

**1st HALF OF 1ST YEAR MONITORING REPORT OF
HIMACHAL PRADESH UNIVERSITY, SHIMLA**

ON

ICT@ SCHOOL SCHEME IN THE STATE OF HIMACHAL PRDESH

DRAFT REPORT- 1

TOTAL DISTRICTS = 12

DISTRICTS COVERED = 3

1.SHIMLA

2.KINNAUR

L3.AHAUL & SPITI

Nodal officer:

Prof. Romesh Chand

**DEPARTMENT OF EDUCATION
HIMACHAL PRADESH UNIVERSITY
SHIMLA-5 (171005)**

**1st HALF OF 1ST YEAR MONITORING REPORT OF HIMACHAL PRADESH
UNIVERSITY, SHIMLA FOR THE STATE OF HIMACHAL PRDESH**

1. General Information

Sr. No.	Information	Details
1.	Name of the monitoring institute	Himachal Pradesh University, Shimla
2.	Number of districts allotted	12 (Bilaspur, Chamba, Hamirpur, Kangra, Kinnaur, Kullu, Lahaul and Spiti, Mandi, Shimla, Sirmaur, Solan, Una)
3.	Name of the district covered	1. Shimla 2. Kinnaur 3. Lahaul and Spiti

ICT @ School Scheme in the state of Himachal Pradesh

Information from the State Level Authority

Name of the State: **Himachal Pradesh**

Date of launch of ICT@ School Scheme in State: 2009-2010

The State of Himachal Pradesh has implemented this scheme since 2010-11 and the coverage of the scheme is as under:

Coverage of the Scheme:

Year of Implementation	Number of District/Schools* (covered/remaining)	Vendor (in case of outright purchase)/operating Agency (in case of BOOT)	Status of implementation (completed/in progress)
2010-11	12/ 628	BOT HCL Infosystems Ltd. In consortium with IL & FS Ets. Ltd.	Completed
2011-12	12/ 628	BOT HCL Infosystems Ltd. In consortium with IL & FS Ets. Ltd.	Completed
2012-13	12/ 628	BOT HCL Infosystems Ltd. In consortium with IL & FS Ets. Ltd.	Completed

Information and Communication Technology in the schools of Himachal Pradesh

The Department of Higher Education, Government of Himachal Pradesh, had taken a number of initiatives in the past years to provide IT infrastructure and IT education in Government Senior Secondary Schools of the state. It had also provided basic IT infrastructure within the College premises to support and cater to the basic IT needs of the students. IT Labs are available in the colleges to meet the curriculum requirement of regular courses like Bachelors of Science, Computer Applications, Arts, and Commerce etc.

It was however felt that a more comprehensive and integrated approach to Computer Aided Learning is required to prepare the students of schools to take maximum advantage of the knowledge economy.

The Department of Higher Education also proposed to closely integrate the critical components into a framework, incorporating the learning and best practices from the similar initiatives at the global level and practical needs of the evolving knowledge society.

In view of this, the Department of Higher Education, Himachal Pradesh intended to set up fully integrated Information and Communication Technology (ICT) Labs and smart classrooms in 628 Government Senior Secondary Schools of the state (Annexure-1).

District wise establishment of the ICT labs and smart classrooms in the state is given as under:

Sr. No.	District	Number of schools
1.	Bilaspur	35
2.	Chamba	29
3.	Hamirpur	70
4.	Kangra	149
5.	Kinnaur	07
6.	Kullu	26
7.	Lahaul & Spiti	06
8.	Mandi	98
9.	Shimla	80
10.	Sirmaur	42
11.	Solan	29
12.	Una	57
Total		628

Information and Communication Technology (ICT) in Government Senior Secondary Schools of Himachal Pradesh was a window of opportunity to the learners in the

Government Senior Secondary Schools in Himachal Pradesh to bridge the digital divide. The scheme was a comprehensive and well thought-out initiative to open new vistas of Computer Aided Learning (CAL) and to provide a level-playing field to government school students.

For expanding the use of Information Technology in schools, 618 Government Senior Secondary Schools, 848 High Schools and 5 Smart Schools are being covered under ICT at School Scheme (Phase II) during 2014-15.

1. Analysis of the tender document and tendering process:

A. Tendering Process

The Department of Higher Education, Himachal Pradesh intended to implement the ICT project on Build Operate Transfer (BOT) basis for all the liabilities covered under the scope of work mentioned in the tender document for 628 Govt. Sr. Sec. Schools across the State.

It invited sealed pre-qualification, Technical and commercial proposals from eligible Bidders for selection as "BOT Operator", to implement ICT Project in 628 Senior Secondary Schools of HP.

The last date for submission of the bid was 17-08-2010 up to 1:00 PM.

The successful bidder's responsibilities included supply, installation of Multimedia Educational Content, teacher training, refreshers and monitoring, Integrated Computer projector, LCD TV/Monitor, Computer Hardware, software and other allied accessories (i.e. webcam, multi purpose printers, UPS, etc.), site preparation (i.e. vinyl flooring, furniture and fixtures, electrical fittings, power back up facilities, LAN, etc.), etc. The successful bidder was also to maintain and upkeep the ICT Lab, and two Smart Class Rooms upto **31st March, 2013**. The payment to the successful bidder was to be made after every six months.

The Department was to provide one room for ICT Lab and two class rooms for smart class rooms in all the 628 Government Senior Secondary Schools covered under this project to the successful bidder.

Supply & installation of Multimedia Educational Content for Computer Aided Teaching & Computer Aided Learning was to be done as mentioned below based on Himachal Pradesh School Education Board syllabus.

S. No.	Class	Subject	Language
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1.	9th & 10th	Science, Social Science, Mathematics	Hindi
2.	11th & 12th	Physics, Chemistry, Biology, Mathematics, English	English

Supply and Install Multimedia Educational Content of all the identified 136 Hard Spots for class 9th & 10th and 478 Hard Spots for 11th & 12th classes all the submitted Multimedia Educational Content was evaluated by the committee.

Maintenance of Multimedia Educational Content and all the hardware installed in ICT lab and smart class rooms throughout the contract period was the responsibility of the bidder.

The bidder was to provide training on usage of each of the 614 Multimedia Educational Content to minimum 6500 teachers and internet access to available multimedia content.

Program Monitoring Body: The Department of Higher Education monitored the Project itself.

2. Analysis of the Service Level Agreement:

Schedule of Requirements Bidders were required to undertake the Scope of Work for schools as mentioned below:

Scope of Work for ICT in Govt. Senior Secondary Schools

- a) Supply and installation of Multimedia Educational Content for Computer Aided Teaching & Computer Aided Learning as mentioned below based on Himachal Pradesh School Education Board syllabus.

S. No.	Class	Subject	Language
1.	9th & 10th	Science, Social Science, Mathematics	Hindi
2.	11th & 12th	Physics, Chemistry, Biology, Mathematics, English	English

Thus supply and Installation of Multimedia Educational Content of all the identified 614 Hard Spots in 628 Govt. Senior Secondary Schools list attached (Annexure-“H”).

- b) Supply and Install Multimedia Educational Content of all the identified 136 Hard Spots in 628 schools for class 9th & 10th (list attached) and all the submitted Multimedia Educational Content will be evaluated.
- c) Supply and install Multimedia Educational Content of all the identified 478 Hard Spots in 628 schools for 11th & 12th classes (list attached) and all the submitted Multimedia Educational Content will be evaluated. The location of schools can be changed.
- d) Maintenance of Multimedia Educational Content and the equipments/hardware installed in the smart class rooms throughout the contract period.
- e) Provide training on each of the 614 Multimedia Educational Content to minimum 6500 teachers and internet access to Multimedia Educational Content available on the web.
- f) Refreshers, Monitoring and subsequent reports.
- g) The two rooms will be provided to the bidder for converting them into Smart Class Rooms.
- h) The bidder has to supply and install an Integrated Computer Projector in Smart Class room-I and one LCD Monitor/TV and computer system in the Smart Class room-II in each of 628 schools. Refer Table A for the specifications
- i) The bidder has to provide furniture for smart class rooms which include
 - In 2nd Smart Class room-II: One Computer Table and LCD TV to be fixed at suitable height.
 - Refer Table A for the furniture specifications
- j) The bidder will ensure that the Multimedia Educational Content run properly on all the hardware installed in ICT lab and smart class rooms.
- k) The bidder will also provide the required power points fitting in the smart class rooms.
- l) The bidder will provide batteries for remote control of Integrated Computer Projector, LCD TV Remote Control etc.: As per requirements

Multimedia Based Educational Content.

The bidder shall develop the multimedia educational content for the hard

spots in the subjects of Physics, Chemistry, Biology, Mathematics & English for 11th & 12th classes using English language and Social Science, Science, Mathematics for 9th & 10th classes using Hindi language based on syllabus of Himachal Pradesh School Education Board. The related activities include:-

- Understanding the requirement for developing and installation of customized Computer aided teaching and Computer Aided Learning product. List of hard-spots is enclosed with the tender document.
- Conceptualizing the multimedia content based on story lines, minimum 2D animation, interactive games, live coverage, real life example, music and riddles etc.
- Planning in detail, the content development during Pre- production, Production and Post-production stages.
- Development of content with full multimedia quality control. The individual time of each Multimedia Educational Content should be of minimum 15 minutes i.e. the Total Time of all the 614

Multimedia Educational Content (i.e. hard sports) should be minimum 9210 minutes.

- The hard spots should be categorized classwise and subjectwise folders on the DVD/DVDs.
- Supply of following items on DVD media class wise and subject wise as follows:

i). Multimedia Educational Content of 614 subject wise and class wise hard spots:-

One set in each of the 628 schools

One set in the office of Dy. DHE of each district

One set in the Directorate of Hr. Education Shimla

ii). Support Manuals (detail of each of the hard spot in the medium

in which is being developed and supplied. The Installation Manual, Manual of academic content, Administration Manual and User Reference in English):-

- a) One sets at Directorate level
- b) One set at each of the Dy. Director of Higher Education office at district headquarter
- c) One set in each of the 628 schools,

These sets shall be checked and verified at Directorate level before actual delivery and installation at school level.

