शैक्षिक प्रसार
Educational Outreach

C1973 EV LAB
IIT Bombay

e-POSTGRADUATE DIPLOMA IN

E-MOBILITY

- DESIGNED AND DELIVERED BY IIT BOMBAY FACULTY
- IIT BOMBAY DIPLOMA CERTIFICATE
- INDUSTRY-FOCUSED CURRICULUM
- IIT BOMBAY ALUMNI STATUS

Offered by C1973 EV Power Train Lab, IIT Bombay

ABOUT IIT BOMBAY

India's Top-Ranked University
QS World University Rankings 2025

#3
NIRF India Engineering Rankings 2024

#45
QS World University Rankings in Engineering and Technology, 2024

#63
QS World University Rankings in Electrical and Electronics Engineering, 2024

ABOUT THE e-POSTGRADUATE DIPLOMA

The **e-Postgraduate Diploma (ePGD) in E-mobility** from IIT Bombay equips professionals with cutting-edge expertise in electric vehicle (EV) technology through a comprehensive, six-course curriculum. Designed and delivered by IIT Bombay's esteemed faculty, this synchronous ePGD covers foundational concepts in electric vehicle design followed by advanced topics such as battery technology, electrical drives and their control, power electronics, grid integration, styling, design and manufacturing technologies for electric vehicles. The curriculum emphasizes on conceptual and practical learning, through a series of live and interactive sessions. With an in-person graduation ceremony held at the IIT Bombay campus, this credit-bearing diploma requires the candidates to successfully complete 36 credits that can be saved in the Academic Bank of Credits (ABC), fostering continued academic growth.

THE IIT BOMBAY EDGE

1

IIT BOMBAY CREDITS

Earn up to 36 credits from IIT Bombay, which can be saved in the Academic Bank of Credits (ABC)

2

DELIVERED BY IIT BOMBAY FACULTY

Designed and delivered by IIT Bombay faculty

3

GRADUATION AT IIT BOMBAY

In-person graduation ceremony at IIT Bombay campus

4

ALUMNI STATUS

IIT Bombay alumni status

5

LATERAL HIRING

Access to IIT Bombay's lateral hiring group

ePGD HIGHLIGHTS

- Designed and delivered by IIT Bombay faculty
- Earn individual course credits which can be saved in the Academic Bank of Credits (ABC)
- Online synchronous 6-course curriculum designed for working professionals
- Participate in peer-to-peer learning and expand your professional network
- Hands-on learning through industry-relevant tools
- In-person graduation ceremony at IIT Bombay campus
- Academic support for prompt query resolution
- IIT Bombay alumni status
- Personalised assistance with a dedicated Programme Manager
- Access to IIT Bombay's lateral hiring group

WHO IS THIS ePGD FOR?

Early to Mid-career Professionals who want to upskill themselves and advance their career in the EV industry

Scientists and R&D Professionals who want to build cutting-edge solutions for the growing EV market

Entrepreneurs who want to enhance their technical skills to lead the next EV startup effectively

Academicians and Educators who want to equip themselves with the latest knowledge to inspire the next generation of EV professionals

Recent Graduates who want to launch their career in the EV industry with a solid foundation in electric mobility

KEY LEARNING OUTCOMES

1

Understanding of E-Vehicle Categories
Gain a solid foundation in various electric vehicle types, powertrain components, and the critical role of power electronics in EV systems.

2

Expertise in Battery Technology
Develop in-depth knowledge of battery chemistry, design, management systems, and charging technologies, with a focus on lithium-ion and alternative battery solutions.

3

Power Electronics Design
Learn to design and analyze power electronic converters tailored for electric vehicle applications, including inverters and charging systems.

4

Electric Drive Control
Understand the principles and methods for effectively controlling electric drives, including DC, BLDC, and PMSM motors.

5

Manufacturing Technologies
Gain insights into modern manufacturing techniques used to make the batteries, motors (especially efficient stator and rotor), and vehicle structures, and understand how manufacturing errors influence the Electric Vehicle's performance

6

Grid Integration Strategies
Explore the integration of electric vehicles with grid infrastructure, focusing on smart charging, regulatory frameworks, and the impact on energy systems.

