Panjab University
Chandigarh

Criterion VII: Innovations and Best Practices

CRITERIA VII: INNOVATIONS AND BEST PRACTICES

7.1 Environment Consciousness

7.1.1 Does the university conduct a Green Audit of its campus?

There is no formal conduct of green audit in the University Campus but the University Campus is eco- friendly. Lot of expenditure is incurred to make the campus eco-friendly.

7.1.2 What are the initiatives taken by the university to make the campus eco-friendly?

- **Energy Conservation:-**
  a) The Panjab University buildings are planned/ designed in order to achieve best ventilation, glare free light and well lighted interiors by choosing proper Orientation.
  b) The materials used for the construction, especially for the External Wall i.e. cladding with red sand stone, automatically provides sound and thermal insulation to specific areas.
  c) New buildings like All Weather Swimming Pool planned with water heating system through solar panels as backup.
  d) Use of Shading devices in a Judicious manner like Chajjas, Sunshades, Louvers, Overhangs further help in energy conservation of the buildings.
  e) Plantation of large number of trees along Pedestrian walk ways and other green areas help in reducing the temperature inside the Campus.
  f) Use of LEDs instead of traditional lights for street lighting and interiors of the buildings has been made popular to take care of energy conservation further.

- **Use Of Renewable Energy**
  Taking a step towards becoming environment-friendly, Bhai Ghanaiya Ji Institute of Health, Panjab University plans to install systems of harnessing solar energy for the various facilities it offers. The Institute is planning to use solar power mainly for the emergency room, the patient OPD and the dressing room. It will be helpful for accomplishing tasks which require minimum energy like the lighting system and supplying lukewarm water to patients for washing hands.

  There is also a plan that all hostels on the University campus will have to generate their own energy through biogas plants. Biogas would be produced

from the waste of kitchens of these hostels to meet the requirements. It would not only help reduce consumption of LPG, but would also manage waste.

- **Water Harvesting**
  The Construction office of Panjab University, under the guidance of department of Geology & in collaboration with Central Ground Water Board, Chandigarh region has worked out & implemented the scheme with respect to Rainwater Harvesting, funded by Govt. of India, for the main campus of Panjab University.

- **Check Dam Construction**
  Well designed Storm Water System and Water Harvesting System take care of any flooding in Campus.

- **Efforts For Carbon Neutrality**
  Plantation of new trees has helped in reducing carbon contents. The dead leaves and the waste papers are not allowed to be put on fire. The leaves are buried in the soil itself and the papers are disposed off.

- **Plantation**
  Panjab University has been organizing Tree Plantation drive for the last many years. 20,000 to 30,000 saplings have been planned during the past 5 to 6 years and there is planning to Plant 10,000 to 20,000 more trees in the future.

  Every year, Panjab University's Ecological Club celebrates the Environment Day by creating awareness among students and teachers on the campus through a tree plantation drive.

  The National Service Scheme (NSS) volunteers of Panjab University planted trees at the boys' hostels on January 03, 2014.

  Tree Plantation Drive was held on 21st August, 2010 at University Institute of Dental Sciences, Panjab University, Chandigarh under Youth United Mass Education and Awareness Mission (YUMEAM)- Environment in collaboration with Nehru Yuva Kendra Sangathan (NYKS) and 100 different trees of various varieties were planted.

- **e-Waste Management**

As of today, e-waste generated in the University finds its way to the informal sector where it is not handled with due process and is disposed of without any attention to safety measures.

However, the University is in touch with some approved companies registered with Ministry of Environment & Forests/ **Central Pollution Control Board** (MOEF/CPCB) as e-waste Recyclers/Re-processors having environmentally sound management facilities, where the entire pool of e-waste that is collected from the University will be sent for safe disposal.
Name and address of E-waste Re-Processor is given below:

M/s Earth Sense Recycle Pvt. Ltd.
Plot No.225, Sector-VI
IMT Manesar, Gurgaon
Haryana – 122 051

- **Hazardous Waste management facility**

a) The Job of Waste Management is undertaken by Panjab University itself.
b) Garbage containers of 4.5 Cubic Meter capacities are placed near the Departments & Residential Areas.
c) This Garbage is segregated & disposed off at Dadumajra, (Plant of J.P. Industries) place identified by the Municipal Corporation.

7.2 Innovation

7.2.1 Give details of innovations introduced during the last four years which have created a positive impact on the functioning of the university.

