

# Integration of PDC topics with Various Computer Science and Engineering Undergraduate Courses

An Early Adopter Experience: In Progress, EduHPC-2015

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## About Institute

- Indian Institute of Technology Roorkee (India)
  - A premier tier-1 institute of Government of India
  - Situated 170 KM from New Delhi in hilly and holy area in state of Uttarakhand
- Early Adopter Program in Department of Computer Science and Engineering

## Target Courses

- Computer Architecture,
- Computer Networks
- Software Engineering
- Network Programming
- Computer Networks Laboratory
- Undergraduate Software project
- Both are core/compulsory courses at undergraduate level

## Goals

To ensure that every undergraduate student of our department is exposed to parallel and distributed computing from systems, programming, architecture, and algorithms perspectives.

Developing interest in the students for PDC so that they not only learn in the class, but also perform self-learning.

Making students understand the basic concepts of PDC and developing interest of students in parallel programming.

Equipping students with fundamental concepts of parallel and distributed computing.

Making students to 'think in parallel' by providing them with ample opportunities in this direction, so that it become the part of normal practice for students in dealing with the design or development projects of any domain.

Participating students to review and explore the literature to understand the effect of PDC on Software Engineering practices from various dimensions.  
*It will prepare students to handle PDC related design and development projects with systematic methods.*

Making students to explore the possible adaptations due to PDC related software development in various Software Engineering practices such as life cycle models, estimation metrics, performance measurement parameters and others.  
*It will prepare students for PDC related software development.*

## Integration of PDC Topics

- Analyzed complete course structure of undergraduate level and identified the courses as mentioned above for planned integration.
- Chosen compulsory courses to be learned by every student for proposed integration of PDC topics.
- Course are taught at second year, pre-final year, and final year level to undergraduate students.
- Many core level courses such as Introductory Course on Computer Science, Introductory Course on Programming, Data Structures, Algorithm design, Compiler design, and Programming Languages and some elective courses on Parallel and Distributed Algorithms, Cloud Computing, High Performance Computing, and Distributed Systems already have focus and coverage on some fundamental topics of PDC.

➤ Through this initiative, it is intended to widen the scope of integration of PDC topics at departmental level, in multi-semesters, and to add a flavor of parallel thinking in the other subjects especially in the subjects of Computer Architecture, Computer Networks, Network Programming, Networks based programming laboratory, Undergraduate Software Project, Software Engineering, and Industry-oriented projects.

## Integration with Research

- Conceptual project problems were given that need brainstorming, exploration of literature, and decision making.
- The problems were given in groups so that every level of student can learn in the class.
- It encourages the students to have self-learning and thinking independently after knowing the basics from class-room teaching.
- The progress of the students was monitored on weekly basis.

## Mode of Delivery

- Discussion,
- Assignments,
- Laboratory programs,
- Problem solving,
- Projects.
- Critical Reviews

## Evaluation Plan

Course Period: one semester

Evaluation Mode:

- Continuous assessment via various modes
- Mid-term written examinations,
- Quizzes,
- Mini-projects,
- Assignment,
- Presentations,
- End term written examinations.
- Mid-term written examinations,
  - 1.5 Hours written test
  - 35% weightage in Computer Networks course and 25% weightage in other courses.
- End Term Written Examination
  - 3 hours written test
  - 50% weightage
- Class work performance
  - Assessment through quizzes, mini-projects, assignments, presentations
  - 15% weightage in Computer Networks course and 25% weightage in other course.

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