

Open Basic Education Course
Social Science (C-102)
Level- 'C'

1. Rationale

In the Open Basic Education course at level 'B', the learners were introduced to the concepts of society, community, culture and family, along with the basics of public administration, system of governance, general science, etc. Now the learners are equipped enough to go to the next level of learning. Whether the learners will want to continue education by regular mode or opt for distance education mode at higher level, the learners need to be able to raise the level of their knowledge to meet the challenges of higher education.

This course at level 'C' has been made keeping in view the needs of the learners in mind. The course content comprises lessons of History, Political Science, Geography, and Economics. While studying these lessons the learners will get acquainted with the history of India, its geographical location & structure, its economy and economical development, sources of energy, agriculture and modes of transportation and communication, its system of governance, constitution, local administration, and our constitutional rights and duties.

Apart from this the learners will also be aware of the progress that India has made so far and the developmental schemes which are being administered for the benefit of country and citizens.

2. Prerequisites for the course

Before entering this course learners are expected to have completed the Open Basic Education Course at level 'B' successfully or have equivalent knowledge.

3. Objectives

The specific and general objectives of the course are as following-

3.1 General Objectives

After completing this course successfully the learners will be able to-

- Describe the resplendent past of India
- Illustrate about their rights and duties
- Explain about the freedom movement and understand their duties towards the nation
- Participate in creation of a knowledge seeking and evolving society

- Identify duties of law abiding responsible citizens
- Join and work for new programmes and welfare schemes for benefit of the people
- Prepare themselves for further and higher education

3.2 Specific Objectives

After completing this course successfully the learners will be able to-

- Interpret the chronology of evolution of human civilization
- Discern about the Indus valley civilization
- Illustrate about Vedic civilization, coming of Aryans to the Indian sub-continent and Post Vedic civilization and life in general
- Explain about the political situation at different point of time in History of India, different royal families/lineages, and social, cultural and economic situations in those times
- Illustrate about medieval History of India
- Describe about the British colonial rule in India-coming of Britishers, Establishment of British rule in India, and India Freedom Movement
- Describe about physical features of India
- Explain about the natural resources and sources of energy available in India and help in conserving them by using different ways of energy conservation and environment protection
- Identify different types of agriculture and other important information related to them
- Get acquainted with the history of industries in India and different types of industries we have
- Describe the modes of transportation and communication
- Illustrate about the population explosion we are facing in India and ways to curb it from further increase
- Illustrate about different aspects of financial life
- Give examples for different level and institutions involved in administration and governance
- Outline the concept and form of democracy as enshrined in the constitution of India
- Discuss about the tri-level Panchayat Raj organization and Urban self-governance and be inspired to join these
- Classify various welfare schemes of government of India

4. Brief Description of the Course

The present course has been developed in simple language, the examples and instances given in the lessons have been taken from everyday life. The course has been developed for distance education mode.

The entire course has been divided into 20 lessons. Each lesson has been divided into various sections on the basis of the content, it is easy for the learner to study and follow. Various ways of self-assessment and techniques have been used in the lessons.

5. Course Structure

The study time for this course is 100 hours in total. It has 20 lessons, which have been divided into four (4) modules-

The description of study hours and allotted marks per module is as following-

Sl. No.	Module	Lesson No.	Study Hour	Mark
1.	Our Culture and Heritage	1-8	40 hours	40
2.	Our India	9-15	35 hours	35
3.	Our Political System	16-19	20 hours	20
4.	India on the Path of Progress	20	5 hours	5
	Total	20	100 hours	100

Each lesson has been divided into topics and sub-topics according to the subject matter, so that it is easy for the learners to study.

6. Course Description

Lesson-1: Evolution of Human Civilization

1. Ancient Human-Society and Life
2. Social, Economical, Political and Religious Faiths and Beliefs
3. Indus Valley Civilization
4. Evolution of Urban Life
5. Evolution of Agriculture, Mixed Agriculture

Lesson-2: The Vedic Civilization

1. The Vedas
2. The Social, Economic and Political systems in Vedic Age
3. Vedic Civilization during the Ramayana and Mahabharata Period

Lesson-3: Life during Post Vedic Age

1. The Nanda Dynasty- Janapada and Mahajanapada- Social, Economic and Political Systems
2. The Maurya Empire

Lesson-4: Advent of the Medieval Age

1. Post Mauryan Social, Economic and Political Systems- Gupta Dynasty, Kanishka
2. Last Ancient King-Harshavardhana
3. Kingdoms in the South of India-Subcontinent-Chola, Chera and Pandya

Lesson-5: Delhi Sultanate

1. Arrival of Arabs and beginning of Islam in India
2. Delhi Sultanate- Establishment of the Slave Dynasty, Economic reforms- Agriculture, Market system, Developmental schemes, Art and Culture