Some of the recent initiatives/innovations introduced during the last four years which have created a positive impact on the functioning of the university are given below:

1. **Community Empowerment**

a. Conducting a monthly colloquium speaker series where luminaries from various fields are invited to deliberate on the issues related to the academic interest as well as common interest.

b. Organizing Induction Training Programme for newly recruited ministerial and secretarial (non-teaching) staff to make them aware about the

functions of the University and use of campus portal (http://campus.pu.ac.in) for efficient operations.

c. The community radio station (Jyotirgamaya: 91.2 MHz- **http://radiostation.puchd.ac.in**) located on the Panjab University campus, housed in the university's three-storey School of Communication Studies, plays music by local bands, broadcasts stories by local writers and interviews with experts and offers a platform to little-known talent.

   Books, which are not available in Braille, are read out and recorded for the benefit of visually-impaired students pursuing higher education, and this expanding audio library is made available to them free of cost.

d. Embracing Social Media to stay in touch with the students, staff and alumni

   http://www.facebook.com/official.pu.india (verified page) is a great tool to quickly and easily get your message out to world. In less than one year of its launch, it has got more than 52000 LIKES.

e. Provision of Wi-Fi connectivity and access to the Internet in all academic areas and hostels

2. Academic and Administrative (A&A) Reforms

a. Setting up of Research Promotion Cell (RPC) to coordinate and facilitate Research

   In an endeavour to promote research work in the streams of sciences and social sciences, Panjab University (PU) has created a Research Promotion Cell (RPC).

   The cell has been formed with an aim to ease out the entire research process starting from making funds available for the research to making the research projects available to the academia.

   The cell is supposed to have a detailed record of all the research projects that are going on in the varsity, the updated list of all funding agencies and a mechanism to help the researchers to come out of problems they encountered during study.

b. Setting up of Research Centres in affiliated colleges of the University

The purpose of a Research centre in an affiliated college is to promote and facilitate collaborative and/or interdisciplinary research and enhancement of research networking capacity and infrastructure.

c. Setting up of Policy Research Centre (PRC) to work on various aspects of 'industry- academia interaction' leading to better employability

d. Establishing Cluster Innovation Centre in Biotechnology (CIC-B) under the University Innovation Cluster (UIC) programme to nurture bright new ideas of young scientists

e. Signing Memorandum of Understanding (MoU) for academic activities

The varsity had already signed various memorandums of understandings (MoUs) with the Post Graduate Institute of Medical Education and Research, Central Scientific Instruments Organization (CSIO), IMTECH, University of Western Australia, University of Salzburg, Austria, Oxford Brookes University, and ONGC.

University of Western Sydney (UWS), Australia, and Panjab University (PU), Chandigarh, signed a memorandum of understanding (MoU) for joint research; organization of joint academic and scientific activities, like courses, conferences, seminars, symposia or lectures; exchange of academic staff for teaching and research activities; exchange of students for study or participation in research programmes and exchange of publications and other information of common interest.

British city Nottingham and Chandigarh have decided to explore academic collaboration opportunities between the University of Nottingham (UoN), UK and Panjab University (PU) Chandigarh. PU and UoN have decided that student exchange, joint research and industry-academia will help the two institutions. Both the varsities will identify the areas of mutual interest and might collaborate in the areas like public health, engineering, geography, food security, pharmacy, bio-science and management.

f. Promoting interdisciplinary teaching and learning through series of workshops/seminars/conferences/debates/panel discussions

Setting up of Chandigarh Region Innovation and Knowledge Cluster (CRIKC) is the major initiative taken in the year 2013 in which fourteen leading institutions in and around tri-city Chandigarh have been brought on a common platform.

For the last four years, Chandigarh Science Congress (CHASCON) as well as Chandigarh Social Science Congress (CHASSCON) has been held

every year to develop interaction between the scientific communities in the tricity.

The University organized a seminar (Oct 24–26, 2013) on the issue of "The Making of Modern Punjab from 1850 to Contemporary Times, in the background of 150 years of Higher Education in Punjab" as part of the celebration of the **foundation day of the university** and the commemoration of the 150th birth anniversary of eminent scholar Professor Ruchi Ram Sahni.

