

Information and Communication Technology for the School System

A Model Curriculum for ICT in Education

Developed by:

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1.0 The Context:

The ICT@Schools scheme of the Ministry of Human Resources Development, Government of India provides for the development of an ICT Infrastructure at each Secondary School. While the scheme in its early stages emphasised computer literacy, ICT has grown to have a diverse set of applications. In the context therefore, it is increasingly recognised that using computers and the Internet as mere information delivery devices grossly underutilizes its power and capabilities. There is an urgent need to develop and deploy a large variety of applications, software tools, media and interactive devices in order to promote creative, aesthetic, analytical and problem solving abilities and sensitivities in students and teachers.

The National Policy of ICT for School Education defines ICT Literacy in terms of levels of competence. Based on the stage of schooling at which a student or teacher is introduced to ICT, they may progress to different levels. The levels do not correspond to specific classes (for eg, sixth or seventh standard) and time duration must also be locally determined, based on the strength of the school. The competencies are organised into three broad levels, basic, intermediate and advanced.

Stage 1: Basic

Basics of computers and basic use of tools and techniques – operate a computer, store, retrieve and manage data, use a computer to achieve basic word and data processing tasks; connect, disconnect and troubleshoot basic storage, input and output devices Connect to the internet, use e-mail and web surfing, use search engines, keep the computer updated and secure, operate and manage content from external devices (sound recorders, digital cameras, scanners etc.); connect, disconnect, operate and troubleshoot digital devices;

Stage 2: Intermediate

Create and manage content using a variety of software applications and digital devices; using web sites and search engines to locate, retrieve and manage content, tools and resources; install, uninstall and troubleshoot simple software applications etc.

Stage 3: Advanced

Use different software applications to enhance ones own learning – database applications, analysis of data and problem solving, computing, design, graphical and audio-visual communication; undertake research and carry out projects using web resources; use ICT for documentation and presentation; create and participate in web based networks for cooperative and collaborative learning; become aware of issues of cyber security, copyright and safe use of ICT and take necessary steps to protect oneself and ICT resources.

As each stage is defined by competencies to be achieved, the pace is dependent on frequency of access to the ICT facilities. Also, different parts of each stage run concurrently. An attempt should be made to ensure that every student completes the Advanced stage before completing schooling. The competencies are equally applicable to teachers.

Teachers will be encourage to become part of online professional groups, for instance an English teachers network, which will help them continue their education, pool in their resources and actively contribute to the strengthening of domain specific knowledge within the country. The forums will also facilitate continuous development of ICT skills introducing them to tools and resources in different subjects / specialisations as well as create and share learning resources in those subjects.

Teacher participation in the digital content development process will catalyse its broad based usage in the classrooms. Teacher capacities will be developed in instructional design, selection and critical evaluation of digital content, and strategies for effective use of digital content to enhance student learning.

2.0 The Content of the Curriculum:

The ICT curriculum is considered a significant vehicle for the realisation of the goals of the National Curriculum Framework. It is expected to contribute to enhanced exposure to information and resources, ongoing professional support, improved teaching-learning-evaluation-tracking, and increased productivity.

To this end, the curriculum is organised into six themes. The themes have significant overlap in terms of the use of ICT devices, software applications and peer interaction, providing for in built reinforcement. The major emphasis therefore is on impacting educational processes. This method of organisation minimises the need for using instructional time for learning how to operate hardware and software, making it incidental. It also accommodates the fact that different generation of ICT devices and software applications have evolved different look and feel and routines. Provision of tutorial support in the form of handouts for all such requirements is proposed.

The onus of mastering the various components of the ICT environment will therefore lie with the student of the programme (subject teachers, ICT teacher or the students).

The six themes are:

- Connecting with the world
- Connecting with each other
- Interacting with technology
- Creating with ICT
- Possibilities in Education
- Reaching out and bridging the divide

The Curriculum recognises the fact that being connected to the internet, breaks professional isolation, encourages collaboration and enriches practices. Also, seeing ICT devices and software as ends in themselves denies an opportunity for the creative genius in every individual from expressing itself. The joy of creating and using ICT tools to enhance its range and possibilities and also share it with the world at large can be a better goal.