Lesson-6: The Mughals, the Marathas and the Rajputs

1. Arrival of the Mughals and establishment of the Mughal Empire
2. Political, Social, Economic, and Cultural achievements of the Mughal Empire
3. The Maratha Empire, Relations between the Mughals and the Marathas
4. The History of the Rajputs-Relations between the Rajputs and the Mughals

Lesson-7: The British Rule

1. Arrival of the East India company and the British to India
2. Expansion of the British Empire- Trade- Agriculture, development of Industries and impact on the society
3. The Period of awakening during 19th Century-Impact of Social, Educational and Religious Reforms
4. Changes in the Policies of the East India Company
5. The first war of India's Freedom-1857

Lesson-8: Freedom Struggle

1. Impact of the changes made in the British Administration
2. Initiation of National Freedom Struggle and its Impact
3. The Situation in Post-Independent India

Lesson-9: Different Physical Features on the Surface of the Earth-Our India

1. Expanses of India-Physical Features

2. Climate and Monsoon, Natural Resources, Types of Soil and Soil Conservation, Water Resources-Use and Conservation
3. Forest Resources- Importance and Use, Ill-effects of deforestation, Importance of forest conservation- Diversity of Flora and Fauna

Lesson-10: Minerals and Energy Resources in India

1. Mineral Resources and Non-Mineral Resources
2. Sources of Energy- Traditional (Coal, Petroleum products, Atomic energy), and Non-Traditional (Solar energy, Wind energy)

Lesson-11: Agriculture in India

1. Types of Agriculture- Single crop Agriculture, Mixed Crop Agriculture, Step Agriculture, Agriculture for life subsistence and Commercial Agriculture, Rabi, Kharif and Jayad
2. Major Crops of India- Food Crops, Cash Crops
3. Factors that affect Agriculture- Extreme Rains, Hail, Frost, less Rains

Lesson-12: Our Industries

1. Industries and their Types
2. Development of Industries from Ancient period to Modern Period- Small scale industries, Cottage Industry, Medium and Heavy Industry

Lesson-13: Modes of Transportation and Communication

1. Road, Rail and Air Transportation
2. Tele-communication Revolution

Lesson-14: Population Explosion and Population Control

1. Population Explosion- Social and Economic Impact
2. Population Control- Birth Rate, Death Rate, Sex Ratio, and ways of controlling it

Lesson-15: Financial Life

1. Financial life and Financial Needs
2. Division of Labour
3. Inclusion of women in Economic Growth
4. Market Centric Economy

Lesson-16: Nature of Governance Systems

1. Need for Government and State
2. Types of system of Governance- Monarchy, Fascism, Colonialism, Democratic system

Lesson-17: Indian Constitution

1. Characteristic Features of the Indian Constitution
2. Fundamental Rights and Duties
3. Parliamentary Democracy- Legislature (organization and functioning), Executive (President, Prime Minister and the council of Ministers)

Lesson-18: State Government

1. Legislature (Legislative assembly and Legislative council)- Organization, Functioning and Powers
2. Executive (Governor, Chief Minister and council of Ministers)- Appointment, Functioning and Power

Lesson-19: Democracy and Local Self-Governance

1. The Concept and Nature of the Democracy
2. Fundamental Ingredients of Democracy- Constitution, Fundamental Rights, Universal Adult Franchise, Political Parties, Electoral System, Modes of communication and Media
3. Coalition Government
4. Local Self-Governance- Tri-level Panchayat Raj system, Urban self-governance

Lesson-20: India on the Path of Progress

1. *Swachh Bharat Abhiyan* (Clean India Mission)
2. Clean Ganges
3. Skill India
4. Digital India

7. Scheme of Study

This course is essentially for self-study. The course material has been prepared keeping in mind the social, psychological & intellectual conditions of the intended learners. As the course is designed for self-study therefore at the end of each lesson, questions related to the lesson are given, so that learners are able to develop concepts as well as learn to express them well through writing.

Learners also have the option of attending contact classes at their AAs, learners will be able to clarify any subject related doubts in these sessions as well as discuss them with peer group. Learners can also clarify their subject related problems at literacy centre and adult education centre.

8. Scheme of Evaluation

8.1 Self-Assessment

Learner can keep doing their evaluation throughout the course. For this purpose a scrutiny/ question paper is provided after every five lessons, which contains questions related to those five lessons. Learners can answer these questions and then evaluate their answers by looking at the correct answers provided at the end. This is the self-evaluation method adopted for this course.