These series of academic events have established the reputation of this university as a place of quality education and research.

g. Introducing Choice-Based Credit System as a flexible and student-friendly learning system on a pilot basis

In an attempt to provide students the freedom to choose what they want to study according to their interests and abilities, Panjab University is moving forward to introduce choice-based credit system (CBCS) in all its programmes of the study.

The system has been introduced in School of Communication Studies on a pilot basis from the academic session 2014-15 and is running successfully. Education imparted under the system will be more student-centric and will provide enhanced learning opportunities to match the students' scholastic needs and also their aspirations.

h. Introducing the semester system to engage the faculty and the students in academic activity throughout the year

Unlike in the annual system where a student, after entering the department/ college of his/her choice, tends to study only during the exam time, the semester system involves the student throughout the year and reduces the examination burden.

i. Introducing Cumulative Grade Point Average (CGPA) that can be used by potential employers /educational institutions to assess and compare applicants

Bringing the evaluation system at par with the global best practices, the University Institute of Engineering and Technology (UIET) in Panjab University has made a shift from marks and division system to the grading system that is based on a nine-point scale and cumulative grade point score.

j. Revising Curricula and streamlining the examination process

The University ensures that the curricula development exercise leading to a major revision in course contents and curricular is taken up every three years and the results are declared in a time-bound manner by adopting a uniform academic calendar and by streamlining the examination process. Computerized results, uploading of results on university website, and timely examination have also improved our reputation and commitments.

k. Introducing specialized Courses at the University from the session 2014-15

Six new courses – M.Ed Special Education (Learning Disability) at the department of Education and M.E. (Food Technology), M.E. (Chemical with specialization in Environment Engineering), M E (Electrical Engineering) and M E (Material Science and Engineering) at University Institute of Engineering and Technology (UIET) are being introduced in the new curriculum of PU.

l. Introducing Feedback mechanism

Students give the feedback about the teachers at the end of each session/semester to improve the teaching-learning process.

m. Introducing Library Automation

A.C. Joshi Library is fully automated and uses SLIM21 software as the Integrated Library Management Sofware, connected to the Campus Wide Network providing Internet and e-mail facility to the University community.

E-Resources, Web Based On-line Public Access Catalogue facility (WEB OPAC), INFLIBNET, RFID technology to track books and 24x7x365 reading room provide right ambience for more footfalls.

n. Adopt-a-Village initiative

In a first of its kind initiative, students of the department of Community Education and Development, Women's Studies and Development, Centre for Emerging Areas in Social Sciences and Population Research Centre at the Panjab University, will be catalysts of actual social development of village population. With an aim to provide first hand practical experience to students and also uplift the people residing in the rural areas, the Panjab University will adopt six villages surrounding the city. The villages already identified include Nayagaon, Sarangpur, Dhanas, Kaimbwala, Palsora and Halo Majra.

o. Providing a Dynamic, Decentralized and Transparent Governance System

One of the salient features of the University management is that, there is a practice of constituting several sub-committees and other non-statutory bodies to discuss the issues and their complexities in depth and recommend decisions to the relevant authorities. This enables a de facto decentralization, involving wider participation of the faculty and others in decision making. Thus, the University has the practice of delegation of powers from authorities to their sub-committees and from higher officers to next level officers. Right from the inception, this healthy practice is in vogue and the delegation of powers is well defined. Such delegation of powers leads to not only a sense of involvement but also a speedy and efficient administration.

The University greatly relies on ICT, to automate and simplify its daily activities thereby establishing an automated and transparent Governance System.

p. Recognition of University employees through awards/prizes/commendation certificates to promote more efficient and quality services.

3. Student Focused Initiatives

a. Establishment of SC/ST Cell for welfare of students

The University has established a SC/ST cell at its administrative block which caters to the needs and requirements of the students belonging to minority classes. This cell provides coaching to the minority students for various competitive exams. This cell also provides scholarships to the students belonging to the SC/ST/BC students to facilitate higher education among them.

b. Anti Ragging Committee

The University has established an Anti Ragging Committee to restrict ragging related activities in all its affiliated colleges and University Campus. This committee takes immediate action within no time limit as soon as there is any case reported for ragging.

c. Anti Ragging Squad

The University has created an Anti Ragging Squad which performs periodic visits in the University Departments and all hostels of the campus.

