Department of Computer Science

(1) Total No. of class rooms available (seminar room, meeting room, etc. may be mentioned separately)
- Four class rooms
- One Seminar room
- One Meeting room (air conditioned)

(2) No. and details of Laboratories with brief description on the kind of work done therein, including computer laboratories

The Department has two laboratories:
1. Common Facility Lab - 25 computers (air conditioned)
2. Computer Science Department Lab - 10 computers.

- Both labs are setup and maintained by the faculty of the computer science department.
- All the computers have the latest Linux operating system (Debian distribution) along with state-of-the-art open source tools.
- Both laboratories are used by students of the Departments of Sanskrit Studies, and Computer Science. Department of Physics and Mathematics have their own separate labs.
- The students of Sanskrit studies learn to use open source tools, C language programming, image/photo editing, document preparation, spreadsheets, presentations and introductory web programming as a part of their 3 year long computer training.
- The students of computer science use lab for programming tasks in their course work. For instance database implementation, Android programming, Computer Graphics, Network programming, etc.

(3) Details of Library:

No. of books:	1364 (CS books in Central library)
No. of journals: nil	nil
web-based access to resources provided or no:	Nil ebook collections(*)
total built up area	9680 sq.ft (Central library)
e-journals and e-databases available	nil
other printed journals and magazines	nil
total no. of users	11 students + 5 faculty + 2 adjunct faculty
total no. of books issued yearly,	73
no. of yearly visitors approximately:	16

(*) University has allotted funds to subscribe online ebook library of British Council Library from the following academic session starting from second week of July 2016. Students of computer science will get to avail the vast collection.

(4) No. of students admitted in various courses during the last 3 years (male and female to be separately shown)

Year	Male	Female
2013-14	7	0
2014-15	3	1
2015-16	8	0

(5) New educational and communication technologies used for teaching:

1. We are undergoing active deployment of Moodle which is a web-based application suite for teaching. It is an open-source software geared towards the needs for both teachers and students.
2. Department of computer science was instrumental in introducing KOHA in the library. KOHA is the state-of-the-art integrated application designed for libraries in a web-aware campus.
3. Department of computer science is responsible for the campus wide computer network and network facilities. We have a dedicated firewall, content filtering, cache server, website filtering, domain name servers and dynamic host naming (dhcp). The caching/proxing is done transparently. The subnets are segregated using virtual LAN. The Belur campus wide network is supported by a fibre optics backbone connected to NKN.
4. Department of computer science also maintains Internet servers, including web server, mail server, web sub-site deployment with their own web server and mail server. Ramakrishna Mission Vivekananda University uses 13 static IP addresses. Even library has its own web server enabling catalogue search for one and all in the internet.
5. Apart from this department has conventional projector system for classes which use presentations.
6. Some courses are run on video conferencing, when the situation demands it.

(6) Details of to what extent is the Faculty Centre computerized:
- LAN Management using vlans, proxy servers, masquerading, dhcp, dns, mail services, web services.
- Library catalogue browsing and circulation using KOHA
- Gathering various feedbacks from students and faculty is automated using Moodle(c).
- Departments have their own web server, mail server. Students and teachers have their own personal webpages.

(7) Research and Extension facility and actual work done during the last 3 years

Research Facility
1. Up-to-date Campus Network with access to Internet everywhere and anywhere, all the time with practically zero downtime.
2. Access to research material through computers.
3. Access to library from whole campus (or even from outside campus using Internet).

Extension facility
1. Library automation
2. Campus wide network installation
3. Internet servers

4. Intranet servers
5. University web portal.

Part of the research coming out of a PhD program of a faculty has been open-sourced for wider use to the academia and the industry under GPL. The links are provided below:

1.   Robust Foreground Segmentation
   [C++ source code for state-of-the-art foreground detection (background subtraction) algorithm](#)

2.   Anomaly Detection
   [C++ source code for detecting anomalies in image sequences](#)

In total, the source-code has been downloaded more than 5000 times.

(8) Publications of faculty (underscore) during the last 3 years

Swami Dhyanagamyananda (Swathyprabhu Mj)

1. Sandip Das, <u>Swathyprabhu Mj,</u> Prantar Ghosh, Sagnik Sen
   Relative clique number of Planar signed graphs,
   CALDAM-2016

2. Sandip Das, <u>Swathyprabhu Mj</u>, Sagnik Sen
   On oriented relative clique number,
   LAGOS-2015

Swami Sarvottamananda

3. John Augustine, Sandip Das, Anil Maheshwari, Subhas C. Nandy, Sasanka Roy, <u>Sarvattomananda</u>
   Localized geometric query problems.
   Comput. Geom. 46(3): 340-357 (2013)

