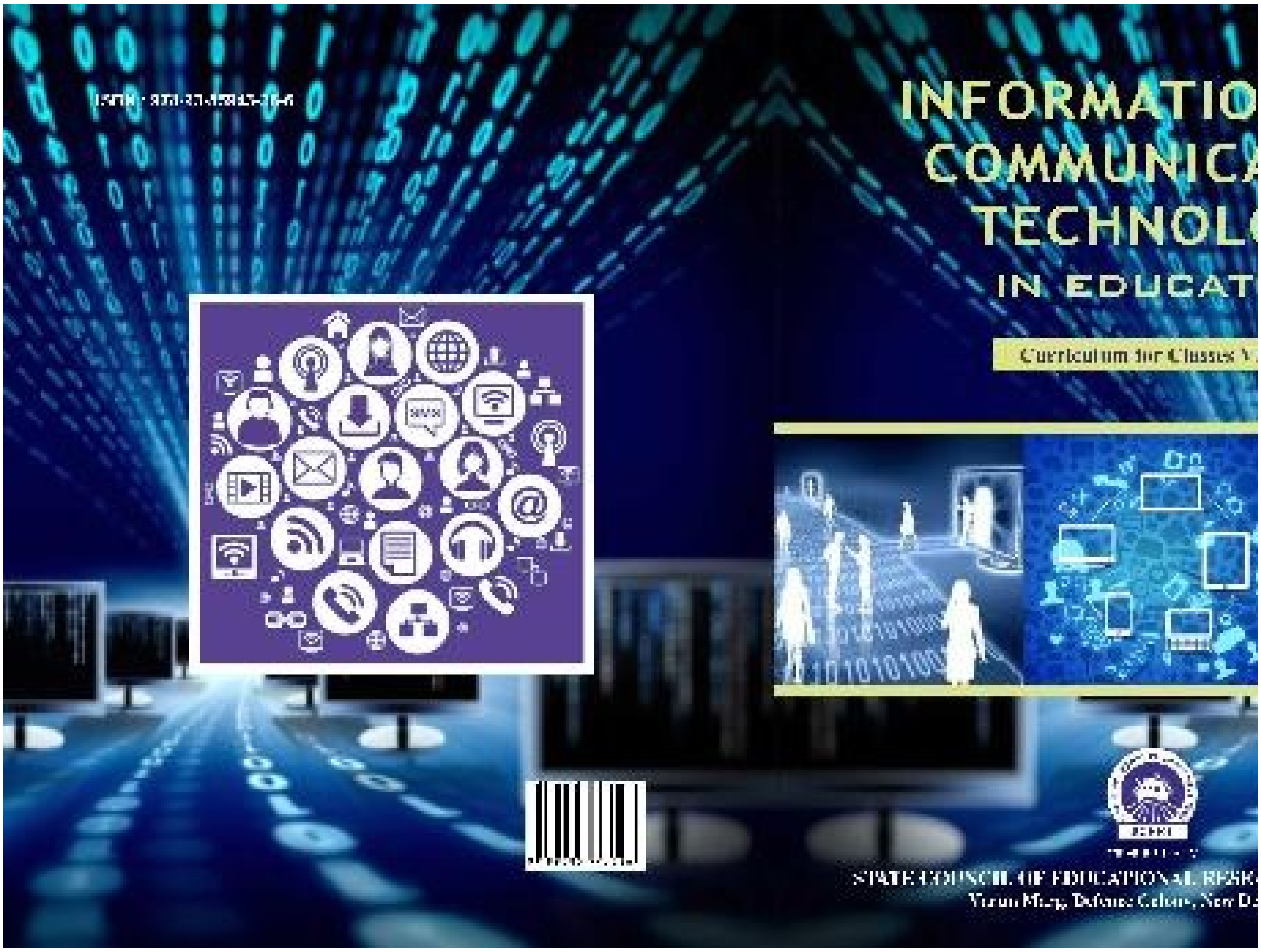
INFORMATION AND COMMUNICATION TECHNOLOGY
IN EDUCATION

Curriculum for Classes VI to X

SCERT
स्वाध्यायात्मा प्रमदः
STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING
Varun Marg, Defence Colony, New Delhi – 110024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MESSAGE

It gives me immense pleasure that the State Council of Educational Research and Training (SCERT) in its capacity as State Academic Authority has developed the curriculum for "ICT in Education" for classes VI to X.

