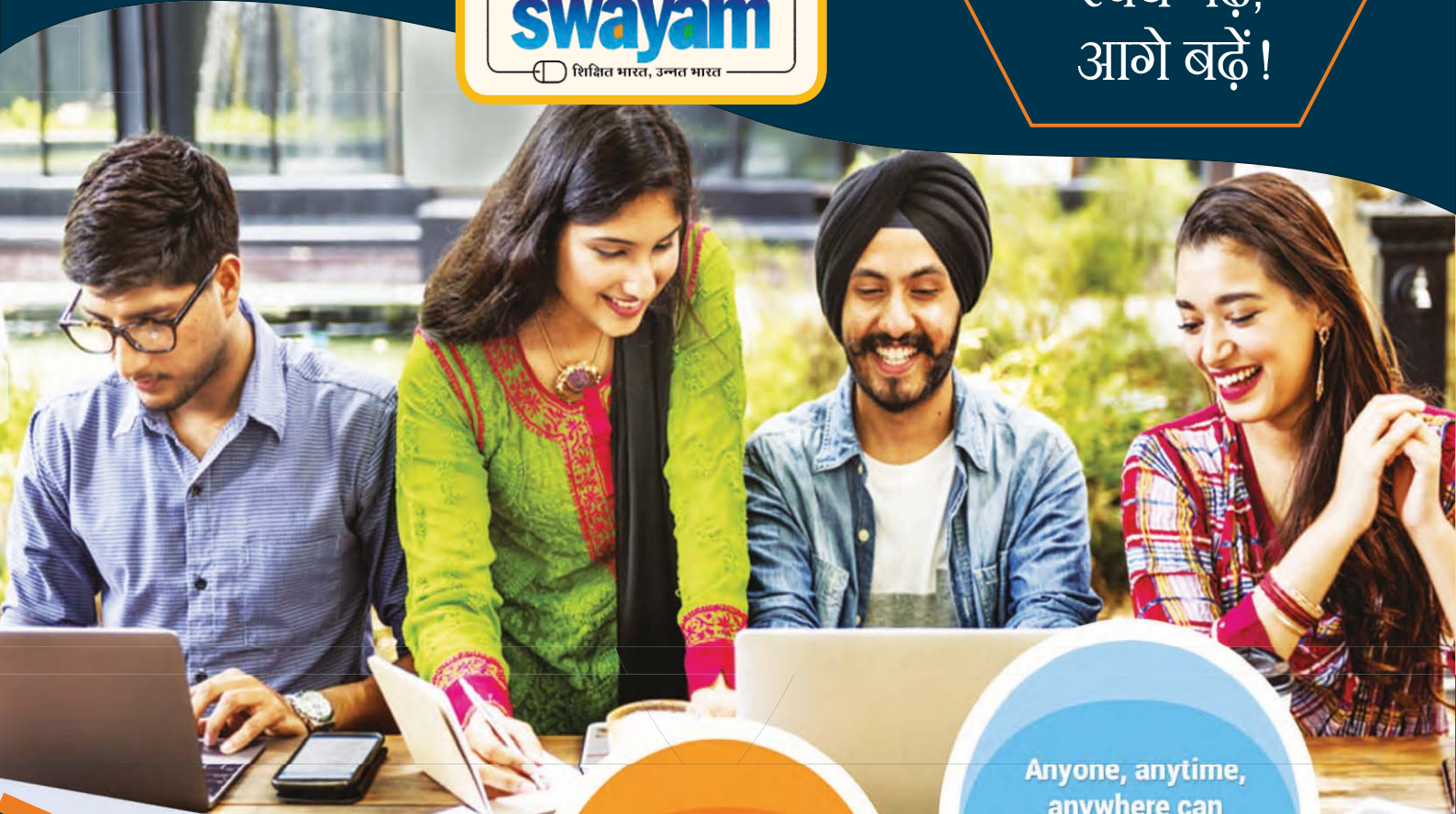


# SWAYAM Courses: At a Glance



स्वयं पढ़ें,  
आगे बढ़ें!



Thousands of  
Massive Open  
Online Courses available  
by best teachers from  
top institutions.

Anyone, anytime,  
anywhere can  
learn through mobile or  
laptop absolutely  
free.



Ministry of Human Resource Development  
Government of India

July 2018



## Message of the Chairman



The Indian higher education system is one of the oldest and largest in the world with 903 universities including Institutions of National Importance, 41, 012 colleges, 3.66 crore students and 12.84 lakh teachers. This massification of higher education brings along with it many issues which confront the higher education of our country today like, the issues of access, equity, relevance, quality, management and financing.

The ICT plays a major role in addressing these issues. In this context, Massive Open online courses are very successfully bridging the digital divide as through these courses quality education can be brought at the doorstep of every learner at virtually no cost. I congratulate the Ministry of Human Resource Development for this noble initiative which will bring a marked improvement in the quality of education being imparted in our country. The project would also help the students and teachers to update their knowledge and skills especially for those located in rural/backward/remote areas and would help the nation move towards an information-rich society.

I congratulate, Prof Rajnish Jain, Secretary, UGC, Dr(Mrs) Pankaj Mittal, Additional Secretary, UGC and her team in bringing out this document which will be very handy information booklet for our Vice Chancellors.

Wishing you all the best.

Prof. D P Singh  
Chairman, UGC

## Foreword



The phenomenal growth of ICT in the education system has had a tremendous impact globally. India has been quick enough to leverage technology for teaching learning processes as ICT has facilitated the accessibility to education and promoting quality teaching and learning to learners of all age groups across the length and breadth of the country. Taking cognizance of such advancements, the Ministry of Human Resource Development, Government of India launched SWAYAM (Study Webs of Active Learning for Young Aspiring Minds), an indigenously developed platform aimed at providing learning opportunities to the learners through MOOCs (Massive Open Online Course) free of cost in a structured manner.

MHRD has identified nine National Coordinators for developing MOOCs from School to PG level on the platform, namely- NCERT for school education from 9th to 12th; NIOS for out of school children from 9th to 12th; Consortium for Educational Communication (CEC), an IUC of UGC, for Non-technology UG programmes; UGC for Non-technology PG programmes; IGNOU for Diploma and Certificate programmes; NPTEL for Technical/ Engineering UG & PG degree programmes; IIM for management programmes, NITTR, Chennai for Teacher Training programmes and AICTE for self paced programmes.

The MOOCs courses on Swayam being run by these National Coordinators (except for NPTEL) in the coming semester beginning from July, 2018 are compiled in this document for easy reference of the Vice Chancellors and academicians.

I compliment my colleagues, Dr (Mrs) Pankaj Mittal, Additional Secretary, UGC and Dr Diksha Rajput, Publication Officer and her team in editing and compiling this document which will work as a ready reckoner for our users.

My Good Wishes for all.

Prof Rajnish Jain  
Secretary, UGC

## Preface



The MOOCs on the SWAYAM are high quality, curriculum-based, interactive content in different subjects across disciplines of social sciences, arts, fine arts, humanities, natural & mathematical sciences, linguistics, languages, technology, management, teacher training and skill sector. These courses are developed by the best faculty of the country carefully chosen from various educational institutions across the country from Secondary till Post-Graduation level. The basic philosophy of MOOCs on SWAYAM is free learning for Any one, Any time, Any where (AAA) with the facility of credit transfer for upto 20% of the courses in a programme.