The focus on ICT for education also untethers the teacher from specific ICT tools. Exposure to a range of hardware and software to provide wider choices and flexibility in the approaches to using ICT. Along the way, the student should also become aware of the social, ethical and legal aspects of ICT, and evolve into an informed and critical user of ICT. To this end, the curriculum suggests a range of Free and Open Source Software applications, which would be conveniently accessible and permit unhindered sharing. The exhibition and sharing of creations is expected to support this process.

3.0 The Organisation of the Curriculum:

Capacity building of teachers is recognised as the key to the widespread infusion of ICT enabled practices in the school system. An inservice training of teachers is proposed comprising of an Induction Training as well as Refresher Courses.

All teachers, including the ICT teacher will undergo a two year programme consisting of the following:

- A ten day first level induction course
- A first set of six refresher courses
- A five day second level induction course
- A second set of six refresher courses
- A five day third level induction course
- An examination, qualifying the teacher to a Diploma in ICT in Education

While the structuring of the programme is identical, the programme for subject teachers equips them with ICT competencies to strengthen their own professional capabilities and to effectively use ICT tools and devices in their teaching-learning. The ICT teacher on the other hand, will be trained to manage the ICT environment in the school, teach ICT to students and function as a local coordinator for the subject teachers capacity building programme.

The students programme in ICT is spread over three years (ninety weeks), with the first two years developing the basic skills of operating in an ICT enabled environment. The third year will consist of projects, which will help the students expand their capabilities of using ICT in actual practice.

Note: The programme is restricted to three years (ninety weeks) based on a three sessions a week time schedule for each student. Larger schools will require more than three years to complete the programme. Smaller schools may aspire to a single student per computer or increase the number of sessions providing for more practice time. States may evolve a plan to ensure that outgoing students are given priority.

Number of computer terminals available, as per scheme = 10 Students covered in each period @ 2 students per computer = 20; Number of periods per week ~ 42; Number available per student @ 3 periods per week ~ 14 Number of students covered = 280; Number of working days available in a year ~ 220 say 30 weeks

Evaluation:

A continuous comprehensive evaluation is built into the schedule. Cumulative records in the form of an e-portfolio is proposed. The certification examination for the Diploma in ICT in Education for the teacher will be conducted by the State Board of Secondary Education or similar agency. ICT may be introduced as a subject in the tenth grade examinations for the students.

It is likely that teachers with access to ICT may already have reached the levels of ICT competency proposed here. These teachers may complete all requirements, viz., assignments, projects and tests and the Board may on the basis of a prescribed minimum performance, allow them to take the certification examination earlier.

4.0 The subject Teachers Programme:

This course assumes that the teacher is a complete fresher to ICT, but being an experienced teacher (TGT/PGT) has a good general understanding of teaching-learning processes and student needs. Together, the three induction courses and the twelve refreshers would constitute form a holistic exposure to applications of ICT in education and help teachers independently use ICT for their own professional development as well as for their work in the school.

After undergoing this course the subject teacher will be able to:

- Effectively use ICT tools, software applications and digital resources
- Integrate ICT into teaching learning and its evaluation
- Acquire, organise and create their own digital resources
- Participate in the activities of teachers' networks
- Participate in the evaluation and selection of ICT resources
- Practise safe, ethical and legal ways of using ICT

The ten day first level induction course:

	Demo	Handson		Demo	Handson	Special Lecture	Handson
Day 01	Opening	D1	CWW-01	D2	CWW-02	SP-01	CWW-0A
Day 02	D3		CWW-03	D4	CWE-01	SP-02	CWEO-0B
Day 03	D5		CWW-04	D6	CWE-02	SP-03	CWW-0C
Day 04	D7		CWW-05	D8	IWICT-01	SP-04	CWW-0D
Day 05	D9		CWW-06	D10	IWICT-02	SP-05	CWW-0E
Day 06	D11		EVAL-01	D12	IWICT-03	SP-06	CWICT-0F
Day 07	D13		CWICT-01	D14	CWICT-02	SP-07	CWICT-0G
Day 08	D15		CWICT-03	D16	PIE-01	SP-08	CWICT-0H
Day 09	D17		PIE-02	D18	ROBD-01	SP-09	CWICT-0I
Day 10	EVAL-02			Exhibition		Closing	

