Teaching Statement

Hrishikesh Terdalkar
BharatGen

https://hrishikeshrt.github.io

ācāryāt pādamādatte pādaṃ śiṣyaḥ svamedhayā ।
pādaṃ sabrahmacāribhyaḥ pādaṃ kālakrameṇa ca ॥

A student receives a quarter (of his knowledge) from his teacher,
a quarter by his own intelligence, a quarter from his fellow students,
and a quarter in due course of time.

My teaching philosophy is rooted in the belief that education is a transformative journey, one that an educator takes with his students, and one that extends beyond the classroom. My primary goal as an educator is to cultivate a deep understanding of the subject while instilling a lifelong passion for learning in order to *turn students into effective researchers and passionate teachers*. In addition to a *solid technical foundation*, I aim to equip students with essential skills, including *critical thinking*, *problem-solving*, *effective communication*, as well as the ability to consider the *societal implications* of their research. I am dedicated to fostering a dynamic and *interactive* learning environment that nurtures intellectual curiosity, promotes *active collaboration* among peers, and empowers students to reach their *full potential over time*. Furthermore, I strive to create a safe and inclusive space where all students feel valued, respected, and inspired to participate actively.

1 Experience

During my PhD at IIT Kanpur I gathered experience by serving as a teaching assistant and tutor for a variety of courses on undergraduate and postgraduate level. During my postdoctoral position, I was an instructor for two courses, one at the University Lyon 1 and the other at École normale supérieure de Lyon.

Instructor: I offered a full course on *Natural Language Processing* in the International Masters Program (M2: Data and Intelligence for Smart Systems (DISS)) at University of Lyon 1, France during January 2025 to March 2025. I also covered the *Data Mining* component of the *Databases and Data Mining* course, in the Masters Program (M1: Informatique Fondamentale) at École normale supérieure de Lyon, France from February 2025 to April 2025. Both of these experience involved designing syllabi for the courses, delivering lectures, conducting practical sessions, setting and evaluating assignments, projects and exams.

Tutor: During my tenure as a *Head Student Tutor* for the course '*ESC101: Introduction to Programming*' at IIT Kanpur, I had the opportunity of overseeing the backend administration of *Prutor* [Karkare and Kar, 2022] for five semesters. In this role, I not only managed essential administrative tasks but also had the opportunity to lead a team of teaching assistants and tutors. Beyond administrative duties, I actively contributed to the academic process by aiding in setting question papers, conducting tutorials and assessing student work. Each offering of the course had more than 500 undergraduate students and more than 50 teaching assistants. This multifaceted experience deepened my understanding of the nuances of educational management and assessment, while also providing insights into effective team leadership.

Teaching Assistant: My time as a *Teaching Assistant* at IIT Kanpur encompassed a diverse range of courses, each contributing to my growth as an educator. In '*CS315: Principles of Database Systems*', for two semesters, I helped in setting question papers, grading assignments as well as clearing students' doubts. I also provided similar support in *CS774: Optimization Techniques*. In addition to these duties, in '*CS685: Data Mining*', I developed and maintained a dedicated web-based platform for managing assignments.

Mentor: As an academic mentor at the department of CSE, IIT Kanpur, I provided support to students who required academic assistance in various areas of Computer Science such as Functional Programming (Haskell), Procedural Programming (C), Data Structures, Algorithms and Databases.

MOOC: My experience extends beyond the confines of traditional classrooms. As a teaching assistant, I assisted in designing and delivering '*NOC17-CS33: Fundamentals of Database Systems*', an online certification course under the umbrella of *National Programme on Technology Enhanced Learning* (NPTEL) [Krishnan,

2009], a platform to offer *Massive open online courses* (MOOC). This experience enabled me to contribute to the development of educational content that reaches a wider audience.

Tutorials: I also conducted hands-on tutorial sessions covering *Basics of Linux Shell*, *Python*, *Weka*, and *Classification Techniques* in the '*Artificial Intelligence*' course conducted at IITK under the *Indian Technical and Economic Cooperation* (ITEC), a bilateral assistance programme run by the Government of India. In this course, I had the opportunity of interacting with and helping students from various developing countries.

Pedagogy Courses: I served as a tutor in two offerings of the course '*Introduction to Programming: A Pedagogical Approach*' hosted by Electronics and ICT Academy, IITK. This course was designed for teachers from various colleges affiliated with Dr. A.P.J Abdul Kalam Technical University. In this pedagogy course, my responsibilities included providing guidance and offering insights on '*How to teach programming?*'. The experience enriched my knowledge into practical teaching strategies benefiting both educators and learners.