d. Women Anti-Sexual Harassment Cell

The university has constituted Women Anti-Sexual Harassment Cell. The cell is responsible for maintaining equal opportunity to female students, employees and teachers. Any female candidate can approach to the cell if she feels any sort of discrimination. The women can also approach to the cell if she is harassed socially, emotionally and physically. Thus cell ensures the fare, protective and gender sensitive environment to female students, employees.

e. Central Placement Cell

The University has established a central placement cell at the campus. This cater to the training and development needs of the students in the context of their placement through campus drives at various national, international corporate, companies, public sector undertakings etc. This cell also emphasizes on skilled development, personality development, technically enriched knowledge among the students. Central Placement Cell is dedicated to strengthen the interaction between PU and the corporate sector. The Cell is headed by a Director and supported by other faculty. The Cell receives input from Industry regarding employment opportunities and trends and disseminates the information by organizing expert lectures from corporate world, short term training program for students as well as faculty. The placement cell also organizes Industrial Training for students.

f. Providing Excellent Sports Facilities

The University has playgrounds for all major sports, a gymnasium hall and a swimming pool of high standard for its sports activities. The gymnasium hall houses in-door games with international standard facilities and equipment for Badminton, Table-Tennis, Kabaddi (NS), Weight Lifting, Judo and Wrestling. A separate fitness centre for men and women and a well-equipped physiotherapy laboratory has also been established in the gymnasium hall.

Series of sports and cultural events have created positive impact on our stakeholders.

g. Providing Shuttle Bus Service

The University has started free-of-cost shuttle bus service for the convenience of students so as to control the traffic on the campus and to discourage students from making use of their private vehicles. The University has planned that students and staff should have access to shuttle service after every 10-15 minutes.

The University is also planning to connect all the institutions in Chandigarh and Mohali through a shuttle bus service for use by students and staff of all the CRIKC institutions.

h. Making available Group Insurance Scheme to its students
The University makes a provision of Group Insurance Scheme every year for its about 16000 Campus Students including Research Scholars enrolled/registered on annual basis and under this scheme benefits are given to the students in case of death/partial disability in the accident by the Group Insurance Company.

4. Campus Development

a. Eradication of plastic in the campus is insisted among students. The entire campus has been made tobacco free and polythene/plastic free zone through initiatives of both the teaching and non-teaching staff and this has definitely created a positive impact in the University.

b. Ecological Club of Panjab University instills awareness on eco-friendly environment and conservation of nature. Environmental Education is given on various environmental issues to keep the environment clean and green. The Students and Staff are motivated towards tree plantation to keep the environment green and eco-friendly.

c. Setting up of a Herbal Garden, Rose Garden and Recreation park
For the last many years, the Horticulture Division of Panjab University Construction Office, has been organizing the '**Chrysanthemum Exhibition'** as a matter of tradition, to re-experience and to relive the heralding of the coming of the spring season, a season of hope, activity and a life full with the spirit of zeal.

The 6th Chrysanthemum Exhibition was organized in Prof. R.C. Paul Rose Garden, PU, Chandigarh on December 12, 2013.

7.3 Best Practices

7.3.1 Give details of any two best practices which have contributed to better academic and administrative functioning of the university.

Best Practice-I

1. **Title of the Practice**

   Chandigarh Region Innovation & Knowledge Cluster (CRIKC) - A Cluster of Chandigarh Region Institutions to Promote and Sustain Excellence in Research

   http://crikc.puchd.ac.in

2. **Objectives of the Practice**

   CRIKC endeavours to foster and sustain close academic alliances between institutions of higher education and research in the Chandigarh region, to facilitate innovation and knowledge creation and for achieving excellence in all academic spheres without compromising in any manner the autonomy of the participating institutions.

   CRIKC aims:

   1. To identify and carry out joint and collaborative research projects.
   2. To initiate joint teaching/training programs including pre-PhD courses.
   3. To encourage the pooling of research facilities of the participating institutions.
   4. To nurture scientific culture from school level onwards.
   5. To promote the spirit and philosophy of 'Meta-University' concept
   6. To promote and sustain excellence in research in select areas such as Biomedical Sciences, Applications of Nano-Science and Nano-Technology and Theoretical Studies.
   7. Policy planning for better comprehension of GOI programs and societal needs.

3. **The Context**

   The contextual features/challenging issues that were needed to be addressed in designing and implementing this practice is mentioned below:

   - Building a commitment to collaborate by leveraging value systems and external pressure

     Value systems provided a basis for putting collaboration in a larger context such as an institutional desire to be innovative. At this stage, academic heads

of participating institutions built a case in support of collaboration by utilizing supportive external entities and the campus network.