D – Demonstration lecture (to be organised by lead instructor)

SP – Special lecture (for showcasing specific applications related to the day's theme; can involve resource persons)

Handson 0A – 0I (a residential programme is recommended; these sessions are free practice sessions in the evenings outside the course schedule and are open ended)

CWW – Handson sessions for Connecting with the world – exploring the internet and its resources

CWEO – Handson sessions for Connecting with each other – email and other personal communication tools

IWICT – Handson sessions for Interacting with ICT – introduction to hardware and software

CWICT – Handson sessions for Creating with ICT

PIE – Handson sessions for Possibilities in Education

ROBD – Handson sessions for Reaching out and bridging divides

EVAL – will involve a test, a portfolio of all work done during the course and assignments

Refresher courses: (offered in a blended – online + inschool face to face)

	Demo	Handson		Demo	Handson	Special Lecture
Day 01	D1	Handson		D2	Handson	SP01
Day 02	D3	Handson		D4	Handson	SP02

Day 03 - 08	Self learning, Assignments and Mentor supported network activities				
Day 09	D5		D6		SP03
Day 10	D7	EVAL	D8	Feedback & Exhibition	

These refreshers attempt to bridge areas in technology, gaps in learning, specific tools and devices, pedagogy for technology, improving classroom practices, management of learning, professional development of teachers, tracking learning, creating ICT content, evaluation of ICT, etc.

The courses will be clustered around sub-themes so that each teacher can select from among the sub-themes based on their subject specialisations, classes taught, interest and professional needs.

The five day second level induction course:

	Demo	Handson	Demo	Handson	Special Lecture	Handson
Day 01	Opening + D1	PFL - 01	D2	PFL - 02	SP - 01	PFL - 0A
Day 02	D3	PFL - 03	D4	TinTL - 01	SP - 02	PFL - 0B
Day 03	D5	TinTL - 02	D6	TinTL - 03	SP - 03	TinTL - 0C
Day 04	D7	TinE - 01	D8	TinE - 02	SP - 04	TinE - 0D
Day 05	EVAL 01		Exhibition		Closing	

D – Demonstration lecture (to be organised by lead instructor)

SP – Special lecture (for showcasing specific applications related to the day's theme; can involve resource persons)

Handson 0A – 0D (a residential programme is recommended; these sessions are free practice sessions in the evenings outside the course schedule and are open ended)

PFL – Handson sessions for Planning for Learning

TinTL – Handson sessions for Technology in Teaching Learning

TinE – Handson sessions for Technology in Evaluation

EVAL – will involve a test, a portfolio of all work done during the course and assignments

The five day third level induction course:

	Demo	Handson	Demo	Handson	Special Lecture	Handson
Day 01	Opening + D1	EPIE - 01	D2	EPIE - 02	SP - 01	EPIE - 0A
Day 02	D3	ETTL - 01	D4	ETTL - 02	SP - 02	ETTL - 0B
Day 03	D5	ETTL - 03	D6	ETTL - 04	SP - 03	ETTL - 0C
Day 04	D7	CTN - 01	D8	CTN - 02	SP - 04	CTN - 0D
Day 05	EVAL 01		Exhibition		Closing	

D – Demonstration lecture (to be organised by lead instructor)

SP – Special lecture (for showcasing specific applications related to the day's theme; can involve resource persons)

Handson 0A – 0D (a residential programme is recommended; these sessions are free practice sessions in the evenings outside the course schedule and are open ended)

EPIE – Handson sessions for Evaluating Possibilities in Education

ETTL – Handson sessions for Evaluating Technology in Teaching Learning

CTN – Handson sessions for Creating for Teacher Networks

EVAL – will involve a test, a portfolio of all work done during the course and assignments

An examination, qualifying the teacher to a Diploma in ICT in Education:

This is proposed to be a centralised examination to be organised by the Board of Secondary Education or similar agency at appropriate time and periodicity. Due weightage will be given to the performance at the induction and refresher courses. Successful teachers will be awarded a Diploma in ICT in Education.