In today's world of information revolution, globalization and rapid digitalization, ICT has become an area of vital need in Secondary Education. The curriculum for "ICT in Education" will pave the way for imparting knowledge of Information and Communication Technology to the new generation scholar. It will also help open up more enjoyable and desirable options for students in academics as well as vocational areas.

I congratulate Director, SCERT, Project Coordinator, her team and the contributors for their effort in developing this curriculum. Text books based on the curriculum shall follow and this initiative will go a long way in improving the teaching and learning process at secondary level in schools.

Punya Salila

(PUNYA SALILA SRIVASTAVA)
Chairman (SCERT)

Saumya Gupta, IAS

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MESSAGE

The National Policy of ICT in School Education aims at preparing youth to participate creatively in the establishment, sustenance and growth of knowledge through Information Technology. It further aims at leading socio-economic development of the nation and global competitiveness.

The Directorate of Education has been encouraging the use of ICT in the classroom practices which has thus resulted in increased availability of ICT in schools. It has also led to an increase in opportunities for teachers' professional development. Individual teachers have exploited the potential of ICT to complement their own pedagogical practices, and to raise the standard of learning of their students.

I wish to congratulate SCERT for its initiative of developing Curriculum in "ICT in Education" for classes VI to X. I believe that this will impact class room practices which will, in turn, benefit the learners in the long run.

I congratulate the Director of SCERT, her team and the contributors for their efforts in this project of developing the curriculum of 'ICT in Education" for classes VI to X.

(SAUMYA GUPTA)

ICT IN EDUCATION

State Council of Educational Research and Training

(An Autonomous Organisation of GNCT of Delhi)

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Anita Satia
Director

Date : 12/8/2016

D. O. No. : DPD/SCERT/240

Foreword

The National Policy of ICT in School Education aims at preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge society leading to socio-economic development of the nation and global competitiveness.

The purpose of Curriculum of ICT in Education is to provide exposure to the state of the art technologies, building capacities to interact and experiment with them productively and apply them to address one's own issues and those of the nation.

The "ICT in Education" programme for students aims to enable them to creatively interact with a wide variety of hardware, software applications, devices and tools, nurturing their inquisitiveness and imagination, enabling them to access a wide variety of information and resources.

This would require a universal, equitable, open and free access to a state of the art ICT and a broad range of ICT enabled tools and resources for all students and teachers. Free and Open Source software will be used wherever applicable. Information and Communications Technology has become an integral and accepted part of everyday life for many people. Technology is increasing its importance in people's lives and it is expected that this trend will continue, to the extent that technological literacy will become a functional requirement for people's work, social, and personal lives.

The creative use of Information and Communications Technology (ICT) in education has the capacity to increase the quality of people's lives by enhancing teaching and learning. Support for the use of ICT by the Department of Education and Science has resulted in increased availability of ICT in schools, as well as increased opportunities for teacher's professional development regarding the use of ICT for teaching and learning. In this context, individual teachers have exploited the potential of ICT to complement their own pedagogical practices, and to extend their children's learning.

Contribution of all the members of Curriculum Development Committee for their sincere efforts and expert advice in developing this curriculum is acknowledged. It will lead to qualitative and quantitative improvement in the ICT Education and will help to make this subject interesting, joyful and effective. We are very grateful to the CIET, NCERT Faculty members who help us a lot in the development of this curriculum.