- Building from commitment to action
  After building support for collaboration, the second stage in the process entailed building from commitment to action. Critical in this step was the role of senior academic and administrative leadership to demonstrate that collaboration was a priority both symbolically and substantively.

- Sustaining collaborative activity
  The third stage focussed on sustaining collaborative activity primarily through changes in larger organizational structures, processes, and design. Each of these was leveraged to support, solidify, and institutionalize the commitment for collaboration.

The governance of CRIKC is vested with an Advisory Committee consisting of the heads of the participating institutions and chaired by the Vice-Chancellor, Panjab University. The core office of CRIKC is located in Panjab University campus.

Three Committees, Finance committee, Academic committee and Administrative committee are there for operational functioning of CRIKC.

4. The Practice

The idea of having a knowledge cluster/hub has its genesis in the '**Narayan Murthy report** 'April 2012, commissioned by Planning Commission on corporate participation in 'higher education'. This also finds echoed in the '**Knowledge Commission Report'** of GOI. Further, the idea of having alliances between institutions of higher education and research in and around a given city also finds reference in the **12th Plan Document of GOI.** The idea of having knowledge cluster/hub is also inclusive of the '**Meta-University'** concept, being advocated by MHRD, GOI. Furthermore, **"Science, Technology and Innovative (STI) 2013 policy of GOI"** also refers to clusters/hubs as tools for innovations. Globally, it is well known that innovation and knowledge clusters lead to accelerated creation of wealth (i.e. 2/3 of world GDP originates from 40 odd clusters).

Keeping these broad ideas in mind, several rounds of meetings involving heads and/or representatives of institutions of higher education and research in and around Chandigarh have been held from July 2012 onwards under the Chairmanship of Vice-Chancellor of Panjab University. In one of the meetings held on 24th November, 2012 at Panjab University, it was agreed to name the knowledge cluster/hub as "**Chandigarh Region Innovation and Knowledge Cluster (CRIKC)".** On 11th May, the Technology Day, 15 Heads of Institutions approved a document enunciating academic co-operation amongst participating institutions.

As per the vision 2020 document of the University, the focus of the University is on interdisciplinary courses and accordingly in the year 2013, the University started the Chandigarh Region Innovation and Knowledge Cluster (CRIKC) comprising 14 different medical and research institutes in the Chandigarh region, to promote and sustain

Excellence in Research. The CRIKC involves all the premier institutions of higher learning and research located in and around Chandigarh such as:

1. Bio Processing Unit (BPU)
2. Central Scientific Instrumentation Organization
3. Government Medical College & Hospital
4. Indian Institute of Science Education & Research
5. Indian Institute of Technology
6. Institute of Microbial Technology
7. Institute of Nano Science & Nano Technology
8. National Agri Food Biotechnology Institute
9. National Institute of Pharmaceutical Education & Research
10. National Institute of Technical Teachers' Training and Research
11. Panjab University
12. Punjab Engineering College of Engineering and Technology
13. Post Graduate Institute of Medical Education & Research
14. Terminal Ballistic Research Laboratory (TBRL)

BPU, Mohali	CSIO, Chandigarh	GMCH, Chandigarh	IISER, Mohali
IIT, Ropar	IMTECH, Chandigarh	INST, Mohali	NABI, Mohali
NIPER, Mohali	NITTR, Chandigarh	Panjab University	PEC, Chandigarh
PGIMER, Chandigarh	TBRL, Chandigarh		

5. Evidence of Success

CRIKC has already received a support of Rs One crore from the former local MP, Shri Pawan Kumar Bansal, out of MPLAD scheme for purchasing two AC buses (Rs 50.00 lacs) and other Rs 50.00 lacs for developing infrastructure (Books for Library, Server / Computers and computer peripherals, video conferencing paraphernalia etc.) to realize few steps towards CRIKC's creation.

A presentation about CRIKC was made by Professor Arun Kumar Grover, Vice Chancellor, Panjab University, at MHRD, New Delhi on 18 July 2013. The entire idea received good deal of support from the Secretary, MHRD and his colleagues.