8.2 External Assessment

After completing the course the learner will appear in external evaluation. The method for this evaluation is written examination, which will consist of 100 marks. The duration of this exam will be three hours and question paper will comprise questions based on lessons and concepts in them. The questions will be objective type, very short answer type, short answer type, and long answer type

Open Basic Education Course
Mathematics (C-103)
Level- 'C'

1. Rationale

Mathematics is a very important subject of Open Basic Education (Adult) course level 'C'. By learning about concepts of Mathematics the learner acquires the ability to tackle the known and unknown challenges in the world around. Mathematics helps in development of objective, critical and analytical thinking. The present course is at this level has been designed to inculcate problem solving attitude, expression, and better work ability and conduct in learners. It is expected that before embarking on this course the learners have completed the course in Mathematics at levels 'A' and 'B'. The present course will enhance the ability of the learners to relate everyday life situation to Mathematics, thus making the study of Mathematics more relevant. Vedic Mathematics has also been included in the present course it will help in developing Mathematical ability of the learners and make them more interested and inclined towards study of Mathematics.

2. Prerequisites for the course

Before entering this course the learner is expected to complete the Open Basic Education Course at level 'B' successfully or have equivalent knowledge

3. Objectives

On successfully completing this course the learners will be able to-

- Explain the fundamental concepts, symbols, formulae, and theories of Mathematics and to acquire more knowledge related to them.
- Elaborate the principles of measurement by experiencing them in everyday life and to be able to use them in their life.
- Describe the queries put in words in form of Mathematical equations
- Exhibit positive outlook towards Mathematics and its concepts
- Demonstrate the use of Mathematics in everyday life.
- Make quick calculations and answer more questions in given time by using knowledge of Vedic Mathematics
- To give strong base to the learners in Mathematics at this level and to prepare them for learning Mathematics at next level and secondary examination.
- To cultivate self-confidence in the learners so that they can play a positive role in education of coming generations.

4. Course Structure

The Open Basic Education (Adult) course level 'C' in Mathematics has been divided into six modules. All the modules contain many lessons containing various topics. Number of lessons, suggested study time and marks allotted to each module is as following-

Module & Lessons	Number of Lessons	Study Hour	Marks
Module 1: Arithmetic	03	20	20
1. Natural Numbers and Whole Numbers			
2. Whole Numbers			
3. Square and Square root and Cube and Cube root			
Module 2: Algebra	03	15	10
4. Introduction to Algebra			
5. Algebraic Integers and Formulae			
6. Quadratic Equations			
Module 3: Commercial Mathematics	03	20	25
7. Ratio and Proportion			
8. Percentage and its usages			
9. Simple & Compound Interest			
Module 4: Geometry	06	20	20
10. Fundamental Concepts of Geometry			
11. Angles and Equidistant Lines			
12. Triangle and its types			
13. Quadrangle and its types			
14. Circle			
15. Congruent and Similar Figures			
Module 5: Area & Statistics	03	15	15
16. Area of Plain surface Objects			
17. Volume of Solids			
18. Introduction to Statistics			
Module 6: Vedic Mathematics	02	10	10
19. Introduction to Vedic Mathematics			

20. Usages of Vedic Mathematics

Total	20	100	100
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5. Course Description

Module 1: Arithmetic

Lesson-1: Natural and Whole Numbers

Natural numbers, whole numbers and their operations, characteristics, factors and multiple in natural and whole numbers. Prime Numbers, co-prime numbers, Prime Number factors, writing Prime number factors as unique factors. Finding Highest common factor (HCF) and Lowest Common Multiple (LCM) by factorization and division methods. Finding relations between two numbers and their HCF and LCM. Learning the principles of divisibility.

Lesson-2: Whole Numbers

Creation of whole numbers, plotting whole numbers on the number line, plotting whole numbers chronologically on the number line, addition and subtraction of whole numbers on the number line, absolute value of the whole numbers, characteristics of whole numbers and operations involving whole numbers, division and grouping of whole numbers

Lesson-3: Squares and square root, Cubes and cube root

Understanding the concept of square, squares of natural numbers, square roots, finding square root of a perfect square using multiplicative function, finding square root of a perfect number by divisional method, questions based on square roots, whole cube numbers, making a number whole cube number, concept of cube root, finding cube root of any whole cube number by prime number factorization method.

Module 2: Algebra

Lesson-4: Introduction to Algebra

Developing the concepts of variable and constant, introduction to Algebra through Arithmetic, fundamental operations on algebraic numbers and symbols, doing multiplication and division using variables and constants, difference between monomials and coefficient, differentiating between similar and dissimilar equations, addition and subtraction of similar equations, multiplication of variables

Lesson-5: Algebraic expressions and operations

Concept of Algebraic expression, multiplication constant of expressions with two or more variables, similar and dissimilar algebraic expressions, types of algebraic

expressions, characteristics of algebraic equations, value of algebraic equations, addition, subtraction, multiplication and division of algebraic expressions.