SCERT as an organization is committed to systemic reforms and continuous improvement in the quality of its interventions, thereby the quality of education.

We welcome your comments and suggestions on this curriculum.

Anita Satia
Director, SCERT

Preface

This document has been prepared with a view to outlining the basis of the ICT in Education curriculum for Classes VI to X. The document has been inspired by National Policy on ICT in School Education, NCF 2005, Position Paper on Educational Technology, the ICT@School Scheme document as well as Implementation of the ICT@School Scheme: Model Bid Document, Curricula for ICT in Education Version#1.02 by Central Institute of Educational Technology (NCERT).

Aim of education is not merely to transfer the information but it is to improve the quality of life. Education is inherently values oriented and must develop in learning caring, cooperation and respect for others. Hardware and Software are two structural components of this technology and multimedia is an important aspect related to them. Education as a system has some objective planed for the process, for the realization of which a variety of strategies, techniques and aids have been designed and devised by educational technologists; Multimedia approach is one such innovation that is aimed at improving the teaching-learning process.

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, improved teaching-learning-evaluation-tracking, and increased productivity.

ICT does not merely constitute a specific tool or application. Rather it is a new framework which we must prepare our children for in schools.

Dr. Pratibha Sharma Joint Director, SCERT

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INTRODUCTION

Information and Communication Technology is the convergence of Information technology, and communication Technology (Internet, satellite, Telecommunication, broadcast).According to UNESCO (2002), **"ICT refers to forms of technologies that are used to create, store, share or transmit, exchange information.ICT includes radio, television, video, DVD, telephone (fixed line & mobile), satellite systems, computer and network hardware and software; (equipment & services associated with these technologies, such as videoconference electronic mail)".**

ICTs can contribute to universal access to education, equity in education, the delivery of quality learning and teaching, teachers' professional development as well as improve education management, governance and administration provided the right mix of policies, technologies and capacities are in place. It plays an important role in forging links between schools, local and global communities. It can promote innovation, increase productivity and enrich quality of life.

21st century is characterized with the emergence of knowledge based society wherein ICT plays a critical role. The National curriculum framework 2005 (NCF 2005) has also highlighted the importance of ICT in school education. Keeping in mind the importance of ICT, a major paradigm shift is imperative in education characterised by imparting instructions collaborative learning, multidisciplinary problem-solving and promoting critical and creative thinking skills.

Digital India campaign has provided further impetus to all the ICT related initiatives and emphasis on skill development among school children and teachers. While implementing all the initiative under the umbrella of Digital India, it is planned to infuse skills, scale and speed in all systems. The Year 2010-2020 has been announced the decade of innovation by Government of India. The skills *i.e.* creative, critical and logically thinking are necessary for innovations and schools need to lay solid foundations of these skills across all level.

In this regard, the National Policy of Information communication Technology in School Education aims at preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all round socio-economic development of the nation and global competitiveness.

The vision envisaged by the National Policy of ICT in School Education, ICT@School Scheme and the Digital India Scheme has been the guiding force for evolving this curriculum framework for the stake holders of Delhi State. this curriculum is developed. This curriculum is developed based on Curricula for ICT in Education for School System v1.02, Central Institute of Educational Technology, NCERT.

The ICT in Education curriculum for students attempts to introduce students to a dynamic, immensely popular field, exposing them to a wide range of information and resources, motivating them to explore and participate. It can not only support learning, but also introduce them to diverse activities which challenge their intellect and imagination.