Course Content for the Subject Teachers Programme:

(please make suggestions to expand this listing)

- Connecting with the world (CWW) – exploring the internet and its resources
- Connecting with each other (CWEO) – email and other personal communication tools
- Interacting with ICT (IWICT) – introduction to hardware and software, connections and troubleshooting
- Creating with ICT (CWICT) – introduction to software applications for creating documents, databases, graphics, models and animation, audio-visual materials, interactive content, computer programmes

- Possibilities in Education (PIE) – introduction to the range of hardware, software and technologies used for enhancing education, their scope, critical evaluation of their use in the context of NCF, improving productivity and enhancing learning
- Evaluating Possibilities in Education (EPIE) – introduction to critical and informed use of ICT, examining ICT in the context of educational needs,
- Technology in Teaching Learning (TinTL) – introduction to specific tools, devices and software applications relevant to particular subject domains
- Planning for Learning (PFL) – introduction to using ICT in teaching learning, range and scope of different tools and software applications
- Technology in Evaluation (TinE) – introduction to specific tools, devices and software applications relevant to testing, recording, evaluating and longitudinal tracking in the school context
- Evaluating Technology in Teaching Learning (ETTL) – introduction to evolving and interpreting criteria for evaluating specific ICT tools, evaluating ICT tools

- Reaching out and bridging divides (ROBD) – introduction to teacher networks, blogs and wikis, accessibility devices, creation and sharing of digital resources, participation in collaborative activities and discussions, participation in forums and providing peer support
- Creating for Teacher Networks (CTN) – introduction to repositories, rating, evaluating, critiquing and commenting on digital resources, ICT applications, tools and techniques.

5.0 The ICT Teachers Programme:

The ICT teacher is expected to have a reasonably good exposure to ICT tools, but may not been exposed to a wide range of tools and software applications. The course assumes that the teacher is a complete fresher to teaching-learning processes and student needs. Together, the three induction courses and the twelve refreshers would constitute form a holistic exposure to applications of ICT in education and help ICT teachers manage the ICT environment in the school, organise the ICT curriculum for teachers and students and assist the other teachers and the school in putting ICT to use for various purposes.

After undergoing this course the ICT teacher will be able to:

- Manage ICT infrastructure, database, website and ICT enabled activities of the school
- Organize the ICT Curriculum for teachers and students of the school
- Arrange and demonstrate various hardware and software required by teachers and students
- Support the teachers and students to acquire and utilize digital resources
- Participate in the activities of ICT teachers network
- Participate in the evaluation and selection of ICT resources
- Support teachers in evaluation and maintaining records

The ten day first level induction course:

	Demo		Handson		Demo	Handson	Special Lecture	Handson
Day 01	Openi ng	D1	CWW-01		D2	CWW-02	SP-01	CWW-0A
Day 02	D3		CWW-03		D4	CWEO-01	SP-02	CWW-0B
Day 03	D5		IWICT-01		D6	IWICT-02	SP-03	CWEO-0C
Day 04	D7		IWICT-03		D8	IWICT-04	SP-04	IWICT-0D
Day 05	D9		IWICT-05		D10	IWICT-06	SP-05	IWICT-0E
Day 06	D11		OEVAL-01		D12	CWICT-01	SP-06	CWICT-0F
Day 07	D13		CWICT-02		D14	MICT-01	SP-07	CWICT-0G
Day 08	D15		MICT-02		D16	MICT-03	SP-08	MICT-0H
Day 09	D17		OICT-01		D18	OICT-02	SP-09	MICT-0I
Day 10	OEVAL-02				Exhibition		Closing	

D – Demonstration lecture (to be organised by lead instructor)

SP – Special lecture (for showcasing specific applications related to the day's theme; can involve resource persons)

Handson 0A – 0I (a residential programme is recommended; these sessions are free practice sessions in the evenings outside the course schedule and are open ended)

CWW – Handson sessions for Connecting with the world – exploring the internet and its resources

CWEO – Handson sessions for Connecting with each other – email and other personal communication tools

IWICT – Handson sessions for Interacting with ICT – introduction to hardware and software

CWICT – Handson sessions for Creating with ICT

MICT – Handson sessions for Managing the ICT infrastructure

OICT – Handson sessions for Organising ICT classes for students and teachers

EVAL – will involve a test, a portfolio of all work done during the course and assignments

Refresher courses: (offered in a blended – online + in school face to face)

	Demo	Handson		Demo	Handson	Special Lecture
Day 01	D1	Handson		D2	Handson	SP01
Day 02	D3	Handson		D4	Handson	SP02
Day 03 - 08	Self learning, Assignments and Mentor supported network activities					
Day 09	D5			D6		SP03
Day 10	D7	EVAL		D8	Feedback & Exhibition	

These refreshers attempt to bridge areas in technology, gaps in learning, specific tools and devices, pedagogy for technology, professional development of teachers, tracking learning, creating ICT content, evaluation of ICT, etc. In addition they expose the ICT teachers to aspects related to management of the ICT infrastructure and helping teachers and students with their ICT learning.