Lesson-6: Linear Equation with one Variable

Concept of equation, linear equation, mathematical structures, solving linear equations

Module 3: Commercial Mathematics

Lesson-7: Ratio and Proportion

Ratio, Proportion, types of proportion, unitary method, time and work, work and ratio, time and distance

Lesson-8: Percentage and its Applications

Percentage in form of fraction, changing fractions into percentage, calculating a certain percentage of the given amount, few problems in words, related to percentage, profit and loss, percentage profit and loss, discount/rebate

Lesson-9: Simple and Compound Interest

Simple Interest, Compound interest, and difference between the two

Module 4: Geometry

Lesson-10: Fundamental Concepts of Geometry

Point, line and surface, line segment and ray, a line crossing two points and two lines in one surface, convergence point of many lines and line travelling together, detecting convergence points, drawing lines travelling together, closed and open structures, easy structures, easy closed structures internal structure and external structure, instruments used in geometry and their usages-ruler, divider, compass, set square, protractor, measurement of a line segment, using a scale measuring a line segment, drawing a line segment of a given measurement using a scale

Lesson-11: Angles and Equidistant Lines

Rotation, Angle, measurement of angles, drawing angles of - 60° , 120° , 90° , 30° , types of angles, sum of two angles, non-equidistant and equidistant lines, sum of equidistant lines, drawing equidistant lines, vertical lines

Lesson-12: Triangles and their Types

Triangle, making an angle, apex point of the triangle, arms, angles, external angles and internal inside angles, perpendicular and medians of the triangle, sum of all the angles of the triangle, relation between external angles and internal inside angles of a triangle, sum of any two arms of the triangle, categories of the triangle, scalene triangle, isosceles triangle, equilateral triangle, acute triangle, right angle triangle, obtuse triangle,

characteristics of an isosceles triangle, characteristics of arms and angles of an isosceles triangle, characteristics of a right angle triangle (Pythagoras theorem)

Lesson-13: Quadrangle and their Types

Quadrangle and its different parts, sum of all the angles of a quadrangle, trapezium and equidistant quadrangles, rectangle, square, rhombus, and diamond.

Lesson-14: Circle

Parts of the circle and its components, drawing a circle, measuring the angle in a semi-circle, distance of chords of circle from the centre of the circle

Lesson-15: Congruent and Similar Figures

Congruency, congruency in a triangle, rules and exceptions of congruency in triangles and, SSS, SAS, ASA, RHS, congruency principle, similarity, similarity of axis or number of lines.

Module 5: Area & Statistics

Lesson-16: Area of Plain surface Objects

Area, area of a plain surface area, standard units of measurement for measuring area, dimensions of linear structures, finding area of a triangle using different formulae, dimensions of a rectangle, dimensions of a square, area of a parallelogram, area of a trapezium, perimeter of a circle, area of a circle

Lesson-17: Volume of Solids

Dimensions of Cuboids, sides and height of the cuboid, cuboid in a special way, area of a cube and cuboid, volume of a cube and cuboid

Lesson-18: Introduction to Statistics

Collection of data, presentation of the data, using frequency for presentation of the data, classification of data into different categories, bar graphs, reading bar graphs, illustrating bar graph, drawing bar graphs, need of appropriate scale, how to draw bar graph on the graph sheet, pie chart

Module 6: Vedic Mathematics

Lesson-19: Introduction to Vedic Mathematics

Importance of teaching & learning Vedic Mathematics, formulae and meaning of Vedic Mathematics, use of *vinkulam* numbers, operations involving *vinkulam* numbers,

formulae of zero, formulae for addition, subtraction, mixed operations (addition & subtraction)

Lesson-20: Applications of Vedic Mathematics

First procedure for multiplication-formula *ekanyunen purven*, multiplication formula *ekadhiken* and *antyordashkeypi*, *guna sutra nikhilam (aadhar, upadhar)*, Formula-*nikhilam*, and *aanurupyen (upadhar)*, Multiplication formula- *udharvatriyagbhayam*, multiplication of three digit numbers- formula *udharvatriyagbhayam*, calculating the square- formula *yavdunam*, calculating the square- formula *dwandhyoga*, by *vargmula viloknam*, by *ghan-sutra nikhilam*, by *ghanmula-viloknam*.

6. Scheme of Study

This course is essentially for self-study. The course material has been designed keeping in mind the social, psychological & intellectual conditions of the learners. At the end of each lesson, questions related to the lesson are given, so that learners are able to understand concepts as well as learn to express them.

Learners also have the option to attending contact classes at their AAs, learners will be able to clarify any subject related doubts in these sessions and discuss difficult topics with their peer group. Learners can also clarify their subject related problems at the literacy centre and adult education centre.

7. Scheme of Evaluation

7.1 Self-Assessment

Learner can keep doing their evaluation throughout the course. For this purpose a practice paper is provided after every lesson, which contains questions related to the lesson. Learners can answer these questions and then evaluate their answers by looking at the correct answers provided at the end. This is the self- evaluation method adopted for this course.