Important Note

▪ The bidder is required to arrange a copy of Subject Text books prescribed by the Himachal Pradesh Board of School Education Dharmshala, under its own arrangements and consult these books before developing Multi-media Educational Content. Moreover, in case of any change in syllabus at any point of time during contract period, the bidder has to supply Multimedia Educational Content on the new topics incorporated/changed.

Required features of the Software keeping in mind CAL for student oriented, CAT for teacher oriented, aptitude and ability of the children:-

- **User Interface:** The proposed system components should be simple comprehensive, learner centric and easy to use.
- **GUI:** The proposed solution should be based on graphical interpretation and windows architecture.
- **Learning Objective:** The Multimedia content should meet out all the academic objectives in respect of all the 614 hard spots.
- **Interactive:** Multimedia contents should provide many interactions during the use of Multimedia Educational Content. There should have a facility whereby a teacher/student can stop at any point and restart after a pause from the same point in the topic. All modules should have pause, play, fast forward, index, assessment and rewind facilities.
- **Learning approaches:** 2-3 different learning approaches should be used during the preparation of the contents
- **Accuracy:** The contents should be clearly represented, structured, accurate current.
- **Accessibility:** All contents should be accessible with good response time.
- **Other features:** Quality of contents, innovation, instructional language of content, flow of logic, clarity and relevance of voice over, methodology, assessment, and examples etc.

INSTRUCTIONS

- a) Concepts should be explained through good and effective graphics, and animations based on imaginative analogies.
- b) The bidder should ensure proper installation of the Multimedia Educational Content on the equipments/hardware installed in the ICT lab and two smart class rooms in each of 628 schools and their proper functioning on all the equipments. The

Principal of the school concerned will certify the successful installation. The installation of Multimedia Educational Content shall be done at the risk and cost of the bidder.

- c) If any technical/operational defects are found in the Multimedia Educational Content at any point of time (during the period of contract), the same will have to be rectified/replaced free of cost by the bidder.
- d) The content developed will be the property of Government of Himachal Pradesh and it can be used by the department in other schools in the state also without seeking consent of the bidder and without paying any extra cost for unlimited period of time.
- e) All the equipments once installed in ICT Lab and smart class rooms will not be taken away by the bidder in any case. After the expiry of the contract period, the entire infrastructure supplied and installed will be transferred to the department/Government of Himachal Pradesh at zero transfer value

Training of Teachers and other Staff

The bidder will train at least 6500 teachers on usage and integration of multimedia educational content in the lesson plans. Due attention should be given to the following aspects:-

- Proper proposal including curriculum for the training will be designed and submitted by the company at the time of signing of agreement and shall be got approved by the DIRECTOR OF HIGHER EDUCATION, Himachal Pradesh.
- The training for 5 working days for about 6500 teachers for usages of Multimedia content and browsing of internet for academic content.
- There should be special emphasis on practical training (operating computers for the use of multimedia educational content, browsing of internet).
- The venue and infrastructure for the training will be provided by the DEPARTMENT OF HIGHER EDUCATION. The Department shall provide 20 to 25 venues or more as training centers located all over the State (List of training centres with available hardware has been annexed as “M”). Beside this any additional equipment required to run the multimedia educational content has to be provided by the successful bidder. The bidder will be allowed to take away the additional supplied hardware/equipment from the training centres after the completion of the training.
- During the training programme there will be about 40 teachers in a batch and the training schedule should be of 8 hrs per day i.e. 9:00 AM to 6:00 PM.
- Company will deploy 2 subject wise Master Trainer per training centers for a batch.

The recruitment, retrenchment, reallocation and salary of the training staff is exclusive prerogative and responsibility of the contracting Company.

- After the completion of the training the concerned principal of the training centre will issue the certificate to the bidder whether the training is satisfactory (by taking the feedback from the trainees) and conducted as per the schedule.
- The expenditure involved in r/o of TA/DA of teachers training, will have to be borne by the bidder as per Govt. rates.

QUALIFICATION OF TRAINERS

The Master Trainer must be Post Graduate from a recognized University in the concerned subject and having full knowledge of multimedia educational content and its usage. Bidder may also provide assistant trainer, if required.

As per the service level agreement the bidder was provided two rooms for converting them into Smart Class Rooms.

IT Infrastructure Requirements:

The following infrastructure to be supplied by the bidder was to be supplied by the bidder as per the specifications given in Table-1.

i. Computers

The Bidder is required to provide 8 computers in ICT Lab in each of 628 schools, 2 computers for Directorate of Hr Education and 1 computer for each 12 Dy Director of Hr Education offices at District Headquarter for project monitoring purpose. Bidder may note that the scope of work includes all services (AMC /insurance/repair /maintenance/spares/instant replacement in case of theft etc).

ii. Server

Bidder is required to provide one Server in ICT Lab in each of the 628 Govt. Sr. Sec. Schools.

iii. Printer/ Scanner/Copier/FAX

The bidder has to provide 1 Multipurpose Laser Printer with facility of Print, Scan, copy & Fax in ICT Lab in each of the selected 628 Govt. Sr. Sec Schools. One Multipurpose Laserjet Printer at Directorate of Higher Education and Multipurpose Laserjet Printer at each 12 Dy Director of Hr. Education offices at Distt Headquarter for monitoring purpose. The Printer installed in ICT Lab should be on the network.

iv. Web Camera

Bidder has to provide one web camera in ICT Lab in each of 628 schools.

v. LAN Equipment

The bidder has to provide LAN equipment in each of the ICT labs of 628 Govt. Sr. Sec. Schools.

vi. LAN set up

The bidder has to undertake LAN set up including cabling, I/O boxes and other allied accessories for 8 PCs and one Server and printer in each of the 628 schools.

vii. Internet:

(These services are mandatory and have to be provided either PART- A or both parts will be implemented.) Provision of Broadband Internet connectivity (unlimited download) at ICT labs would be the responsibility of BOT operator. Monitoring and management of availability of internet will continue to be the scope of BOT operator. The capital and recurring charges for Broadband internet connection (including telephone connection if required) will be borne by the BOT Operator. BOT operator has to coordinate with school administration and ISP for the continuous availability of internet facility in ICT Lab. Wherever there is no availability of Broadband bidder has to provide the Dialup connection and whenever the feasibility of broadband exists, the bidder will have to replace the dialup connection with the broadband.

The successful bidder will maintain log book for the usage of Internet facility in each of the 628 schools. The report of this usage will be provided to School Principal on monthly basis.

vii. Registers for Fault logging cum Penalty Register, Stock Register, Internet usage Register and Cash Book etc. (These services are mandatory and have to be provided either PART-A or both Parts will be implemented.)

viii. Consumables

Bidder will provide the following consumables in each of 628 ICT labs:

- One reams of white paper A4 size (min 60 GSM) per month per ICT lab.
- Printer Cartridge :
- 3 refills in the 1st year and thereafter 1 new cartridge and 3 refills per year per ICT lab for Multifunctional printer.
- DVDs : Blank 5 RW DVD"s per year per ICT Lab]\

ix. Softwares:

The Department will provide the software and licenses required for the functioning of ICT lab and smart class rooms. The software will be provided to the bidder in the form of media at a central location (Directorate of Higher Education, Shimla). Bidder would be required to install all the software/upgrades/patches etc. in the ICT lab and Smart class rooms as and when required during the

contract period. The indicative list of softwares is mentioned in the Table –A Technical Specification.

4. Manpower Requirements

(These services are mandatory and have to be provided either PART- A or both parts will be implemented.)

a) State Project Officer (SPO):

The bidder will have to provide one State Project Officer to coordinate, implement and to provide regular feedback and reporting regarding the project. The bidder will provide the appointment letter alongwith the eligibility documents to the Directorate of Higher Education.

Educational Qualifications for SPO:

B.Tech/MCA/MSc (Comp Sc./IT) from a recognized University.

Minimum 4 years project management experience in handling such large school implementation project preferably in Himachal Pradesh.

Roles and responsibilities of SPO:

- To ensure smooth implementation of the project.
- To coordinate and cooperate with the o/o the Directorate of Higher Education.
- Monitoring the performance of Cluster Coordinators.
- Infrastructure maintenance and upkeepment of Hardware, software and Multimedia Educational Content.
- To get the desired data, reports on time.
- To schedule and conduct refresher programme of teachers in consultation with the departmental authorities.
- Send monthly monitoring reports to Directorate of Higher Education after verification.

b) Cluster Coordinators

The bidder will have to provide one Cluster Coordinators per 20 Govt. Sr. Sec. Schools to coordinate, implement and to provide periodic feedback and reporting regarding the project. The Cluster Coordinators are to be bonafide Himachalis.

Educational Qualifications

MSc. (Comp. Sc./IT) from recognized University having Minimum 2 years project management experience in handling such large school project preferably in Himachal Pradesh.

Roles and responsibilities of Cluster Coordinators

- To maintain close coordination with Dy. Director of Higher Education/Nodal

Officer for the successful implementation/ running of the project.

- During the visit for collection of data, these Cluster Coordinators should be competent enough to resolve the difficulties of the teachers regarding usage of the multimedia educational contents.
- They will visit each school at least once in a month and interact with the Teachers/Principal for at least five hours.
- He will also provide 2 days" refresher training of teachers after every three months from the date of completion of 150 days of implementation schedule in all the schools covered under his jurisdiction in consultation with the concerned school principal.
- To ensure smooth implementation of the project in concerned area.
- Infrastructure, multimedia educational content and software maintenance
- To collect the desired data and reports on time from Schools.
- He will be responsible for receiving the complaints regarding scope of work as defined earlier and in response he will respond back to the concerned Principal as well as Dy DHE/Nodal Officer with compliant number and its rectification report.

The govt. shall not have any liability including litigation arising due to either recruitment or retrenchment or any other service conditions of State Project Officer/Cluster Coordinators/any other staff appointed by the company. In case of any dispute/litigation arising as a result of the service conditions, the said dispute/litigation will be the exclusive dispute/litigation between the State Project Officer/Cluster Coordinators/any other staff appointed by the bidder and the bidder. The H.P. Govt. / Department of Higher Education/Deputy Director of Higher Education of concerned district/ Principal of the concerned school or any other govt. agency will have no responsibility or liability in all such matters.

8. Services:

(These services are mandatory and have to be provided either PART- I or both parts will be implemented.)