7

Vehicle Design Fundamentals
Learn the essential principles of vehicle styling, ergonomics, and design processes that enhance user experience in electric mobility.

LEARN FROM IIT BOMBAY FACULTY

SANDEEP ANAND

Professor and ePGD Coordinator

Dept. of Electrical Engineering, IIT Bombay

Ph.D. | IIT Bombay

Research Interests: Electric Vehicles Drive Train and Chargers, Wide Bandgap Devices (GaN and SiC) Based Power Converters

SHILADRI CHAKRABARTY

Assistant Professor

Dept. of Electrical Engineering, IIT Bombay

Ph.D. | IIT Kharagpur

Research Interests: High-Frequency-Isolated Converters, Soft-Switching, Wide Bandgap Devices, Power Semiconductor Packaging

KISHORE CHATTERJEE

Dr. D.T. Manwani Chair Professor in Electric Vehicles

Dept. of Electrical Engineering, IIT Bombay

Ph.D. | IIT Kanpur

Research Interests: Utility-Friendly Converter Topologies, Power Factor Correction Techniques, Switched Mode Rectifiers, Electronic Ballast, Control of Electric Drives

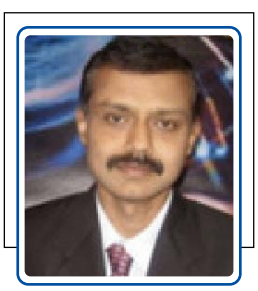
PRASHANT P. DATE

Professor

Dept. of Mechanical Engineering, IIT Bombay

Ph.D. | IIT Madras

Research Interests: Metal Forming Processes, Formability, Shopfloor Metallic Waste Processing, Powder Metallurgy, Metal Injection Moulding



BAYLON G. FERNANDES

Professor

Department of Electrical Engineering, IIT Bombay

Ph.D. | IIT Bombay

Research Interests: Inverter topologies for VAr compensation, Power electronic interface for non-conventional energy sources, Permanent magnet machines for wind power generation, Switched reluctance machines for electric vehicle application

Note: *This is an indicative list of faculty and is under the purview of IIT Bombay*

PAVAN KUMAR HARI

Associate Professor

Energy Science and Engineering, IIT Bombay

Ph.D. | IISc Bengaluru

Research Interests: Electrical Machines, Power Electronics and Industrial Drives, Wind Turbine Generators, Magnetic Gears, Railway Power Systems, Micro-Energy Harvesting, Electric and Hybrid Electric Vehicles

RAVI PRAKASH

Assistant Professor

Energy Science and Engineering, IIT Bombay

Ph.D. | IISc Bengaluru

Research Interests: High-Performance Control of Motor Drives for Electric Vehicles, Charging of Electric Vehicles, Design, Modulation and Control of Power Electronic Converters

ZAKIR RATHER

Professor

Dept. of Energy Science and Engineering, IIT Bombay

Ph.D. | Aalborg University

Research Interests: Grid Integration of Renewables, System Integration of Renewables, Power System Dynamics and Control, Electric Vehicle Grid Integration

NISHANT SHARMA

Professor

Industrial Design Centre, IIT Bombay

Ph.D. | IIT Guwahati

Research Interests: Automotive Design, Vehicle Design Process, Product Form and Aesthetics, Participatory Innovation

BHARATKUMAR SUTHAR

Assistant Professor

Dept. of Chemical Engineering, IIT Bombay

Ph.D. | Washington University

Research Interests: Multiphase Reaction, Reaction Engineering, Surface Science, Porous Media

Note: *This is an indicative list of faculty and is under the purview of IIT Bombay*

e-POSTGRADUATE DIPLOMA CURRICULUM

This e-Postgraduate Diploma requires candidates to successfully complete 36 IIT Bombay credits across 6 courses: 2 core courses and 4 electives. The courses offered are:

CORE COURSES

Introduction to E-Mobility

In this course, you will build a comprehensive understanding of electric vehicle (EV) technology. You will learn about various categories of electric vehicles, powertrain components, sub-systems, and their specifications. After this, you will learn about the critical role played by power electronics in EVs, regenerative braking and integration of EVs into the grid. Additionally, this course will help you build an in-depth understanding of EV charging technologies and the business aspects of charging.