7.2 External Assessment

After completing the course the learner will appear for external evaluation. The method for this evaluation is written examination, which will consist of 100 marks. The duration of this exam will be three hours and question paper will comprise questions based on lessons and concepts in them. The questions will be objective type, very short answer type, & short answer type. There will be 35 questions in total.

Open Basic Education Course
Basic Computer Skills (C-104)
Level- 'C'

1. Rationale

India is a rapidly growing and developing nation. The growth should be multifaceted and even for it to be meaningful for all. With the advent of computers the world moved to a new age-cyber age. The unprecedented amount of growth that the world has seen since information technology revolution is unparalleled in history. Computers have taken over almost all spheres of human existence be it Offices, Homes, Hospitals, Railway stations, Universities or Schools. Therefore it is imperative for all of us to have computer skills, if not advanced at least basic skills, so that we are able to handle computers properly and to our benefit. This course in Basic computer skill at level 'C' is centered on knowledge about computers and application of that knowledge in everyday life. It will help the learners in achieving further knowledge and skills in computers.

2. Prerequisites for the course

Before entering this course the learner is expected to –

- Have successfully completed the Basic computer skills course at level 'B' or have similar competence.
- Recognize all the parts of computer & its attachments like printer etc. and use them
- Use computer and operating system
- Be aware of internet and threat and dangers involved in working on it. The learner is also expected to know about the remedies for internet threats like viruses and malware etc.

3. Objectives

The general and specific objectives of this course are as follows-

3.1 General Objective

After successfully completing this course learners will be able to-

- Use computer with better skills and perform complex tasks using a computer.
- Draw pictures, write texts, and make charts, documents, spread sheets and presentations using computer applications.
- Use different mathematical formulae while working on spreadsheets, will be able to download sound and video clips from internet and use them in presentations.
- Explain how to search internet information related to job prospects and further studies, application processes and also apply online

3.2 Specific Objectives

After successfully completing this course the learner will be able to-

- Use tabs and indentations for making the documents orderly and beautiful
- Demonstrate how to fill information after making column
- Use the page setup application and print the documents in orderly way
- Describe how to see print preview of the document files before taking printouts
- Explain how to incorporate charts and formulae in spreadsheets
- Use the power point template and include sound and video files in power point slides
- Learn more attractive way of making presentations
- Understand different types of network
- Explain different components and usages of internet
- Analyse mass use of internet like video conferencing, social networking, and e-commerce
- Illustrate about different components, benefits and instruments of multimedia
- Indicate how to apply for jobs online

4. Brief Description of the Course

The course has been designed in such a way that before embarking on new information in each lesson the learner gets an opportunity to understand and revise what he/she has learnt so far. The course also tells about the benefits of learning and using computers in practical life situations and how to acquire it. Job prospects related to knowledge of computers have also been discussed in the course.

This course has been developed in easy language, descriptions and examples used in the lessons have been taken from general day to day life. This course is meant for distance learning mode.

5. Course Structure

This course comprises of total 100 study hours. It has nine (9) lessons. The course is divided on the basis of study hours and marks allocation as following-

Sl. No.	Lesson	Study Time	Marks
1.	Revision	06 hours	08
2.	Word Processing	16 hours	12
3.	Spread sheet	16 hours	12
4.	Presentation	16 hours	12
5.	Computer Network	10 Hours	12
6.	Internet	16 hours	12
7.	Multimedia	05 hours	12

8.	Internet Banking	10 hours	12
9.	Prospects of Job in Computer sector	05 hours	08
	Total	100 hours	100

6. Course Description

On the basis of the topic, each lesson has been divided into several units, so that it is easy for the learners to go through and understand

Lesson-1: Revision

Introduction to computers, operating system, word processing, spreadsheet, presentation, computer security, internet, e-mail

Lesson-2: Word Processing

Introduction to word processing, intend of word processing, tabs and indentation, page setup, print preview, printing, word art

Lesson-3: Spreadsheet

Introduction, intend, types of charts, inserting the charts, formula and functions (only basic)

Lesson-4: Presentation

Introduction, intend, making presentations using the template, inserting audio clip, inserting video clip, slide transition, customized animation

Lesson-5: Computer Network

What is computer network and what are its usages? Functioning of a computer network, types of network, network tools, network connections

Lesson-6: Internet

Introduction, intend, categorization of the websites, benefits of internet, video conferencing, social networking, e-governance, e-commerce, chatting, instant messaging

Lesson-7: Multimedia

Introduction, intend, elements of multimedia, scope of multimedia-education, entertainment, marketing, fashion etc. instruments of multimedia- (1) C.D. ROM, (2) speaker, mike, (3) hard disk

Lesson-8: Internet Banking

What is e-banking, types of e-banking, benefits from e-banking, precautions while making e-banking transactions, contribution of e-banking in development and business growth

Lesson-9: Prospects of Job in Computer sector

Availability of jobs in computer sector, job search using computer and internet

7. Scheme of Study

This course is essentially for self-study. The course material has been designed keeping in mind the social, psychological & intellectual conditions of the learners. At the end of each lesson, questions related to the lesson are given, so that learners are able to understand concepts as well as learn to express them.

