M.Tech. (ICT)
with specialization in
Signal Processing
and 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 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 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)

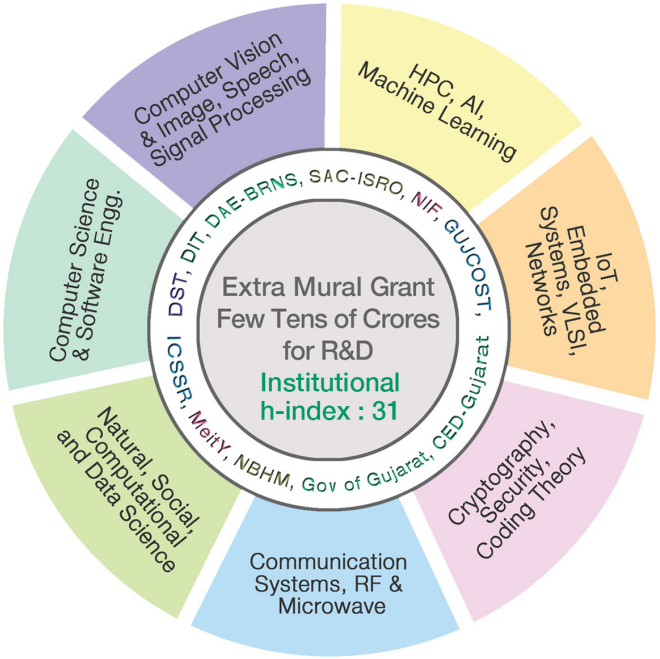
Only **Anchor Institute** in Gujarat to mentor the Faculty members of Engineering Colleges in Gujarat

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	**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
Amnex 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

SPML 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. Post graduate 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 **Signal Processing and Machine Learning (SPML)**.

Signal Processing

In the modern world, technology has become an essential part of our daily lives. Devices such as computers, mobile phones, tablets are indispensable for smooth functioning of day-to-day work in the digital world. Signal processing (SP) is a branch of Electrical Engineering and it is the science behind our digital lives. In other words, Signal Processing is at the heart of our modern information centric society, powering today's entertainment and tomorrow's technology. A signal is a representation of data and information generated in the physical world like audio, video, electromagnetic radiation, data acquired by different sensors, waveforms generated by telecommunication systems etc. Through signal processing, this data is analyzed, refined and synthesized for development of any technology and its operation. It boosts information sharing and communication through mathematical modeling and analysis of physical events.

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.

Signal Processing meets Machine Learning

Modern Signal Processing has drifted away from pure analysis to adopt the modeling tools of ML and it has benefitted tremendously as a result. Though analysis is still the central part of the signal processing, in many cases the combination of ML and SP enables signal processing engines to solve some difficult inference problems that no other field is really equipped to handle.

Due to the enormous surge in available computational power, deep learning algorithms are able to learn hierarchical representations directly from raw input signals. Modern methods tightly integrate signal processing and machine learning into unified models, to reach signal understanding. This combination has the potential to alleviate several digital signal processing challenges: ranging from computational efficiency, fast online adaptation and learning with limited supervision to the ability of the corresponding algorithms to combine heterogeneous information, or to efficiently interact with the user. This fusion of ML algorithms into different aspects of signal processing has resulted in several shared applications like Speaker Identification, Face Recognition, Autonomous Driving and Noise Cancellation.

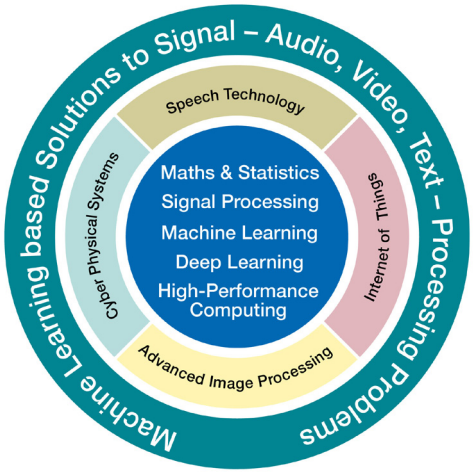
Objective & Outcome

In this era of digital signal processing, specific characteristics and huge volume of data streams are challenging the traditional signal processing techniques. Hence, the MTech (ICT) with specialization in Signal Processing and Machine Learning (SPML) program has been designed as a smart fusion of these two disciplines - SP and ML. The primary objectives of this program are (i) to create quality human resources with strong foundations and state-of-art knowledge in Signal Processing, Machine Learning, Deep Learning concepts and techniques with a special focus to solve challenging problems in signal processing; (ii) to provide analytical and technical skills for efficient information processing and to achieve high performance by combining machine learning and signal processing.