The MOOCs on SWAYAM follow a Four Quadrant Approach comprising of Quadrant-I - e-Tutorial, which contains Video and Audio Content in an organised form, Animation, Simulations, video demonstrations, Virtual Labs, etc. , Quadrant-II - e-Content, which contains PDF, Text, e-Books, illustrations, video demonstrations, documents and Interactive simulations; Quadrant-III - Web Resources, Open source Content on Internet, Case Studies, books including e-books, research papers & journals, Articles, etc. and Quadrant-IV - Self-Assessment, which contains Problems and Solutions, which could be in the form of Multiple Choice Questions, Fill in the blanks, Matching Questions, Short Answer Questions, Long Answer Questions, Quizzes, Assignments and solutions, Discussion forum topics and setting up the FAQs, Clarifications on general misconceptions etc.

This document "SWAYAM Courses : At a Glance " is a compilation of the Courses developed by the Course Coordinators/Instructors of eight National Coordinators and gives a bird's eye view of the Course objectives, learning outcomes, course duration, credits and profile of the course coordinator for the learner. It is hoped that this document will enable learners and institutions to make informed choices about the MOOCs courses to be pursued in the coming semester, commencing from July, 2018.

The compilation and production of this document would not have been possible without the active support of my colleagues in UGC, Dr Diksha Rajput, Mr Abhishek Anand and in INFLIBNET, Dr Jagdish Arora and Dr Abhishek Kumar. I am grateful to them for their support.

Wishing you a happy learning.

Dr(Mrs) Pankaj Mittal  
Additional Secretary, UGC



National Council of Educational  
Research and Training

## School Educational Courses



MHRD

सत्यमेव जयते



# School Educational Courses

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**PROF. SHIPRA VAIDYA**

Faculty in Department of Education in Social Science,  
NCERT, New Delhi

**FIRST CYCLE : July 9, 2017 To Dec 31, 2017**

<https://swayam.gov.in/course/3845-ncert-accountancy-01-class-11>

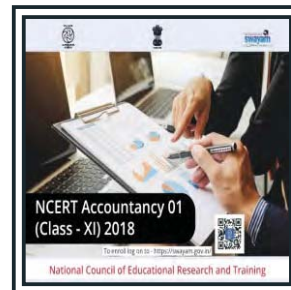
**SECOND CYCLE : June 1, 2018 To Nov 30, 2018**

<https://swayam.gov.in/courses/5044-ncert-accountancy-01-class-xi-2018>

**ABOUT THE COURSE**

An important part of any business organisation is the money that comes in and the money that goes out. Every bit of monetary inflow and outflow needs to be tracked and accounted for.

This course will help the aspiring accountants, like you, to strengthen the conceptual base in accounting through variety of e-resources like video lectures, enrichment materials for supplementing textbooks, self assessment inventory and checklist, external weblinks and many more activities for smooth progression and joyful learning. This is a 6 months course. Each week, one module containing eText, Video tutorial along with Self Assessment and Weblinks for extra study will be released.

**OBJECTIVE**

This course is intended to develop understanding:

1. Systematically recording the accounting transactions, accountants ably determine the longevity, profitability of a business, perform financial forecasts and assess the overall performance of a business enterprise.
2. How can the credibility and usefulness of accounting and financial information be ensured? Or Why accounting and finance are the key elements for a business entity?
3. To understand how accounting operates through Generally Accepted Accounting Principles, accounting standards and structured rules and

**COURSE SCHEDULE****Introduction To Accounting**

Economic events, Summarising, Analysing, Reporting, Financial position, Accounting a source of information, Branches of Accounting, Users of accounting information, Reliability, Relevance, Understandability, Comparability, Assets, Liabilities, Capital, Expense, Income, Expenditure, Revenue, Debtors, Creditors, Goods, Cost, Gain, Stock, Purchase, Sales, Loss, Profit, Voucher, discount, Transaction, Drawings.

**Theory Base of Accounting**

Accounting concepts, Accounting principles, Consistency, Going concern, Accrual, Cost, Conservatism (Prudence), Matching, Money measurement, Accounting Period, Business entity, Dual Aspect, Revenue recognitions, Full Disclosure, Materiality, Objectivity, Double entry system, Single entry system, Accrual basis of accounting, Cash basis of accounting, Accounting standards, IFRS

**Recording of Business Transactions**

Source Documents, Accounting Vouchers, Accounting equation, Impact of Business transactions, Debit, Credit, Rules of Debit and Credit, Analysis of Business transactions, Debit, Credit, Rules of Debit and Credit, Analysis of Business transactions, Cash Book, Types of cash book, Single column Cash book, Double Column Cash book, Three column Cash book, Petty cash book, Contra entry, Imprest system of petty cash book, Special purpose books, Subsidiary books, Purchases book, Sales Book, Purchases Return books, Sales returns book, Journal proper, Ledger, Principal book of Accounting, Balancing of Ledger accounts, Bank Reconciliation Statement, BRS, Reasons of differences between Bank column of Cash book and Pass book

**Trial Balance and Rectification of Errors**

Trial Balance, Compensating Error, Commission, Error of Principle, Error Omission, Trial Balance, Compensating Error, Error of Commission, Error of Principle, Error Omission, Suspense Account,

**Depreciation, Provisions & Reserves**

Source Documents, Depreciation Vouchers, Reserve and Provision, Revenue and Capital Reserve,

**ABOUT INSTRUCTOR**

Dr. Shipra Vaidya is Professor of Commerce in Department of Education in Social Sciences, NCERT, New Delhi. Her area of specialisation includes Accounting, Budgeting and Finance; Business Entrepreneurship and Computerised Accounting System. She is a member coordinator for NCERT's Commerce Curriculum and Textbooks at the higher secondary stage.



**PROF. SUNITA FARKYA**

Faculty in Department of Education in Science and Mathematics, NCERT, New Delhi

**DR. YASH PAUL SHARMA**

Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi

**FIRST CYCLE : Oct 30, 2017 To Apr 30, 2018**

<https://swayam.gov.in/courses/4321-ncert-biology-01-class-11>

**SECOND CYCLE : June 1, 2018 To Nov 30, 2018**

<https://swayam.gov.in/courses/4930-ncert-biology-01-class-xi-2018>

**ABOUT THE COURSE**

Biology is the science of life forms and living processes. The living world comprises a wide diversity of organisms. The observation of the diverse forms of life on earth was made initially through the naked eyes and later by using instruments such as magnifying lenses and microscopes. The organisms were described on the basis of observed structural features, both external and internal. The detailed description of life forms on the basis of appearance external and internal features brought out their concept of diversity. It is the cell theory that emphasised the unity underlying this diversity of forms, i.e., the cellular organisation of all life forms. Cell theory also created a sense of mystery around living phenomena, i.e., physiological and behavioural processes. This mystery was the requirement of integrity of cellular organisation for living phenomena to be demonstrated or observed. This is a 6 months course. Each week, one module containing eText, Video tutorial along with Self Assessment and Weblinks for extra study will be released.

**COURSE SCHEDULE****The Living World**

Biodiversity, Binomial Nomenclature, Taxonomy, Systematics, Species, Genus, Family, Kingdom, Phylum, Class, Order Family, Genus, Species, Herbarium, Monographs

**Biological Classification**

Biological classification, Two Kingdom System Of Classification, Five Kingdom system of Classification, Monera, Protista, Fungi, Animalia, Plantae,

**Plant Kingdom**

Thallophyta, Chlorophyta, Rhodophyta, Phaeophyta, Isogamous, Anisogamous, Eutrophication, Pyrenoids, Phycocolloid, Bryophytes, Rhizoid, Gemma, Protonema, Antheridium, Pteridophyta, Sphenophyta, Gymnosperms, Angiosperms, Cone, Flower, Pollen Grain, Embryo, Monocot, Dicot, Fruit, Cotyledons

**Animal Kingdom**

Biodiversity, classification, Phylum Porifera, Phylum Cnideria, Features of animals as the basis of classification: Grade of organisation, Body plan, Symmetry.