ICT IN EDUCATION

This curriculum is organized into four Learning strands as per Curricula for ICT in Education developed by Central Institute of Educational Technology (NCERT):

• Connecting with the World
  • Connecting with each other
  • Creating with ICT
  • Interacting with ICT

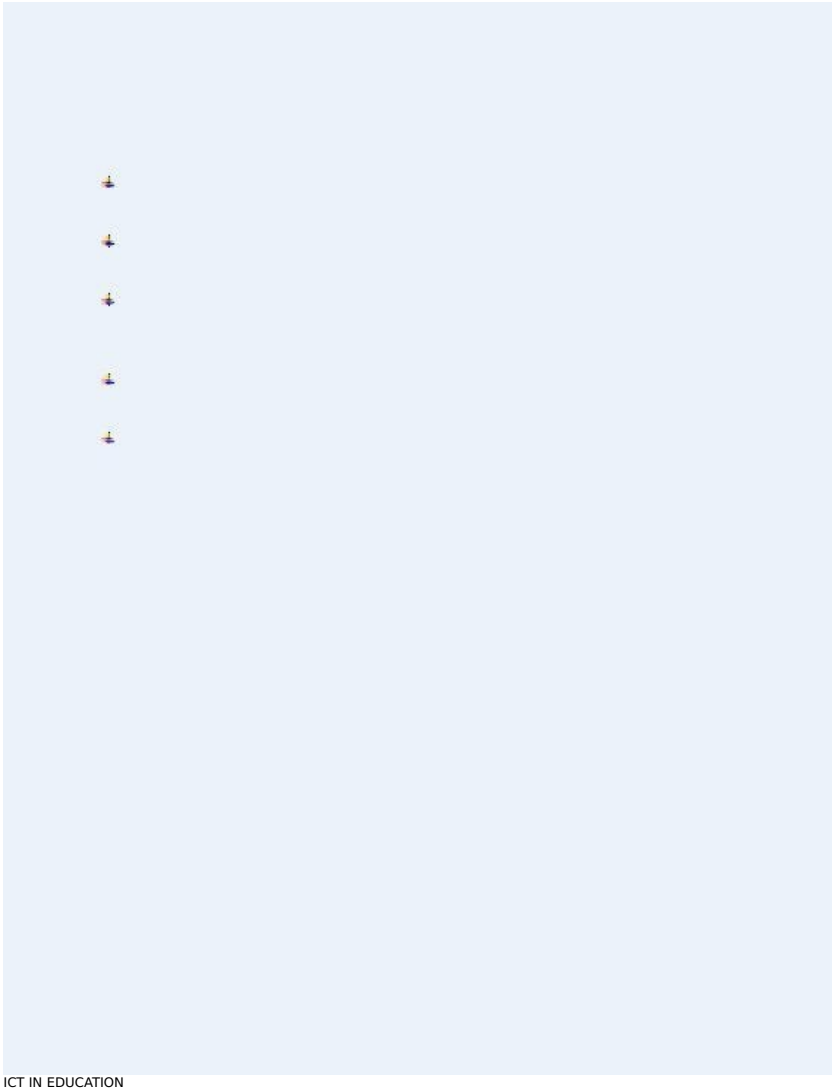
These learning strands seek to build capacities to handling today′s and tomorrow′s technologies appropriate use in education, capitalizing on technology to master technology, managing the ICT Infrastructure, using technology to surmount boundaries and to acquiring insights to lead technology educationally. Keeping in view the above four strands, learning will be organized under the following six thematic areas identified by Central Institute of Educational Technology (NCERT) : Programming

Graphics and animations Internet and the ICT environment Data representation and processing Audio visual communication Software applications 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 irrespective of ICT devices and software applications evolved in different generations, the developed skills can be applied across similar tools. The challenge is to effectively harness these technologies in a way that serves the interests of learners and the larger teaching/learning community.

This curriculum also encourages students to use ICT ethically so that they can learn to use ICT responsibly and be aware of potential dangers and issues that can arise in the contemporary world.