Battery Technology for Electric Vehicles

In this course, you will learn about the various aspects of battery technology, focusing on lithium-ion batteries and alternative battery solutions. After this, you will learn combining individual batteries to design battery packs and various associated concepts such as charging algorithm, estimation of State of Charge (SoC) and State of Health (SoH). You will also gain hands-on exposure through modeling and simulation of li-ion battery systems using electrochemical and equivalent circuit models. Additionally, the course covers battery management systems and battery safety considerations in detail.

ELECTIVES

Manufacturing Technologies for Electric Mobility

In this course, you will learn about identifying manufacturing technologies for making car bodies, batteries and motors. Car body design needs revisiting, in view of heavy battery altering the weight distribution and hence bending, twisting and in general, vehicle behaviour on road. As the course proceeds, you will learn about battery manufacturing technologies which includes drawing up bill of materials for a battery, technologies in manufacture of pouch/prismatic cells and integration into battery packs. The very technologies for autobody production work differently in the context of thin micron thick foils. Manufacturing steps for making batteries, both Li Ion and solid state batteries will be discussed. Finally, manufacture and assembly of motors of different types, including stator manufacture with the latest hairpin winding technology, and rotor manufacture using Soft Magnetic Composites will be discussed. The course will cater only to manufacturing aspects of three systems of an EV and will not cover electronics and control aspects of an EV.

Power Electronic Converters for EV Applications

In this course, you will learn about power electronics - a critical area for electric vehicles. You will start with the fundamentals of DC-DC converters and voltage source inverters. You will analyze how power factor correction and battery charging circuits work together to optimize performance. As the course proceeds, you will delve into the intricacies of gate driver circuits and inverter design, gaining hands-on knowledge that prepares you for real-world applications. Finally, you'll examine the latest advancements in power semiconductor devices, which play a crucial role in enhancing the efficiency and reliability of EV systems.

Electrical Drives for EVs

In this course, you will dive into the principles of controlling DC motors for electric vehicles, beginning with field control and variable-speed drives. You'll explore the application of brushless DC motors alongside 3-phase voltage source converters, gaining insights into their operation. The course also covers regenerative braking, allowing you to understand energy recovery in EVs. You will be introduced to key concepts like space vector transformations which will eventually lead to advanced field-oriented control techniques. This comprehensive approach will equip you with the skills needed to excel in motor control applications within electric mobility.

Electric Vehicle Grid Integration

In this course, you will explore the evolution of EV charging technologies and their integration with power grids, particularly in regions with high EV adoption. The course will cover various charging infrastructures, including Electric Vehicle Supply Equipment (EVSE) for different vehicle types and smart charging systems. As the course progresses, it will delve into regulations, tariff structures, and the impact of EV integration on distribution systems. You'll also examine the synergy between electric vehicles and renewable energy, exploring the role of EVs in enhancing renewable energy penetration at the system level.

E-vehicle Styling and Design

In this course, you will cover the essential aspects of vehicle aesthetics, packaging, and ergonomics specific to electric vehicles. You will start with the design process, including initial vehicle sketching and computer-aided surfacing, progressing to clay modelling and prototyping. The course will emphasize both exterior and interior design, highlighting how form and function intersect in EV design. Through case studies of various vehicle types, you'll gain insights into real-world applications, while also learning about the tools and skills required in modern vehicle design studios.