Learners also have the option to attending contact classes at their AAs, learners will be able to clarify any subject related doubts in these sessions and discuss difficult topics with their peer group. Learners can also clarify their subject related problems at the literacy centre and adult education centre.

8. Scheme of Evaluation

8.1 Self-Assessment

Learner can keep doing their evaluation throughout the course. For this purpose a practice paper is provided after every lesson, which contains questions related to the lesson. Learners can answer these questions and then evaluate their answers by looking at the correct answers provided at the end. This is the self- evaluation method adopted for this course.

8.2 External Assessment

After completing the course the learner will appear for external evaluation. The method for this evaluation is written examination, which will consist of 100 marks. The duration of this exam will be three hours and question paper will comprise questions based on lessons and concepts in them. The questions will be objective type, very short answer type, & short answer type.

Open Basic Education Course
Science
Level- 'C'

1. Rationale

Science forms the active, changing experiences that we have in our everyday lives-in context of technology, travel, health care our education etc. To make every citizen equipped with the scientific temperament, it is imperative to include science as a subject of study for all. This will take the learners towards a healthy and productive life.

Due to the rapid development in fields of technology and scientific knowledge, many scientific inventions have become our everyday need; therefore it is very difficult to navigate in today's world without knowledge about these. Indeed scientific knowledge is the knowledge that opens the vistas of the new age for us.

In formal schools science is taught as a compulsory subject till the secondary level and NIOS aims to provide all its learners with equivalent knowledge of Science. This course of Science subject in Open Basic Education (OBE) programme at level 'C' has been designed to not only endow learners with basic scientific concepts related to the subject but also to enable them in developing a scientific outlook towards their society, environment, customs and culture. Science also develops questioning attitude in learners asking how? and why? Is very important part of scientific study. This course is also meant to inspire learners into adopting questioning attitude, critical thinking and employing scientific methods and analysis in solving problems. This course will also make the learners aware of importance of the natural resources, their usages and conservation for next generations. The present course also focuses on the process of learning so that the learners are able to develop skills and creativity required for further studies in science. This course includes information on the principles of science and scientific study. It also describes the contributions made by various scientists from India and abroad to various fields of scientific study.

2. Prerequisites for the course

Before entering this course the learner is expected to have knowledge of certain important terms like educational, ingredient, process/ reaction, historical, environmental and morals in scientific way. To accomplish this learners are expected to have completed OBE 'B' level course of NIOS or equivalent from any other recognized board in India.

3. Objectives

Science endeavors to understand the linear as well as non-linear and complex processes of nature. It also attempts to describe the nature and its processes and project future of

natural phenomena on the basis of what is being observed today. Study of Science equips the learner with the attitude, training and skills to seek, find and process the truth.

3.1 General Objectives

After completing this course successfully the learner will be able to

- Explain about the scientific principles and basics
- Establish the importance of scientific temperament for individual and society.
- Describe the history and evolution of science as a subject (especially in context of India) and look at it as a career option
- Describe the conceptual principles and practical usages of these principles.
- Review the creativity, natural curiosity and aesthetics in study of science and technology
- Develop scientific outlook as well as moral values

3.2 Specific Objectives

After completing this course successfully the learner will be able to

- Describe living things like plants, animals and micro organisms
- Identify different life processes
- Give examples of different types of agricultural products and the nutrients that they possess
- Explain use of matter in everyday life
- Classify matter on the basis of their characteristics
- Describe things on the basis of their functions (electricity and magnetism)
- Discuss the concept of motion, moving objects, force, friction and pressure
- Explain the natural phenomena, natural calamities, their effect, calamity and disaster management
- Determine the importance of natural resources, their constant use and conservation
- Appreciate the concept of cleanliness and ‘*swach Bharat abhiyan*’ and importance of such public schemes
- Identify the contribution of Indian scientists to science and appreciate it

4. Brief Description of the Course

This course has been divided into seven modules which are based on seven subjects approved by NCF 2005. The chronology of modules is as following-

1. Living World
2. Matter
3. Food
4. How Things Work
5. Objects in Motion

6. Natural Phenomena

7. Natural Resources

5. Course Structure

This course has been divided into seven modules and all modules have been divided into several lessons. It will require in total 100 study hours to study them. The description of lessons, study hours and allotted marks per module is as following-