This curriculum takes care of the requirements of a 21st century learner with the following special features: Development of Life Skills like creative thinking, critical thinking, problem solving, interpersonal relationships, communication skills, collaboration Integration with real life scenarios Integration with other academic subjects (interdisciplinary approach) Inculcation of Values & Ethics Inclusivity: Gender Sensitization & Inclusion of the Differently able Sapna Yadav

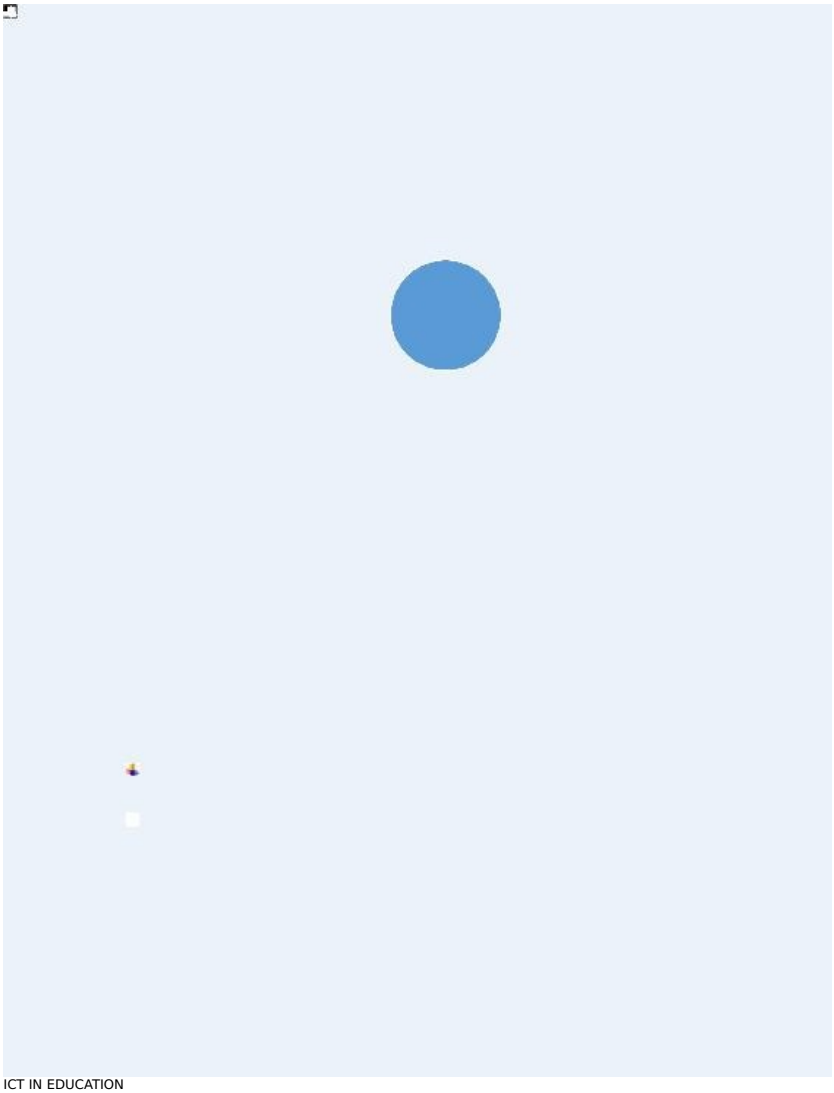
Sr. Lecturer, SCERT



ICT IN EDUCATION

CURRICULUM OBJECTIVES: The following are the Objectives for the curriculum of ICT in Education: To develop skills that will enable them to function as discerning students in an increasingly digital society To access various tools and applications for learning and skill development opportunities

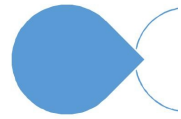
To operate a variety of hardware and software independently and troubleshoot common problems and using the ICT facility with care, ensuring the safety of themselves, others and the equipment To create a variety of digital products using appropriate tools and applications and saving, storing and managing digital resources To practice safe, legal and ethical means of using ICT

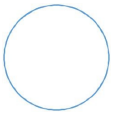


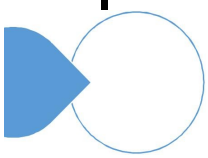
ICT IN EDUCATION

DURATION OF THE C OURSE: 2 periods per week (one period = 40 minutes), at least 25 weeks of engagement per year over 5 years.