- i. The bidder has to manage and maintain in working condition the complete ICT lab and Smart Class rooms covering hardware, software, multimedia Educational Content and necessary infrastructure like UPS, furniture and fixtures etc. for the entire contract period.
- ii. Installation of softwares /upgrades/patches from time to time.
- iii. The Principal of the concerned school will be responsible for the following:
 - Opening and closing of the ICT Lab and smart class rooms for normal school hours

except Sunday/ Gazetted holidays in Himachal Pradesh

- Day to day cleanliness, operation of hardware, software, other lab accessories, lodging of complaints and imposition of penalty for proper functioning.
 - To ensure that the trainings and refreshers of concerned subject teachers are carried out as per the schedule.
 - School principal or his nominee will act as Assistant Nodal Officer (ANO) to ensure that the proper stock entry has been completed in all respect, checking the functional status of all hardware and allied accessories during the contract period, ensure that the complaints regarding the defects has been logged in the complaint register and penalty has been imposed.
 - The ICT lab will remain open during winter/Summer Vacations.
- iv. Successful bidder will be responsible for compliance of all the statutory labour laws w.r.t. deployment of manpower by him under the contract and any/all liabilities accruing on account of labour laws will be the responsibility of the BOT Operator
- v. in case of any complaint regarding the services, the school Principal will inform Cluster Coordinator as well as Nodal Officer of the concerned Districts. The Cluster coordinator will issue a complaint number to School Principal concerned and take necessary steps to rectify the problem at earliest. After rectification, the Nodal Officer of the concerned District will have to be informed about the same. The bidder will supply telephone numbers alongwith address of SPO and Cluster coordinator to the concerned school Principals/Nodal officer/Dy. Director of Hr. Education/ Directorate of Higher Education. A consolidated list containing the above details of Cluster Coordinators and State Project officer will have to be submitted to Directorate of Higher Education.

Table-1**Specifications for the supply of ICT Infrastructure**

S. No	EQUIPMENT	
1.	UPS	
	Type	Offline
	Capacity /Output Rating	Minimum Output Rating: VA/W 600/360, Nominal Input :230Vac / 50Hz, Mains Operation:140–280Vac, Input Frequency: 50Hz, Nominal, > 40Hz sensing : Output Voltage: 230+-15% Vac, Microprocessor based, Protections Overload – Output Trip OFF Battery Operation: Output Voltage: 210 - 240Vac rms, Output Frequency: 50Hz , Nominal Transfer Time:3mSec, Typical Output Wave force: Stepped, approximation to Sine Wave, Protections: Short Circuit, Overload – Output Trip OFF No. of Internal Batteries 12V/7AH * 1 Environment: 0 – 40DegC, 95% RH (non condensing), Typical Load: 1PC, Typical Run Time: 20Mins, * Molded Cabinets * 3 (5PIN) Output Sockets (Indian) * Backup time is based on 17” or „19” TFT monitor system * Black Start
	Brands	OEM having annual turnover more than 50 Crores in India in last financial year.
Warranty	3 years comprehensive onsite warranty	
2.	Server	
	Processor	Intel Xeon Quad Core Pro X3430 Processor (2.4 GHz) OR AMD Opteron 1381, 2.5 GHz, 75W, System Bus Speed 1400 MT/second
	Cache	8 MB L2 Cache/8 MB total Cache for AMD Processor
	Chipset	Intel 3420 or better/ Nvidia /Broadcom chipset for AMD Processor
	Memory	4 GB DDR 3 @ 1066 MHz with ECC expandable up
	LAN Card	Two Onboard integrated Gigabit Ethernet Card
	Hard Drive	320 GB SATA HDDs with RAID 0,1 support
	Optical Drive	16x or higher DVD-Writer
	I/O Ports	Port: 1x Serial, 6 xUSB, 1xVGA , 2xRJ45
	Monitor	18.5" TFT colour monitor with anti glare, anti static
	Keyboard	USB Keyboard
Mouse	USB Optical Mouse	

	Warranty	Warranty: 3 years comprehensive on-site
	OS Certifications	Microsoft Windows Standard Server 2008
	Indicative Brands	OEM having annual turnover more than 500 Crores in India in last financial year
3.	Computers	
	Processor	Intel® Core™ 2 Duo Processor E7500 or higher with Intel G4X Series Express Chipset or higher Intel Chipset OR AMD Athlon II X2 255 or higher with AMD 7x Series Chipset or Equivalent Nvidia Chipset
	Processor Speed	3 GHZ or higher
	System Bus	1066MHz or for AMD 4000 MHz, full duplex HyperTransport
	Cache	3 MB L2 Cache/ 2MB Total Cache for AMD
	Memory	2 GB Dual Channel DDR3 1066 MHz Non ECC RAM
	Hard Drive	250 GB , SATA , 7200 RPM with SMART or Higher
	Optical Drive	16X or higher DVD-RW
	Speakers	On board audio.
	Graphics Card	Onboard Intel graphics GMA4500 Integrated OR ATI Radeon™ 2100 graphics
	LAN Card	Onboard integrated Gigabit Ethernet Card
	I/O Ports	1 Serial, 6 USB (2.0 version), 2 PS/2 ports, 1 Serial, 1 Parallel, 1 VGA Port, 1 RJ45 LAN Port, Audio Port
	Keyboard / Mouse	USB/ PS2 , 107 Keys Keyboard wired USB/ PS2, Optical 2 button scroll Mouse -wired
	Monitor	18.5" TFT colour monitor with anti glare, anti static coating or higher
	Warranty	3 years comprehensive onsite warranty
	Brands	Reputed OEM having annual turnover more than 500 Crores in India in last financial year
4.	Printer/copier/scan/ fax	Multi Functional Laser Printer with facility of print, scan, copy, fax speed 15 PPM, 1200 DPI, 64 MB RAM, 150 sheet tray output) fax speed 33.6 Kbps, auto redialing, display LCD, 10/100 Base –T Ethernet network, copier resize 25 to 400%, copy speed upto 18 cpm
	Indicative Brands	OEM having annual turnover more than 100 Crores in last financial year in India
	Warranty	3 years comprehensive onsite warranty
5.	LAN Equipment	16 Port Switch, 24 x 1 CAT6 Patch Panel, 9U wall mounting Rack
6.	Web Camera	Enhanced VGA sensor (640 x 480 pixels) Video capture: up to 800 x 600 pixels (software enhanced) Photos: up to 1.3 megapixels (software enhanced) Up to 30 frames per second video (with recommended systems), Hi-Speed USB 2.0 certified, Universal clip fits notebooks, LCD or CRT monitors Snapshot button for capturing photos

7.	Integrated Computer Projector	DisplayEngine: Brightness: 3000 ANSI Lumens, Contrast Ratio: 2000:1, Resolution: XGA: 1024 x 768, Lamp life: 5000 hr, Computing Engine: Intel® Core™ 2 Duo Processor 1.6 GHz or higher with Intel G4X Chipset or higher Intel Chipset, 1GB Dual Channel DR II or higher, Graphics: Intel 945G with upto 128 MB of VRAM, Storage: 160 GB SATAII@7200rpm of higher Optical Drive: DVD RW System Audio: (Internal: 30W)External: connections required for connecting stereo active speakers/amplifier & speakers Microphone: Stereo Microphone input TV Tuner with native XGA resolution, 150” Channels, recording and playback capabilities External I/O: 4x hi-speed USB 2.0, 1xgigabit LAN, 3x RCA in from VHS/VCD player, 1x stereo in for connecting microphone, 1x VGA in for connecting external XGA document camera, 1 x RF input for cable/antenna connection Audio Output through Stereo jack for external powered speakers should be compatible with Microsoft Windows Xp, Windows Vista, Windows 7 and Linux etc. Accessories: Remote for integrate computer Projector Remote for TV Tuner. DVD writing software and TV Tuner application installed with the product
	Warranty	3 years comprehensive onsite warranty
	Indicative Brands	OEM having annual turnover more than 20 Crores in last financial year in India
8.	LCD TV (40/42 inch)	40/42" LCD Tv (With Remote & Screen Protector) Resolution 1920 x 1080 with Energy Star 4.01 compliant or higher
	Warranty	3 years comprehensive onsite warranty
	Indicative Brands	OEM having turnover more than 1000 Crores in last financial year in India
	SOFTWARES (to be provided by the department at a Central Location)	
9.	Operating System - Desktops	Windows Starter Kit, Windows 7 OS Licences for all the desktops Prof Upgrade, MS Office, Visual Studio, Encarta Encyclopedia and for above PCs with PIL in PC based schools.
10.	Server OS	Windows 2008 Standard Server (1 copy in Media) along with 10 Client Access Licences in each ICT Lab
11.	Anti Virus Client/Firewalls	Anti Virus for each desktop with 3 years upgrade

The bidder had to provide furniture for smart class rooms which included Seating arrangement for Students:

- PVC/Plastic moulded 30 Chairs (Make: Supreme, Model: Lily or Nilkamal make) per school without arms rest
- PVC/Plastic moulded one Chair (Make: Supreme, Model: Globus, or Nilkamal, Model: CHR5001) per School with arms rest

In 2nd Smart Class room-II: One Computer Table and LCD TV to be fixed at suitable height.

- The bidder would ensure that the Multimedia Educational Content run properly on all the hardware installed in ICT lab and smart class rooms.
- The bidder would provide the required power points fitting in the smart class rooms.
- The bidder would provide batteries for remote control of Integrated Computer Projector, LCD TV Remote Control etc.

Penalty and Termination due to Non-Fulfillment of Contract

The following penalties were imposed on the bidder in the tender document:

Penalty for failure of equipment(s)

- I. No computer system (CPU, monitor, keyboard, mouse, webcam, speakers) or Integrated Computer Projector installed in the ICT

Lab or smart class rooms would be down for more than 3 working days continuously from the date of the lodging of complaint (even if computer system/ Integrated Computer Projector is down during part of a calendar day, it will be counted as one calendar day). For downtime beyond 3 working days, the penalties would be imposed as under:-

No. of days	Penalty amount per school per day per equipment
1-15	@ Rs. 500/-
16-30	@ Rs. 1000/-
31-60	@ Rs. 2000/-
61 onwards	@ Rs. 5000/- till the rectification takes place

If the rectification does not take place up to 90 days from the lodging of the complaint and if such situation occurs in 15% or more allotted Govt. Sr. Sec. Schools, then the contract shall be terminated at the risk and cost of the bidder.

