

Statement of Purpose
Master's in Electrical Engineering
Indian Institute of Technology Kharagpur

I am writing to express my decision to pursue postgraduate study in India, which is underlined by my avid interest to be a part of the master's program in Electrical Engineering at the IIT Kharagpur and be a part of the prestigious ICCR scholarship. I am interested in Microelectronics & VLSI, Electronic System as both a major subject and a field to pursue my career in. It is a fast-growing area with tremendous potential for research and also an increasing number of applications in today's world of technology.

I have graduated from the Electrical and Electronic Engineering department at the Ahsanullah University of Science & Technology (AUST). My enthralling undergraduate journey made me discover many fascinating and imperative virtues of Electrical Engineering. Enamored with the vast domain of this subject I have developed keen interest in subjects like VLSI, Digital Electronics, Control System, Power Electronics, Biomedical Instrumentation. Furthermore, throughout my academic career I came across a blend of engineering subjects which constitute the soul of electrical engineering such as Power Electronics, Electromagnetics, Mechanical Engineering, Electrical & Electronic Circuits, Programming, Computer Architecture, Signal Processing, Simulation Lab, Power System, Energy Conversion- I & II. Besides building theoretical concepts, I have always enjoyed long hours spent in the labs to correlate theory to practical observation. Also, working on projects throughout the academic curriculum gave me a sound technical base. But the greatest advantage of involving me in these activities was to accomplish skills of teamwork. While attending Microprocessor, Interfacing & System Design class in the third year of my bachelors, I was given a project to "build a binary parallel adder with a 7-segment display". Within a week, I was able to reach my goal. From that moment of success, I had started to cherish the joy of innovation. I tried a lot of new things at my home where I built my personal mini lab.

From my childhood days I had always been fascinated by the shiny devices & flashy lights used in the genre of sci-fi fantasy and I had the curiosity of knowing more about Robotics. Where a typical child would be busy admiring his toy, I have always been amazed by the circuitry, sensor system, motor, and assembly of it which actually makes it work. This craving for proficiency in robotics and a strong will to enhance my research skills enabled me to take part in a Line Following Robot racing competition in the fourth semester of my Bachelor's, which is primarily on Microcontroller system. During this project I had gone through many other projects on Microcontroller system which helped me to develop my research ability. This outcome of that project encouraged me so much that resulted in another project in the same area named "Microcontroller based Battery Charger and DC to controllable AC converter" for my Power Electronics course. As part of the VLSI course, I have completed a project on "Designing a one Bit Arithmetic Logic Unit (ALU) using VLSI software Cadence". The goal of this project was to design ALU with the minimum number of IC's in layout.

As for the final year thesis research activity, we, a team of four undergrads was assigned to study different machine learning algorithms and finally implemented a system named “Handwritten Bangla Character Recognition with Convolutional Neural Network”. Handwritten character recognition could be comprehended as a quintessential image processing problem. It performs a non-trivial high-dimensional task as it works to recognize handwritten characters without user dependency. We compared the results of widely used machine learning methods like support vector machine (SVM), neural network & convolutional neural network (CNN). This in turn helped me in grooming my problem-solving abilities. As a group leader, my key tasks were to manage overall activities, writing codes or going through codes written by others, which furnished my skills to understand how artificial intelligence works, and I was able to quench my thirst for research & inner calling for exploiting new avenues in the field of machine learning. Through this, I have acquired a handful of expertise in Image Processing, Python Programming, and several Machine Learning approaches. This experience made me interested in getting involved in research and thus pursuing graduate education.

Apart from academics, I was actively involved in plethora of extra-curricular activities. Being a member of AUST Innovation and Design Club, I took part in organizing inter university tech competitions, project festivals, workshops, and seminars etc. Henceforth, we organized the most prestigious tech event Engenius’17 in the history of our university.