**Morphology of Flowering Plants**

Meristematic tissue, permanent tissue, xylem, phloem, Tissue Systems, Dermal System, Ground Tissue System, Vascular

**Anatomy of Flowering Plants**

Tissue System, Anatomy of stem, Anatomy of roots, Anatomy of leaf, Secondary Vascular Growth, Heart wood and Sap wood, Periderm,

**Structural organisation in Animals Cell: Unit of life**

Cell Theories, Prokaryotic cell, Eukaryotic cell, Cell Components, Cell Processes, Cell Mechanics, Active transport, passive transport, endomembrane system, endoplasmic reticulum, Golgi apparatus, nucleus, chromatin, cytoskeleton, cilia, flagella

**Biomolecule**

Primary Metabolites and Secondary Metabolites, Biomacromolecules, Polysaccharides, Proteins, Nature of bond linking monomers in a polymer, Structure of proteins, Classification of proteins based on structural complexity, Nucleic Acids

**Cell Cycle and Cell division**

Mitosis, Meiosis, cell division

**ABOUT INSTRUCTOR****Sunita Farkya**

Dr. Sunita Farakya is Professor in Department of Education in Science and Mathematics, NCERT, Her area of specialization includes Plant Biotechnology, Biological Control of weeds, Production of Secondary metabolites. She has completed projects named 'Studies on the production of secondary metabolites from plant cell culture' funded by CSIR; 'Study of Post Graduate Teachers' (PGTs) understanding of Plant tissue culture and genetic engineering (Biotechnology) and their application to human welfare'; 'Studies on the production of anti cancer drug in cell and hairy root cultures of Thuja spp.' funded by UGC. She has further worked on Plant tissue culture techniques, Photochemistry, Molecular Biology Techniques, Microbial Techniques, Chromatographic techniques, Electrophoresis techniques, enzyme extraction and activity assay, toxicity studies and many more.

**Dr. Yash Paul Sharma**

Dr. Yash Paul Sharma has worked as Assistant Professor in the Central Institute of Educational Technology, NCERT, New Delhi. With PhD degree in Zoology and one year PostDoc from CSIR, Dr. Sharma has interests in Taxonomy, evolutionary Biology and integrating ICT to teach biological concepts. Dr. Sharma has discovered several new species of ants with co-workers with publications in many international journals of repute.





**DR. C.V. SHIMRAY**

Associate Professor in the Department of Education in Science and Mathematics, NCERT, New Delhi

**DR. YASH PAUL SHARMA**

Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi

**FIRST CYCLE : July 01, 2017 To Dec 31, 2017**  
<https://swayam.gov.in/course/3866-ncert-biology-03-class-12>

**SECOND CYCLE : June 1, 2018 To Nov 30, 2018**  
<https://swayam.gov.in/courses/5042-ncert-biology-03-class-xii-2018>

**ABOUT THE COURSE**

The course is designed for class 12th on NCERT textbook pattern. The course will deal with Reproduction in Organisms, Sexual Reproduction in Flowering plants, Human Reproduction and Reproductive Health from Unit 6. It also deals with Principles of Inheritance and Variation, Molecular Inheritance and Evolution from Unit 7. These chapters are divided into modules as per syllabus and each module will be having eContent file, Video tutorial, Self Assessment questions and Weblinks. Apart from it Transcription of the video will also be provided. This is a 6 months course. Each week, one module containing eText, Video tutorial along with Self Assessment and Weblinks for extra study will be released.

**COURSE SCHEDULE****Reproduction in Organisms**

Reproduction, Life Span, Asexual Reproduction, Sexual Reproduction, clone, Sexual reproduction, Juvenile phase, Vegetative phase, Oestrous cycle, Menstrual Cycle, Gametogenesis, zygote, embryogenesis,

**Sexual Reproduction in Flowering Plants**

Flower, stamen, microsporangium, pollen grain, microsporogenesis, outbreeding devices, pollen-pistil interaction, artificial hybridisation, emasculation, ovule, double fertilisation, triple fusion, apomixis, polyembryony

**Human Reproduction**

Sexual dimorphism, testes, accessory ducts, external genitalia, male germ cells, spermatogenesis, spermiation, seminiferous tubules, Leydig's cells, interstitial cells, Ootid, polar body, Graafian follicles, fallopian tube, mammary glands, corpus luteum, Fertilisation, Zygote, Polar body, cleavage, blastomeres, trophoblast, inner cell mass, placenta, implantation, pregnancy, parturition, lactation, colostrum

**Reproductive Health**

Reproductive health, RCH. AIDS, Sexual diseases, contraceptive methods, reproductive health, test tube baby, infertility, reproductive diseases. Sexually transmitted diseases (STD), medical termination of pregnancy (MTP)

**Principles of Inheritance and Variation**

Gene, Allele, Dominant, Recessive, Homozygous, Heterozygous, Genotype, Phenotype, Punnett's Square, F<sub>1</sub> and F<sub>2</sub> generations or progenies, Gene, Allele, Dominant, Recessive, Homozygous, Heterozygous, Genotype, Phenotype, Punnett's Square, F<sub>1</sub> and F<sub>2</sub> generations or progenies, Pleiotropy, polygenic inheritance, Linkage, Recombination, crossing over, sex determination, Dihybrid cross, Independent assortment, Linkage, recombination, sex chromosomes, autosomes, heterogametic sex, pedigree analysis, aneuploidy and polyploidy.

**Molecular basis of Inheritance**

Nucleoside, nucleotide, phosphodiester linkage, histone octamer, nucleosome, euchromatin, heterochromatin, transforming principle, bacteriophage, RNA world, semi-conservative, point mutation, adapter RNA, charging of t-RNA, translation, untranslated regions, operon, repressor, inducer, DNA, Human Genome Project, DNA fingerprinting

**Evolution**

Big Bang Theory, Nebular Hypothesis, Biopoiesis, Abiogenesis, Biogenesis, Panspermia, Coacervates, Chemical Evolution, Paleontology, Zoogeography, Phytogeography, Vestigial organs, Paleontology, Taxonomy, Biochemistry, Physiology, Biological evolution, Lamarckism, *Dryopithecus*, *Ramapithecus*, *Australopithecus*, *Homo habilis*, *Homo erectus*, *Homo sapiens*, *Neanderthal*, *Cro-Magnon*

**ABOUT INSTRUCTOR****Dr. C. V. Shimray**

Dr. C.V. Shimray is a faculty in Biology in the Department of Education in Science and Mathematics, NCERT, New Delhi. Her area of specialization includes Zoology (Entomology) and Environmental Education. She was a member of the development team for Biology Classes XI and XII Textbooks and Laboratory Manual in Biology for Classes XI and XII.

**Dr. Yash Paul Sharma**

Dr. Yash Paul Sharma has worked as Assistant Professor in the Central Institute of Educational Technology, NCERT, New Delhi. With PhD degree in Zoology and one year PostDoc from CSIR, Dr. Sharma has interests in Taxonomy, evolutionary Biology and integrating ICT to teach biological concepts. Dr. Sharma has discovered several new species of ants with co-workers with publications in many international journals of repute.