- II. The following penalty will be imposed for the non working of the equipments such as Multipurpose Printer, UPS and LC TV/Monitor, if the problem is not rectified within 3 working days from the lodging of the complaint. The penalty will be counted from day one and will be calculated as under:-

No. of days	Penalty amount per school per day per equipment
1-15	@ Rs. 1000/-
16-30	@ Rs. 2000/-
31-60	@ Rs. 3000/-
61 onwards	@ Rs. 5000/- till the rectification takes place

If the rectification does not take place upto 90 days from the lodging of the complaint and if such situation occurs in 15% or more allotted Govt. Sr. Sec. Schools, then the contract shall be terminated at the risk and cost of the bidder.

III. The following Penalty will be imposed for the non working of internet, if the problem is not rectified within 3 working days from the lodging of the complaint. The penalty will be counted from day one and will be calculated as under:-

No. of Days	Penalty amount per school per day
1-15	@ Rs. 1000/-
16-30	@ Rs. 2000/-
31-60	@ Rs. 3000/-
61 onwards	@ Rs. 5000/- till the rectification takes place

The clause is not to be invoked where Internet Service Provider (ISP) is not available.

If the rectification does not take place upto 90 days from the lodging of the complaint and if such situation occurs in 15% or more allotted Govt. Sr. Sec. Schools, then the contract shall be terminated at the risk and cost of the bidder.

IV. The following penalty will be imposed for the non working of the networking, if the problem is not rectified within 3 working days from the lodging of the complaint. The penalty will be counted from day one and will be calculated as under:-

No. of days	Penalty amount per school per day
1-15	@ Rs. 1000/-
16-30	@ Rs. 2000/-
31-60	@ Rs. 3000/-
61 onwards	@ Rs. 5000/- till the rectification takes place

If the rectification does not take place upto 90 days from the lodging of the complaint and if such situation occurs in 15% or more allotted Govt. Sr. Sec. Schools, then the contract shall be terminated at the risk and cost of the bidder.

- V. The following penalty will be imposed if multimedia content remains non-functional for more than three working days from the lodging of the complaint. The penalty will be counted from day one and will be calculated as under:-

No. of days	Penalty amount per school per day
1-15	@ Rs. 1000/-
16-30	@ Rs. 2000/-
31-60	@ Rs. 3000/-
61 onwards	@ Rs. 5000/- till the rectification takes place

The Penalty on multimedia educational content will be applicable only when Integrated Computer Projector/system/LCD Tv/monitor is operational and multimedia educational content is non-functional.

If the rectification does not take place upto 90 days from the lodging of the complaint and if such situation occurs in 15% or more allotted Govt. Sr. Sec. Schools, then the contract shall be terminated at the risk and cost of the bidder.

VI. Penalty @ Rs 1000/- Per day per Cluster Coordinator/State

Project Officer will be imposed if Cluster Coordinator or State Project Officer remains absent without written intimation and does not respond to the queries raised by the Dy. DHE & DHE.

- VII. If the bidder fails to conduct the refreshers course of teachers as per schedule, Penalty @ Rs 1000/-per day per school will be imposed till the bidder conducts the refresher courses of teachers.
- VIII. If the Bidder fails to submit the Monthly Monitoring Reports (MMRs) of 628 schools within a week after each month then a penalty @ Rs. 500/- per school per day will be imposed for maximum 30 days, thereafter a consolidated penalty of Rs. 1,000/- per school per day will be imposed till the submission of MMRs.
- IX. If the Monthly Monitoring Reports (MMRs) submitted by the bidder is not as per the specified structure and format or is observed incomplete in any respect then report in respect of that school will be considered rejected and penalty @ Rs. 500/- per MMR will be imposed till the complete MMR is submitted.
- X. If the bidder fails to complete all the liabilities covered under the scope of work in a school with in a stipulated period as mentioned in implementation schedule, the penalties will be imposed as under:-

No. of days	Penalty amount per school per day
1-15	@ Rs. 2000/-
16-30	@ Rs. 3000/-
31-60	@ Rs. 5000/-
61 onwards	@ Rs. 10000/-

All the furniture and fixtures and power point fittings need to be repaired/replaced, as per the requirement arises during the contract period. In case during rectification/ repair of any equipment, the bidder will install a new equipment of same or higher configuration till the repaired equipment is received and installed. The bidder is allowed to take away the faulty equipment after replacement with a new one of same or higher configuration.

3. Analysis of the monitoring mechanism:

Help desk number to lodge complaints was installed by HCL Infosystems Ltd. at Directorate of Higher Education to receive complaints from the field for hardware installed in school ICT lab and Smart classrooms. Helpdesk with 2 engineers deputed by HCL Infosystems for the project period up to 31.03.2013 at Directorate of Higher Education as per the conditions of the tender.

Monthly Monitoring report collected from each school every month which contained information for monitoring of the project on the following aspects:

- a. Use of the multimedia educational content by the teachers in their schools.
- b. Mode of use of the multimedia educational content by the teachers in their schools.
- c. The difficulties/problems being faced by the teachers in using the multimedia educational contents & internet access.
- d. The benefit or improvement in teaching by multimedia educational content and internet access.
- e. The benefit to the student in learning through multimedia.
- f. Any other important aspect as per proposal of company.
- g. Status of hardware performance and maintenance by the bidder.
- h. Usage report on use of internet by the teacher and students.
- i. The school wise number of teachers Trained and refresher programmes conducted.

4. Analysis of the overall plan for education through ICT (to include programme for ICT, syllabus, instructional material, teacher training, e-content, etc):

Time given to HCL for implementation of ICT Project was of 5 months. However it took 6 months time for the implementation with one month extension granted by the Government of Himachal Pradesh taking into account different considerable facts.

Teacher Training of 5 days was conducted by IL &FS in 30 institutions at the following places :

Sr. No	District	Number of Institutions	Name of the Institution
1	Solan	1	SCERT Solan
		2	Govt. College Arki
		3	Govt. College, Nalagarh
2	Sirmour	4	Govt..College Nahan
		5	Govt. College, Paunta Sahib
	Shimla	6	Govt. College, Chaura-Maidan
		7	Govt. College, Seema
3		8	Govt. College, Sarswatinagar
		9	Govt. College, Rampur-Bushhar
4	Kinnour	10	Govt. College, Reckong-Peo/ MMC
5	Bilaspur	11	Govt. College, Ghumarwin
		12	Govt. College, Bilaspur
6	Mandi	13	Govt. College, Mandi
		14	Govt. College, Sarkaghat
		15	Govt. College, Karsog
7	Chamba	16	Govt. College, Chamba
		17	Govt. College, Chowari
8	Una	18	Govt. College, Una
		19	SVSD College, Bhatoli
9	Kangra	20	Govt. College, Dharamsala
		21	Govt. College, Nurpur
		22	Govt. College, Palampur
10	Hamirpur	23	Govt. College, Hamirpur
		24	Govt. College, Nadaun
		25	Govt. College, Sujanpur
		26	Govt. College, Bhoranj
11	Kullu	27	Govt. College, Kullu
		28	Govt. College, Banjar
		29	Govt. College, Anni at Haripur
12	Lahoul	30	MMC at GSSS Keylong

TA/DA to the participants was paid by the HCL Infosystems Ltd.

E- contents developed by IL & FS for classes and subjects given below were evaluated by a committee constituted by the Director of Higher Education.

S. No.	Class	Subject	Language
1.	9 th & 10 th	Science, Social Science, Mathematics	Hindi
2.	11 th & 12 th	Physics, Chemistry, Biology, Mathematics, English	English

The content was based upon all the identified 136 Hard Spots in 628 schools for classes 9th and 10th and content of all the identified 478 Hard Spots in 628 schools for classes 11th and 12th. The abstract of the Hard Spots identified by the committee and their details subject wise and class wise are given as below:

Abstract of List of Hard Spots

Sr. No	Class	Subject	No. of Topics	No. of Hard Spots
1.	9 th	Mathematics	11	24
		Science	10	22
		Social Science	13	20
Total				66
2.	10 th	Mathematics	12	24
		Science	14	28
		Social Science	14	18
Total				70
3.	10+1	Physics	12	68
		Biology	22	70
		Mathematics	9	32
		Chemistry	14	22
		English	6	17
Total				209
4.	10+2	Physics	10	100
		Biology	16	90
		Mathematics	11	44
		Chemistry	13	22
		English	7	13
Total				269
G. Total				614

One cluster coordinator for every 20 schools was deputed by HCL Infosystems Ltd. for monitoring and refresher training in respective schools. Collection of MMR was done by Cluster Coordinators and submitted to the Directorate of Higher Education every month.

E-contents were delivered at every school in 14 DVDs with a copy of the same to all the Deputy Director of Higher Education Office and one set of contents at Directorate of Higher Education.

5. Problems encountered by State Authorities in implementing the scheme in the State such as finalizing the BOOT vendor, and related issues in case of BOOT model and the problems encountered by State Authorities in case of outright purchase model:

The State authorities did not face any problem in implementing the scheme in the State such as finalizing the BOOT vendor, and related issues in case of BOOT model and outright purchase model:

6. Problems encountered by State Authorities- issues with contractor/ vendor and contract teachers, issues with District Authorities, issues with schools:

The State Authorities did not report any problem encountered by them with the contractor/vendor, contract teachers or the issues related with the schools and district authorities.

7. Suggestions of State Authorities in improving the implementation of ICT scheme in the State:

In improving the implementation of the ICT scheme in the state, the State Authorities suggested that:

1. Timely release of the payment/installment from the Ministry of Human Resource Development is required.

2. There must be a provision of Project Coordinator in each school without any additional charge.

8. Detail the problems encountered in procuring the hardware or software/ deciding on mode of implementation:

The State Authorities did not report any problem encountered by them in procuring the hardware or software and taking decisions about the implementation of the scheme in the state.