2 Teaching Interests

I am excited to teach courses in various areas including but not limited to:

- **Undergraduate Courses**
  - Programming Languages (C, Python)
  - Database Systems
  - Software Engineering
  - Theory of Computation
  - Data Structures
  - Algorithms
- **Graduate Courses**
  - Mathematics for Computer Science
  - Natural Language Processing
  - Information Retrieval
  - Data Mining
- **Specialized Courses**
  - Computational Linguistics
  - Computational Aspects of Indian Languages

In addition to covering the fundamental concepts in depth, I envision these courses having project components to encourage students get first-hand experience, expose them to recent research directions as well as encourage collaboration among the peers.

I have a particular interest in crafting *specialized courses* that delve into niche domains encompassing advanced subject matter. One illustrative example is the development of a course titled '*Computational Aspects of Indian Languages*'. In this course, students will receive exposure to principles and techniques specific to Indian languages, augmenting their understanding of conventional NLP methods. I firmly believe that this course can foster diversity by encouraging students to undertake projects aligned with their native languages. This approach could facilitate a collective exploration of various cutting-edge technologies. The primary objective of this course is to equip students with the skills necessary to tackle novel challenges that contribute to advancing the state-of-the-art in the field. Consequently, the curriculum will place significant emphasis on engaging with recent academic literature and culminate in an extensive project that delves into uncharted territory, addressing open problems within the domain.

3 Teaching Approach

I believe that every student brings a unique perspective and set of experiences to the classroom. To engage and accommodate diverse learning styles, I intend to employ a variety of teaching methods, ranging from interactive discussions and collaborative projects to hands-on activities and multimedia resources. By creating opportunities for student-driven exploration and fostering an atmosphere of open inquiry, I encourage active engagement and facilitate a deeper understanding of the subject.

Connection to India's Linguistic Diversity: Having a profound understanding and deep appreciation for India's rich multilingual heritage, I recognize the significance of linguistic diversity and its profound influence on the learning process. My proficiency in four languages - English, Hindi, Marathi, and Sanskrit - positions me to establish meaningful connections with students hailing from diverse linguistic backgrounds.

This, in turn, contributes to cultivating an inclusive and relatable learning atmosphere. My commitment to this inclusive approach is exemplified by my contribution in delivering lectures in Hindi while serving as a tutor for the 'ESC101: Introduction to Programming' course.

Technology Integration: Incorporating technology as an educational tool enhances the learning experience and prepares students for the digital age. I intend to integrate technology thoughtfully, leveraging online platforms, and multimedia resources to facilitate active learning. I firmly believe that intuitive and friendly interfaces are essential for effective teaching and learning. I am dedicated to creating clear and user-friendly learning materials, presentations, and resources that enhance the educational experience and facilitate seamless interaction with course content.

Assessment and Feedback: Assessment serves as a tool for both gauging student progress and promoting continuous improvement. I will emphasize a balanced approach to assessment that includes formative and summative methods. I will provide timely and constructive feedback that highlights strengths and suggests areas for growth. I believe that such a feedback loop enables students to track their development and make informed adjustments to their learning strategies.

Mentoring Approach: In my role as a mentor to graduate and doctoral students, my overarching objective is to challenge them in order to stimulate their intellectual growth, enabling them to reach their utmost potential without experiencing undue frustration. I recognize the uniqueness inherent in each student and research problem, necessitating a customized approach to guidance and counsel. I am committed to adapting in the most effective manner to cater to the unique needs and characteristics of my students.

During the course of my doctoral studies, I had the privilege of engaging with numerous undergraduate and post-graduate students, offering them guidance across a spectrum of topics. These interactions proved to be immensely fulfilling for me, as they served as mutual learning experiences. I learnt as much from these students as they did from me. My experiences as a mentor have honed my ability to elucidate complex problems to students at varying stages of their academic journey. Additionally, they have sharpened my interpersonal skills and enhanced my capacity to articulate my thoughts concisely and persuasively.

In my mentoring approach, I am dedicated to allowing my students the freedom to explore their chosen areas of research while remaining readily accessible to address their requirements and inquiries. I am enthusiastic about perpetuating my own growth and development as a mentor, and I eagerly anticipate the opportunity to apply the insights I have gained to empower emerging researchers in realizing their full potential.

References

Amey Karkare and Purushottam Kar. Prutor: an intelligent learning and management system for programming courses. *Communications of the ACM*, 65(11):62–64, 2022.

Mangala Sunder Krishnan. NPTEL: A programme for free online and open engineering and science education. In *2009 International Workshop on Technology for Education*, pages 1–5. IEEE, 2009.