**PROF. ALKA MEHROTRA**

Faculty in the Department of Education in Science and Mathematics, NCERT, New Delhi

**DR. AERUM KHAN**

Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi

**PROF. ANJNI KOUL**

Faculty in the Department of Education in Science and Mathematics, NCERT, New Delhi

**FIRST CYCLE : July 8, 2017 To Dec 31, 2017**

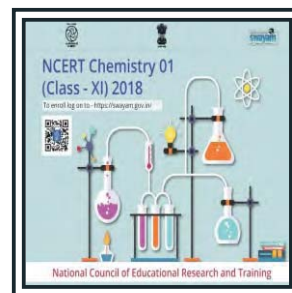
<https://swayam.gov.in/course/3898-ncert-chemistry-01-class-11>

**SECOND CYCLE : June 1, 2018 To Nov 30, 2018**

<https://swayam.gov.in/courses/4931-ncert-chemistry-01-class-xi-2018>

**ABOUT THE COURSE**

The subject of Chemistry is intimately linked to the well-being of human kind. The rate of development in this subject is too high. Keeping this in mind this course is developed, it is intended to cover Some Basic Concepts of Chemistry, Structure of Atom, Classification of Elements and Periodicity in properties, Chemical Bonding and Molecular Structure, States of Matter, Thermodynamics and Equilibrium the following topics for the students of Class XI, Semester 1 specifically, and others interested in general. These chapters are divided into modules as per syllabus and each module will be having eContent, Video tutorial, Self Assessment questions and Weblinks. Apart from it Transcription of the video will also be provided. This is a 6 months course. Each week, one module containing eText, Video tutorial along with Self Assessment and Weblinks for extra study will be released.

**COURSE SCHEDULE**

**Some Basic Concepts of Chemistry :** Importance of Chemistry, Nature of Matter, properties of matter and their measurement, uncertainty in measurement, laws of chemical combinations, Dalton's atomic theory, atomic and molecular masses, mole concept and molar masses, percentage composition, stoichiometry and stoichiometric calculations

**Structure of Atom :** Discovery of sub-atomic Particles, Atomic models, developments leading to Bohr's model of atom, Bohr's model for hydrogen atom, quantum mechanical model of the atom

**Classification of Elements and periodicity in properties :** Need of classifying elements, genesis of periodic classification, modern periodic law and the present form of the periodic table, nomenclature of elements with atomic number >100, Electronic Configurations of Elements and the Periodic Table, Electronic Configurations and Types of Elements, s-, p-, d-, f- Blocks, Periodic Trends in Properties of Elements

**Chemical Bonding and Molecular Structure :** Kössel-Lewis Approach to Chemical Bonding, Ionic or Electrovalent Bond, Bond Parameters, The Valence Shell Electron Pair Repulsion (VSEPR) Theory, Valence Bond Theory, Hybridisation, Molecular Orbital Theory, Bonding in Some Homonuclear Diatomic Molecules, Hydrogen Bonding

**States of Matter :** Intermolecular Forces, Thermal Energy, Intermolecular Forces vs Thermal Interactions, The Gaseous State, The Gas Laws, Ideal Gas Equation, Kinetic Energy and Molecular Speeds, Kinetic Molecular Theory of Gases, Behaviour of Real Gases: Deviation from Ideal Gas Behaviour, Liquefaction of Gases, Liquid State

**Thermodynamics :** Thermodynamic Terms, Applications, Measurement of  $\Delta U$  and  $\Delta H$ : Calorimetry, Enthalpy Change,  $\Delta_r H$  of a Reaction – Reaction Enthalpy, Enthalpies for Different Types of Reactions, Spontaneity, Gibbs Energy Change and Equilibrium

**Equilibrium :** Equilibrium in Physical Processes, Equilibrium in Chemical Processes – Dynamic Equilibrium, Law of Chemical Equilibrium and Equilibrium Constant, Homogeneous Equilibria, Heterogeneous Equilibria, Applications of Equilibrium Constants, Relationship between Equilibrium Constant K, Reaction Quotient Q and Gibbs Energy G, Factors Affecting Equilibria, Ionic Equilibrium in Solution, Acids, Bases and Salts, Ionization of Acids and Bases, Buffer Solutions, Solubility Equilibria of Sparingly Soluble Salts

**ABOUT INSTRUCTOR****Dr. Alka Mehrotra**

Dr. Alka Mehrotra is Professor in Department of Education in Science and Mathematics, NCERT, she is specialized in Organic Chemistry and has vast experience in Science Education. She has been the member of NCERT's Textbook development team for Chemistry at different levels.

**Dr. Anjni Koul**

Dr. Anjni Koul has 13 years of Research/ Teaching experience in National and International Laboratories/ Universities. CSIR Research Associate in School of Life Sciences, Jawaharlal Nehru University, New Delhi (1991-1997). Post Doctoral Fellow in Department of Dermatology, Case Western University, Cleveland, Ohio, U.S.A (1997- 1998). Pool Scientist (CSIR) in Department of Biochemistry, Punjab University, Chandigarh (1999- 2001). Presently working as Professor of Chemistry in Department of Education in Science and Mathematics, NCERT.

**Dr. Aerum Khan**

Dr. Aerum Khan has worked as Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi from a long time. She has Ph.D. degrees in

Plant Physiology and Biochemistry, and Education (Science Education), and teaching experience of more than 12 years. Her areas of research interest include ICT integration in School and Higher Education, Plant Physiology and Biochemistry, and Pedagogical aspects of Science Education. She has published many Research articles/ papers, books and deliberated more than 60 Research papers in National and International Conferences and seminars. The first PG Course in 'Education' developed by her and team is launched by UGC on the SWAYAM Platform.



**PROF. ALKA MEHROTRA**

Faculty in the Department of Education in Science and Mathematics, NCERT, New Delhi

**DR. AERUM KHAN**

Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi

**PROF. ANJNI KOUL**

Faculty in the Department of Education in Science and Mathematics, NCERT, New Delhi

**FIRST CYCLE : July 8, 2017 To Dec 31, 2017**

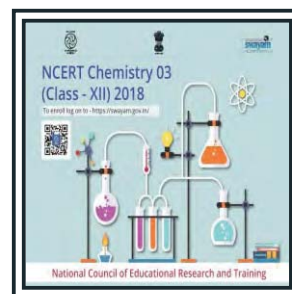
<https://swayam.gov.in/course/3899-ncert-chemistry-03-class-12>

**SECOND CYCLE : June 1, 2018 To Nov 30, 2018**

<https://swayam.gov.in/courses/4932-ncert-chemistry-03-class-xii-2018>

**ABOUT THE COURSE**

Chemistry is the study of matter and its properties. How and why substances combine or separate to form other substances, how substances interact to absorb or produce energy. Chemistry is known as the central branch of science because it touches all other natural sciences like biology, physics, geology and many more. It has made a profound impact on the society. This course is designed for class 12th on NCERT textbook pattern, it is intended to cover topics on Solid State, Solutions, Electrochemistry, Chemical Kinetics, Surface Chemistry, General Principles and Processes of Isolation of Elements, The *p*-Block Elements, *d* and *f*-Block Elements and coordination compounds for the students of Class XII, Semester 1 specific, and others interested in general. This is a 6 months course. Each week, module(s) containing eText, Video tutorial along with Self Assessment questions and Weblinks for extra study will be provided for learning.

