Academany
The Academy of (almost) Anything

fabfoundation   FAB LAB BCN   The Center for Bits and Atoms
Massachusetts Institute of Technology

FAB ACADEMY

Future-Proof Skills

INNOVATING
SINCE
2009
LEARN
CREATE

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"Digital fabrication is hard. It introduces a set of new competencies, including the navigation of continually evolving CAD and CAM software as well as additive and subtractive hardware, embedded computing, and an understanding of the biological and chemical properties of the materials used in fabrication. It also requires design thinking, creativity, collaboration, problem solving, and resiliency. These all require knowledge, skills, and mindsets that cross very different disciplines and domains and, as a result, are not currently well integrated. *We define fab literacy as the social and technical competencies necessary for leveraging digital fabrication technologies to accomplish personally and professionally meaningful goals, as well as a commitment to the responsible use of the technologies. We cannot build toward a more self-sufficient, interconnected, and sustainable society without widespread fab literacy.*"

— Alan Gershenfeld, Joel Cutcher-Gershenfeld, and Neil Gershenfeld - *Designing Reality*

In today's rapidly evolving world, the way we value knowledge is changing, and with it, new career opportunities are emerging. Traditional degrees lay the foundation for a career, but they may no longer be enough on their own. Professional certifications are becoming essential to expand your career options, validate your skills to potential employers, and build connections within your industry. By earning certifications, you can accelerate your career, hone your expertise, and grow your professional network.

At Fab Academy, you'll have the chance to turn ideas into reality by transforming digital designs into tangible creations. You'll develop skills that can directly impact the world around you, while also engaging with cutting-edge technologies to shape the future of digital fabrication.

Key Information

Fab Academy is a hands-on learning experience focused on personal fabrication; learn to prototype your ideas into products.

Format
Globally distributed hybrid education | global lecture and regional reviews (online, synchronous or asynchronous); hands-on assignments (in-person at local Node)

Duration
Five months (January-June), Monday-Friday; plus one month (July) for final documentation and evaluation

Degree
Global Certification upon completing the full curriculum. Official accreditation available, depending on the Node.*

Graduation
At annual FABx Conference

Experience
Non-Technical: Artists, students, designers, educators, entrepreneurs, and hobbyists are all welcome. No previous experience is required, only a desire to learn and a commitment to the program.

Technical: Individuals with professional experience in engineering, programming, design, or related technical fields will find an excellent opportunity to enhance their skills and apply them in the realm of digital fabrication.

Modality
Hybrid, full-time

Language
English and native local

Director
Neil Gershenfeld, CBA, MIT

Tuition Fee
3,000-7,000 USD/€

*Increasingly, Nodes are partnering with institutions of higher education to offer credits to Fab Academy graduates.

Overview

Fab Academy operates on a distributed education model. Students attend the in-person portion of the course at a local Fab Lab (fabrication laboratory), which offers access to peers, mentors, and machines. Fab Labs participating in Fab Academy are called Nodes, and each is part of a broad virtual network. Through this network, students get to interact with their peers and mentors at local Nodes, but they also have the opportunity to regularly connect online with a vast community of students and tutors from every corner of the globe. Each week, participants from all active Nodes gather virtually for a global lecture, an opportunity for the distributed group of students to collaborate directly with faculty, subject matter experts, and their peers at other Fab Labs.

The program is supported by the global nexus of nearly 3,000 Fab Labs distributed across the five continents. The international Fab Lab Network enables a broad change in the way that we have traditionally produced, learned, shared, and made, moving from a linear industrial paradigm to a circular, distributed, and locally productive model. This approach provides the physical infrastructure to produce locally (almost) anything, while, at the same time, connecting highly technically trained people with communities, companies, and institutions for knowledge transfer, prototyping capacities, and career opportunities.

Since its beginnings, Fab Academy has been anchoring a global education movement, challenging traditional approaches to teaching and learning. Now, many formal institutions of education are starting to accredit Fab Academy as a set of global credentials, enabling the spanning out of jobs, projects, businesses, and initiatives.