Additionally, I can be delineated as a self-led learner. During this period of the pandemic, when I am supposed to stay home, I have been passing my time by learning & enriching my depth of knowledge. Since the beautiful about learning is that nobody can take it away from me. Taking massive open online courses, online exams, and workshop on Coursera, Udemy, edX, IBM Training, Academy Europe, American Center U.S Embassy, Canvas, CertiProf, iTronix Solutions, MuktoPaath, Study Section, TestDome is how I am spending my time indoors. Not only, courses on Deep Learning & Machine Learning, Data Science, Information Technology, Internet of Things, Python Programming, Power BI Desktop, Blockchain Technology, Web Development are what I have finished so far but also, I have accomplished several capstone projects. Recently, I participated in a workshop called “Hour of Code” on python programming organized by American Centre U.S. Embassy Dhaka and Arduino Community Bangladesh, I ranked 2nd in that quiz competition. Recently, Stanford University has launched “Code in Place”, which is a special course in the time of COVID-19 built as a community service project, upon learning about this I became a part of this initiative in order hone my programming skill even further. I am also a part of “Microsoft Could Skill”, a free online training jointly initiated by Bangladesh Hi-Tech Park Authority and Corporate Projukti Limited, the training is based on ASP.NET Core MVC Web Applications.

My interest is now to gain a comprehensive and solid scientific and technological background in Electronics, able to design and to use electronic devices, circuits, and systems of any complexity as well as to promote the diffusion of electronic technologies in the fields of human activity where benefits can be envisaged. I believe this program will not only hone my skills and enable me to develop expert knowledge that will help me to overcome challenges but will also give wider recognition of the electronics sector, since it focuses on the most advanced

disciplines in electronic design (Analog and Digital Design, CAD and IC Design, Time and Frequency Domain Analysis, Fault Analysis, Embedded Processing, DSPs and Fast Prototyping) to provide a complete and up-to-date preparation. All these things attracted me to learn more about this exciting field. I have chosen this particular program to fulfill my dream in electronic engineering because its course outline is balanced where one finds best amalgamation of theory and practical knowledge. Due to the fact the IIT Kharagpur provides tremendous research facilities I decided to move into your University. I am confident and strongly believe that masters at this juncture would give me the necessary push and momentum that would hasten my steps towards my aspired dream of making Bangladesh with no limitations of a technologically advanced country.

Deciding to become a researcher in a developing country is challenging, bearing in mind the underdeveloped research capacity, the lack of resource materials and funding. But I do like challenges. Hence, I thrived to get the best scientific orientation I could by joining the IIT Kharagpur as a master's student. There, I would be able to form a solid foundation of advanced engineering disciplines based on methodological and operational aspects, which can be applied to develop a "design-oriented" mindset and acquire the skill to use engineering tools to design solutions based on existing scientific knowledge in compliance with the principles of responsible conduct of research to advanced engineering challenges in scientific and technological fields.

Now I am at an important juncture in my academic career, where I am aspiring to develop knowledge and skills that would allow me to grow intellectually. Choosing IIT Kharagpur as my destination for higher education was not a difficult step as I have been doing my research on pursuing academic programs abroad and well-suited institutes for that since 2017. India is regarded as one of the best for its unique and up-to-date education system, and IIT Kharagpur is regarded as one of the world's topnotch institute. I am looking forward to broadening my horizons & study complexities, exchange ideas and insights with the global community. This program will allow me to study my research field from an academic perspective, to share my experiences, and to get more knowledge to fundament my research work.

Ever since I had discovered my passion for Electronics, I wanted to extend my skills into engineering practice and research. I believe, for me to take the necessary step towards such a goal, IIT Kharagpur is the perfect steppingstone because it offers "state of the art" knowledge and possesses vast research prospects, and that my qualifications and experiences make me a worthy candidate. Therefore, I pray that you give me the opportunity to be a part of the master's program of Electrical Engineering at your esteemed university.

Thanking you,
Emon Sarkar