APPENDIX- 1

LIST OF 628 GOVT. SENIOR SECONDARY SCHOOLS

	CONSTITUNCY	S.NO.	NAME OF SCHOOL
S.NO.	Kotkehloor		
1			
2		2	Bhakara
3		3	Jagatkhana
4		4	Jukhala
5		5	Kallar-Patta
6		6	Kothipura
7		7	Namhol
8		8	Sawahan
9		9	Soldha
10		10	Tarsu
	Bilaspur		
11		1	Auhar
12		2	Bilaspur(B)
13		3	Bilaspur(G)
14		4	Chalehli
15		5	Ghagas
16		6	Kandraur
17		7	Panjgain
18		8	Rambag(Barmana)
19		9	Taliyana
	Ghumarwin		
20		1	Bharari
21		2	Danger
22		3	Ghumarwin(B)
23		4	Ghumarwin(G)
24		5	Hatwar
25		6	Kaphara
26		7	Kuthera(Bhel)
27		8	Nalti

Geharwin

29	1	Darthin
	2	Geharwin
30	3	Jejwin
31	4	Jhanduta
32	5	Kalol
33	6	Rishikesh
34	7	Samoh
35	8	Talai(U)

Distt Chamba

	Bhattiyat		
36		1	Chowari
37		2	Dhulara
38		3	kakira(B)
39		4	Mehla
40		5	Sihuntha
41		6	Tundi
	Banikhet		
42		1	Banikhet
43		2	Bathari
44		3	Dalhausie(U)
45		4	Salooni
46		5	Sundla
47		6	Telka(Salwan)
48		1	Chakloo
49		2	Kiani
50		3	Masroond
51		4	Srikund
52		5	Tissa
	Chamba		
53		1	Chamba(B)
54		2	Chamba(G)

55		3	Chaned
56		4	Chhatrari
57		5	Saho
58		6	Sunara
59		7	Udaipur
	Bharmour		
60		1	Bharmour
61		2	Holi
62		3	Khani
63		4	Killar
64		5	Sach
	Distt Hamirpur		
	Nadaun		
65		1	Amlehar
66		2	Badaran
67		3	Balduhak
68		4	Bara
69		5	Bhumpal(Sadhiyal)
70		6	Dhaneta
71		7	Gauna
72		8	Jalari
73		9	Kangoo
74		10	Kashmir
75		11	Nadaun(B)
76		12	Nadaun(G)
77		13	Naunghi(Jolslapar)
78		14	Rail
79		15	Sanahi
80		16	Sera
	Hamirpur		
81		1	Amroh
82		2	Chabutra
83		3	Chauri
84		4	Hamirpur(B)U
85		5	Hamirpur(G)U

86		6	Jhagariani
87		7	karot
88		8	Kot
89		9	Kuthera
90		10	Matahani(MS to SSS
91		11	Nalti
92		12	Patlander
93		13	Sujanpurthira(B)U
	Bamson		
94		1	Badhani
95		2	Bagwara
96		3	Bajrol
97		4	Bohni
98		5	Chamboh
99		6	Darbiar
100		7	Jandru
101		8	Jangalberri
102		9	Kakkar
103		10	kakriar
104		11	Lambloo
105		12	Pahunch
106		13	Parol
107		14	Tauni Devi
108		15	Tikkar-khattarian
109		16	Uhal
	Mewa		
110		1	Bhareri
111		2	Bhoranj
112		3	Bhota
113		4	Didwin
114		5	Jahu
115		6	Jhiralari
116		7	Kharwar
117		8	Ladraur
118		9	Mair
119		10	Mehal

120		11	Mundkhar
121		12	Patta
122		13	Tal
	Nadaunta		
123		1	Bani
124		2	Biar
125		3	Bijhari
126		4	Dhangota
127		5	Gallaur
128		6	Garli
129		7	Giaragan
130		8	Jaure Amb
131		9	Lower Hareta
132		10	Maharal
133		11	Raili Jajri
134		12	Tipper
	District Kangra Nurpur		
135		1	Bhadwar
136		2	Ganoh
137		3	Giora
138		4	Ladauri
139		5	Nurpur(G)
140		6	Nurpur(U)
141		7	Raja ka Talab
142		8	Rehan
143		9	Sadwan
144		10	Sulyali
	Gangath		
145		1	Basantpur at Tesra
146		2	Dah kulahara
147		3	Dainkwan
148		4	Gangath
149		5	Indora
150		6	Lodhwan
151		7	Mohtli

	Jawali		
152		1	Bahadurpur
153		2	Bharmar
154		3	Bhogarwan
155		4	Dhameta
156		5	Fatehpur
157		6	Guglara
158		7	Rey
159		8	Sathana
	Guller		Amlala
160		1	
161		2	Amni
162		3	Bharila-Daroka
163		4	GharJarot
164		5	Harsar
165		6	Jawali
166		7	Kotla
16		8	Kuther
168		9	Matlaher
169		10	N.Surian
	Jaswan		
170		1	Bankhandi
171		2	Bathu Tippri
172		3	Bhatoli-phakorian
173		4	Dada-siba
174		5	Ghamroor
175		6	Haripur
176		7	kotla-behar
177		8	Sansarpur-Terrace
	Pragpur		
178		1	Badalthore
179		2	Channaour
180		3	Dhaliara
181		4	Garli
182		5	Karua
183		6	Pirsaluhi

184		7	Pragpur
185		8	Rakkar
	Jawalamukhi		
186		1	Bharolikohala
187		2	Dehragopipur
188		3	Ghallaar
189		4	Jawalamukhi
190		5	Kathog
191		6	Khundian
192		7	Lagru
193		8	Muhal
194		9	Surani
195		10	Tihari
	Thural		
197		2	Balakrupi
198		3	Gander
199		4	Jaisinghpur
200		5	Lambagaon
201		6	Majhien
202		7	Sanghol
203		8	Serimolag
204		9	Silh
205		10	Tamber
206		11	Thural
	Rajgir		
208		2	Bhulana
209		3	Chadhiar
210		4	Dagoh
211		5	Jalag
212		6	Koseri
213		7	Majhera
214		8	Makol
215		9	Rajpur
	Baijnath		
216		1	Averi

217		2	Baijnath
218		3	Bir
219		4	Deol
220		5	Kandwari
221		6	Krishannagar
222		7	Lohardi
223		8	Paprola
224		9	Sansai
225		10	Sansal
	Palampur		
226		1	Bhawarna
227		2	Bindraban
228		3	Chachian
229		4	Kandi-(Badoh)
230		5	Lahla
231		6	Pahra
232		7	Palampur(G)
233		8	Palampur(Guggar)
234		9	Parour
	Sullah		
235		1	Bhoda
236		2	Boda
237		3	Daroh
238		4	Dhira
239		5	Garhjamula
240		6	Gharana
241		7	Khera
242		8	Kotloo
243		9	Mundhi
244		10	Naoura
245		11	Rajhoon
246		12	Sulah
	Nagrota		
	Baowan		

248		2	Dhaloon
249		3	Nagrota-Bagwan(G)
250		4	Nagrota-Bagwan(U)
251		5	Pathiar
252		6	Rajiana
253		7	Samloti
254		8	Serathana
255		9	Suinhin
	Shahpur		
256		1	Baranj
257		2	Chari
258		3	Darini
259		4	Harchakian
260		5	Kaliara
261		6	Kareri
262		7	Rait
263		8	Rehlu
264		9	Salol
265		10	Shahpur
	Dharamshala		
266		1	Bagli
267		2	Dari
268		3	Dharamshal(B)
269		4	Dharamshal(G)
270		5	Forsythganj(U)
271		6	khanaiyara
272		7	Mandal
273		8	Tang narwana
	Kangra		
274		1	Balugaloh
275		2	Daulatpur
276		3	Dhughiari
277		4	Jassain
278		5	Kachhiyari
279		6	Kuther(Ranital)
280		7	Lanj

281		8	Mataour
282		9	New Kangra(U)
283		10	Tiyara
	Distt.Kullu		
	Anni		
285		2	Arsu
286		3	Dalash
287		4	Deogi
288		5	Kungash
289		6	Neether
290		7	Nirmand
291		8	Samej
292		9	Tandi
	Banjar		
294		2	Banjar
295		3	Bhuntar
296		4	Garsa
297		5	Jallugran
298		6	Jaree
299		7	Sainj
	Kullu		
301		2	Bran
302		3	Haripur
303		4	Katrain
304		5	Kharahal
305		6	Kullu(B)
306		7	Kullu)(G)
307		8	Manali
308		9	Nagar
309		10	Raison
	Distt Kinnaur		
310		1	Kalpa

312		3	Katgaon
313		4	Nichar
314		5	pooh
315		6	Reckongpeo
316		7	Sangla
	Distt L & S		
317		1	Hansa
318		2	Jhalama
319		3	Kaza
320		4	Keylong
321		5	Kibbar
322		6	Udaipur
	Distt Mandi		
	Karsog		
324		2	Karsog
325		3	Khanyolbagra
326		4	Mahunag
327		5	Nehri
328		6	Pangna
329		7	Seribanglo
330		8	Shakra
	Chachiot		
331		1	Bagshad
332		2	Balichowki
333		3	Chattri
334		4	Gadagushaini
335		5	Gohar
336		6	Janjehli
337		7	Thachi
338		8	Thunag
	Nachan		
340		2	Dhangiarara
341		3	Jaidevi
342		4	Kaned
343		5	Mahadev
344		6	Rohanda
	Sundernagar		
345		1	Behli
346		2	Chah-Ka-Dora
347		3	Dehar
348		4	Jarol

350		6	Sundernagar(B)
351		7	Sundernagar(G)
352		8	Taleli
	Balh		
354		2	Dushahra
355		3	Gaggal
356		4	Galma
357		5	Gurukotha
358		6	Hatgargh
359		7	Pairi
360		8	Rajgarh
361		9	Rajwari
362		10	Riwalsar(U)
363		11	Sidhyani
	Gopalpur		
365		2	Bhadarwar
366		3	Bhambla
367		4	Chowk
368		5	Gopalpur
369		6	Jamni
370		7	Kashmaila
371		8	Kot-Hatli
372		9	Nabahi
373		10	Paonta
374		11	Rissa
375		12	Samella
376		13	Sarkaghat(U)
377		14	Thona
	Dharampur		
378		1	Bharari(Sujaopipli)
379		2	Cholthara
380		3	Dharampur
381		4	Gaddidhar
382		5	Hawani(Parsada)
383		6	Kujja-Balh
384		7	Longni
385		8	Mandap
386		9	Mari
387		10	Sandhole
388		11	Seyoh
389		12	Tihra