Fab Academy at Fab Lab Lima - 2024

Instructor's Bootcamp - Fab Lab León - 2024

History

2005

The first Fab Lab was established at the Massachusetts Institute of Technology's (MIT) Center for Bits and Atoms (CBA), marking the inception of the global Fab Lab Network. Equipped with machines like 3D printers, laser cutters, and CNC machines, Fab Labs were designed to enable individuals to create physical objects from digital designs.

2009

The Fab Academy program was officially launched as an educational initiative within the Fab Lab Network. Based on MIT's popular rapid-prototyping course *How To Make (almost) Anything*, taught by Professor Neil Gershenfeld, it provided hands-on training in digital fabrication for makers in Fab Labs through a distributed, collaborative learning approach.

2010s

Over time, Fab Academy expanded globally, with an average of 60 Fab Labs around the world participating as Nodes each year. Hundreds of students from diverse backgrounds enrolled to learn about digital fabrication, electronics, programming, and more.

2024 & beyond

With new Nodes added each cycle, Fab Academy's reach is growing at a rapid rate. The program continually evolves, adapting to the latest technologies and educational methodologies. It offers a structured curriculum, lectures, hands-on projects, and peer interaction, with participants completing assignments and creating projects in local Fab Labs while connecting virtually to the global network.

Fab Academy welcomes participants from varied backgrounds and fields, all brought together by a shared commitment to learning, creativity, and innovation. Whether you are a professional seeking a career transition, a student interested in enhancing your technical skills, or a lifelong learner eager to broaden your knowledge, Fab Academy offers the perfect opportunity to participate in practical, impactful learning experiences in digital fabrication and related areas.

Profile of a Prospective Student

Curious Creator

You are motivated to transform ideas into reality by exploring the intersections of technology, art, and design. Whether you are new to digital fabrication or possess experience in the field, you are eager to understand the process of creation, from concept to finished product.

Entrepreneur & Innovator

You aim to develop a project or prototype a product that could potentially create a positive impact on society. Fab Academy serves as a platform for you to explore innovative ideas and connect with like-minded individuals globally.

Problem Solver

You thrive on confronting challenges, enjoy troubleshooting, and seek to learn how to design, prototype, and iterate solutions using advanced technologies.

Lifelong Learner

You are dedicated to continuous learning and aspire to expand your knowledge in advanced manufacturing, electronics, and programming, regardless of your prior experience.

Interdisciplinary Thinker

You have a strong interest in integrating diverse fields, such as engineering, art, design, architecture, and education. You view Fab Academy as an opportunity to enhance your skill set.

Learn

During this intensive five-month program, participants will have the opportunity to learn over 20 different competencies, enhancing both their technical and professional skill sets.

Design

This fundamental anchor of digital fabrication enhances innovation.

Computer-Aided Design (CAD/CAM)
3D Scanning
Mechanical Design
Machine Design

Fabrication

Gain insights into machinery and materials by engaging in experiential learning.

Computer-Controlled Cutting
Computer-Controlled Machining
**Molding & Casting**
Composites
3D Printing

Electronics & Programming

If design serves as the essential foundation, then electronics and programming provide the critical support for the development of any project idea, effectively transforming concepts into tangible products.

Electronics Production
Electronics Design
Embedded Programming
Input Devices
Interface & Application Programming
Output Devices
Networking & Communications

Management

Learn practical skills for effective development and fabrication.
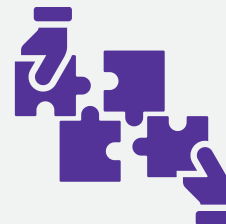
Principles & Practices
Applications & Implications
Invention, Intellectual Property & Income

Fab Academy at Waag Amsterdam - 2018

Experience

Advanced Manufacturing

Digital fabrication has revolutionized manufacturing. Access to advanced tools allows individuals to innovate faster and more efficiently. Fab Academy makes these techniques accessible to everybody who has a novel idea or simply wants to streamline their processes through fast prototyping.

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"[I am] now able to design all my containers and closures and we can provide our clients a customized packaging solution in an easy, fast and cost effective way… Fab Academy teach[es] you that the sky is your limit…"

— Khaled Youssef,
Fab Academy Alum 2018

Technical Proficiency

Students are regularly challenged to apply new concepts and techniques, learning from their peers and creating an enhanced awareness of the information sources around them.