The courses will be clustered around sub-themes so that each teacher can select from among the sub-themes based on their specific needs, classes taught, interest and professional needs.

The five day second level induction course:

	Demo	Handson		Demo	Handson	Special Lecture	Handson
Day 01	Opening + D1	PFL - 01		D2	PFL - 02	SP - 01	PFL - 0A
Day 02	D3	PFL - 03		D4	TinTL - 01	SP - 02	PFL - 0B
Day 03	D5	TinTL - 02		D6	TinTL - 03	SP - 03	TinTL - 0C
Day 04	D7	TinE - 01		D8	TinE - 02	SP - 04	TinE - 0D
Day 05	EVAL 01			Exhibition		Closing	

D – Demonstration lecture (to be organised by lead instructor)

SP – Special lecture (for showcasing specific applications related to the day's theme; can involve resource persons)

Handson 0A – 0D (a residential programme is recommended; these sessions are free practice sessions in the evenings outside the course schedule and are open ended)

PFL – Handson sessions for Planning for Learning

TinTL – Handson sessions for Technology in Teaching Learning

TinE – Handson sessions for Technology in Evaluation

EVAL – will involve a test, a portfolio of all work done during the course and assignments

The five day third level induction course:

	Demo	Handson		Demo	Handson	Special Lecture	Handson
Day 01	Opening + D1	EPIE - 01		D2	EPIE - 02	SP - 01	EPIE - 0A
Day 02	D3	ETTL - 01		D4	ETTL - 02	SP - 02	ETTL - 0B
Day 03	D5	ETTL - 03		D6	ETTL - 04	SP - 03	ETTL - 0C
Day 04	D7	CTN - 01		D8	CTN - 02	SP - 04	CTN - 0D
Day 05	EVAL 01			Exhibition		Closing	

D – Demonstration lecture (to be organised by lead instructor)

SP – Special lecture (for showcasing specific applications related to the day's theme; can involve resource persons)

Handson 0A – 0D (a residential programme is recommended; these sessions are free practice sessions in the evenings outside the course schedule and are open ended)

EPIE – Hands-on sessions for Evaluating Possibilities in Education

ETTL – Hands-on sessions for Evaluating Technology in Teaching Learning

CTN – Hands-on sessions for Creating for Teacher Networks

EVAL – will involve a test, a portfolio of all work done during the course and assignments

The five day induction courses however are common as the ICT teacher should also be professionally developed as a teacher and perform roles expected of any other teacher.

An examination, qualifying the teacher to a Diploma in ICT in Education:

This is proposed to be a centralised examination to be organised by the Board of Secondary Education or similar agency at appropriate time and periodicity. Due weightage will be given to the performance at the induction and refresher courses. Successful teachers will be awarded a Diploma in ICT in Education.

Course Content for the ICT Teachers Programme:

(please make suggestions to expand this listing)

- Connecting with the world (CWW) – exploring the internet and its resources
- Connecting with each other (CWEO) – email and other personal communication tools
- Interacting with ICT (IWICT) – introduction to hardware and software, connections and troubleshooting
- Creating with ICT (CWICT) – introduction to software applications for creating documents, databases, graphics, models and animation, audio-visual materials, interactive content, computer programmes

- Possibilities in Education (PIE) – introduction to the range of hardware, software and technologies used for enhancing education, their scope, critical evaluation of their use in the context of NCF, improving productivity and enhancing learning
- Evaluating Possibilities in Education (EPIE) – introduction to critical and informed use of ICT, examining ICT in the context of educational needs,
- Technology in Teaching Learning (TinTL) – introduction to specific tools, devices and software applications relevant to particular subject domains
- Planning for Learning (PFL) – introduction to using ICT in teaching learning, range and scope of different tools and software applications
- Technology in Evaluation (TinE) – introduction to specific tools, devices and software applications relevant to testing, recording, evaluating and longitudinal tracking in the school context
- Evaluating Technology in Teaching Learning (ETTL) – introduction to evolving and interpreting criteria for evaluating specific ICT tools, evaluating ICT tools