Methodology







The strategy will be as follows: Step 1: Demo by the Teachers: At this step, Teacher will demonstrate the activities to the students using teacher's manual.

Step 2: Hands on Activities: Based on the demonstration given by Teacher, the students will do the Hands on activities. Teachers will facilitate the session. If any students like to explore further then teachers support them through extended activities.

NOTE: If there are more than 20 students in a class then the class will be divided into groups of 20 students for the Hands on session.

One group will attend the ICT Lab for doing Hands on activities. Rest of the group will go for the other subject classes / labs.

Step 3: Assessments: E-portfolio: At the end of the Hands on Activities, students will submit the outputs in the e-portfolio which will be assessed by the teachers and grade them.

Showcase: At the end of the year students will showcase the outputs in the e-portfolio which will be assessed by the Teachers.

REQUIREMENT OF INFRASTRUCTURE & RESOURCES

Computer Lab with minimum of 10 Computers with accessories (Head phone , speakers) , Printer , scanner and Overhead Projector One classroom with Overhead Projector (to accommodate the strength of one class of that particular school) One ICT Teacher and one Technical Assistant Internet Connectivity with adequate bandwidth.

NOTE: All the resources and infrastructure may increase depending upon the strength of the students in the school.

BRIDGING PROCESS FOR IMPLEMENTATION

ICT in Education Curriculum will be implemented by adopting the following bridging process for initial 5 years:

YEAR	Respective Class	Curriculum to be followed
1	VI	VI
	VII	VI
	VIII	VI
	IX	VI
	X	VI
2	VI	VI
	VII	VII
	VIII	VII
	IX	VII
	X	VII
3	VI	VI
	VII	VII
	VIII	VIII
	IX	VIII
	X	VIII
4	VI	VI
	VII	VII
	VIII	VIII
	IX	IX
	X	IX
5	VI	VI
	VII	VII
	VIII	VIII
	IX	IX
	X	X

In the 5th year, all Classes from VI to X, will be taught their own respective ICT in Education Curriculum.

COURSE COVERAGE

Coverage: Class VI

Sr. No.	Themes	Objectives	Title	Tools	Periods		
					Demonst--ration	Hands on & Assessment	Total Periods
1	Graphics &	▫					

Introduction to ICT		Learning to	My Paint/	2	4	6		
	Animation 01	Environment* ▫ Free hand sketching and painting digitally using different brushes. ▫ Mixing colours.			▫ ICT environment ▫ Sketch ▫ Paint & Create ▫ digital art	Flow paint		
2	Programming 01	▫ Demonstrate the possibilities of movement. ▫ Familiarise with ways of defining parameters – movement coordinates and colour. ▫ Visualise space, coordinates and shapes through movement and vice versa. ▫ Demonstrate the logic of different repeating programming structures.			Learning to Create with Logo programming	Turtle Art/ Turtle blocks	2	4	6
3	Internet & ICT Environment 01	▫ Familiarize with the internet and World Wide Web (WWW) ▫ Familiarize with browsers and their basic functions ▫ Familiarize with a web page, its layout ▫ Familiarize with the structure, URL and navigation of a website			Learning to Navigate the Web	Internet Explore, Google chrome, Opera, Mozilla Firefox	2	4	6

		▫ Knowing about search engines and their roles ▫ Searching for text and images from the web ▫ Familiarising with copyright and safe search					
4	Data Representation & Processing 01	▫ Familiarise with different forms of data and the different formats in which it can be captured - images, numbers, text, audio and video. ▫ Identify data elements and methods of organising it from given data sets. ▫ Work with spreadsheets to input , order and analyse data(min., max., sum) text and numeric. ▫ Analyse different data sets and share findings. ▫ Query datasets to generate information.	Learning to work with Spread sheets	Spread sheet	3	6	9
5	Data Representation & Processing 02	▫ Represent ideas and processes using mind maps – semantic relationships. ▫ Create mind maps to explore an idea/ process. ▫ Make a presentation (Peer sharing) of mind maps.	Learning to create mind maps	Free mind/ VUE	1	2	3
6	Data Representation & Processing	▫ Input text and save text. ▫ Format a word	Learning to Create, Edit and Format	Text editor, Word	3	7	10