Jogindernagar

390	1	Chontra
391	2	Droobal
392	3	Jogindernagar(B)
393	4	Jogindernagar(G)
394	5	Ladbharol
395	6	Langna
396	7	Makreri
397	8	Matroo
398	9	Pandol
399	10	Utpoor

Darang

400	1	Bhararu
401	2	Darang
402	3	Dhar
403	4	Katindi
404	5	Katoula
405	6	Kufri
406	7	Narla(Paddar)
407	8	Panarsa
408	9	Pashakot(Barot)
409	10	Shivabadar

Mandi

410	1	Baryara
411	2	Karkoh
412	3	Kothigehra
413	4	Kotli
414	5	Kot-Sadar(Tungal)
415	6	Majjwar
416	7	Mandi(B)-(U)
417	8	Mandi(G)-(U)
418	9	Pandoh(U)
419	10	Saigaloo
420	11	Tilii-Kehanwal

Distt. Shimla**Rampur**

421	1	Dhargaoura
422	2	Dutt Nagar
423	3	Jeori
424	4	Jhakri
425	5	Khamadi

426	6	Majheoti
427	7	Nankhari
428	8	PadamRampur(U)
430	10	RRM Nogli
431	11	Sarahan-Bushahar
432	12	Takletch
Rohru		
433	1	Arhal
434	2	Chargaon
435	3	Jangla
436	4	Lowerkothi
437	5	Pujarli-4
438	6	Rohru(B)U
439	7	Rohru(G)-U
440	8	Tikker
Jubbal-Kotkhai		
441	1	Deori-Khaneti
442	2	Jharagnakrari
443	3	Jubbal(B)-U
444	4	Kalbog
445	5	Kiari
446	6	Kotkhai(G)
447	7	Kotkhai(U)
448	8	Mahasu
449	9	Mandal
450	10	Mandhol
451	11	Melthi
452	12	Pandranu
453	13	Rawla-Kiar
454	14	Sarsawati-Nagar(Sawra)
Chopal		
456	2	Bour
457	3	Chopal
458	4	Deoth
459	5	Kupvi
460	6	Maneoti
461	7	Matal
462	8	Nerwa
463	9	Sarain
464	10	Tharoach

Kumarsain

466	2	Baragaon
467	3	Bhutti
468	4	Birgarh
470	6	Kangal
471	7	Khanetisadhoch
472	8	Khatnol
473	9	Kotgarh
474	10	Kumarsain
475	11	Narkanda
476	12	Pahal
477	13	Sunni(U)

Theog

478	1	Bagain
479	2	Deha
480	3	Matiana
481	4	Theog(B)U
482	5	Theog(G)U

Shimla

483	1	Boileauganj(U)
484	2	Chhotashimla(U)
485	3	Lakkarbazar(G)-U)
486	4	Phagli(U)
487	5	Portmore(G)-U
488	6	Sanjauli(U)
489	7	Shimla(B) U
490	8	SummerHill

Kusumpti

492	2	Ghanahatti
493	3	Halog-Dhami
494	4	Junga
495	5	Khalag
496	6	Kohbagh
497	7	Mashobra
498	8	Rampur-Keonthal
499	9	Shoghi
500	10	Tutu(U)

Distt Solan

	Arki	
501	1	Arki(B) U
502	2	Arki(G)
503	3	Bhumti
504	4	Darlaghat
505	5	Dhundand
506	6	Kunihar
	Doon	
508	2	Barotiwala
509	3	Chandi
510	4	Diggall
511	5	Goela
512	6	Gullarwala
513	7	Manpura
514	8	Patta Mehlog
515	9	Ramshsahar
	Nalagarh	
517	2	Dabhota
518	3	Joghon
519	4	Nalagargh Girls
520	5	Nalagarh(B)(U)
521	6	Panjehra
	Kasauli	
522	1	Chamian
523	2	Deothi
524	3	Dharampur
525	4	Jabli
526	5	Kasouli
527	6	Kuthar
528	7	Parwanoo(Baroti)
529	8	Subathu
530	9	Sultanpur
	Solan	
531	1	Chail
532	2	Deothi
533	3	Gaura
534	4	Guggaghat
535	5	Jaunaji
536	6	Kalhog
537	7	Kandaghat
538	8	Kuftoo

539	9	Mamligh
540	10	Ochhghat
541	11	Solan(B)
542	12	Solan(G)

Distt. Sirmour

Pachhad

544	2	Fagoo
545	3	Nainatikkar
546	4	Narag
548	6	Srahan(U)

Renuka

550	2	Bogdhar
551	3	Korag
552	4	Sangrah

Shillai

554	2	Kaffota
555	3	Shillai

Paonta Doon

557	2	Kolar
558	3	Majra
559	4	Nagheta
560	5	Paonta(B)U
561	6	Paonta(G)
562	7	Sataun
563	8	Shivpur

Nahan

564	1	Bankalan
565	2	Bechar-ka-Bagh
566	3	Dadahu
567	4	Jamta
568	5	Nahan(B)
569	6	Nahan(G)
570	7	Surla
571	8	Trilokpur

Distt UNA

Gagrate

573	2	Badhera-Rajputan
574	3	Bhadarkali
575	4	Bhanjal

576	5	Challate(G)
577	6	Daulatpur (TO)
578	7	Ghanari
579	8	Gobdhpur Bhanera
580	9	Marwari
581	10	Nangal-Jariala
Chintpurni		
583	2	Bharwain
584	3	Dharamshal-Mahantn
586	5	Dushara
587	6	Lohara
588	7	Mubarkpur
589	8	PoliaPurohita
590	9	Rapo-Misran
591	10	Suri
592	11	Thathal
Santokhgarh		
593	1	Bathri
594	2	Dulehar
595	3	Haroli
596	4	Kangar
597	5	Khad
598	6	Lalhari
599	7	Pandoga
600	8	Panjawar
601	9	Pubowal
602	10	Saloh
603	11	Santokhgarh(B)(U)
604	12	Santokhgarh(G)(U)
Una		
606	2	Basdehra
607	3	Behdala
608	4	Charatgarh
609	5	Dehlan
610	6	Nangran
611	7	Sanouli
612	8	Takka
613	9	Una(B)(U)
614	10	Una(G)(U)
616	2	Arloo

617	3	Bangana(MS to SSS)
618	4	Chauki Maniar
619	5	Dhamandari
620	6	Dhundla
621	7	Hatli
622	8	Lathiani
623	9	Raipurmaidan
624	10	Samoor Kalan
625	11	Saroh
626	12	Takoli
627	13	Talmehra
628	14	Thanakalan

APPENDIX-2

CLASSWISE AND SUBJECTWISE HARD SPOTS IDENTIFIED BY THE COMMITTEE FOR E-CONTENT

Class - IX & X

Subject - Science

Sr	Name of the Topic	Hard Points/Difficult Areas identified by the
1	gekjs vkI ikI ds inkFl	inkFl dh voLFkk, fdz;kdyki Ifgr
2	D;k gekj vki ikI ds inkFl 'kq)	ok; ds 'kVksa dk i'fkdj.k] fuyacu D;k g\ nks 'kqyu'khy nzo ds feJ.k dk i'fkdj.k] nks
3	v.lj ,oa ijek.k	v'kqyu'khy nks ds feI.k dk i'fkdj.k] nks I d'zhe dks dSI i'fkdj.k] I d'sr. g\ ijok.k D;k g\ v.k D;k g\ jlk;fud lw= ijek.k] dh ljapuk] I akstdrk] leL;kfed
4	thou dh ekfyd hZ0	dksf'kdk ,oa dksf'kdk dh lajpuk
5	mUkd	mUkd ,oa mUkd] dk oxhZdj.k
6	thou e fofu/krk	thou e fofu/krk
7	cy rFlk xfr ds fu;e	cy] laqfyur vkj vlfyur cy] xfr d rhuks fu;ek dh O;k]k mnkg. la Ifgr
8	/ofu	/ofu dk mRiknu] /ofu laj.k] ek;/e] /ofu rj. rFlk muds vfHky{k.k
9	dku dh lajpuk	ekuo d.k dh lajpuk
10	izk'd'frd Iaink	ok; rFlk ty iznw'k.k] ty pdz] ukbZV'kstu pdz vksDlhtu pdz] xzhu gkml i'ilkko] vlstksu
	CLASS - X	ii
11	jlk;fud vfHkfdz;k ,oa	fdz;k dykiA
12	vEy] {kkjd rFlk yo.k	vEy ,oa {kkjd /kkrd I'fkd dSI vfHkfdz;k djrs g\ vEy ,oa {kkjd ds fofy;u d'rus
13	/kkq ,oa v/kkq	/kkqv] d jklk;fud xq.k /kZ] /kkq] dh la{kkj.k
14	dkeZu rFlk mId ;ksfxd	dkeZu e vca/kuj] la' Ir ,o la' Ir dkeZu ;ksfxd] dkeZu ;ksfxd] d jklk;fud xq.k /ke
15	rRok dk vkorZ oxhZdj.k	v'k/kqfud vkorZ I'fkd] es r'khu dh fLFkr
16	tSo izdze	eq"; e iks'k.k] gekjk iEi g'n;] jDrko mrltZu
17	fu;U=k ,oa leUo;	ekuo eflr"d
18	tho tuu dI djrs g\	,dy thou suztuu dh fof/k ykafx] tuu] ekuo e ykafx] tuu
19	vuoqaf'kdrk ,oa to fodkl	vuoqaf'kdrk
20	izk'd' ijkoZru rFlk vijkorZu	xkyh; niZ.k] fdj.k v'khu dk mi;ksx djds xkyh; niZ.k] }kji cu izfrf'ceek dk fu;i.k
21	Ekuo us= rFlk jax fejaxk lalkj	Ekuo us=] n'fV nks' rFlk mudk lalksku
22	fo/kqr	fo/kqr/kkjk] vj ifjp;] fo/kqr foHko vkSj fo/kqr foHkokarj] fo/kqr foHko] vkse dk fu;e]
23	fo qr /kkjk ds picdh; i'ilkko	izfrf'ceek ds fodk- dk izfrf'ceek fdlh fo qr /kkjkoghpkyd d dkj.k picdh; {ks=} picdh; {ks= e fdh fo qr
24	fo qr /kkjk ds picdh; i'ilkko	izfrf'ceek pkyd ii cvl fo qr ekVi ,oa fo qr fu;= fo qr picdh; izsj.k] /kqyu fo qr ifji;