- Reaching out and bridging divides (ROBD) – introduction to teacher networks, blogs and wikis, accessibility devices, creation and sharing of digital resources, participation in collaborative activities and discussions, participation in forums and providing peer support
- Creating for Teacher Networks (CTN) – introduction to repositories, rating, evaluating, critiquing and commenting on digital resources, ICT applications, tools and techniques.

In addition to the common course content for all teachers adapted to the ICT teachers' needs, this programme will also include:

- Managing the ICT infrastructure (MICT) – introduction to the specific ICT environment, hardware and software, their operation, troubleshooting, maintenance and upkeep, maintaining records and ensuring safety of the equipment, oneself, students and teachers, practice of socially, ethically and legally correct practices
- Organising ICT classes for students and teachers (OICT) – introduction to planning for and conducting ICT training sessions, mentoring students and fellow teachers, evaluating and maintaining records

6.0 The Students' Programme:

These courses are spread over three years, with a 30 weeks engagement each year. Students will have access to the ICT facility thrice a week, one of them being a teacher led interaction and the other being a block period for hands on activities. The content of the courses is organised into one week sets requiring three sessions. The ICT teacher is expected to organise these classes.

The courses aim to introduce students to a variety of tools, software applications and resources. It clearly distinguishes between what students can achieve through an interaction with the ICT facility on their own and what requires instruction. The curriculum in keeping with the spirit of the National Curriculum Framework, exposes students to a tool or application and allows them to explore it. Self exploration and peer learning are active ingredients of such a process. The curriculum also recognises that computer commands are forgotten easily when not used frequently. But, they can be looked up in the help files or on the web as and when needed.

Hence the content underplays the importance of routines, procedures and *how to* tricks, minimising the need for rote learning. At the same time, it attempts to provoke the creativity and imagination of students and lets them recognise that a computing environment can be exciting.

All techniques related to operating the hardware and software; making, saving and managing files; using various devices (storage, input and output) will be incidentally dealt with in each session; no separate instructional time should be spent on it.

After undergoing the course, the student will be able to:

- operate a variety of hardware and software independently and troubleshoot common problems
- use the ICT facility with care, ensuring the safety of themselves, others and the equipment
- save, store and manage digital resources
- create a variety of digital products using appropriate tools and applications
- respect copyright and practice legal and ethical means of using ICT

The basic flow of the programme will be as follows:

- Introduction to the basic command set / procedure / tools
- Exploration of the software / hardware
- Using it to perform the given activity
- Using it to create / execute one's own ideas

During the first year, students will be introduced to:

	Set 01	Set 02
programming (logo or turtle graphics)	2 weeks	2 weeks
graphics (Flowpaint, MyPaint)	1 week	3 weeks
modelling (Google Sketchup, Blender, Wings 3D)	2 weeks	2 weeks
sounds and pictures (SoundRecorder, digital camera, web cam)	2 weeks	2 weeks
databases and spreadsheets	2 weeks	2 weeks

documents	4 weeks	4 weeks
devices and connections	1 week	
Evaluation consisting of one examination and one exhibition, supported by a portfolio consisting of all work done through the year	1 week	

The school can make a timetable mixing the above themes, a set at a time. The two sets need not be taken together. The evaluation will be organised at the end of the year, but each activity / task organised will be recorded in the digital portfolio of each student.

and in the second year, they will be introduced to:

	Set 01	Set 02
programming (logo, turtle graphics, scratch)	2 weeks	2 weeks
internet, web and e-mail	2 weeks	2 weeks
maps and virtual globe (google maps, google earth, bhuvan)	2 weeks	2 weeks
music, video and animation	3 weeks	6 weeks
databases and spreadsheets	3 weeks	4 weeks
Troubleshooting devices and connections	1 week	
Evaluation consisting of one examination and one exhibition, supported by a portfolio consisting of all work done through the year	1 week	

The third year will consist of projects, with students selecting two from each of the themes:

	Set 01	Set 02
Graphics, animation and media applications	4 weeks	4 weeks
Document production and web design	4 weeks	4 weeks
Programming and Database applications	4 weeks	4 weeks
Documentation and Reporting	1 week	
Evaluation	1 week	

Each project will require 8-10 weeks and will be executed by a team of at least 4 students. To the extent possible, each team of students will take up a different project. The project will lead to a practical product, which show cases the teams' capabilities in ICT. The list of projects given in the course content below can be expanded, drawing from various sources.

