Abstract — Parallel and distributed computing has become an indispensable knowledge domain of the broad area of Information Technology. Looking at technology trends, it is felt all around that it has become important to incorporate various topics related to parallel and distributed computing at the undergraduate level of engineering program in Information Technology/ Computer Science & Engineering. This article summarizes the current scenario and future plans regarding incorporation of such topics into the undergraduate curriculum of the department of Information Technology at Sikkim Manipal Institute of Technology.

Keywords- Multi-threaded data structure; parallel queue; cloud computing; big data;

II. CURRENT OFFERINGS RELATED TO PARALLEL AND DISTRIBUTED COMPUTING

The syllabi of various programs offered by the department undergo changes due the latest trends in the subject domains. At present, there are some courses which address some issues related to Parallel and Distributed Computing. Following are the courses related to PDC and are offered at VII Semester of UG level. The courses are: IT 1702 Web Technology and Web Services, IT 1704 Multimedia Computing and Communications, IT 1761 Web Technology and Web Services Laboratory, IT 1762 Multimedia Computing and Communications Laboratory, and IT 1738 Distributed and Grid Computing (as an optional course against Elective III). These courses discuss some advanced topics related to parallel and distributed computing.

The undergraduate students of the department are required to carry out two project works; one in VII semester and the other in VIII semester. Recently, we have assigned project works related to Parallel and Distributed Computing to such students such that they get exposure to this area through practical works too. Some project works related to PDC are as mentioned under: Challenges and opportunities with big data, Data mining with big data, Routing algorithm for delay tolerant networks, Autonomous learning system for big data, Security issues in big data, Security issues in cloud based storage, Fair resource allocation in distributed environment.

The department also organized first national conference in communication, cloud, and big data 2014 (CCB 2014) during 20-21 Dec 2014. The speakers and paper presenters highlighted several topics related to PDC and presented their research findings. This conference is going to be an annual event through which the students of the department are expected to be benefited.
III. INCORPORATING TOPICS OF PARALLEL AND DISTRIBUTED COMPUTING INTO DATA STRUCTURES COURSE

The students of III semester are taught a basic course on data structures namely IT 1302 Data Structures (previously IT 302 Data Structures). During the last semester, some topics related to parallel data structures were also taught along with the traditional content on classical data structures. Following are some topics: multi-threaded data structures for parallel computing, parallel queue, programming for multi core processors. The study materials for these advanced topics are under development. This study material will be published in the web on its completion.

IV. FUTURE PLAN REGARDING INCORPORATION OF PARALLEL AND DISTRIBUTED COMPUTING TOPICS INTO THE CURRICULUM

Looking at the popularity of different computing and communication areas linked with parallel and distributed computing, the department has planned to incorporate some more elective courses in the under graduate level. The titles of those courses are as mentioned under: Cloud Computing, Big Data, Internet of Things, Security Issues in Distributed Computing, Distributed Software Development.

Moreover, some topics related to PDC are also planned to be incorporated in some existing courses of the curriculum. For example, a detail discussion on Service Oriented Architecture (SOA) is to be incorporated in the existing software engineering course.

The department also has keen interest in developing course materials for such areas of studies making those appropriate for under graduate students. The topics considered at this moment are as mentioned under: Cloud Computing, Big Data, Internet of Things, Information Centric Networking, Distributed Software Engineering, Security Issues in Distributed Computing, and Parallel and Distributed Algorithms.

V. SUMMARY

The concepts related to parallel and distributed computing (PDC) are becoming very important along with the growth of Internet technologies. The undergraduate students of Information Technology / Computer Science & Engineering domain need exposure to this field of knowledge. Looking at this need the department of Information Technology at Sikkim Manipal Institute of Technology has taken initiative to incorporate various topics/courses related to PDC at undergraduate level. This article provides an overview of this initiative.