Class - IX & X

Subject - Mathematics

Sr.	Name of the Topic	Hard Points/Difficult Areas identified by the committee
1.	Number System	Definition of Whole Numbers, Irrational Numbers, Rational Numbers, Co-prime Numbers, Real Numbers, Representation of Irrational Numbers on the line, Properties of non repeating and non terminating. Representation of real numbers on the number lines.
2.	Co-ordinate Geometry	Introduction and representation of a point in a plane with the help of co-ordinates concept.
3.	Euclid geometry	Introduction to Euclid's Geometry and the postulates of Euclid along with explanation
4.	Lines and Angles	Definition and properties of Lines and Angles
5.	Triangles	Definition and Congruence of triangles a clarification to all the axioms of congruence.
6.	Quadrilaterals	Quadrilaterals, types and properties of a quad.
7.	Parallelogram and	Figures on the same base and between the same parallel lines.
8.	Circles	Definition of circle and its contents and properties alongwith the theorems.
9.	Surface Area & Volume	Surface area and volume of cube, cuboids, cylinder, cone & sphere along with examples.
10.	Statistics	Representation of data with the help of bar graphs and the histograms and difference between bar graph and histogram
11.	Probability	Introduction to the probability, construction of the sample space with the live examples.
	Class –Xth	
12.	Real Numbers	Euclid's division lemma alongwith prove that $\sqrt{3}$ is not a rational number. Prove that $\sqrt{5}$ is not a rational number.
13.	Polynomials	Graphical representation of the polynomial and Zeros of the polynomial
14.	Linear Equations in Two Variables	Solution of the linear equations by the graphical methods and by the methods of cross multiplication.
15.	Arithmetic Progressions	Introduction to Arithmetic Progressions, sum of first n terms of an A.P
16.	Triangles	Properties & theorems alongwith the concrete examples.
17.	Co-ordinate geometry	Distance formula, Section Formula & area of the triangle using coordinates.
18.	Trigonometry	Introduction to t-ratios, values of t-ratios at standard angles.
19.	Height & Distance	Real life problems, how to draw the triangles for the solution of real life situation.
20.	Circles	Properties & theorems on circles.

21.	Areas related to circle	Areas of a sector of a circle and areas of the combination of plane figures.
22.	Surface Areas and Volumes	surface areas and volumes of a Frustum
23.	Probability	Introduction, Events, sure event set

Class - IX

Subject - Social Science

S	Name of the	Hard Points/Difficult Areas identified by the
		yksdrkfU=d jktfufR
1	Chapter-1 Iedkyhu	1-4 fo'o Lrj ij ykstrU=
2	Chapter-2	2-4 vk/kfud ifjis{; e ykstrU= dh lkRkZdrk
3	Chapter-3	3-2 ge Iafokku dh t:jR Dksa g\
4	Chapter-4	4-2 gekjh puko izkkyh ,o LorU= puko vk;ksx
5	Chapter-5	Ialn ds nk Inu
6	Chapter-6 ykstrkfU=d	6-4 vf/kdkjk dk cB=rk nk;jk
	Unit-I	Hkkjr ,oa ledkyhu fo'o & 1
7	Chapter-1	Topic-1.2 vkS;kSfxd lekt ,oa Ikekftd ifjorZu
		Topic-1.2
	Unit-II	ftfodk vFkZ;oLFk ,o lekt
8	Chapter-2	2-1 O;olkf;d okfudh ls ykstrU= dk thou dI izHkkfor gqvk\
9	Chapter-4	Topic - 4.5 okfudh e u, cnyko
1	Chapter-6	vkt ds nkSj e O;kikj] feM;k vkj fdzV
1		Iedkyhu Hkkjr- I
	ekufp=	i) ekufp= dkS'ky
		ii) ekufp= ,oa vFkZ;oLFk e vFkZ;oLFk
1	Chapter-2 viokg	ufnkso dk vFkZ;oLFk e egRo
2	Chapter-2 tyok;q	ok;qnko ,oa iou ekulwu pd
1	Chapter-5	ouksa ds izdkj
3	izk'frd ouLifr ,oa -oll-	ouksa dk lai{k k

Class - X

Subject- Social Science

Sr. No.	Name of the Topic	Hard Points/Difficult Areas identified by the committee
		Hkkjr vk\$ ledkyhu fo'o & 2
1	Chapter – 1 ;wjksi e jk"V²okn dk fuelZk	Topic – 2 jk"V²okn ,oa jk"V²&jkT; dk fopkj dS l mHkj\
2	Chapter – 3	Topic – 6 Topic – 3.1 Hkkjr e jk"V²okn lR;kxzg dk fopkj
3		Unit-II thfodkj vFkZO;oLFkk ,oa lekt dk cuuk
4	Chapter – 1	Topic – 2.2
5	Chapter – 3	"kgj ,o i;kZoj.k dh ppukfr;k
6		Unit-III eqnz lald'fr vkj vk/kqfud nqfu;k
7	Chapter – 5 mUuhloh lnh	Topic – 5.2 eqnz ds u, rdudh ifjidkj

8		Hkwksy ¼ledkyhu Hkkjr & 2½
9	Chapter – 1 lalk/kuk ,oa fodk l	i). lalk/kuk ds izdkj ii) lalk/kuk d lai/k t ds mik:
	Chapter – 2	i). tSo fofo/krk ekuo thou ds fy, D;k egRo iw.k g\$
0	Chapter – 3 ty lalk/kuk	i).ty nqZhrk ,oa ty laj(k.k dh vko';drk
	Chapter – 4 dT'k	i).dS'ohdj.k dk dT'k ij i flkko
	Chapter – 5	i).mtk d ijEijkxr ,oa xSj ijEijkxr lalk/kuk/4L=ksr½
2	Chapter – 6	lwpuk i ij kSfxdh rFkk byDV²ksfud m]ksx
4		

Class - Plus One
Subject - Physics

Sr. No.	Name of the Topic	Hard Points/Difficult Areas identified by the
1	Motion in Line & Plane	Uniform Motion – Accelerated motion – Motion in One – two
2	Rotational Motion	Concept of Centre of mass, centre of rigid body, centre of mass motion, moment of Inertia, radius gyration, its applications, Torque & its applications
3	Gravitation	Motion of Satellite, Orbital velocity, Escape Velocity (Geostationary Satellite), Weightlessness
4	Mechanical Properties of solids	Elasticity – Hook's Law – stress - - strain curve shear Modules,
5	Mechanical Property of Fluids	Flow of Liquids – Type of flow – streamline, Turbulent Laminar Flow. Bernoulli's Theorem Applications, Surface tension, surface energy, Angle of Contact, Action of detergents
6	Thermal properties of Matter.	Thermodynamics – Systems & surroundings, Clarification of
7	Kinetic Theory of gases	Kinetic Theory of gases – Random motion of molecules,
8	Oscillation	Periodic Motion – Oscillatory Motion, SHM with reference to
9	Waves	Superposition of Waves, stationary waves (Geometrical)
10	Work Power & Energy	Law of conservation of energy with example, collision (elastic
11	Friction	Friction, necessity & an evil, angle of friction & angle of repose
12	Measurement	Scale, Vernier Callipers, Screw Gauge, Methods of

Class - Plus Two
Subject - Physics

	Name of the Topic	Hard Points/Difficult Areas identified by
	Electrostatics	Basic concept of charge, properties of charge concept of electric field and electric lines of force, Electric field due to a dipole at any point (pictorial part) Torque produced in an electric field, concept of area vector and solid angle.

	Current Electricity	Electric current, drift velocity, emf and terminal potential
	Magnetic Fields of Current	Right hand thumb rule & Maxwell cork screw rule (Pictorial, illustration) Magnetic field on the axis of circular loop (3D) Magnetic field due to a long & Toroidal solenoid Motion of a charged particle in magnetic and electric field. Cyclotron (Working Model) Torque on current carrying loop in magnetic
	Electromagnetic Induction	Eddy Currents and its applications, AC generator, concepts of Phasor diagram, Sharpness of resonances & quality factor, L-C
	e.m. waves	Concept of displacement current, Hertz
	Optics	Concept of light ray, reflection by spherical mirrors (various definitions viz centre of optics, focus etc.) Image formation by Spherical mirrors, refraction and its applications, total internal reflection and its applications. Image formation by spherical surfaces. Lens maker's formula (ray diagram) spherical and chromatic aberration, Dispersion, Derivation without dispersion, applications of scattering of light, Primary
	Dual Nature of matters & Radiations	Photoelectric effect & electrostatic waves, photocells
	Structure of Atom	Rutherford & Bohr's Model, B-E curve, radioactivity, nuclear
	Electronic Devices	Formation of energy bands, doping P&N Type semiconductors, P-N junctions Transistors, logic gates IC
0	Communication	Type of wave – propagation, Modulator & demodulator,