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"Fab Academy experience gave me the freedom to explore a new way of thinking that positively changed my personal and professional perspective. I understood that making mistakes is one of the best way[s] to learn! I managed to complete assignments, attempts and projects through perseverance and curiosity. I learned to fail and I understood the importance of finding new ways to make things work."

— Eleonora Piccinelli,
Fab Academy Alum 2018

Individual Growth

Fab Academy offers a dynamic and supportive learning environment that encourages self-directed exploration and continuous development. Students are empowered to take charge of their own learning journeys, with access to cutting-edge digital fabrication tools and resources that spark creativity and innovation.

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"Fab Academy showed me what quality education feels like… I believe everyone should have access to such programs which will help them figure out their passion in life."

— Nadine Tuhaimer,
Fab Academy Alum 2018

Community of Practice

Practitioners around the world share a synchronized educational experience. This unique learning environment fosters a rich exchange of diverse ideas and perspectives, driven by the varied cultural and professional backgrounds of its participants. Using similar tools and common protocols encourages collaboration and communication, enhancing every student's ability to tackle complex problems personally and also collectively.

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"Now I know that one person is capable of so many things on [their] own [and], with the help and experience of makers, that everything is achievable."

— Alberto Porri,
Fab Academy Alum 2021

Only at Fab Academy

JOIN
Fab Academy students may study at any location or join virtually.

+60 locations

Lectures

Hands-On Work

Regional Reviews

Projects

216+ Fab Labs

320+ Applications

100+ Countries

1,500+ Alumni

1,800+ Final Projects

CORE COMPETENCIES
Power skills

Project Management
Time Management
Problem Solving
Teamwork
Communication Skills
Adaptability & Resilience
Project Development

Outcomes

Fab Academy graduates possess a distinctive approach to problem solving that empowers them to transform ideas into concrete, impactful projects with the potential to influence the future. By the conclusion of the program, participants will have acquired a comprehensive skill set in digital fabrication, achieved proficiency in rapid prototyping, and fostered collaboration within a global network of makers.

This hands-on experience will prepare you to meet the technical demands of the ever-evolving world while opening up new career opportunities across various industries. From roles in advanced manufacturing, product design, and engineering to positions in innovation labs, research, and education, Fab Academy graduates are equipped to tackle real-world challenges. Employers value the practical skills and creative problem-solving abilities that Fab Academy alumni bring as leaders in fields like digital fabrication, industrial design, and even entrepreneurship. With expertise in cutting-edge tools and technologies, you'll carve out a career path that aligns with future job market demands, preparing you to excel in industries that are shaping tomorrow.

Fab Academy at Fab Lab Kerala 2024

Fab Lab Network

Fab Academy is the best way to connect to the global Fab Lab Network—a thriving community of knowledge builders, makers, and doers.

Nodes

To ensure the quality and consistency of the program, a Fab Lab must fulfill certain requirements to become a Fab Academy Node. Each Node must provide access to all the equipment and materials listed in the Fab Lab Inventory, a common space for students to attend class and complete work, and internet connectivity for the global sessions. To instruct Fab Academy, the prospective Node's staff must have first completed the Fab Academy program themselves to gain necessary experience and knowledge. In these ways, the program offers a high-quality education, job opportunities, and a strong sense of community.

Community

The Fab Academy community is a dynamic, international network of innovators, makers, and educators dedicated to digital fabrication and technology. It comprises current students, alumni, instructors, and Fab Labs, with each member contributing their distinct expertise and creativity. With over 1,500 alumni from more than 100 countries and a presence in numerous Fab Labs globally, the community shares a common objective: to advance the boundaries of possibility through collaboration, knowledge sharing, and peer support.

This network is founded on the principle of distributed learning, enabling participants to connect both virtually and in-person, exchange ideas, and collaborate across different time zones and cultures. Through global lectures, local Lab activities, online platforms, and events such as Fab Academy reviews and FABx Conferences, the Fab Academy community cultivates an environment conducive to lifelong learning, mentorship, and innovation. As part of this network, members are empowered to undertake impactful projects, address real-world challenges, and contribute to the ever-evolving field of digital fabrication.

