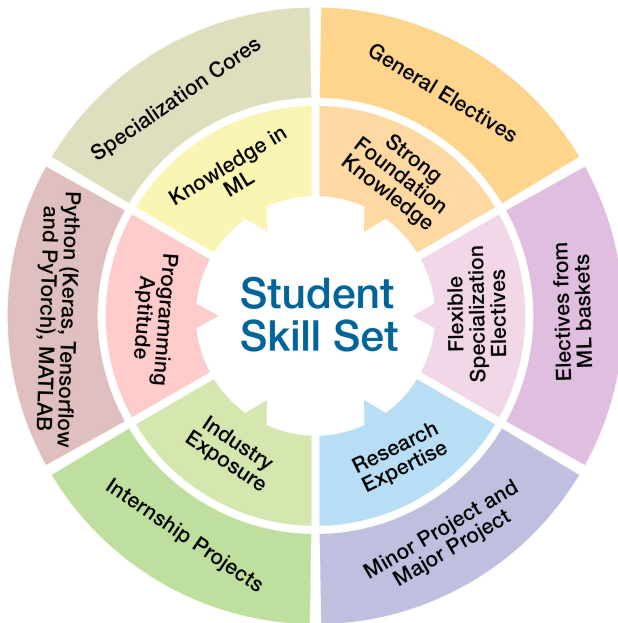
Major Project I (Autumn): Scheduled in Semester-III, it is preferably an extension of Major Project I (Summer)

Major Project II (optional): An extension of the project work carried out in previous semesters, culminating into a thesis



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Program Structure





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Course Curriculum

Autumn Semester (Semester-I)

Course Name	Credits (L-T-P-C)
General Elective – Mathematics	3-0-0-3
Communication Skills and Technical Writing	2-0-0-2
Programming Lab	1-0-4-3
Specialization Core I: Foundations of Machine Learning	3-0-2-4
General Elective – Technical	3-0-0-3

*Choose from the general elective baskets

Winter Semester (Semester-II)

Course Name	Credits (L-T-P-C)
Specialization Core II: Advanced Machine Learning	3-0-2-4
Specialization Elective I-II: (Choose any two)	3-0-0/2-3/4
Digital Image Processing	
Information Retrieval	
Recommendation System	
Adversarial Machine Learning	
Deep Learning	
Multimedia Security & Forensic	
Speech Technology	
Minor Project	0-0-6-3

Summer

Course Name	Credits (L-T-P-C)
Major Project I (Summer)	0-0-8-4

Autumn Semester (Semester-III)

Course Name	Credits (L-T-P-C)
Specialization Elective III-IV: (Choose any two)	3-0-0/2-3/4
Computer Vision	
Natural Language Processing	
Reinforcement Learning	
Computational Shape Modeling	
Wavelet Image Processing	
Time Series Forecasting	
Major Project I (Autumn)	0-0-12-6

Winter Semester (Semester-IV)

Course Name	Credits (L-T-P-C)
Major Project II / Industrial Training Project	0-0-24-12

General Electives – Mathematics in the areas of:

Probability & Statistics, Linear Algebra, Optimization, Graph Theory

General Electives – Technical in the areas of:

Advanced Algorithm, Cloud computing, Artificial Intelligence, Human Computer Interaction



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Admissions

All India Category: Total Seats: 21

GATE 16 & Non-GATE 5

Gujarat Category: Total Seats: 11

Eligibility Criteria

GATE Qualified candidates

A candidate with a qualifying degree in any one of the following:

- BE/BTech (CS/IT/EL, ECE, Electrical, Instrumentation)
- 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 candidates

- MSc (CS), MCA, BE/BTech (CS, IT, CSE)

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.

Candidates appearing in their final degree examination and expecting to complete it by July 2024 may also apply. However, their final admission will be subject to the condition that they obtain an aggregate of marks required based on mode of admission i.e. GATE/Non-GATE, or its equivalent as per the norms set by the degree granting Institute/University. All admitted candidates have to submit their degree certificates or proof of completion of degree, before 30 October 2024 failing which their admission is liable to cancellation.

Age: There is no age limit applicable to this program.

Selection Process

Admission to All India category of M. Tech. (ICT) with specialization SS, ML, VLSI&ES and WCSP will admit candidates through two channels: GATE and NON-GATE.

Admission through GATE Channel:

Candidates who have a valid GATE score in the disciplines of Electronics & Communication Engineering (EC), Electrical Engineering (EE), Computer Science & Information Technology (CS), Instrumentation Engineering (IN) and Data Science & Artificial Intelligence (DA), only can apply.

The final merit list for admission will be prepared on the basis of valid GATE score only.

Specialization GATE Discipline

- Machine Learning (CS/EC/EE/DA)
- Software Systems (CS)
- VLSI and Embedded Systems (EC/EE/IN)
- Wireless Communication & Signal Processing (EC)

Admission through Non-GATE Channel:

The selection of candidates in Non-GATE category will be based on the entrance test to be conducted at selected centers all over the country. The tentative list of centers is: DAIICT Gandhinagar, Ahmedabad, Bhopal, Bengaluru, Chennai, Mumbai, Hyderabad, Patna, Jaipur, Kolkata, New Delhi, Pune, Rajkot, Surat, Udaipur, Bhavnagar, Bhilai, Bhubaneswar, Chandigarh, Guwahati, Jammu, Kochi, Lucknow, Pant Nagar, Porbandar, Ranchi and Vijayawada. The final merit list for admission will be prepared on the basis of the aggregate score in the entrance test.



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Admissions

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.

Note: The decision of the Competent Authorities of DA-IICT regarding eligibility and selection of any candidate shall be final.

How to Apply

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

Admission Offer

The short-listed candidates will be offered admission (confirmed/waitlisted) in order of their merit.

Important Dates

Online application website opens
14th March 2024
Last date for submission of online applications
20th May 2024
Entrance test for Non-GATE Category
16th June 2024

For Inquiries

Email: pg_admissions@daiict.ac.in

Voice call: 079 69 08 08 08

For more details please visit: www.daiict.ac.in

Fees Structure*

At the time of admission an amount of Rs. 96,000/- (Rs.71,000/- towards Tuition Fee for the First Semester and Rs. 25,000/- towards Caution Deposit) is to be paid. The registration fee is payable at the time of registration and hostel rent on allotment of the hostel room.

Tuition fee	Rs. 71,000 per Semester
Registration Fee	Rs. 2,500 per Semester
Caution Deposit	Rs. 25,000 (Refundable at the end of the program)
Hostel Rent	Rs. 27,500 per semester
Food	On actuals. There are multiple food options available in the campus (The expense will be approximately Rs.5,500 pm)

***Subject to revision every Academic Year from 8 to 10%.**

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.