Class - Plus One

Subject - Biology

	Name of the Topic	Hard Points/Difficult Areas identified by the
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	Taxonomical hierarchy Chapter 1-The Living	1. Concept of Taxon & Category 2. Schematic key for Identification of plants
	Chapter-2 Biological classification	1. Kingdom classification (R.H. Whittaker) 2. Problem in classifying Virus & its structure
	Chapter-3 Plant	1. Life cycle of an Angiosperm (3D or Animated)
	Chapter -4 Animal Kingdom	1. Body Symmetry in Animals (Radial/Bilateral) 2. Concept of Germinal layers
	Chapter-5 Morphology of	Modification in Roots, Stem & Leaves Inflorescence and its types
	Chapter -6 Anatomy of Flowering	1. Permanent tissues & its types 2. Secondary growth in Stem and roots
	Chapter -7 Structural	1. Animal tissue – types
	Chapter-8 Cell- The unit of Life	1. Prokaryotic & Eukaryotic Cell 2. Cell-organelles
	Chapter 9: Biomolecule	DNA Structure & types Structure of Glucose, Ribose, Cellulose, Starch Glycogen, Amino Acid, Fats, Nitrogenous
0	Chapter 10 Cell cycle and cell	Cell Division: Mitosis, Meiosis Mechanism of chromosomal separation
1	Chapter 11 Transport in Plants	Diffusion, Osmosis, Osmotic Pressure, Osmotic Potential, Solute Potential, Imbibition Absorption & movement of water (Apoplast
	Chapter 12	Mechanism of Biological Nitrogen Fixation
3	Chapter 13 Photosynthesis in Higher Plants	Light Harvesting Complex (Z-Scheme of Light reaction) Splitting of water Photophosphorylation : Cyclic & non cyclic
4	Chapter 14 Respiration in Plants	Glycolysis Krebs cycle ETC (Electron Transport Chains) The
	Chapter 15	1. Root 7 shoot Apical meristem

	Plant Growth and Development	2. Growth rate: Arithmetic & Geometric Growth
6	Chapter 16 Digestion &	Digestive system Glands: Salivary, Gastric, Intestinal, Pancreatic
7	Chapter Breathing &	Mechanism of breathing Respiratory volumes
8	Chapter 18 Body & Circulation	Cardiac Cycle- working of Heart Systemic & Pulmonary Circulation Heart Sound (Lub & Dub) Nodal tissue: SA node, AV node, Bundle of His.
9	Chapter 19 Excretory	Mechanism of urine formation & ultra structure of kidney
0	Chapter 20 Locomotion &	Mechanism of muscle contraction by sliding filament theory
1	Chapter 21 Neural control &	generation, conduction and transmission of Nerve pulse
2	Chapter 22 Chemical	1. Human Endocrine System: Position and function of different

Class - Plus Two
Subject - Biology

1	Chapter 1	Various modes of reproduction – Vegetative, asexual
2	Chapter 2 Sexual Reproduction	Process of Microsporesgenesis & Megasporogenesis Development of Male and female gametophyte Types of
3	Chapter 3 Human reproduction of	Concept of Pollination, Post fertilization, development of endosperm & development of embryo
4.	Chapter 4 Reproductive Health	Menstrual and oestrous cycle Events from embryogenesis till Parturition Contraceptive used for birth control: STD, ART, GIET

5.	Chapter 5 Principal Inheritance & variation	1. Phenotype, Genotype, allele and other Genetic of terms 2. Mendel's monohybrid and dihybrid cross, Genetic Inheritance-Incomplete dominance, Co-dominance,
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6.	Chapter 6 Molecular basis of Inheritance	Genetic Disorder DNA replication, Transcription and translation, Nucleosome
7	Chapter 7 Evolution	Types and structure of RNA, Gene regulation (Inducible Repressible), DNA finger printing Human Genome Project: Origin of life, Miller & Urey Exp, Embryological evidences, Concept of convergent & Divergent evolution, Geological time scale, connecting link,
8	Chapter 8 Human health &	1. Human and Horse evolution, Life Cycle of Plasmodium,
9	Chapter 9 Strategies for and types	1. Plant breeding for disease resistance, tissue culture
10	Chapter 10	3D structure of Bacteria and Virus
11	Chapter 11 Biotechnology: Principal and Processes	Antibodies, Microbes in sewerage treatment (activated sludge method, anaerobic sludge digestion) Biogas Plant Restricted Enzymes, steps in the formation of DNA by restriction
12	Biotechnology and	Genetically engineered insulin, gene therapy, transgenic
13	Organism and population	Concept of habitat and ecological niche, soil profile, adaptation
14	Ecosystem	Energy flow model of Ecosystem, Food chain and food
15	Biodiversity &	α , β and γ biodiversity, IUCN red list, In situ and ex-situ
16	Environmental	Acid rain, Green House effect and Global warming,

Class - 10+1

Subject - Chemistry

Sr	Name of the Topic	Hard Points/Difficult Areas identified by the
1	Some Basic Concepts of	Atomic and molecular masses Mole concept and laws
2	Structure of Atom	History of Atomic Models leading to Quantum Mechanical Model including orbital concept Schrodinger's wave
3	Classification of Elements and	Periodic table, periodic properties (atomic/ionic, radii, ionization enthalpy, electron gain

4	Chemical Bonding and Molecular Structure	Lewis structure of molecules and concept of hybridization, formation of Ionic covalent coordinate bond.
5	States of Matter	Gas Law, Kinetic Molecular Theory of Gas, Real
6	Thermodynamics	Types of systems and thermodynamics processes, Laws of
7	Equilibrium	Concept of Physical and chemical equilibrium (dynamic equilibrium), concept of acid- base theories (Arrhenius, Lory Bronstel and Lewis concept)
8	Redox Reaction	Electronic concept and Redox
9	Hydrogen	Hard and soft water and method of removal of
10	s-Block Elements	Solrays process, castner kellner cell, cement
11	The p-block elements	Structure of Diamond, Diamond and Graphite,
12	Organic Chemistry some basic principal and techniques	Electron displacement effect (inductive , electromeric, resonance, hyper conjugation effect) nucleophiles,
13	Hydrocarbon	Conformation of ethane, propane, butane and cyclohexanes, by saw-horse and New marri's projection,
14	Environmental	Green house effect, Ozone hole formation, Global

Class - 10+2

Subject - Chemistry

Sr.	Name of the Topic	Hard Points/Difficult Areas identified by the
1	The Solid State	1. Crystal Structure (NaCl, ZnS, CsCl, Na ₂ O, CaF ₂), (Close packing (Simple Cubic, bcc, fcc))
2	Solutions	2. Imperfection in solids, explanations of metallic Colligative properties and their applications
3	Electrochemistry	1. Corrosion (Mechanism of testing, protection) 2. Fuel Cells (H ₂ -O ₂) Primary (Voltaic Cell) and Secondary Cell (rechargeable batteries) Law of electrolysis
4	Chemical Kinetics	1. Collision Theory of molecular reaction,
5	Surface Chemistry	1. Physisorption and chemisorption, Energy categories/

		peptization of Dialysis, electrophoresis, electromoscopy,
6	General Principles and	General metallurgical extraction procedure and
7	The p-block element	1. Contact process, Ostwald process, Haber's process
8	The d-block element and f-block	1. Extraction of Iron (Blast –furnace, Bessemer process), extraction of Copper
9	Co-ordinations Compounds	1. Pictorial presentations of coordination compounds and ionization high spin-low spin complexes strong –
10	Haloalkanes and Haloarenes	Mechanism of SN ₁ , SN ₂ , addition, elimination, rearrangement reaction Optical isomerism, naming class of light
11	Biomolecules	Structure of proteins (primary, secondary, tertiary, Quaternary) (Questions)
12	Polymers	Addition and condensation polymerization
13	Chemistry in Everyday Life	Enzyme as drug target (allosteric modulation of cell signaling)

Class - 10+1

Subject - Mathematics

Sr.	Name of the Topic	Hard Points/Difficult Areas identified by the committee
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1	Sets	1. Sets and their representations 2. Operations on sets
2	Relations &	Relations
3	Complex Numbers	Argand Plane
4	Permutations and Combinations	1. Fundamental Principle of Counting 2. Permutations
5	Conic Sections	Introduction Section of Cone Circle Parabola Ellipse Hyperbola
6	Introduction to 3-D Geometry	Coordinate axes and coordinate plane in Three Dimensional space Coordinates of a point in space Section formula
7	Limits and Derivatives	Concepts of limits Geometrical interpretation of derivative

8	Mathematical Reasoning	1. Introduction 2. Statements 3. New Statements from old 4. Special words/phrases
9	Probability	Introduction Random experiments Events

Class - 10+2

Subject- Mathematics

Sr	Name of the Topic	Hard Points/Difficult Areas identified by the
1.	Relation and Function	1.Types of Functions and Relations 2. Inverse function
2.	Inverse Trigonometric	1. Introduction 2. Basic concepts
3.	Continuity and Differentiability	1. Continuity 2. Differentiability

4.	Application of Derivation	Inverse and decreasing functions Tangents and normal Approximation
5	Integrals	1. Integration as an inverse process of differentiation 2. Integrals of some particular functions
6.	Application of	Area under the curves
7.	Three Dimensional Geometry	1. Introduction 2. Direction cosines and ratios of line 3. Equation of a line in space 4. Angles between two lines 5. Shortest Distance between two lines 6. Plane and angle between two planes
8.	Linear Programming	Introduction Linear Programming problems and its mathematical
9.	Probability	1. Introduction 2. Conditional probability 3. Multiplication theorem 4. Independent Events 5. Bayes' Theorem
10	Differential equations	1. Basic concepts 2. Formations of differential equations

		4. Brief concept of solving first order differential
11	Vector Algebra	1. Introduction and basic concept. 2. Types of vectors 3. Addition and multiplication of vector

CLASS: 10+1

Subject: English

1	<u>HORNBILL</u> Chapter 3 Discovering Tut:	Forensic analysis Mummy- How it is preserved Medical terms-CT Scan, MRI, tomography,
2	Chapter 4	Nek Chand and his works, Outsider arts

3	Chapter 5 The ailing planet	Global Warming Population Growth
4.	<u>SNAPSHOTS</u> Chapter 4	1. Faulty school system often curbs individual talents.
5.	Composition and Grammar	Comprehension Note-making Letter writing Paragraph writing Types of Sentences Tense Modals
6.	Literary terms	Irony, metaphor, Rhyme scheme, plot, characters,

CLASS: 10+2

Subject: English

1	<u>FLAMINGO</u> Chapter 5 Indigo	Leadership quality with reference to Mahatma Gandhi- Civil
2.	Chapter-7 The	Role of interview in the life of celebrities
3.	<u>VISTAS</u> Chapter-3	The geological history trapped in Antarctica
4.	Chapter-8	Atrocities against women and their rights
5.	<u>POETRY</u> Poem-2 An	1. Complete paraphrase
6.	Composition	Comprehension Note-making Letter writing Paragraph writing Advertisement
7.	Literary	Irony, metaphor, Rhyme scheme, plot, characters,