**COURSE SCHEDULE**

**The Solid State :** General Characteristics of Solid State, Amorphous and Crystalline Solids, Classification of Crystalline Solids, Crystal Lattices and Unit Cells, Number of Atoms in a Unit Cell, Close Packed Structures, Packing Efficiency, Calculations Involving Unit Cell Dimensions, Imperfections in Solids, Electrical Properties, Magnetic Properties

**Solutions :** Types of Solutions, Expressing Concentration of Solutions, Solubility, Vapour Pressure of Liquid Solutions, Ideal and Non-ideal Solutions, Colligative Properties and Determination of Molar Mass, Abnormal Molar Masses

**Electrochemistry :** Electrochemical Cells, Galvanic Cells, Nernst Equation, Conductance of Electrolytic Solutions, Electrolytic Cells and Electrolysis, Batteries, Fuel Cells, Corrosion

**Chemical Kinetics :** Rate of a Chemical Reaction, Factors Influencing Rate of a Reaction, Integrated Rate Equations, Pseudo First Order Reaction, Temperature Dependence of the Rate of a Reaction, Collision Theory of Chemical Reactions, Adsorption, Catalysis, Colloids, Classification of Colloids, Emulsions, Colloids Around Us

**General Principles and Processes of Isolation of Elements :** Occurrence of Metals, Concentration of Ores, Extraction of Crude Metal from Concentrated Ore, Thermodynamic Principles of Metallurgy, Electrochemical Principles of Metallurgy, Oxidation Reduction, Refining, Uses of Aluminium, Copper, Zinc and Iron

**The p-Block Elements :** Group 15 Elements, Dinitrogen, Ammonia, Oxides of Nitrogen, Nitric Acid, Phosphorus – Allotropic Forms, Phosphine, Phosphorus Halides, Oxoacids of Phosphorus, Group 16 Elements, Dioxygen, Simple Oxides, Ozone, Sulphur – Allotropic Forms, Sulphur Dioxide, Oxoacids of Sulphur, Sulphuric Acid, Group 17 Elements, Chlorine, Hydrogen Chloride, Oxoacids of Halogens, Interhalogen Compounds, Group 18 Elements

**The d-and f-Block Elements :** Position in the Periodic Table, Electronic Configurations of the d-Block Elements, General Properties of the Transition Elements (d-Block), Some Important Compounds of Transition Elements, The Lanthanoids, The Actinoids, Some Applications of d- and f-Block Elements

**Coordination Compounds :** Werner's Theory of Coordination Compounds, Definitions of Some Important Terms Pertaining to Coordination Compounds, Nomenclature of Coordination Compounds, Isomerism in Coordination Compounds, Bonding in Coordination Compounds, Bonding in Metal Carbonyls, Stability of Coordination Compounds, Importance and Applications of Coordination

**ABOUT INSTRUCTOR****Dr. Alka Mehrotra**

Dr. Alka Mehrotra is Professor in Department of Education in Science and Mathematics, NCERT, she is specialized in Organic Chemistry and has vast experience in Science Education. She has been the member of NCERT's Textbook development team for Chemistry at different levels.

**Dr. Anjni Koul**

Dr. Anjni Koul has 13 years of Research/ Teaching experience in National and International Laboratories/ Universities. CSIR Research Associate in School of Life Sciences, Jawaharlal Nehru University, New Delhi (1991-1997). Post Doctoral Fellow in Department of Dermatology, Case Western University, Cleveland, Ohio, U.S.A (1997- 1998). Pool Scientist (CSIR) in Department of Biochemistry, Punjab University, Chandigarh (1999- 2001). Presently working as Professor of Chemistry in Department of Education in Science and Mathematics, NCERT.

**Dr. Aerum Khan**

Dr. Aerum Khan has worked as Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi from a long time. She has Ph.D. degrees in Plant Physiology and Biochemistry, and Education (Science Education), and teaching experience of more than 12 years. Her areas of research interest include ICT integration in School and Higher Education, Plant Physiology and Biochemistry, and Pedagogical aspects of Science Education. She has published many Research articles/ papers, books and deliberated more than 60 Research papers in National and International Conferences and seminars. The first PG Course in 'Education' developed by her and team is launched by UGC on the SWAYAM Platform.



**PROF. APARNA PANDEY**

Faculty in Department of Education in  
Social Sciences, NCERT, New Delhi

**DR. ARCHANA**

Assistant Professor in Central Institute of Educational  
Technology, NCERT, New Delhi

**FIRST CYCLE : July 8, 2017 To Dec 31, 2017**

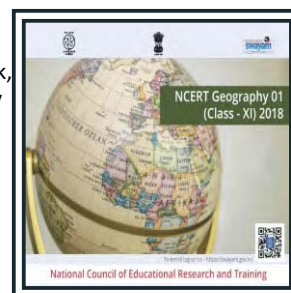
<https://swayam.gov.in/course/3900-ncert-geography-01-class-11>

**SECOND CYCLE : June 1, 2018 To Nov 30, 2018**

<https://swayam.gov.in/courses/4933-ncert-geography-01-class-xi-2018>

**ABOUT THE COURSE**

You have studied Geography as one of the components of social sciences up to secondary stage. Now you will study Geography as an independent subject and learn about the physical environment of the earth, human activities and their interactive relationships. We live on the surface of the earth. Our lives are affected by our surroundings in many ways. We depend on the resources to sustain ourselves in the surrounding areas. This course is designed on NCERT textbook pattern. It is intended for the students of Class XI, Semester 1 specific, and others interested in general. This is a 6 months course. Each week, module(s) containing eText, Video tutorial along with Self Assessment questions and Weblinks for extra study will be provided for learning.

**COURSE SCHEDULE****Unit 1 Geography as a Discipline :**

1. Geography as an integrating discipline, as a science of spatial attributes.
2. Branches of geography; importance of physical geography

**Unit 2 The Earth :**

1. Origin and evolution of the earth
2. Interior of the earth
3. Wegener's continental drift theory and plate tectonics
4. Earthquakes and volcanoes

**Unit 3 Landforms**

1. Rocks and minerals – major types of rocks and their characteristics
2. Landforms and their evolution
3. Geomorphic processes – weathering, mass wasting, erosion and deposition; soils – formation

**Unit 4 Climate**

1. Atmosphere – compositions and structure; elements of weather and climate
2. Insolation – angle of incidence and distribution; heat budget of the earth – heating and cooling of atmosphere (conduction, convection, terrestrial radiation, advection); temperature – factors controlling temperature; distribution of temperature – horizontal and vertical; inversion of temperature
3. Pressure – pressure belts; winds – planetary seasonal and local, air masses and fronts; tropical and extra tropical cyclones
4. Precipitation – evaporation; condensation – dew, frost, fog, mist and cloud; rainfall – types and world distribution
5. World climate - classification (Koeppen), Greenhouse effect, global warming and climate changes.

**Unit. 5 Water (Oceans)**

1. Hydrological Cycle
2. Oceans – submarine relief; distribution of temperature and salinity; movements of ocean water – waves, tides and currents

**Unit. 6 - Life on the Earth**

1. Biosphere – importance of plants and other organisms
2. Biodiversity and conservation; ecosystems, bio-geo chemical

**ABOUT INSTRUCTOR****Prof Aparna Pandey**

Prof. Aparna Pandey is working as Professor in Department of Education in Social Sciences, NCERT, New Delhi. Her areas of specialisation include Geography education, urban and regional planning, environmental studies, remote sensing and Geographical Information System.

**Dr. Archana**

Dr. Archana has worked as Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi. She has Ph.D. degree in urban Geography. Her areas of research interest include ICT and Urban Geography. She is also involved in development and



**PROF. APARNA PANDEY**

Faculty in Department of Education in  
Social Science, NCERT, New Delhi

**DR. ARCHANA**

Assistant Professor in Central Institute of  
Educational Technology, NCERT, New Delhi

**FIRST CYCLE : July 8, 2017 to Dec 31, 2017**

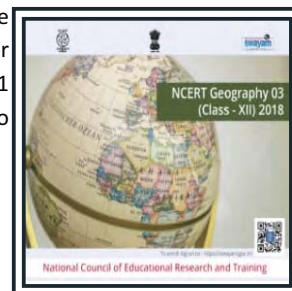
<https://swayam.gov.in/course/3901-ncert-geography-03-class-12>

**SECOND CYCLE : June 1, 2018 to Nov 30, 2018**

<https://swayam.gov.in/courses/4934-ncert-geography-03-class-xii-2018>

**ABOUT THE COURSE**

Geography is as an elective subject at the higher secondary stage. It is an academic discipline and school subject with defined perspective, knowledge and skills. Geographical knowledge is useful in daily lives because it is a valuable medium for the education of young people. Its contribution lies in the content, cognitive processes, skills and values that geography promotes and thus helps the students explore, understand and evaluate the environmental and social dimensions of the world in a better manner. This course is designed on NCERT textbook pattern. It is intended for the students of Class XII, Semester 1 specific, and others interested in general. This is a 6 months course. Each week, module(s) containing eText, Video tutorial along with Self Assessment questions and Weblinks for extra study will be provided for learning.

