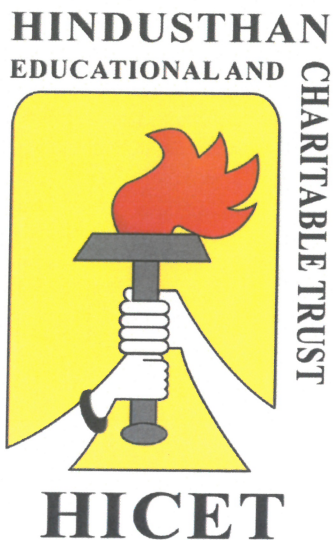


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SMART CAMPUS POLICY

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Initiatives and Implementation

Information and Communication Technologies (ICT) are used by smart campuses to communicate with stakeholders and build an ecosystem that combines physical and digital places. In order to produce a productive, innovative, and sustainable environment, it establishes responsive, intelligent, and better services.

The goal of the Smart Campus policy is to promote environmentally and energy-conscious development. By "smart campus," we refer to a campus that is supported and improved by digital and internet-based technologies and is an effective, secure, sustainable, responsive, and joyful place to live and work. In addition to the obvious advantages of a more effective, connected, and responsive campus, such a campus would also strengthen and maintain the College's reputation as an academic institution that is forward-thinking, something that our Management firmly supports.

The emergence of Smart Campus will have a number of advantages. Complete control over resource use will be offered; reforms and integration of diverse academic and administrative activities will be demanded; discipline in service delivery will be introduced; and a culture of cooperative research and innovation will be fostered.

Smart Campus offers a centralized framework that connects systems and makes it simple to pinpoint constraints, issues, and chances to improve things. To increase learning and optimize College operations, it assesses campus effectiveness and tracks student experiences. The college information is poised to move into a new phase with the development of new information technologies including cloud computing, Internet of things, mobile Internet, big data, knowledge management, social network apps, etc.

Intelligent and open education and teaching, a more humane learning environment, and comfortable and convenient living services are all made possible by a smart campus, which links information technology to the university's physical environment as well as its digital virtual space. It is now evident that today's pupils think and absorb information fundamentally differently than their forebears as a result of this pervasive information environment and the sheer volume of their connection with it.

The nature of education is changing drastically as a result of technological innovation and student desire for new learning methods. Therefore, the college system will undergo its most significant shift in the next five years.

According to the smart campus design concept, administrators, teachers, and students can make different management decisions by using first-generation information technology with a more complex and dynamic approach. One can achieve the integration between campus life and physical systems in a smart campus by embedding sensors into the campus buildings, water supply systems, power supply systems, and equipment between the various objects.

Real-time large-scale data capture is possible by integrating management systems, learning systems, and office systems into the "campus cloud," along with the Internet of Things and an Internet connection. A more solid foundation for decision-making is provided by the in-depth analysis of such big data, which ultimately serves the goal of service information development.

The smart campus is an expansion and completion of the digital campus. In order to understand the work, learning, and personal qualities of teachers and students, it makes use of new information technology to sense the campus's physical environment.

The departments and center's digital and physical spaces are interconnected to create a convenient and comfortable learning environment and living environment for teachers and students. This interaction between teachers and

students is made possible by the department environment and resources, which also enable humanised innovation service.

CONCEPTS TO BE IMPLEMENTED TO ACHIEVE SMART CAMPUS

The Internet of Things (IoT): The Internet of Things integrates sensors, controllers, machines, people, and things in a new way to realize intelligent identification, location, tracking, monitoring, and management through the integration of intelligent sensing, identification technology, wired network and mobile Internet. Everything is becoming connected Offering Educators unprecedented opportunities to address challenges and transform. IoT is network of devices communicating with each over internet or some other communication to make the system smart. A smart system created using the concepts of IoT can become helpful for automation, data management, retail, green energy, etc

Big Data Technologies: Big data technology in the wisdom of the campus in all aspects of the application will make its management services to a higher level. It include mass data acquisition, mining, storage and processing. Smart campus is through a variety of intelligent terminal equipment, information systems and sensing devices to obtain a large number of activities and status data, and in order to collect data analysis to grasp the law of things, to carry out intelligent applications.