Instructors

Fab Academy instructors are seasoned professionals and mentors from various disciplines, including digital fabrication, engineering, and design. They support students through the duration of the course by offering technical assistance, delivering constructive feedback, and facilitating practical learning experiences at local Fab Labs. Instructors are instrumental in helping students understand intricate concepts, enhance their projects, and engage with the global Fab Academy community. Their expertise and commitment ensure that students develop the requisite skills and the confidence to emerge as innovators and leaders in their respective fields.

Class Format

On Fab Academy's Global Campus, over 250 students from more than 50 cities worldwide come together each week for Global Lectures led by Professor Neil Gershenfeld, Director of MIT's Center for Bits and Atoms. During these sessions, Professor Gershenfeld introduces the week's topics and assignments, setting the stage for student exploration.

After the Global Lecture, students participate in reviews, an opportunity to interact and exchange ideas with the broader global community. They then dive into hands-on work, experimenting with materials and digital fabrication tools at their local Fab Lab. Throughout the week, students receive guidance from local instructors at their Node and can join regional reviews to gain insights and learn from others in their area, creating a truly collaborative and immersive learning experience.

Each year, Fab Academy opens with an informal version of the Global Lecture in which new students have the opportunity to review student projects from previous years, introduce themselves to their classmates around the world, meet Professor Gershenfeld, and learn how the course will proceed.

Student Reviews

Break

Global Lecture

Hands-on Work

Regional Reviews

Global Open Time

Student Reviews

Random selection of all students, one-on-one description of the work process and insightful feedback in real time. | Wednesday 9:00AM EST

Break

Short pause for participants to take care of personal needs or stretch their legs to maintain focus and comfort. | Wednesday 10:00AM EST

Global Lecture

Engaging and dynamic session that connects students, instructors, and experts. During these live sessions, Professor Gershenfeld introduces the week's concepts, explains assignments, and demonstrates cutting-edge tools and technologies, providing a comprehensive foundation for participants. Each lecture covers key topics in digital fabrication, project development, and advanced manufacturing techniques. | Wednesday 10:30AM EST

Hands-on Work

Based on the knowledge learned during the Global Lecture, students begin work on their assignments. With one week to deliver, students can make use of all the Fab Lab facilities and get personal help with projects. | 2-3 Lab days during the week (Schedules determined by individual Nodes.)

Regional Reviews

Interactive sessions that provide students the opportunity to present their weekly assignments and projects to a smaller, geographically grouped audience of peers and instructors. This allow participants within a similar time zone or area to connect in a more focused setting. | Weekly, depending on the region

Global Open Time (optional)

Dedicated time for students to ask questions, receive guidance on assignments and final projects, share progress, explore new techniques, and connect on a personal level with fellow participants and instructors. This fosters a collaborative environment focused on problem solving, skill development, and community building. | Saturday 10:00AM-12:00PM EST

Topics

1. Principles & Practices
2. Project Management
3. Computer-Aided Design
4. Computer-Controlled Cutting
5. Electronics Production
6. Computer-Controlled Machining
7. Electronics Design
8. Molding & Casting or "Wild Card Week"
9. Composites
10. Embedded Programming
11. 3D Scanning & Printing
12. Input Devices
13. Interface & Application Programming
14. Mechanical Design
15. Output Devices
16. Networking & Communications
17. Machine Design
18. Applications & Implications
19. Project Development
20. Invention, Intellectual Property & Income

Evaluation Cycles

The class period runs from late January to early June, when students present their final projects, the culmination of their 20 weeks of training.

Evaluations occur on two separate timelines:

1. Late July - for students participating in the live graduation ceremony at the annual FABx Conference
2. Early December - for students requiring an extended period of time to finish their documentation

Alumni projects reflect a wide spectrum of interests, including sustainable design, advanced robotics, wearable technology, and digital art. Many alumni have launched their own businesses, harnessing the skills and knowledge gained from Fab Academy to develop unique products and services that address specific needs in their communities or industries. Others have pursued careers in established companies, where they apply their expertise in digital fabrication, product design, and engineering to drive innovation and solve complex problems. See some examples below.