4. Arijit Bishnu, Subir Kumar Ghosh, Partha P. Goswami, Sudebkumar Prasant Pal, <u>Sarvattomananda</u>
   An Algorithm for Computing Constrained Reflection Paths in Simple Polygon.
   CoRR abs/1304.4320 (2013)

5. Sandip Das, <u>Sarvottamananda</u> and Ayan Nandy
   Linear time algorithms for Euclidean 1-center in Re^d with non-linear convex constraints,
   Conference on Algorithms and Discrete Applied Mathematics, 2016

6. Sandip Das, Ayan Nandy and <u>Sarvottamananda</u>
   Linear time algorithm for 1-center in Re^d under convex polyhedral distance function
   (submitted to 10th International Frontiers of Algorithmics Workshop, 2016, accepted for publication)

Brahmachari Vikas (V Reddy)

7. J Xu, S Denman, <u>V Reddy</u>, C Fookes, S Sridharan
   Real-time video event detection in crowded scenes using MPEG derived features: A multiple

instance learning approach
Pattern Recognition Letters 44, 113-125, 2014

8. L Cheng, <u>V Reddy</u>, C Fookes, PKDV Yarlagadda
Agent-based modelling simulation case study: assessment of airport check-in and evacuation process by considering group travel behaviour of air passengers
Applied Mechanics and Materials 568, 1859-1864, 2014

9. L Cheng, <u>V Reddy</u>, C Fookes, PKDV Yarlagadda
Impact of passenger group dynamics on an airport evacuation process using an agent-based model
Computational Science and Computational Intelligence, 2014

10. L Cheng, CB Fookes, <u>V Reddy</u>, PK Yarlagadda
Analysis of passenger group behaviour and its impact on passenger flow using an agent-based model
International Conference on Simulation and Modeling Methodologies, Technologies and Applications, 2014

11. A Konda, <u>V Reddy</u>, PKDV Yarlagadda
An intuitive multi-touch surface and gesture based interaction for video surveillance systems
International Journal of Future Computer and Communication 3 (3), 197-201, 2014

12. <u>V Reddy</u>, AC Farr, P Wu, K Mengersen, PKDV Yarlagadda,
An Intuitive Dashboard for Bayesian Network Inference
Journal of Physics: Conference Series 490 (1), 012023, 2014

13. <u>V Reddy</u>, C Sanderson, BC Lovell
Improved foreground detection via block-based classifier cascade with probabilistic decision integration
IEEE Transactions on Circuits and Systems for Video Technology, 23 (1), 83-93, 2013

Prof S K Ghosh

14. <u>S K Ghosh</u> and P E Haxell,
Packing and covering tetrahedra,
Discrete Applied Mathematics, vol. 16, no. 9, pp. 1209-1215, 2013.

15. <u>S K Ghosh</u> and P P Goswami,
Unsolved problems in visibility graphs of points, segments and polygons, (Survey Paper),
ACM Computing Surveys, vol. 46, no. 2, pp. 22:1-22:29, 2013.

16. Y Disser, <u>S K Ghosh</u>, M Mihalak, P. Widmayer,
Mapping a polygon with holes using a compass,
Theoretical Computer Science, vol. 553, pp. 106-113, 2014.

17. <u>S K Ghosh</u> and B Roy,
Some results on point visibility graphs,
Theoretical Computer Science, vol. 575, pp. 17-32, 2015.

18. A A Diwan, <u>S K Ghosh</u> and B Roy,
Four-connected triangulations of planar point sets,
Discrete and Computatational Geometry, vol. 53, pp. 713-746, 2015.

19. P Bhattachary, <u>S K Ghosh</u> and B Roy,
Vertex Guarding in Weak Visibility Polygons,
*(*Submitted to Journal of Discrete and Applied Mathematics, 2016)

20. A Bishnu, <u>S K Ghosh</u>, P P Goswami, S P Pal, S Sarvattomananda,
An algorithm for computing constrained reflection paths in simple polygon,
Manuscript, April 2013 (available at arxiv.org).

21. <u>S K Ghosh</u> and B Roy,
Problems on Plane Triangulations of Points,
Proceedings of India-Taiwan Conference on Discrete Mathematics, Hsinchu, Taiwan, pp. 57-60, 2013.

22. <u>S K Ghosh</u> and B Roy,
Some results on point visibility graphs,
Proceedings of the 8th International Workshop on Algorithms and Computations, Chennai, Lecture Notes in Computer Science, vol. 8344, pp. 163-175, Springer, 2014.

23. A Baertschi, T Tschager, <u>S K Ghosh</u>, M Mihalak and P Widmayer,
Improved bounds for the conflict-free chromatic art gallery problem,
Proceedings of the 30th ACM Annual Symposium on Computational Geometry, pp. 144-153, 2014.