The broad topics which are included in the curriculum of SPML program are listed as digital signal processing, adaptive signal processing, wavelet signal processing, detection and estimation theory, computer vision 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. Students are expected to have complete knowledge of the main domain area such as image processing, speech processing, 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 courses 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 signal processing and machine learning. A well-rounded curriculum will be delivered by the competent faculty. It will empower the students with knowledge and skills required to join various research and development organizations as employees after completion of the program. The program is well supported by placement process through a centralized placement cell of the institute.

In summary, the MTech (ICT) with specialization in Signal Processing and Machine Learning program will help students in several aspects including the following:

- Academic foundations in Signal Processing, Machine learning and Deep Learning with underlying mathematics
- Gives industry-ready technical skills in modern Machine Learning frameworks based on the advances in Signal and Information Processing
- Develop analytical and problem solving skills
- Strong programming expertise for solving real life problems



Program Structure

SEMESTER-1

Course Name	Credit Structure
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

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

SEMESTER-3

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

SEMESTER-4

Thesis (continuation)	0-0-26-13

Total Credits	**30-0-52/54-56/57**

The credit structure of a course is given by a sequence of 4 numbers: (1) Number of lecture hours per week (L), (2) Number of tutorial hours per week (T), (3) Number of lab hours per week (P), and (4) the Total credit of the course (C). 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, Random Variables and Random Processes, Advanced Digital Signal Processing, Introduction to Machine Learning, Detection and Estimation, Adaptive Signal Processing, Topics in Deep Learning, Wavelet Signal Processing, Adversarial Machine Learning, Accelerated Computing, Computer Vision.*

***Representative list of Elective courses**: Speech Technology, Advanced Image Processing, Cyber Physical Systems and Internet of Things, Next Generation Communication Networks.*

Admissions

Total Seats: 16

Seats through GATE : 12 and Seats through Non-GATE : 4

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 (Electronics)
- 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

- MSc (Electronics), BE/BTech (ECE/EE/EL) 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 Postgraduate program - MTech (ICT) with specialization in Signal Processing and Machine Learning is a unique blend of Signal Processing concepts, techniques, algorithms and Machine Learning (ML), Deep Learning (DL) with underlying mathematics and statistics. The important takeaways of this program are to impart strong analytical and programming expertise to solve challenging problems in areas related to speech, video, multispectral data.

Dr. K. S. Dasgupta
Director

Signal Processing and Machine Learning (SPML) specialization in the MTech (ICT) program at DA-IICT provides a strong foundation in the field, impart knowledge in industry relevant courses and a compulsory thesis training. The SPML specialization is closely mentored by highly experienced faculty in the field. Students in the specialization would be trained through research-led teaching and insightful hands-on experience in core subjects, electives and compulsory thesis work. I welcome all aspirants to take part of the journey of this specialized program.

Dr. Maniklal Das
Dean (Academic Programs)

Combining SP and ML areas has numerous industrial opportunities. DA-IICT has quite a good number of faculty experts working in the area of ML with application to SP. I am sure the students joining would definitely enjoy learning the related concepts in this specialization. Hence, I strongly feel DAIICT should be the right choice for you.

Dr. Manjunath Joshi
Dean (Research & Development)

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/

ORACLE, LinkedIn, THOROGOOD, Sapient, Cybage, aspiringminds, Directi, practo, ZS, Bit Mapper, Deloitte., hike, ishi systems, eInfochips, CAPILLARY, kuliza, Nirvana, CIGNEX DATAMATICS, OpsHub, Open-Silicon, airtel, Morgan Stanley, amazon.com, flipkart.com, Google, Infosys, interview street, JUNIPER NETWORKS, SAMSUNG, KiVi Technologies, YAHOO!, successfactors An SAP Company, Evosys, VERSE, Futures First, saba, Goldman Sachs, infibeam.com, MAQ Software, GRIT Technologies, Refine Your Business, nagarro, sprinklr, TATA, TATA CONSULTANCY SERVICES, Mu Sigma

Campus Life

DA-IICT is spread over 50 acres of land in Gandhinagar, Capital City of Gujarat. The DA-IICT campus is caringly 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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