7.0 Minimum specifications for the ICT Infrastructure and human resources for the ICT programme:

- A 20 seater ICT facility, accessible 24 hours, with at least 10 computer access points (desktops or full-fledged laptops. If only virtual devices or thin clients are available, they may be checked to ensure that they serve all the software applications in the curriculum.
- The set up should, to the extent possible, be similar to the one the trainees will encounter in their schools.
- Adequate power backup for the safety of the equipment, a generator backup to ensure uninterrupted training time must be available at the facility.
- Internet connectivity of sufficient bandwidth, available to all the computers, preferably through a local area network.
- Microphone and headphones at each access point.
- A projection system of adequate luminosity and speakers of adequate output connected to the trainers computer.
- At least one of each of the following accessories: an entry level laser printer (black), flatbed scanner, DVD writer and blank DVD-RW, webcam, digital still camera, video camera, wi-fi router, laptop and a tablet PC with wi-fi and bluetooth capabilities, at least two separate bluetooth devices, and a mobile smartphone. These accessories are primarily to demonstrate the utility and scope of such devices. While it is likely that many such devices would be available with the participants, trainer may ensure that at least the above list is conformed to.
- All computer nodes to carry a Free and Open Source operating system. If *Microsoft Windows* operating system or any other commercial *Linux* operating system is pre-installed, a dual boot system with at least one Free and Open Source *Linux* based operating system must be available with every computer access point.
- The language environment should be set to the State language. Unicode fonts with appropriate range of type faces should be available on each of the computers.
- **Pirated software must not be used. Licensed copies used on more than the permitted number of computers also constitute piracy.**
- A range of software applications of the Free and Open Source genre as per the list supplied, pre-installed on each of the nodes. Copies of all software used during the training programme must be given to the trainees at the end of the programme.
- Where third party freeware or shareware applications should be avoided to the extent possible. If they are used, they must be available across both Windows and Linux platforms and should not have dependencies on other proprietary software.

- The trainers team should include one or more mentors, one or more resource persons for the special lecture demonstrations, one or more advanced users (must be fellow teachers).
- A support / maintenance team to ensure uninterrupted functioning of the equipment must be available at the programme.
- Handouts, lecture notes, examples of activities for every session, example websites, etc. as required. To the extent possible, these should be in electronic form and available at all the computers in the system. To the extent possible, all these materials should be in a language the trainees are conversant with. A copy of this collection must be given to the trainees at the end of the training programme.
- The supplied access to the Training Portal, which includes a Learning Management System should be used. All trainer instructional materials and trainee record should be available on this system. The e-Portfolio system on the portal should carry all work done by the trainees and their assessment record. These records will be used for the award of Diploma at the end of the total ICT training programme.
Note: NCERT proposes to make available a custom training portal for this purpose. However, States may make similar arrangements.

List of Software Applications to be used:

(please suggest relevant FOS Software applications spanning a range of educational needs. As this list is to be used with teachers, ICT teachers and students starting from grade 6, where possible age appropriateness of the software may be indicated; applications specifically rebuilt for very young children may be avoided;)

8.0 The Review Process:

This document is being circulated in a closed group for obtaining feedback. However, it would be appropriate to share this document with as many concerned and informed ICT enthusiasts and stakeholders so that the newer versions of this document are enriched. Please do not change the format while sharing.

The primary focus of the curriculum is improved educational practice and the development of informed users of ICT. To this extent, comments and suggestions may kindly point out improvements or enhancements in specific sections, where this focus may not have emerged adequately.

Do not send tracked versions of this document. All comments and suggestions must be sent *separately* to jdciет.ncert@nic.in with the subject “Revision of ICT Curriculum”