24. P Bhattachary, <u>S K Ghosh</u> and B Roy,
Vertex Guarding in Weak Visibility Polygons
Proceedings of the 1st International Conference on Algorithms and Discrete Applied Mathematics, Kanpur, Lecture Notes in Computer Science, vol. 8959, pp. 45-57, Springer, 2015. (Full version of the paper is available at arxiv.org).

25. <u>S K Ghosh</u> and S P Pal,
A National Effort for Motivating Indian Students and Teachers towards Algorithmic Research,
Manuscript (on Computer Education), July 2015 (available at arxiv.org).

Note: The adjunct faculty, Prof Sandip Das, ISI Kolkata, and Prof Sudebkumar Pal, IIT KGP, is also involved in active research.

(9) Ongoing research project with source of funding

The Department of Computer Science do not have any external funded projects at present. All the research is currently internally funded.

Dr Subir Ghosh
1. Computational Geometry and Applications
2. Robot Motion Planning
3. Geometric Graph Theory and Applications
4. Discrete Mathematics
5. Algorithms: Sequential, Parallel, On-line and Approximation

Swami Sarvottamanada
1. Optimization problems in Computational Geometry (with Ayan Nandy and Sandip Das)
2. Primality Testing (with Rajeev Kumar)

Brahmachari Vikas
1. Image Processing
2. Pattern Recognition
3. Computer Vision

Swami Dhyanagamyananda
1. Graph Theory
2. Oriented Graph Coloring

(10) National and international linkages

School of Computer Science. Carleton University
BUET Dhaka
University of Queensland
Queensland University of Technology
NICTA (National Information and Communications Technology Australia)
University of Lethbridge, Alberta, Canada
Ben-Gurion University of the Negev, Beer-Sheva, Israel
Simon Fraser University, Burnaby, Canada
Karlsruhe Institute of Technology, Germany
Swiss Federal Institute of Technology (ETH), Switzerland

TIFR, Mumbai
ISI, Kolkata,
IIT, Kharagpur
IIT Delhi
IIT Madras
IIT Mumbai
IIT Kanpur
IIT Roorkee
IIT Guwahati
IISc Bangalore
Indian Institute of Engineering Science and Technology, Shibpur
University of Kerala
University of Kashmir, Srinagar,
Amrita Vishwa Vidyapeetham, Coimbatore
BITS Pilani
BHU Varanasi
NIT Tiruchirapalli
NIT Rourkela
Thapar University, Patiala
PSG College of Technology, Anna University Coimbatore
NIT Patna

NIT Karnataka
DAIICT Gandhi Nagar
IIITDM Jabalpur
BITS Pilani Goa
NIT Warangal
IIITM-Kerala, Thiruvananthapuram
Manipal Institute of Technology and Sikkim Government College, Sikkim
Visvesvaraya National Institute of Technology, Nagpur

(11) Conferences and Workshops organized/attended by the faculty during the last 3 years.

International Conferences/Workshops organized by Faculty

1. The Third International Workshop on Algorithms and Computations (WALCOM 2009), ISI Kolkata, February 18-20, 2009.
2. The Fourth International Workshop on Algorithms and Computations (WALCOM 2010), BUET Dhaka, February 10-12, 2010.
3. The Fifth International Workshop on Algorithms and Computations (WALCOM 2011), IIT Delhi, February 18-20, 2011.
4. The Sixth International Workshop on Algorithms and Computations (WALCOM 2012), BUET Dhaka, February 15-17, 2012.
5. The Seventh International Workshop on Algorithms and Computations (WALCOM 2013), IIT Kharagpur, February 14-16, 2013.
6. The Eighth International Workshop on Algorithms and Computations (WALCOM 2014), IIT Madras, February 13-15, 2014.
7. The First International Conference on Algorithms and Discrete Applied Mathematics (CALDAM 2015), IIT Kanpur, February 8-10, 2015.
8. The Second International Conference on Algorithms and Discrete Applied Mathematics (CALDAM 2016), University of Kerala, Triruvanthapuram, February 18-20, 2016.
9. Second India-Taiwan Conference on Discrete Mathematics, Amrita Vishwa Vidyapeetham, September 8-11, 2011.
10. Pre-Workshop School of WALCOM 2013 on Graph and Geometric Algorithms, ISI Kolkata and RKMVU Belur, February 11-13, 2013.
11. Indo-Slovenia Conference on Graph Theory and Applications (Indo-Slov-2013), Thiruvananthapuram, February 22-24, 2013.
12. Pre-Workshop School of WALCOM 2014 on Algorithms and Combinatorics, IIT Madras, February 10-11, 2014.
13. Pre-Conference School of CALDAM 2015 on Discrete Mathematics, IIT Kanpur, February 5-6, 2015.
14. Pre-Conference School of CALDAM 2016 on Discrete Applied Mathematics, University of Kerala, Triruvanthapuram, February 15-16, 2016.
15. Indo-German Spring School on Algorithms for Big Data, Indian Institute of Technology Madras, Chennai, February 22-26, 2016.