Cloud Computing: Cloud computing requires a combination of grid computing, parallel computing, distributed computing, powerful integrated computing, only the use of open, integrated, collaborative information architecture and dynamically configurable resources, high scalability, on-demand service cloud computing model can provide good infrastructure support.

Business Intelligence: Business intelligence utilizes data warehousing and data mining techniques to systematically store and manage user data, analyze user data through various statistical analysis tools, provide analysis reports, provide decision-making information for a variety of university activities, basis.

Knowledge Management: Knowledge management is the key technology of smart campus. It is the most important and the most common activity of knowledgeable person and university. Knowledge management is the planning and management of knowledge, knowledge creation process and knowledge application.

Social Networking: The social network covers all forms of network services with the core of human society. It is a social or social characteristics of the network services. It is an interactive platform that can communicate with each other and interact with each other, and is therefore the key to achieve a smart campus. In the construction of smart campus, social network has the characteristics of openness and low cost, so that students can better accept and promote its rapid development.

A new technical architecture will result from the integration of all the aforementioned services with the HICET high performance computing infrastructure. The installation of a campus-wide infrastructure of several sorts of sensors will be required to realise the aforementioned.

Building robust and dependable sensor nodes and smart trees across the campus would be a wise use of newly available technologies in solar power, low-power processors, sensors, smart cameras, smart metres, and cloud computing.

It would be feasible to set up WiFi hotspots for the HICET community near important sites on the campus as well as deploy a variety of smart apps (such as monitoring water flow, electricity usage, and pollution, etc.). Once smart infrastructure is in place, a multitude of research and innovation opportunities will become available across the campus.

The development of concepts that can be evaluated as pilot projects employing these sensors will be encouraged among faculty and students at all levels, including UG, PG, and PhD. They could focus on any industry, including waste

management, transportation, and security & surveillance. In reality, such infrastructure might inspire creativity and lead to solutions for smart cities of the future.

There should be a mobile interface designed for all services for users (students and staff). This will eventually encourage total back office system integration (Academic, Finance, Establishment etc.). Due to this, the role of "High Performance Computing Center (HPC)" would assume greater responsibility and may be aptly referred to as "Smart Computing Services Center (SCSC)".

SMART CAMPUS IMPLEMENTATIONS

- **Electricity:** Uninterrupted electricity supply is given in both academic and residential campus through the main grid with backup of generator supply. For essential applications UPS power is also given. A substation is created which draw power from national grid and step down to 400 KVA. Once it is operational a 24x7 power supply will be guaranteed.
- **Transportation:** College bus service is given to students and also ambulance service is provided 24x7 for emergency needs.
- **Medical:** A Medical center is created with one male and one female doctors with supporting staffs. Preventive measures were made to protect the residence from vector borne diseases such as dengue, malaria etc.
- Both academic and residential campus are fully protected from grazing animals through compound wall.
- **Roads:** All buildings and both campuses were connected through broad roads with foot paths in important places.
- **Access to facilities / External services:** Canteen, Stationary Shop, ATM, CUB bank are established.
- A multipurpose hall with indoor auditorium and student's playground are established.

- **Green campus initiative:** A committee is constituted to make the campus clean and green and several initiatives were done through this. Also motivated students and staffs to involve in making the campus green and clean. The NSS students were actively involved -each department also taken initiative in the plantation drive around their building. The bigger challenge is to convert the water logging areas into green corridors by innovative technologies.
- Free Open Source Software as policy wherever possible.
- Harnessing the solar energy by installing solar modules in building roofs, solar powered street lights, procured solar steam generator for cooking need of hostel etc.
- Energy saving measures were introduced wherever possible including usage of LED lights, natural lighting in almost all rooms, high energy rating electronic appliances etc.
- Established IT infrastructure (PCs, telephones, WiFi, printing and scanning) in each needed places and the process of making WiFi and broadband internet connection to the whole campus.
- Created paperless environment wherever possible and most of the official communications are done electronically.
- Introduced Rainwater harvesting by creating artificial ponds and all the sewage water generated in both residential and academic campus were treated through sewage treatment plants.
- Further projects like smart security (CCTVs for Video Surveillance, etc), biometric attendance system for faculties and staffs are enabled and it will be extended to students.

