



Design and Pedagogy of the Introductory Programming Course

Computer Science and Engineering

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Institute: IIT Bombay

Department: Computer Science and Engineering

Course Intro: : College level computer programming is difficult to teach. Failure rates in programming courses are high worldwide, and in India it is noted that students are not able to write simple programs despite completing degrees in computer science. This course will consider the following questions. • How do you design the syllabus for an introductory programming course? • How do you teach it so that it captures the attention of students? • How do you design examinations, and programming assignments which are fair and encourage students to learn in the desired manner? We will sketch out a course design, and strategies for teaching the course. It will use the C++ languages, but most ideas will be independent of the language.

Pre Requisites: : none

Core/Elective: : Elective

UG/PG: : PG

Industry Support : none

Reference : An introduction to programming through C++, Abhiram Ranade, McGraw Hill 2014

About Instructor: Abhiram G. Ranade is a professor of Computer Science and Engineering at IIT Bombay. He obtained a B. Tech. degree in Electrical Engineering from IIT Bombay in 1981. In 1988 he obtained a Ph.D. in Computer Science from Yale University, USA. He was an Assistant professor of Electrical Engineering and Computer Science at the University of California, Berkeley, USA during 1988-94. Since 1995 he has been a faculty member in IIT Bombay. His research interests are Algorithms, Combinatorial Optimization, Scheduling in Transportation Systems, and Programming Education. He has won the Excellence in Teaching Award of IIT Bombay in 2006-7 and 2010-11.



COURSE PLAN

SL.NO	Week	Module Name
1	1	The introductory programming course: approaches, experience, and challenges.
2	2	Our approach. Premises and basic ideas. Importance of manual computation and translating from manual computation to programs. Learning outcomes. Choice of language.
3	3	Pedagogical strategies. The first lecture: convey the spirit of the course and grab student attention. Use of graphics and
4	4	Program design. Correctness and reasoning about programs. The continuum from problem solving to algorithm design. Design of assignments and examinations.