The following brainstorming sessions under CRIKC indicate evidence of success of the practice:

1. Lecture by **Sam Pitroda** entitled, 'Importance of Information Technology Infrastructure in Growth and Development of the Nation' 23rd January, 2013.
2. Lecture by **Shri Pawan Agarwal**, Advisor Higher Education Planning Commission' entitled, Higher Education in the 12th Plan and Beyond: Strategy and Approach'
3. **Prof. Yehiam Prior**, a Distinguished Professor in Chemical Physics at **Weizmann Institute of Science Israel** visited P.U. Campus, PGIMER and IISER, Mohali and gave two lectures at P.U. and IISER.
4. **Professor Richard Jones**, a Distinguished Professor at **Oxford University, U.K.** and President Physiological Society, U.K., was hosted by CRIKC at PGIMER as a one stop interaction point for all the institutions in the region. He deliver a lecture entitled: **Spatial Ca^{2+}/H^{+} ion coupling in the heart: a key substrate for arrhythmia**?
5. National Technology Day lecture on May 11, 2013 at P.U., Chandigarh by **Dr Girish Sahni**, Director CSIR Institute of Microbial Technology, 'Challenges and Opportunity for Translation of Science for Public Good'
6. Visit by **Japanese delegation from AIST** at P.U., Campus to explore collaboration in Biological Sciences.
7. Director British Council in India, **Mr. Rob Lynes**, has already visited PU to explore CRIKC as a facilitator to promote interaction between British Universities and Chandigarh region institutions.
8. This was followed by another visit of **Mr. Rob** on 24th July to Chandigarh.
9. Panjab University along with CRIKC hosted **79th annual meeting of Indian Academy of Sciences** from November 8thh to 10th at PU Chandigarh with the activities on 9th and 10th held in other institutions associated with CRIKC, viz., CSIR-IMTECH and IISER Mohali.
10. CRIKC participation in workshop held at IIT Ropar on 2nd July, 2013. The theme of the workshop "**Eradicating the problem of open field burning in India: turning agricultural waste into energy**", emerging out of in IIT Ropar - Aston University U.K. initiative.

11. Several proposal amongst the CRIKC's institution in the offing are as:
    (i) Bio-Agro proposal submitted by NABI and DBT.
    (ii) Centre for excellence in detonic (CED) by TBRL, Mohali.
    (iii) Creation of cold room facility by Snow and Avalanche Study Establishment, (SASE - DRDO).

6. Problems Encountered and Resources Required

Resources Required

For immediate commencement of CRIKC activities, funding required is as follows:

Sr.	Human Resource Requirements	Amount (Per annum)
01	Project Officer/Senior Scientific Officer	6.0 Lakhs (50,000 p.m.)
02	Project Assistant/Scientific Assistant	3.6 Lakhs (30,000 p.m.)
03	Junior Assistant/Data Entry Operator	2.4 Lakhs (20,000 p.m.)
04	3 Bus Drivers	9.0 Lakhs (25,000 p.m. each)
	Total	**21.0 Lakhs**
	Recurring Expenses	**Amount (Per annum)**
01	Diesel & Maintenance of Buses	30.0 Lakhs
02	Funds for Hosting Visiting Scientists	15.0 Lakhs
03	Travel Funds	12.0 Lakhs
04	Seminars/Conferences/Training Programmes	12.0 Lakhs
05	AMC & Maintenance	5.0 Lakhs
06	Contingency Fund (Office infrastructure, Consumables, Stationary, Postage, Electricity charges, Water charges, Miscellaneous etc.)	5.0 Lakhs
	Total	**79.0 Lakhs**
	Grand Total for First Year	**1 Crore**
	For Three Years	**3 Crores**

Year Wise Plan of CRIKC

Phase I of CRIKC (1st year) plans to provide the following facilities:

- CRIKC website with a directory of active Scientists in the Chandigarh region
- Sharing of library resources
- Common identity cards
- Lecture notification amongst different institutions
- Free shuttle service to cover institutions under CRIKC
- Seamless access to the laboratory facilities of participating institutions
- Holding joint seminar/conferences
- Joint Ph.D. programs including common courses
- Recognition of supervisors on mutual basis

- Setting up of Centre for Theoretical Studies and Policy Planning
- Creation of Research Based Sub-Clusters (Medical, Industrial, Nano-technology, Physical Sciences, Chemical Sciences, etc.)