	03	processor I with- (i) tabs and alignment, (ii) highlight (iii) font and font size (iv) Spell check, (v) find and replace and (vi) numbered/ bulleted lists – local language. ▫ Create a table and organise data. ▫ Structure a document – letter, notice, document and poster. ▫ Print a document.	Text Files	Processor			
7	Audio Visual communication 01	▫ Narrate a story and record it using multiple devices. ▫ Create a library of sounds and music. ▫ Combine sound effects to support the audio narration.	Learning to Create Audio Files for Communication	Audacity	1	3	4
8	Software Application 01	▫ Understand the concept of Maps and Globes. ▫ Understand the scope of a digital map. ▫ Learn about coordinates, resolution, directions on a digital map. ▫ Understand the different types of Satellite Images.	Learning about Maps and Globes	Google Earth, Open Street Map	1	1	2
9	Exhibition of portfolios & evaluation	-	Showcasing/ e-portfolio	-	0	4	4

Note:

***** Introduction to ICT-About ICT, Hardware & software, files & folders *etc.*

COURSE COVERAGE

Coverage: Class VII

Sr. No.	Themes	Objectives	Title	Tools	Periods		
					Demonst--ration	Hands on & Assessment	Total Periods
1	Programming 02	▫ Manipulate arithmetic values, draw shapes using these values and display results.. ▫ Define variables and build shapes using these variables. ▫ Create action sequences (action) and combine with logical operations. ▫ Create pattern based on defined actions. ▫ Solve puzzles. ▫ Design Patterns.	Learning to Create with Logo programming	Turtle art/ Turtle blocks	2	6	8
2	Data Representation & Processing 04	▫ Create presentations. ▫ Editing and formatting presentation. ▫ Animating slides using transitions.	Learning to create a presentation	Presentatio n tool	3	7	10
3	Audio Visual communica-tion 02	▫ Capture images using various devices. ▫ Combine visuals to support audio narration and create a new digital story as a slideshow. ▫ Record and make a narrative of any process/ event in a video format. ▫ Add sound effects to the video narratives.	Learning to Create Audio-Visual Files for Communica-tion	Open shot video editor	3	8	11

		▫ Present digital stories. ▫ Use of media and identification of communication needs and possibilities for given contexts.					
4	Graphics & Animation 02	▫ Create (draw) digital images. ▫ Selectively edit an image. ▫ Make multiple copies of different images by cloning. ▫ Add text to a digital image using layers.	Learning to Create Digital Art	Inks cape	2	5	7
5	Internet & ICT Environment 03	▫ Browsing internet and navigating through various websites. ▫ Classifying websites. ▫ Searching educational resources. ▫ Familiarising the basic of Internet Security and intellectual property rights. ▫ Familiarising Virus and its types.	Mining the web for educational resources	Internet	2	2	4
6	Software Application 02	▫ Analysing difference between drawing and geometric constructions. ▫ Construct geometric figures using their properties. ▫ Verifying results by construction and calculation	Learning to work with subject specific software 1	Geogebra	2	4	6
7	Exhibition of portfolios & evaluation	-	Showcasing	-	0	4	4