**COURSE SCHEDULE****Unit 1 Human Geography**

1. Nature and Scope of human Geography

**Unit 2. People**

1. Population of the world – distribution, density and growth
2. Population change-spatial patterns and structure; determinants of population change
3. Age-sex ratio; rural-urban composition
4. Human development – concept; selected indicators, international comparisons

**Unit 3. Human Activities**

1. Primary activities – concept and changing trends; gathering, pastoral, mining, subsistence agriculture, modern agriculture; people engaged in agriculture and allied activities – some examples from selected countries;
2. Secondary activities – concept; manufacturing: agro-processing, household, small scale, large scale; people engaged in secondary activities – some examples from selected countries
3. Tertiary activities – concept; trade, transport and communication; services; people engaged in tertiary activities – some examples from selected countries
4. Quaternary activities – concept; knowledge based industries; people engaged in quaternary activities – some examples from selected countries

**Unit 4 Transport, Communication and Trade**

1. Land transport – roads, railways – rail network; trans-continental railways
2. Water transport- inland waterways; major ocean routes
3. Air transport – Intercontinental air routes
4. Oil and gas pipelines
5. Satellite communication and cyber space
6. International trade – Basis and changing patterns; ports as gateways of international trade, role of WTO in International trade.

**Unit. 5. Human Settlements**

1. Settlement types – rural and urban; morphology of cities
2. Distribution of mega cities; problems of human settlements in developing countries.

**ABOUT INSTRUCTOR****Dr. Tannu Malik**

Dr. Tannu Malik is working as Associate Professor in Department of Education in Social Sciences, NCERT, and New Delhi. Her areas of specialisation are Geography education, Environment education and Disaster Management.

**Dr. Archana**

Dr. Archana has worked as Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi. She has Ph.D. degree in urban Geography. Her areas of research interest include ICT and Urban Geography. She is also involved in development and





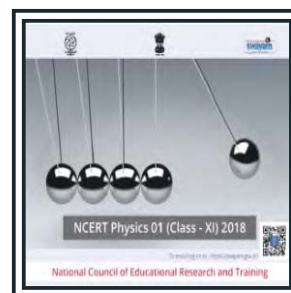
**MRS. ANURADHA MATHUR**  
Head Mathematics (Retd.) Modern School,  
Vasant Vihar, New Delhi

**FIRST CYCLE** : July 01, 2017 to Dec 31, 2017  
<https://swayam.gov.in/course/3836-ncert-physics-01-class-11>

**SECOND CYCLE** : June 1, 2018 to Nov 30, 2018  
<https://swayam.gov.in/courses/4937-ncert-physics-01-class-xi-2018>

### ABOUT THE COURSE

The world around us has an astonishing variety of phenomenon. Physics gives us a chance to take a close look and try to understand these. We have evidence to support the work since ancient times by thinkers, philosophers and scientists, who tried to unravel the mystery around us. The excitement of learning to do systematic scientific work is the root of this course. You will learn methods of measurement-including universally accepted norms. Kinematics and Dynamics, one that helps us realise how things move and the other what causes them to move. Some energy is required to move things and we will define some scientific terminology in a way that communication about physics to others is easy. This course is designed on NCERT textbook pattern. It is intended for the students of 23 Class XI, Semester 1 specific, and others interested in general. This is a 6 months course. Each week, module(s) containing eText, Video tutorial along with Self Assessment questions and Weblinks for extra study will be provided for learning.



### COURSE SCHEDULE

**Unit 1 :** Physical World and Measurement

**Unit 2:** Kinematics

**Unit 3:** Laws of Motion

**Unit 4:** Work, Energy and Power

**Unit 5:** Motion of System of Particles

**Unit 6:** Gravitation

### ABOUT INSTRUCTOR

**Mrs. Anuradha Mathur**

Anuradha Mathur has been teaching Physics since 1975 at secondary and senior secondary level. She has also taught physics to undergraduate students at Harvard University Boston She represented Indian schools at ICT conference in Hawaii, Paris GATE Global Alliance for Transnational Education, IIT Delhi and IIM Bangalore. At Modern School Vasant Vihar New Delhi she was head of Physics and head of Resource Center . She set up the resource centre 1997 and a virtual school in 2000. She led the development of a diagnostic e-test , for the process of teaching and learning. She developed techniques to evolve net based projects, science exhibitions, science toys production and creative models, many of these were awarded at national and international level. She has been part of development team for teaching learning material for CBSE, NCERT ,NIOS ,ICSE since 1983.She was also member of Textbook Development Committee for senior secondary physics text book (2006). She is currently actively working on development of material for National Repository of Open Educational Resource (NROER) at CIET NCERT.



**MRS. ANURADHA MATHUR**

Head Mathematics (Retd.) Modern School,  
Vasant Vihar, New Delhi

**MRS. CHITRA GOEL**

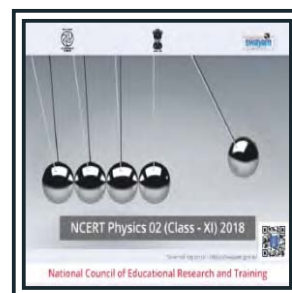
Principal (Retd.) Rajkiya Pratibha Vikas  
Vidyalaya, New Delhi

**FIRST CYCLE : June 1, 2018 to Nov 30, 2018**

<https://swayam.gov.in/courses/5061-ncert-physics-02-class-xi-2018>

**ABOUT THE COURSE**

Physics Course 2 covers the second book of physics for class 11. The course starts with bulk properties of matter, giving scientific names to many phenomenon that we observe around us. Why materials show peculiar behaviour in different states is analysed. This part is therefore very exciting. We will cover kinetic theory of gases and thermodynamics. Both these units will help us to justify the behavior of gases for innumerable uses related to getting mechanical work done by heat. The challenging unit on oscillations and waves has been dealt with differently to explain kinematics and dynamic of oscillators. Wave motion as a method of energy propagation and properties of waves, the cases of superposition are explained with simplicity. The course has 4 units covered over 42 modules for better understanding. Based on feedback from teachers and students we have included modules after completion of each unit to enhance the unit by additional examples and explanations.

**OBJECTIVES**

- Understand bulk properties of matter
- Relate to kinetic theory of gases
- Recognise thermodynamics
- Appreciate oscillatory motion and wave propagation

**COURSE SCHEDULE**

**Unit 7:** PROPERTIES OF BULK MATTER

**Unit 8:** Thermodynamics

**Unit 9:** Behaviour of Perfect Gases and Kinetic Theory of Gases

**Unit 10:** Oscillations and waves

**ABOUT INSTRUCTOR****Anuradha Mathur**

Anuradha Mathur has been teaching Physics since 1975 at secondary and senior secondary level. She has also taught physics to undergraduate students at Harvard University Boston. She represented Indian schools at ICT conference in Hawaii, Paris GATE Global Alliance for Transnational Education, IIT Delhi and IIM Bangalore. At Modern School Vasant Vihar New Delhi she was head of Physics and head of Resource Centre. She set up the resource centre 1997 and a virtual school in 37 2000. She led the development of a diagnostic e-test, for the process of teaching and learning. She developed techniques to evolve net based projects, science exhibitions, science toys production and creative models, many of these were awarded at national and international level. She has been part of development team for teaching learning material for CBSE, NCERT, NIOS, ICSE since 1983. She was also member of Textbook Development Committee for senior secondary physics text book (2006). She is currently actively working on development of material for National Repository of Open Educational Resource (NROER) at CIET NCERT.