Phase II of CRIKC (2nd year) plans to provide the following facilities:

- A few joint programs in Bio-sciences and Nano-science
- Common physical facilities to be created
- Joint pre-PhD courses
- Facility of spending a few months in the participating institutions on mutual basis
- Incentive scheme enabling Ph.D. holder college teacher to take sabbatical leave to work with faculties/scientists in CRIKC institutions.
- Create/provide facilities to attract faculty members from abroad to spend sabbatical leave period in CRIKC institutions: Possible partners in this initiative, TCS and Tata Trusts (Discussion with Mr. F.C. Kohli, Emeritus Chairman TCS).
- Initiation of Industry-Academia interaction
- Joint admission of PhD students in bio-stream
- Refresher courses / summer school / college teachers

Phase III of CRIKC (3rd year) plans to provide the following facilities:

- Integration of Industry sponsored programs.
- Setting mission oriented goals.
- High level of visibility in research.
- New and innovative schemes to attract talent, in particular, Inspire Post Doctoral Fellows to choose CRIKC institutions as hosts to initiate new programmes.
- Creating examples where we achieve 'concept to commercialization'

Challenging issues that are needed to be addressed in successfully implementing this practice are given below:

1. Seeking greater involvement of industries and corporate in both research activities and financially supporting the CRIKC initiative
2. Realising the idea of a meta university and getting funding from UGC in accordance with the guidelines on setting up meta universities
3. Seeking to attract quality international students and faculty in order for the participating institutions to measure up to international standards.
4. Implementing the concept of community college for imparting skills and vocational education through the participating institutions in Chandigarh region coming together.

Best Practice-II

1. **Title of the Best Practice**

   Honours School System of Under Graduate and Post Graduate Studies in Science Education

2. **Objectives of the Practice**

   The main objectives of this education system are:

   - ✓ To teach and study fundamental scientific/academic theories and their various applications as applicable to the progress of the society.
   - ✓ To develop self-reliant, thinking and committed individuals capable of contributing towards India's continued growth and prosperity.
   - ✓ To focus on the development of human resources to meet India's need for an educated and skilled workforce in Science Education.
   - ✓ To enthuse students about the science discipline and its applications, and to develop their confidence in their work using the discipline.
   - ✓ To provide access to science at the frontiers, capitalizing on the strengths of the research undertaken in the science departments.
   - ✓ To provide opportunities and support for all students to reach their full potential during their studies.

3. **The Context**

   The University had commenced Honours School System (HSS) in Sciences and Humanities in 1920s to enroll students for seamlessly connected Bachelors and Masters degree phases culminating in exposure to meaningful research before eventual graduation. After learning the basics, Honours School students explored and contributed to the newer developments in a given field in partnership with a chosen teacher. The senior students of Honours School also performed supervisory duties in laboratories and conducted tutorial sessions. The efficacy of such an approach can be gauged from the fact that ten of the sixty five founding Fellows of Indian Academy of Sciences (IASc), Bangalore in 1934 were faculty and alumni of the University of Punjab at Lahore. By 1940, eight more academics of the University had become Fellows of I.A.Sc., Bangalore. In 1939, the founder Director of the University Chemical Laboratories and Chemistry Honours School at Punjab University Lahore, Dr S.S. Bhatnagar, had been requested to conceive the plan for industrial research and exploration of mineral resources of India as Director of Scientific and Industrial Research by the then Government of India.

   After Indian independence, when PU reassembled at its present campus at Chandigarh in early 1960s, the Honours School programme recommenced only in Science streams and Economics. The five year Masters programme at IITs and newly established IISERs and the integrated Masters and PhD programmes at the premier research institutions of India, like Indian Institute of Sciences, Bangalore, Tata Institute of Fundamental Research, Mumbai etc. are today offering a challenge and

inspiration to remodel and expand the Honours School System of Panjab University on the lines of "Graduate Schools" in Western universities.

The challenging issues that were needed to be addressed in designing and implementing this practice are:

- ✓ To determine characteristics of courses that set high expectations
- ✓ To establish a clear rationale for writing common course syllabi, including how the syllabi will promote horizontal and vertical articulation and guide the use of common planning time
- ✓ To incorporate literacy goals into course expectations
- ✓ To examine components of effective course syllabi: a course description, course standards, an instructional philosophy, major projects and assignments, and a course assessment plan and grading policy

4. The Practice

Every student in this system undergoes three years of education at UG level and two years of education at PG level.