Sl. No.	Module	Title of the Lesson	No. of Lessons	Study Hours	Marks Allotted
1.	Living World	1. What is Science 2. Living beings & their environment 3. Plant & Animal Kingdom 4. Life Processes-I (Respiration, Circulation & excretion) 5. Life Processes-II (Reproduction in Organisms)	05	20	20
2.	Matter	6. Types of Matter-I 7. Types of Matter-II 8. How Things Change 9. Fibers and clothes 10. Heat	05	25	25
3.	Food	11. Nourishment for Plants & Animals 12. Microorganisms 13. Crop Cultivation	03	15	15
4.	How Things Work?	14. Magnetism, Electric Current & Circuits	01	05	05
5.	Objects in Motion	15. Objects in Motion, Pressure and Friction 16. Sound	02	10	10
6.	Natural Phenomena	17. Light 18. Natural Phenomena & Disaster Management	02	10	10
7.	Natural Resources	19. Natural Resources-I 20. Natural Resources-II 21. Waste Management & <i>Swach Bharat</i>	03	15	15

		(Clean India) drive			
		Total	21	100	100

6. Course Description

Module-1: Living World

Time: 20 Hours

Marks: 20

Lesson-1: What is Science, its Concept?

Concept of Science, related values and scientific outlook, contribution of Indian Scientists and Philosophers to Science, Relation between Science and Technology.

Lesson-2: Living beings & their environment (Habitat)

Characteristics and specialties of Living beings, diversity among living beings, structure of a cell and difference between a plant cell and animal cell, Habitat and its contributing factors, different types of Habitat with examples (including plants and animals), adaptation, different types of Habitats for plants and animals (water, desert, mountain and grassland habitats).

Lesson-3: Plant and Animal Kingdom

Classification of plants on the basis of shape and age, recognizing different parts of plants, structure and functions of different parts of plants like roots, stems, leaves, flowers fruits, seeds etc. and differences between them, diversity among animals and movements in different animals, different types of movements in human beings, different structures of human skeletal system and their functions, difference between bones and cartilages, different types of joints, comparison between body structure of different organisms

Lesson-4: Life Processes-I (Respiration, Circulation & excretion)

Respiration, respiration in different organisms, process of respiration, respiratory system in humans, transportation of different things inside the body by blood, respiration in plants, constitution of blood, different types of blood vessels, structure and function of heart, heart beat and pulse rate, circulation systems in different organisms, circulation of food and water in plants, need of excretion, structure and functions of human excretion system, excretion system in different organisms, excretion in plants, need for control and co-ordination, Nervous system in humans (Brain, Spinal cord and neurons), different internal hormonal glands-their secretions and functions

Lesson-5: Life Processes-II (Reproduction in Organisms)

Various ways of reproduction in living organisms (asexual and sexual), reproduction in humans, fertilization, internal and external fertilization, development of embryo in organisms, stages of development from infancy to adolescence, secondary sexual

characteristics, reproductive health, heredity, sex determination, social disparity vis-à-vis sex, asexual reproduction in organisms, asexual and sexual reproduction in plants, development of fruits and seeds, dispersion of seeds

Module-2: Matter

Time-25 hours

Marks-25

Lesson-6: Types of Matter-I

States of matter, Solubility of matter, examples of soluble and insoluble matters, dissolvent, solvent and saturated solubility unit, different ways of separation (filtration, winnowing, sedimentation, centrifugation, distillation, decantation, crystallization etc.)

Lesson-7: Types of Matter-II

Metals and non-metals, classification of metals and non-metals, physical properties of metals and non-metals (shine, hardness, ductility, malleability, tensile strength, conduction etc. with examples, reactions of metals with air, water, acid, and bases, examples and usages of half metals

Lesson-8: How Things Change

Examples of changes witnessed everyday around us, examples of physical and chemical changes, different types of chemical changes (combination or synthesis reaction, decomposition reaction, displacement or replacement reaction, double displacement reaction, acid base reactions etc.), examples of acid and bases, nature and litmus, finding acid and base in the juice of turmeric and beetroot using indicators, examples of acids and bases used in everyday life, natural changes, unnatural changes, human incurred changes, constant and non-constant changes, biological changes, good and bad changes

Lesson-9: Fibers and clothes

Fibers obtained from, plants and animals and other sources, different types of fibers, cotton wool, silk, artificial fibers, cultivation of plant fibers like cotton, jute etc. and their production at local level, sources of obtaining wool, sheep rearing and process of obtaining wool from sheep, source of silk fiber, silkworm rearing and process of obtaining silk fiber, usually used artificial fibers (nylon, polyester, PVC etc.)