National Conferences/Workshops organised by Faculty

1. TIFR-CRCE Workshop on "Introduction to Geometric Algorithms",Mumbai, July 22-23, 2008.
2. Silver Jubilee Workshop on "Introduction to Geometric Algorithms", IIT Kharagpur, October 31-November 2, 2008.

3. TIFR-BITS Workshop on "Introduction to Graph and Geometric Algorithms", BITS Pilani, January 22-24, 2009.
4. Dr. Homi J. Bhabha Birth Centenary Workshop on "Introduction to Graph and Geometric Algorithms", IISc Bangalore, July 15-18, 2009.
5. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", NIT Tiruchirapalli, January 7-9, 2010.
6. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", BHU Varanasi, January 27-29, 2010.
7. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", NIT Rourkela, March 25-27, 2010.
8. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", Thapar University, Patiala, October 28-30, 2010.
9. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", PSG College of Technology, Anna University Coimbatore, January 6-8, 2011.
10. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", NIT Patna, March 26-28, 2011.
11. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", IIT Guwahati, October 21-23, 2011.
12. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", NIT Karnataka, January 10-12, 2012.
13. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", DAIICT Gandhi Nagar, March 14-16, 2012.
14. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", IIITDM Jabalpur, November 1-3, 2012.
15. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", BITS Pilani Goa, January 17-19, 2013.
16. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", BESU Shibpur, March 14-16, 2013.
17. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", NIT Warangal, October 23-25, 2013.
18. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", University of Kerala and IIITM-Kerala, Thiruvananthapuram, January 23-25, 2014.
19. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", Indian Institute of Technology, Roorkee, March 6-8, 2014.
20. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", Manipal Institute of Technology and Sikkim Government College, Sikkim, October 16-18, 2014.
21. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", Visvesvaraya National Institute of Technology, Nagpur, January 15-17, 2015.
22. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", University of Kashmir, Srinagar, May 18-20, 2015.

Conferences/Workshops attended by the Faculty

1. Invited talk on *Planar Graphs, Planarity Testing and Embedding, by* Swami Sarvottamananda at a research promotion workshop held in University of Kerala in October 2014
2. Swami Dhyanagamyananda presented a research paper in CALDAM 2016 held at University of Kerala. (Received best paper award)
3. Dr Subir Ghosh and Brahmachari Vijneyachaitanya attended CALDAM 2016.

4. Swami Dhyanagamyananda attended Fourth workshop conducted by National Knowledge Network (NKN) at Hyderabad, 21-22 Jan 2016

5. Dr Subir Ghosh, Swami Sarvottamananda, Swami Dhyanagamyananda, Brahmachari Vijneyachaitanya attended CALDAM 2015 held at IIT Kanpur

6. Dr Subir Ghosh, Swami Dhyanagamyananda, Brahmachari Vijneyachaitanya attended WALCOM 2014 held at IIT Chennai

7. Dr Subir Ghosh, Swami Dhyanagamyananda, Swami Sarvottamanada attended WALCOM 2009 held at ISI Kolkata

8. Dr Subir Ghosh attended all the workshops and conferences mentioned previously.

9. Additionally Dr Subir Ghosh gave invited lectures in each research promotion workshop mentioned previously.

10. Swami Sarvottamananda gave invited lecture in following research promotion workshops

   1. TIFR-CRCE Workshop on "Introduction to Geometric Algorithms",Mumbai, July 22-23, 2008.
   2. Silver Jubilee Workshop on "Introduction to Geometric Algorithms", IIT Kharagpur, October 31-November 2, 2008.
   3. TIFR-BITS Workshop on "Introduction to Graph and Geometric Algorithms", BITS Pilani, January 22-24, 2009.
   4. Dr. Homi J. Bhabha Birth Centenary Workshop on "Introduction to Graph and Geometric Algorithms", IISc Bangalore, July 15-18, 2009.
   5. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", NIT Tiruchirapalli, January 7-9, 2010.Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", BHU Varanasi, January 27-29, 2010.
   6. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", NIT Rourkela, March 25-27, 2010.
   7. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", Thapar University, Patiala, October 28-30, 2010.
   8. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", PSG College of Technology, Anna University Coimbatore, January 6-8, 2011.
   9. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", NIT Patna, March 26-28, 2011.
   10. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", BESU Shibpur, March 14-16, 2013.
   11. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", University of Kerala and IIITM-Kerala, Thiruvananthapuram, January 23-25, 2014.
   12. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms", Manipal Institute of Technology and Sikkim Government College, Sikkim, October 16-18, 2014.