SAMPLE PROJECTS

- Vehicle sub-system modelling
- Embedded controller for electric motors
- Simulation of power electronic systems
- Battery modelling techniques and degradation phenomenon
- Modelling and control of EV chargers
- Impact assessment of EVs on grid infrastructure

Note: *Curriculum review and changes are under the purview of IIT Bombay and would be undertaken from time to time to ensure the curriculum coverage is in line with industry requirements.*

SAMPLE e-POSTGRADUATE DIPLOMA

भारतीय प्रौद्योगिकी संस्थान मुंबई

<विद्यार्थी का नाम >

को एतद्द्वारा (Name of the Programe in Hindi) में

इ-स्नातकोत्तर डिप्लोमा

की उपाधि प्रदान करता है ।

अभिषद की अनुशंसा पर संस्थान की मुद्रांकित यह उपाधि
विनियमों में विहित पाठ्यक्रमों को सफलता पूर्वक पूर्ण कर लेने पर
मुंबई, भारतीय गणराज्य में आज XX अगस्त, 20XX को दी गई है ।

Indian Institute of Technology Bombay

upon recommendation of the Senate hereby confers the

e-Postgraduate Diploma

in (Name of the Programe in English)

on

<Name of the student>

who has successfully completed
the courses of study as prescribed under the regulations.

Given this day, under the seal of the Institute at Mumbai in the
Republic of India, the XXth day of August 20XX.

अध्यक्ष, अभिषद
Chairperson, Senate

कुलसचिव
Registrar

अध्यक्ष, शासी मंडल
Chairperson, Board of Governors

REGISTRATION

ELIGIBILITY CRITERIA

The eligibility criteria for the e-Postgraduate Diploma in E-mobility is as follows:

- Candidates must hold a B.E. / B.Tech degree or a 4-year B.Sc / BS degree in a relevant domain of engineering or technology.
- Candidates with post graduate (M.Tech / M.Sc / MS) or doctorate degrees in a relevant domain of engineering and technology can also apply.

SELECTION PROCESS

Step 01

Application

Interested candidates can apply for e-Postgraduate Diploma by filling out a simple online application form.

Step 02

Online Test and Screening

Applicants must take an online test to assess their foundational knowledge and suitability for the ePGD. After completing the online test, applicants will go through a mandatory screening call with the Registration Office.

Step 03

Offer of Registration

The selected candidates will receive an offer letter to register for the e-Postgraduate Diploma. They will need to pay the registration fee to confirm their participation.

IMPORTANT DATES

Registration Window	Orientation	Classes Begin
13TH DECEMBER 2024 TO EARLY JULY 2025	JULY 2025	JULY 2025

FEE STRUCTURE

REGISTRATION FEE	₹30,000 + GST	*(To be paid within 7 days after receiving the offer letter to confirm registration)*
FEE FOR 1ST COURSE	₹95,000 + GST	*(To be paid at the beginning of 1st course)*
FEE FOR 2ND COURSE	₹95,000 + GST	*(To be paid at the beginning of 2nd course)*
FEE FOR 3RD COURSE	₹95,000 + GST	*(To be paid at the beginning of 3rd course)*
FEE FOR 4TH COURSE	₹95,000 + GST	*(To be paid at the beginning of 4th course)*
FEE FOR 5TH COURSE	₹95,000 + GST	*(To be paid at the beginning of 5th course)*
FEE FOR 6TH COURSE	₹95,000 + GST	*(To be paid at the beginning of 6th course)*

TOTAL FEES	₹6,00,000 + GST

For more details on flexible fee payments, please get in touch with the Registration Team.
Note: *Multiple courses will be offered simultaneously for the ePGD candidates. Total fees can be paid accordingly.*

FINANCIAL ASSISTANCE

Propelld | zest | eduvanz Making Education Accessible | LIQUILOANS For every Borrower, there is a Leader

***Conditions apply.** The Financial Assistance options are available through Great Learning. Please reach out to the admissions office at 080 4718-8428 for more details.*

ABOUT GREAT LEARNING

Great Learning
POWER AHEAD

Great Learning is the ed-tech partner for this e-Postgraduate Diploma and a leading global ed-tech company specializing in professional learning and higher education. It offers comprehensive, industry-relevant, and hands-on learning programs across various business, technology, and interdisciplinary domains driving the digital economy. These programs are developed and offered in collaboration with the world's foremost academic institutions in various formats, such as certificate programs (ranging from 3 to 11 months), online courses, and hybrid degrees. Great Learning leverages its highly qualified, world-class faculty and a vast network of 7000+ industry expert mentors to deliver an unmatched learning experience to more than 12 million learners from over 170 countries worldwide.

