

# Sathish Gopalakrishnan | Teaching Statement

The whole art of teaching is only the art of awakening the natural curiosity of young minds for the purpose of satisfying it afterwards. – Anatole France

## 1 Goals

The primary goal I set myself as an educator is to help students read critically, reason logically and write clearly. These skills are essential – they provide the foundation – to any career, not just careers in science and engineering. These are skills that will mould the behavior of future world citizens, long after very specific content such as the proof of the Liu and Layland theorem (a key result in real-time scheduling) are forgotten. In engineering courses, logical reasoning is emphasized and transferred through numerous exercises in technical problem solving. These courses, sadly, do not stress critical reading or precise writing.

Critical reading is as important as problem solving because it helps us uncover the assumptions people make about the world and challenge them (Are these assumptions correct? Are they reasonable?). In any field, asking the right question is as, if not more, important than the answer. Clarity in writing is almost a precondition to the successful communication of ideas. Engineers should be aware of the world around them and realize that their work has social consequences. For instance, aspiring entrepreneurs should understand that they need to articulate their ideas to investors and users if they are to transform their vision into reality.

## 2 Methods

Students rise only to the level of our expectations, so I will set high standards. I was an instructor for a course on C++ programming basics and the class had students from very diverse educational backgrounds: apart from engineers, there were students majoring in business administration, economics and French. To engage the students, I used real-world examples that everyone could relate to. Starting with examples helped the class understand concepts better and faster. When I used engaging assignments that related to examples discussed in class, students performed very well even if concepts were difficult; much better than in assignments with dull problem descriptions that required the application of simple methods.

When teaching senior undergraduate students and graduate students in engineering, I believe there are a few principles that improve the interest and grasp of different topics. One, especially in systems design, I will encourage simple problem modeling and back-of-the-envelope calculations to evaluate system designs. I want to remove any sense of fear that students may have when they approach difficult material. Starting with the easy examples not only develops confidence but also provides a firm foundation that can be built upon. Two, having students form ad hoc groups and discuss a technical topic in class for a few minutes fosters debate and motivates students to explore more aspects of a problem than they would individually.

I believe group work and projects lead to greater depth of knowledge and I will structure most of my courses to include a project. Additionally, I will include short writing assignments that stress clarity, organization and correct English usage. For students that I may advise on an individual basis, I will provide a copy of *The Elements of Style* by Strunk and White. Students will be encouraged to submit surveys on technical topics to free fora such as Wikipedia in an effort to make students write carefully and to increase the availability of information.

A classroom is a place for respect and understanding. In courses with small to moderate enrollments, I will take photographs of all students (with their consent) and maintain a course page with their photographs and interests to provide everyone in the class with a sense of togetherness. Very few engineering professors

I know made such efforts but my teachers in the social sciences took these measures and I found it to be remarkably effective in constructing a positive environment for learning.

### 3 Philosophy

Teaching is a vital activity, not simply essential, but animating and motivating. By getting students *enthusiastic* about any topic, the process of learning becomes easier and pleasurable for the students and the teacher. In a classroom, enthusiasm causes a positive transformation as more students become involved in the course material – there is deeper attention and more enquiry.

Teaching and learning are also lifelong activities. As a teacher, I expect to set an example for students and I expect to learn from them. Education embraces as principle and overarching purpose the aspiration of people to become more fully human; it impels us towards further knowledge, enlightenment, and human community, toward liberation. One of my professors once said that teaching is teaching values: not a preaching of private or religious values, but an inculcation of public values such as honesty and civility. As educators, setting the correct example for students by the manner in which we handle a class promotes values.

Learning should also be fun and holistic. I would like engineering students to appreciate – via quotations and anecdotes – the historical and social context of technological innovations. The theorems of Shannon and Gödel are comparable to the masterpieces of Van Gogh and the compositions of Bach, and I would like everyone to make the connections.

### 4 Plans

In the past, I have been an instructor for a course on C++ programming and I was responsible for the entire course: from making course plans, delivering lectures, developing assignments and quizzes, and grading. This opportunity has given me great experience and reinforced my desire to act as a catalyst in students' educational career. I have also been a teaching assistant for several courses: Parallel Computer Architecture, Introduction to the Theory of Computation, and Introduction to Computer Science for Engineers.

With a background in computer science and applied mathematics, I am in a position to teach courses for undergraduate students within the spectrum of operating systems, distributed systems and computer networking. My specialized training and research have been in the area of real-time and embedded systems and resource management; I would also love to offer advanced courses to senior undergraduate students and graduate students in these topics.