COURSE COVERAGE

Coverage: Class VIII

Sr. No.	Themes	Objectives	Title	Tools	Periods		
					Demonst--ration	Hands on & Assessment	Total Periods
1	Data Representation & Processing 05	▫ Work with spreadsheets to extend and represent data using graphs. ▫ Read and interpret graphs and identify data patterns. ▫ Infer relationships and make predictions from graphs. ▫ Do conversion and make inferences from data to graph and vice versa. ▫ Data analysis – use of sort, filters, subtotals, advanced formulas *etc.* ▫ Draw information by analysing data and represent it using graphs. ▫ Projects for data analysis.	Learning to Work with Spread sheets	Spread sheet	4	9	13
2	Data Representation & Processing 06	▫ Format a word processor II by – inserting and formatting (resize, align) images into a document; captions and titles, wrapping text, inserting special objects, symbols and formulae. ▫ Represent processes using a mind map - identify data needs, collect, organise data,	Learning to design a textual communication piece	Word Processor	3	8	11

		analyse and summarise findings in a textual format. ▫ Make a presentation of the process and findings (subject based).					
3	Software Applications 03	▫ Construct geometric figures using their properties. ▫ Verifying results by construction and calculation ▫ Plotting graph	Learning to work with subject specific software 2	Geogebra	2	4	6
4	Software Applications 04	▫ Identifying celestial object & astronomical phenomena. ▫ Visualising virtual platforms.	Learning to work with subject specific software 3	Stellarium	2	4	6
5	Graphics & Animation 03	▫ Make whole image transformations - image cropping, straightening, flipping, scaling and framing an image.	Learning to transform images using graphics editor	GIMP	3	4	7
6	Internet & ICT Environment 04	▫ Creating user Ids and managing passwords. ▫ Familiarising Cyber ethics.	Learning to create identity in web	Internet	1	2	3
7	Exhibition of portfolios & Evaluation	-	Showcasing	-	0	4	4

COURSE COVERAGE

Coverage: Class IX

Sr. No.	Themes	Objectives	Title	Tools	Periods		
					Demonst-ration	Hands on & Assessment	Total Periods
1	Internet & ICT Environment 05	▫ Retrieving specific information from the web through advanced search ▫ Identifying avenues for educational resources like repositories, blogs, wikis, *etc.* ▫ Saving resources obtained from web ▫ Familiarizing with how to browse the web securely and cyber law	Mining the web for educational resources	Internet	2	3	5
2	Programming 03	▫ Know about movements and control of animation. ▫ Learn about loops and conditional flows in programming. ▫ Practice basics of animation. ▫ Demonstrate processes upon input cues – keyboard, mouse click *etc.* ▫ Develop a Scratch animation ▫ Present a Scratch project.	Learning to create programs	Scratch	7	13	20
3	Graphics & Animation 04	▫ Make targeted image transformations, using selection tools and advanced	Learning to transform images using graphics	GIMP	3	8	11

		selection techniques. Understand ¤ HSV colour model, improve image colour and create special colour and text effects. ¤ Create composite images.	editor				
4	Project 01	¤ Develop an animation	Project 1	Required tools	0	14	14

COURSE COVERAGE

Coverage: Class X

Sr. No.	Themes	Objectives	Title	Tools	Periods		
					Demonst-ration	Hands on & Assessment	Total Periods
1	Internet & ICT Environment 07	▫ Familiarizing with websites useful for daily life activities ▫ Knowing to communicate and collaborate with others using the web tools in secure environment ▫ Creating a web page. ▫ Familiarizing about how to upload and download from the web. ▫ Knowing about how to locate useful educational software's and subject specific tools	Advanced applications of Web	Wikipedia, Wikimedia, ecommerce websites	3	6	9
2	Software Applications 06	▫ Create 3D models of geometric shape	Creating 3D shapes	Blender	2	4	6
3	Programming 04	▫ Use of graphics and sound effects in scratch(mixing of sounds) ▫ Use of operators and variables. ▫ Creative interactive objects and games. ▫ Presentation of scratch projects.	Learning to work with Scratch Advanced	Scratch	5	15	20
4	Project 02	▫ Develop an interactive game	Game Development	Required tools	2	13	15

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