SMART CAMPUS SUGGESTIONS

- 1) Smart cards for all students and employees where card based/biometric attendance system for students to be enabled, access to services (library,

lab, hospital, printing, etc) to be enabled, and Cycle dock (Bicycle sharing system) to be enabled through Smart Cards.

- 2) Projects like smart security (CCTVs for Video Surveillance, etc), sensor based doors for entry in departments and labs, bus tracking using GPS, smart speed sensors across campus, video conferencing facility in all departments and motion sensing lights and fans could be initiated.
- 3) Digital display panels at key locations and smart navigable notice boards may be implemented. Further SMS Alert facility for all notices/circulars to user groups based on title of content may be planned. Mobile portability for complete College website and smart interactive features using Web 2.0 in all website within Hindusthan Institutions domain may be planned.
- 4) For ensuring sustainability, smart management of electricity, smart management of water resources, smart maintenance scheduling and mechanized cleaning and sensor based waste management (degradable vs non-degradable waste) may be planned for.
- 5) To enhance focus on sustainability, green / nongreen garbage collection, green trucking practices inside the campus and noise control mechanisms near road walls may be planned.
- 6) Transport or travel support for travel outside the campus may be planned for. Separate bicycle path besides roads may be planned to encourage usage of bicycles.
- 7) Dashboards may enable online booking institution resources (classrooms, halls, and online book recommendation). Searchable key notifications (pdfs) repository and searchable telephone directory may be planned.
- 8) To enhance sustainability, projects like energy generation from the solid waste management, solar water heaters to be installed in hostels and residences, shaded footpaths with solar panels on top, building integrated solar panels, regenerative systems across footpaths (generate power when people walk on the footpath) and waste water management to prevent direct/indirect communicable diseases may be planned.

- 9) A digital map of underground infrastructure (electrical/internet wirings, pipes) may need to be created so that infrastructure development does not damage existing services.
- 10) To enhance the sustainability of changes, a bio-gas plant could be developed to generate energy. Initiatives could be planned to monitor carbon footprint of the campus. Further rainwater harvesting for all buildings on campus may be planned for to enhance usage of key water resources.
- 11) Lab access through campus cards only
- 12) Smart printers in campus, access using campus cards
- 13) Biometric/card based attendance system for students
- 14) Payment for transportation facility
- 15) Wi-Fi facility in hostels and throughout campus
- 16) Motion sensing lights, fans, ACs
- 17) Smart maintenance scheduling system for buildings/labs/office/houses.
- 18) Smart security across the campus (e.g. Sensor based CCTVs)
- 19) Sensor based safety solutions (labs & across the campus)
- 20) Solar cell enabled lighting using LEDs in Classrooms
- 21) Smart electronic switches for classes and departments.
- 22) Smart meters for water consumption across campus
- 23) Drip irrigation, springler with timer control to be implemented to have efficient water management.
- 24) All overhead tankers should be connected with a flow controller such that water pumping can be done without human interference.
- 25) Facility for video conference calls/classes in each department
- 26) Entry to all departments/labs using sensor based sliding doors
- 27) Online booking facility for hall and classrooms.
- 28) Online booking of guest house.
- 29) Online leave application and tracking.
- 30) Online book recommendation from library for the faculty. e- Notice facilities over intranet.

- 31) Waste management (degradable vs non-degradable waste)
- 32) Mechanized cleaning for all open areas to reduce the dust pollution.
- 33) Smart monitoring of Gas leakage in hostel.
- 34) Planting trees as much as possible in a holistic manner.
- 35) Cycle dock (Bicycle sharing system)
- 36) Washing facilities in the hostels
- 37) Facility of lockers for all students in the academic area. Sitting facilities around multipurpose hall, main entrance, etc
- 38) Provide automatic washing machine to each floor in all hostels.
- 39) Library Family members may be allowed to access library but issue of books only on employee/student card for the library management.
- 40) Well managed crèche for children of employees.




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