**Chitra Goel**

Chitra Goel has 45 years of professional experience in teaching Physics and has worked in various capacities in the schools of the Directorate of Education GNCT Delhi. In addition to her regular teaching had also been actively associated with the NCERT, SCERT and the DOE. She designed and imparted special coaching to the needy and deserving students of various south Districts schools under DOE. This was to prepare them for common entrance tests in Engineering and Medicine resulting in high degree of success. She is the recipient of Pratibhanjali Award for academic Excellence for seven years; Teacher Excellence award by Lions Club of India in the year 2005; Dr S Radhakrishnan award for teachers of Excellence in 2006; State teacher award for excellence in imparting Education in 2008. She was Principal in Rajkiya Pratibha Vikas Vidyalaya.





**MS. ANURADHA MATHUR**  
Head Mathematics (Retd.) Modern School,  
Vasant Vihar, New Delhi

**FIRST CYCLE : 01/07/2017 to 31/12/2017**  
<https://swayam.gov.in/course/3846-ncert-physics-03-class-12>

**SECOND CYCLE : 01/06/2018 to 30/11/2018**  
<https://swayam.gov.in/courses/5061-ncert-physics-02-class-xi-2018>

### ABOUT THE COURSE

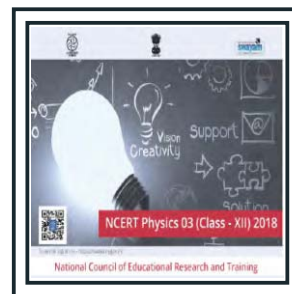
Course-3 in physics will cover very interesting phenomena that we have observe around us. The concepts of static electricity where we will understand electric charges and fields. We will learn methods of describing electric fields and their applications. we will also learn about charges in motion, about the two types of electricity around us- direct current and alternating current and also about generation of alternating current, behaviour of circuits with direct current and alternating current (with circuit elements like resistances, capacitors and inductors).

### COURSE SCHEDULE

- Unit 1:** Electrostatics
- Unit 2:** Current Electricity
- Unit 3:** Magnetic Effect of Current & Magnetism
- Unit 4:** Electromagnetic Induction & Alternating Current
- Unit 5:** Electromagnetic Waves

### ABOUT INSTRUCTOR

Anuradha Mathur has been teaching Physics since 1975 at secondary and senior secondary level. She has also taught physics to undergraduate students at Harvard University Boston She represented Indian schools at ICT conference in Hawaii, Paris GATE Global Alliance for Transnational Education, IIT Delhi and IIM Bangalore . At Modern School Vasant Vihar New Delhi she was head of Physics and head of Resource Center . She set up the resource centre 1997 and a virtual school in 2000. She led the development of a diagnostic e-test , for the process of teaching and learning. She developed techniques to evolve net based projects, science exhibitions, science toys production and creative models, many of these were awarded at national and international level. She has been part of development team for teaching learning material for CBSE, NCERT ,NIOS ,ICSE since 1983. She was also member of Textbook Development Committee for senior secondary physics text book (2006). She is currently actively working on development of material for National Repository of Open Educational Resource (NROER) at CIET NCERT.





**MRS. ANURADHA MATHUR**

Head Mathematics (Retd.) Modern School,  
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**MRS. CHITRA GOEL**

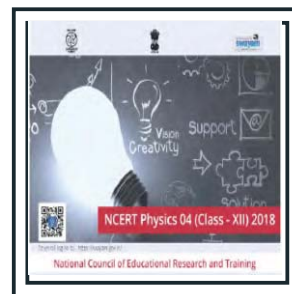
Principal (Retd.) Rajkiya Pratibha Vikas  
Vidyalaya, New Delhi

**FIRST CYCLE : 01/06/2018 to 30/11/2018**

<https://swayam.gov.in/courses/5062-ncert-physics-04-class-xii-2018>

**ABOUT THE COURSE**

Physics Course 4 covers the second book of physics for class 12. The units in this book provide motivation to learners to move towards intricate concepts of Physics. The nature of research and demand to know more has led to continuous and deeper understanding of reasons behind observed phenomenon. The course has 5 units spread over 43 modules. We start with optics and study it under ray optics, kind of macroscopic view of light and its interaction with objects around us. Wave optics, which proposes a microscopic explanation of the phenomenon of interference, diffraction and polarization. These cannot be explained using ray optics. The unit on dual nature of radiation and matter will present a unique view. The continuous and path breaking studies in quantum mechanics can be understood only if we understand initial scientific work which is in the unit of atoms and nuclei. Surrounded by electronics and technology, one will appreciate the unit on semiconductors and electronic devices. The unit is challenging as many new ideas will come up in the course. Likewise, the unit on communication will seem very basic, as there is fast scientific development in this field. The course does not demand high level of mathematics however, you will need to be regular as connections between various segments require deeper study and higher order thinking.

**OBJECTIVES**

Appreciate the need to study ray and wave optics

- Learn basics of dual nature of radiation and matter
- Know composition about atoms and nuclei and distribution of its constituents, radioactivity and nuclear energy
- Understand the behaviour of semiconductors and their application in making electronic devices
- Exposure to present day communication system

**COURSE SCHEDULE**

**Unit 6:** Optics

**Unit 7:** Dual Nature of Radiation and matter

**Unit 8:** Atoms and Nuclei

**Unit 9:** Electronic Devices

**Unit 10:** Communication systems

**ABOUT INSTRUCTOR**

Anuradha Mathur has been teaching Physics since 1975 at secondary and senior secondary level. She has also taught physics to undergraduate students at Harvard University Boston. She represented Indian schools at ICT conference in Hawaii, Paris GATE Global Alliance for Transnational Education, IIT Delhi and IIM Bangalore. At Modern School Vasant Vihar New Delhi she was head of Physics and head of Resource Center. She set up the resource centre 1997 and a virtual school in 2000. She led the development of a diagnostic e-test, for the process of teaching and learning. She developed techniques to evolve net based projects, science exhibitions, science toys production and creative models, many of these were awarded at national and international level. She has been part of development team for teaching learning material for CBSE, NCERT, NIOS, ICSE since 1983. She was also member of Textbook Development Committee for senior secondary physics text book (2006). She is currently actively working on development of material for National Repository of Open Educational Resource (NROER) at CIET NCERT.

Chitra Goel has 45 years of professional experience in teaching Physics and has worked in various capacities in the schools of the Directorate of Education GNCT Delhi. In addition to her regular teaching had also been actively associated with the NCERT, SCERT and the DOE. She designed and imparted special coaching to the needy and deserving students of various south Districts schools under DOE. This was to prepare them for common entrance tests in Engineering and Medicine resulting in high degree of success. She is the recipient of Pratibhanjali Award for academic Excellence for seven years; Teacher Excellence award by Lions Club of India in the year 2005; Dr S Radhakrishnan award for teachers of Excellence in 2006; State teacher award for excellence in imparting Education in 2008. She was Principal in Rajkiya Pratibha Vikas Vidyalaya.





## DR. TIL PRASAD SARMA

Associate Professor in Department of Education in Science and Mathematics, NCERT, New Delhi

## DR. MOHD. MAMUR ALI

Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi

**FIRST CYCLE : 30/10/2017 to 30/04/2018**

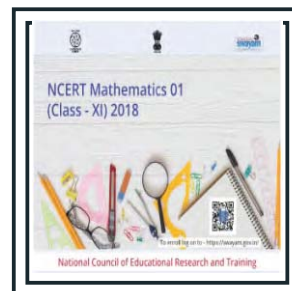
<https://swayam.gov.in/course/4325-ncert-mathematics-01>

**SECOND CYCLE : 01/06/2018 to 30/11/2018**

<https://swayam.gov.in/courses/5031-ncert-mathematics-01-class-xi-2018>

### ABOUT THE COURSE

Mathematics is a human activity, a social phenomenon a set of methods used to help illuminate the world and it is part of our culture. Mathematics is a part of our life experience which we talk about. Mathematics is the foundation and vitalizing energy for the basic sciences. Mathematics is not only about the developing new concepts but also developing a new meaningful language. Mathematics is a creative process, an art form expression of the human mind motivated by insight intuition and a desire to understand the world in which we live so intended for your effective and joyful learning. This is a 6 months course. Each week, one module containing eText, Video tutorial along with Self Assessment and Weblinks for extra study will be released.