In this Honors School Semester System, the University administers separate Common Entrance Tests (CET) for UG and PG studies on a national scale for admission to the following courses:

Sr. No.	**Courses**	**Institution(s)/Department(s) offering the Course**
1.	B. Pharmacy (Credit based Semester System)	University Institute of Pharmaceutical Sciences,
2.	B.Sc. & M.Sc. (Honors School Semester System) in the subjects of: 1. Anthropology 7. Geology 2. Bio-Chemistry 8. Microbiology 3. Bio-Physics 9. Mathematics 4. Biotechnology 10. Zoology 5. Botany 11. Physics 6. Chemistry 12. Physics & Electronics Mathematics & Computing (UG only)	Respective Science Departments of the University

	Computer Science (PG only)	

The eligibility criterion (subject-wise) for admission to B.Sc. (Honors School) is as:

	Should have passed 10+2 examination with at least 50% marks (45% marks in case of SC/ST/BC) with:
Botany, Zoology	Physics, Chemistry, Biology and English
Anthropology, Chemistry, Geology, Physics, Physics & Electronics	Physics, Chemistry, Mathematics/Biology and English
Biochemistry, Microbiology	Physics, Chemistry, Mathematics/Biology/ Biotechnology and English
Biotechnology, Biophysics	Physics, Chemistry, Mathematics/Biology/ Biotechnology/Computer Science and English
Mathematics, Mathematics & Computing	Mathematics as one of the subjects
B. Pharmacy (Credit based Semester System)	Physics, Chemistry, Mathematics/Biology/ Biotechnology and English

a. Senior Professors teach and ignite young minds for future leadership roles and encourage them to think critically.

b. Research Students of Senior Professors take Laboratory sessions, thereby giving students a better appreciation of what "real world" research is all about.

c. Semester system is followed in this system in order to enlarge curricular space and encourage more learning opportunities. Moreover, the latter enhances the ability to accommodate diverse choices that dynamic and motivated students may like to have. The decisions regarding faculty-to-students contact hours during a semester in different programmes; the decision regarding the credit system determining the quantum of class room learning hours; elements of participatory teaching-learning process; field-work; lab-work; and, other curricular work are taken by various academic bodies of the university.

d. Computer-based programmes are introduced in honors school to ensure that

pupils are ready to meet the challenges of the 21st century. Information Technology is used widely as teaching and learning resources to develop skills in communication and independent learning.

e. All pupils in the first year of UG studies follow a curriculum having 60% minor subjects and 40% major subjects. All pupils in the second year follow a curriculum having 40% minor subjects and 100% major subjects. All pupils in the third follow a curriculum having 100% major subjects. M.Sc.(Honors School) level programmes naturally impart a high dose of discipline based knowledge.
f. Honors School system enjoys autonomy in question paper setting, its evaluation and final result preparation.
'Continuous Internal Evaluation' is the central feature of the evaluation in this system. A teacher who offers the course is the best person to assess performance of the students. However, there is the end-semester evaluation. And, to ensure transparency, fairness, and accountability appropriate mechanisms such showing evaluated answer sheet to students for verification have been devised.

g. Feedback is also taken from students to help develop a better class atmosphere and assist an instructor in improving instruction.

h. Discussion and debate of all academic issues raised by students is also encouraged in the system.

5. Evidence of Success

a. The Honors School courses are very popular among 10 + 2 students who are interested in building their career in Sciences.
b. Alumni hold enviable and key positions in different fields of sciences not only in India but also abroad. Refer Criterion-V for detailed list of distinguished alumni.
c. Seven science departments accorded the status of Centre of Advanced Studies (CAS) besides FIST grants from DST and Special Assistance Programme (SAP).
d. PURSE (Promotion of University Research and Scientific Excellence) award of Rs 30 crores given by the Department of Science and Technology, G.O.I., New Delhi.
e. Recognition accorded by the UGC as the “University with Potential for Excellence in Bio-Medical Sciences” with facilities for ‘Stem Cell Research and Drug Development’ as well as “Centre of Excellence” in ‘Application of Nano Material, Nano Particles and Nano Composites’

6. Problems Encountered and Resources Required

The University is providing all types of support to run the Honors School System in Science education successfully.

All appropriate steps are taken by the University to create and maintain infrastructure required for quality teaching and research.