Projects

Leo Kuipers - Waag/Amsterdam
Fab Academy Graduate 2024

The "Marimbatron" is a fully featured digital marimba made during Fab Academy 2024 by Leo Kuipers, a student at Fablab Waag Amsterdam. The Marimbatron is a MIDI-based USB musical instrument that you play with drumsticks and/or mallets. It supports an isomorphic key layout, which maintains consistent musical intervals between keys, allowing for the same shapes to be used for chords and scales, regardless of the root note. This layout is called "Wicki-Hayden" and originates from Bandoneons and Concertinas.

Den Rey - Fab Lab Barcelona
Fab Academy Graduate 2021

Den Rey created "Miss Baker," a device to encourage children to exercise while playing. This device, placed on the shoe, counts steps in a playful way. To do this, it uses an accelerometer and an OLED screen. Then, it connects via Bluetooth with a game made in Unity 3D and uses its gyroscope to function as a game controller to move the game character.

Akhil Hari - Fab Lab Trivandrum
Fab Academy Graduate 2018

Akhil Hari's project replaces a broken motorcycle speedometer with a "Digital Speedometer cum Compass." He reuses the existing speedometer cable and analog disc assembly, adding a 3D-printed disc with a magnet. A Hall effect sensor detects the wheel's rotation, and a microcontroller calculates the speed, displaying it on an LCD. (Akhil also plans to add sensors for direction and temperature.) The setup avoids mounting electronics near the wheels, protecting them from harsh conditions.

Career Paths

Montserrat Ciges
Costa Rica/Spain - Graduate 2017

Current Position: Design and Innovative Engineering at Nike

This program was crucial to my career because, in a short time, you can develop a lot of skills and create a nice weekly portfolio and demonstrate your competencies to the companies. After finishing the Fab Academy and Fabricademy programs, I posted a lot of my final projects and prototypes on social media. One of them went viral, and the human resources of Nike saw my work, and after a process, they welcomed me into the team.

Daniele Ingrassia
Fab Lab Opendot/Germany - Graduate 2015

Current Position: Founder & CEO InMachines

[Fab Academy is for...]
People who want to understand how accessible computer-controlled tools work and build any kind of product themselves. Makerspaces, Fab Labs, and similar spaces will benefit. And people who want to create prototypes and products for themselves or their company/startup, or to start creating prototypes without much prior knowledge.

Bianca Guimarães
Kamp Lintfort/Germany - Graduate 2024

Current Position: Student

I used to be unsure what area I wanted to study. So, I started to research Fab Academy and spent time learning about digital fabrication to gain real-world experience and figure out what called to me the most. In Fab Academy, I got to talk to classmates from around the world and ask them about their professional and academic experiences. I also got to ask advice from more experienced people from different backgrounds, ranging from graphic design to mechatronics engineering. This helped broaden my horizon on professions that I had not considered or even known about.

Enrollment Details

Fab Academy is open to students from both technical and non-technical backgrounds. Interested students may register for the course by completing the enrollment form posted every year on our website: fabacademy.org. At the time of registration, a local Node must be selected from the list of active and accepted Fab Labs.

Central Coordination then forwards the applicant's profile to the selected Node. Once a Node receives one or more applications, the Node's Instructor will contact applicants to provide details about the Lab and the implications of taking Fab Academy. They will then assess each profile to understand the candidate's suitability for the course. Each Node establishes its own selection criteria.

Once applicants pass the selection process, the Instructor or Node coordinator informs Central Coordination, who sends out acceptance letters. These letters also contain program details and payment instructions.

Course Calendar

- Classes start in January.
- Final project delivered in June.
- Time Dedication: 20-30 hours a week (depending on prior technical background)

Tuition

Fab Academy tuition, like all Academany programs, is based on the combination of two factors: **Local Costs** (supporting the Fab Lab that acts as a local Node for the student) and **Central Costs** (covering infrastructural expenses and services provided by Faculty, Team, Central Coordination, and Administration). The suggested price for the course is **3,000-7,000 USD/€**; some Labs may charge more or less, depending on their specific local costs. We publish each year's cost on our website.

Fab Academy at Fab Lab Brighton 2018

Contact Us

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FAB ACADEMY

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