Artificial clothes fibers and their usages, choosing contributing material for artificial fibers based on their properties, insulation due to air trapped in clothes fibers, matters made from plastics, issues related to excessive use of plastics

Lesson-10: Heat

Energy in form of heat, use of thermometer, use of laboratory and everyday thermometer, transfer of heat from one body to another, concept of conduction, convection and

radiation, combustion and environment necessary for combustion, fuel and properties of good fuel, different areas of flame (flame of candle, use of fire extinguisher).

Module-3: Food

Time-15 Hours

Marks-15

Lesson-11: Nourishment for Plants & Animals

Meaning of nourishment, examples of different types of nutrition Auto tropic and heterotrophic, photosynthesis in plants, heterotrophic nutrition, classification of heterotrophic organisms in terms of herbivorous, carnivorous, omnivorous, saprophytic/saprotrophic, parasitic, and holozoic, carnivorous plants (Venus flytrap, pitcher plant etc.) nutrition in humans, diagram of human digestive system, process of digestion, process of nourishment in amoeba.

Lesson-12: Microorganisms

Microorganisms, different types of microorganisms, processes of protecting food in microorganisms, beneficial microorganisms, nitrogen cycle, harmful microorganisms, virus, diseases from protozoa

Lesson-13: Crop Cultivation

Different types of crops, stages of crop cultivation-preparing the soil, choosing the seeds, sowing seeds, using fertilizers and manures, irrigation, weeding, harvest, methods of storage, protection and transportation of crops.

Module-4: How Things Work?

Time- 05 Hours

Marks- 05

Lesson-14: Magnetism, Electric Current and Circuits

Magnet, Magnetic poles and their properties, magnetic and non-magnetic matters, electric circuits, conductor, meaning of insulators, different types of electrical arrangement and electric circuits, role of electric circuit and electroplating in everyday life, magnetic effect of electricity, examples of different electric circuits and issues related to them

Module-5: Objects in Motion

Time-10 Hours

Marks-10

Lesson-15: Objects in Motion, Pressure and Friction

Processes of measuring distance and length, different examples of motion, concept of force with examples, structure and direction of objects in motion, pressure and atmospheric pressure, pressures of different mediums, factors effecting friction, benefits

and harms of friction for objects in motion, increase and decrease in friction, substances used for increasing or decreasing friction

Lesson-16: Sound

Sound, different types of sound, genesis of sound, vibration due to production of sound, dispersion of sound through different mediums, noise as unwanted sound ways to curb noise, noise pollution and its harmful effects, curbing of noise pollution

Module-6: Natural Phenomena

Time-10 Hours

Marks-10

Lesson-17: Light

Light and dispersion of light through different mediums, concepts of transparent, translucent and opaque and their examples, properties of image, image on a plain surface mirror, reflection of light-its examples, different types of lenses, structure of eyes, scientific methods of rectifying the defects in eyes, nutrition and curbing defects and blindness of eyes

Module-7: Natural Resources

Time-15 Hours

Marks-15

Lesson-19: Natural Resources-I (Physical)

Importance of air, water soil, coal, petroleum and other resources, physical resources in nature, air balance through photosynthesis, three stages and states of water cycle, reasons of air and water pollution its effects on living beings and ways of curbing it, ways of water conservation (rain water harvesting), different types of soils, coal and petroleum, process of creation of fossil fuels, limitations to the resources of coal and petroleum and their judicious use

Lesson-20: Natural Resources-II (Biological)

Importance of forests, flora and fauna, effect of forests on water, air and environment, meaning of bio-diversity, fauna and flora, conservation of forests flora and fauna and bio-diversity

Lesson-21: Waste Management & *Swach Bharat* (Clean India) drive

Meaning of waste, accumulation of waste material at different places, harmful effects of accumulation of waste material at places, process of waste management (URS), recycle, remaking and change, sewage management (seepage, need of sewer system & choking of sewer system), *Swach Bharat* (Clean India) drive- objectives, process and contribution and role of each individual

7. Scheme of Study

This course is essentially for self-study. The course material has been designed keeping in mind the social, psychological & intellectual conditions of the learners. At the end of each lesson, questions related to the lesson are given, so that learners are able to understand concepts as well as learn to express them.

Learners also have the option to attending contact classes at their AAs, learners will be able to clarify any subject related doubts in these sessions and discuss difficult topics with their peer group. Learners can also clarify their subject related problems at the literacy centre and adult education centre.

8. Scheme of Evaluation

8.1 Self-Assessment

Learner can keep doing their evaluation throughout the course. For this purpose a practice paper is provided after every lesson, which contains questions related to the lesson. Learners can answer these questions and then evaluate their answers by looking at the correct answers provided at the end. This is the self- evaluation method adopted for this course.

8.2 External Assessment

After completing the course the learner will appear for external evaluation. The method for this evaluation is written examination, which will consist of 100 marks. The duration of this exam will be three hours and question paper will comprise questions based on lessons and concepts in them. The questions will be objective type, very short answer type, & short answer type.