12 Million+
Registered Learners

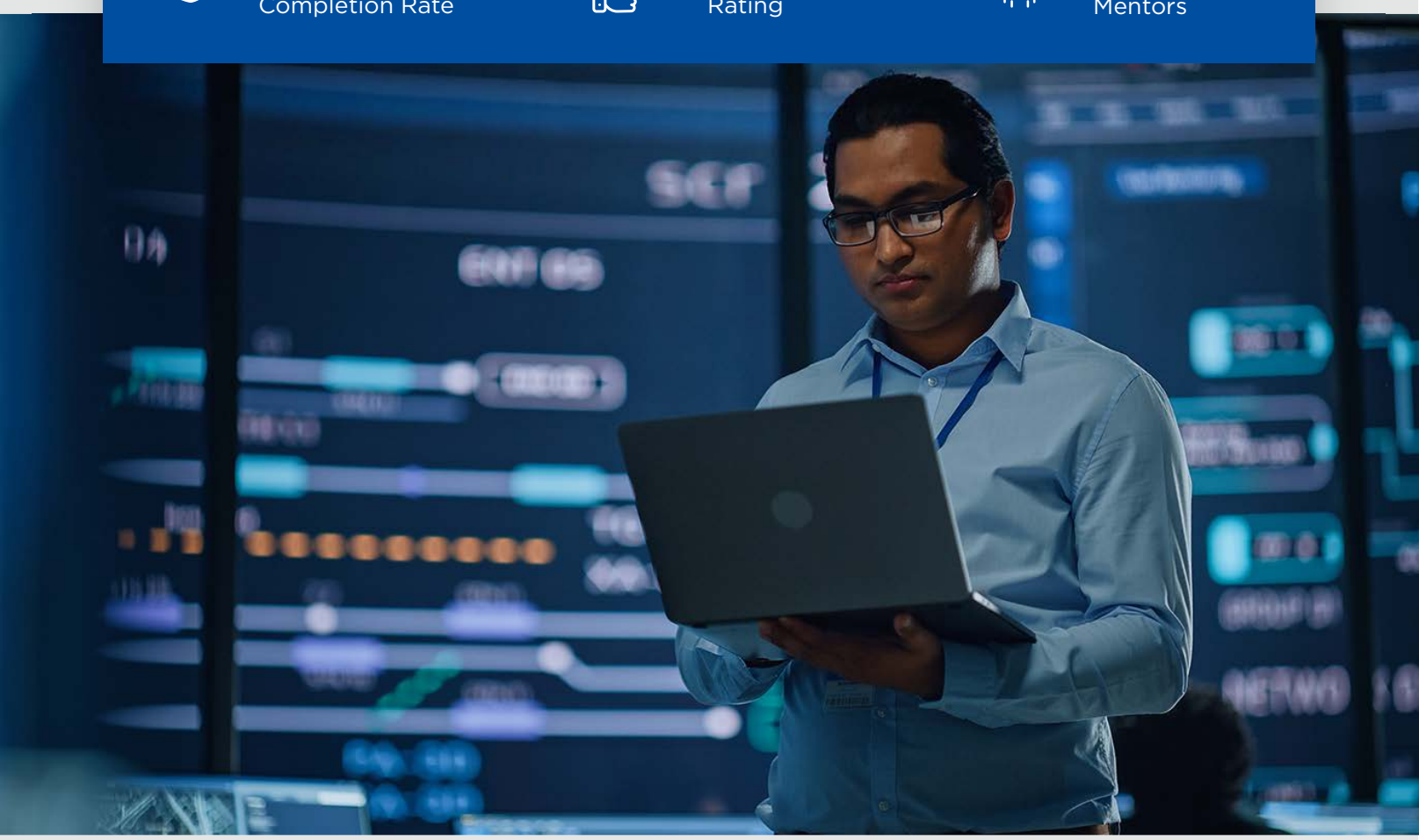
170+
Countries

300 Million+
Learning Hours Delivered

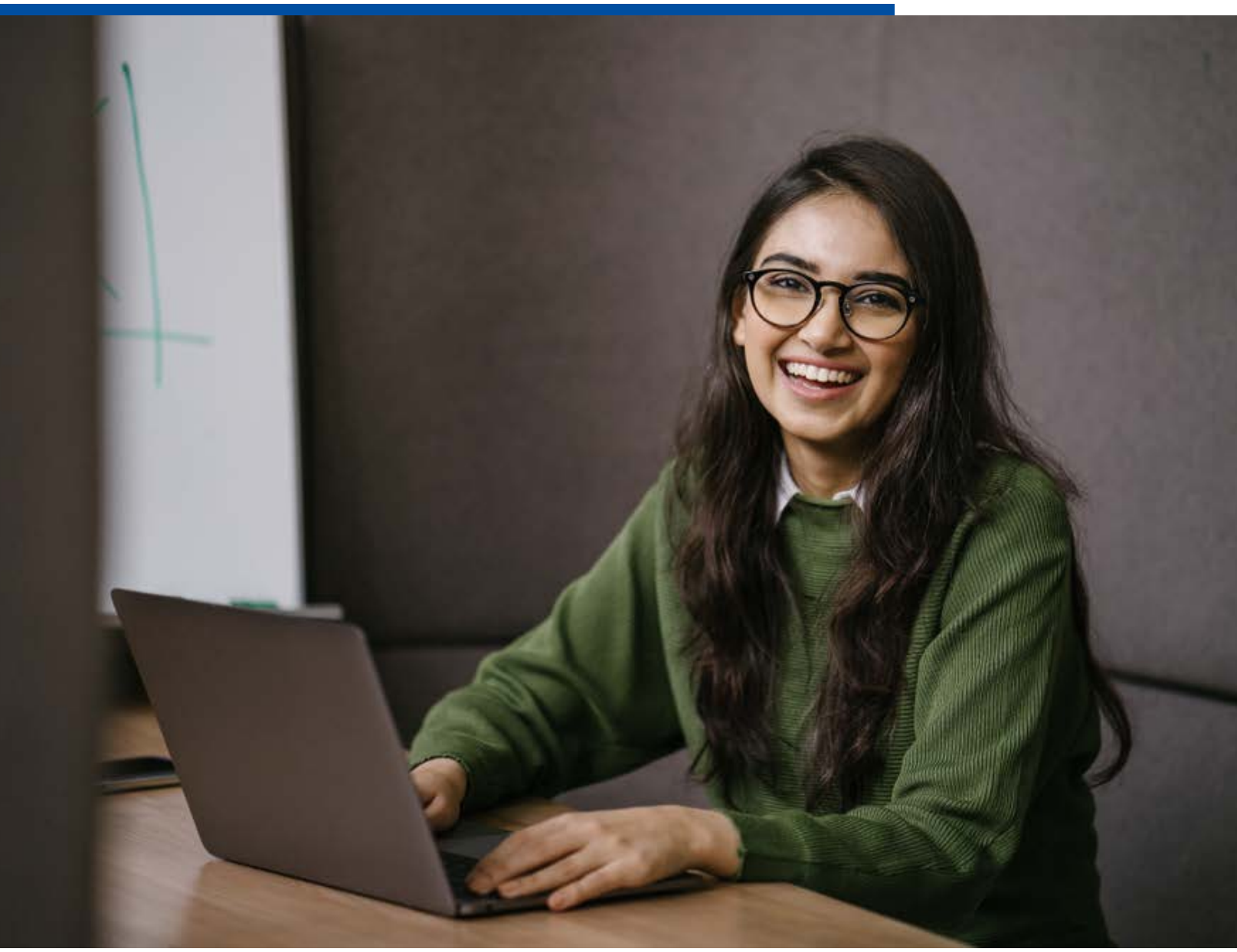
90%
Course Completion Rate

>4.5/5.0
Learner Rating

7000+
Industry Mentors



READY TO ADVANCE YOUR CAREER?



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APPLY NOW