### COURSE SCHEDULE

#### Unit 1-Sets and Functions

Sets Unit 1-Sets and Functions

Relations and Functions

Trigonometric Functions

#### Unit 2- Algebra

Principle of mathematical induction Unit 2- Algebra

Complex numbers and quadratic equations

Linear inequalities

Permutation and Combinations

Binomial Theorem

Sequence And Series

#### Unit 3- Coordinate geometry

Straight lines Unit

Conic sections

Introductions to 3-D geometry

### ABOUT INSTRUCTOR

Educational Qualification M.Sc. , Ph.D. (Mathematics) from University of Delhi

Areas of Work Mathematics Education at School level Development of Teaching Materials,

Teacher Training Material, Textual Material Research: Primary Mathematics, Mathematics Education, Mathematics

DR. MOHD. MAMUR ALI

working as Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi. He has about 10 years experiences in research, development and teaching at various level of education.





## DR. TIL PRASAD SARMA

Associate Professor in Department of Education in Science and Mathematics, NCERT, New Delhi

## DR. MOHD. MAMUR ALI

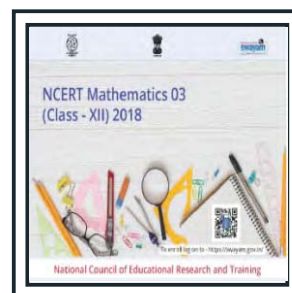
Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi

**FIRST CYCLE : 01/06/2018 to 30/11/2018**

**<https://swayam.gov.in/courses/5032-ncert-mathematics-03-class-xii-2018>**

### ABOUT THE COURSE

Mathematics is a human activity, a social phenomenon a set of methods used to help illuminate the world and it is part of our culture. Mathematics is a part of our life experience which we talk about. Mathematics is the foundation and vitalizing energy for the basic sciences. Mathematics is not only about the developing new concepts but also developing a new meaningful language. Mathematics is a creative process, an art form expression of the human mind motivated by insight intuition and a desire to understand the world in which we live so intended for your effective and joyful learning. The course will deal with the concepts from class 12th mathematics like certain Relations and Functions, Algebra, and Calculus. This is a 6 months course. Each week, one module containing eText, Video tutorial along with Self Assessment and Weblinks for extra study will be released.



### LEARNING OUTCOMES

After completion of the course, the learners will be able to:

1. Understand relation and function including Inverse Trigonometric Functions.
2. Matrices, Determinants etc.
3. Continuity and Functions, Application of derivatives, Integrals, Applications of Integrals and Differential equation

### COURSE SCHEDULE

#### Unit 1-Sets and Functions (19 modules=9 hrs 30 mins)

Sets  
Relations and Functions  
Trigonometric Functions

#### Unit2- Algebra (25 modules=12 hrs 30 mins)

Principle of mathematical induction  
Complex numbers and quadratic equations  
Linear inequalities  
Permutation and Combinations  
Binomial Theorem  
Sequence and Series

#### Unit 3- Coordinate geometry (13 modules=6 hrs 30 mins)

Straight lines  
Conic sections  
Introductions to 3-D geometry

#### Unit 1-Relations and Functions(7 modules=3 hrs 30 min)

Relations and Functions  
Inverse Trigonometric Functions

#### Unit 2- Algebra(12 modules=6 hrs)

Matrices  
Determinants

#### Unit 3- Calculus (21 modules =10 hrs 30 mins)

Continuity and Differentiability  
Application of derivatives  
Integrals  
Applications of Integrals  
Differential Equation

### ABOUT INSTRUCTOR

Educational Qualification M.Sc. , Ph.D. (Mathematics) from University of Delhi, His areas of Work Mathematics Education at School level Development of Teaching Materials, Teacher Training Material, Textual Material Research: Primary Mathematics, Mathematics Education, Mathematics.

DR. MOHD. MAMUR ALI

working as Assistant Professor in Central Institute of Educational Technology, NCERT, New Delhi. He has about 10 years experiences in research, development and teaching at various level of education.



**PROF. MANJU BHATT**

Faculty in Department of Education in Social Sciences,  
NCERT, New Delhi

**DR. SHEETAL SHARMA**

Assistant Professor in Centre for European Studies,  
JNU, New Delhi

**FIRST CYCLE** : 30/10/2017 to 30/04/2018  
<https://swayam.gov.in/course/4274-ncert-sociology-01-class-11>

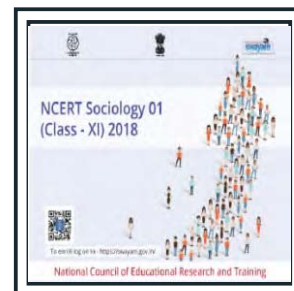
**SECOND CYCLE** : 01/06/2018 to 30/11/2018  
<https://swayam.gov.in/courses/4935-ncert-sociology-01-class-xi-2018>

**ABOUT THE COURSE**

The course covers the "Introducing Sociology" textbook of NCERT class XI. This is a 6 months course. Each week, one module containing eText, Video tutorial along with Self Assessment and Weblinks for extra study will be released.

**COURSE SCHEDULE**

1. Concept of Sociology and Society, (Sociology and relationship with other Social Sciences)
2. Terms, Concepts and Their Use in Sociology
3. Understanding Social Institutions
4. Culture and Socialization
5. Practical in Sociology: Methods and Techniques

**ABOUT INSTRUCTOR**

**1. Prof. Manju Bhatt** is Professor in Department of Education in Social Sciences, NCER. Her Educational Qualifications are MA, M.Phil., Ph.D. Her Areas of Interest and Specialisation are in Urban Sociology, Social Anthropology and Research Methodology.

**2. Sheetal Sharma**

Dr. Sheetal Sharma is Assistant Professor at the Centre for European Studies. Prior to her joining JNU, she was Lecturer since 1998 at Institute of Technology and Management, Gurgaon, India, and taught emergence of Sociological Theory in Europe and Methodology of Social Sciences as curriculum of degree program of London School of Economics and Political Science (LSE). Dr. Sharma holds a BA (Hon) in Sociology from the University of Delhi, and holds post graduate and doctorate degree in Sociology from the Centre for the Study of Social Systems, Jawaharlal Nehru University. Her research interests include social and cultural issues in contemporary Europe and India and their historical roots, Multiculturalism and Diversity, Methodology of Social Sciences, Gender and empowerment of women. Dr. Sharma avidly follows methodological and theoretical trends in Social Sciences and International Relations. She writes regularly on socially relevant issues in India and Europe for journals and magazines of national and international repute.



**DR. SHEETAL SHARMA**

Assistant Professor in Centre for European Studies,  
JNU, New Delhi

**FIRST CYCLE : 30/10/2017 to 30/04/2018**  
<https://swayam.gov.in/course/4275-ncert-sociology-03-class-12>

**SECOND CYCLE : 01/06/2018 to 30/11/2018**  
<https://swayam.gov.in/courses/4939-ncert-sociology-03-class-xii-2018>

**ABOUT THE COURSE**

Sociology is a study of society but you will be puzzled to understand that what is there in this society to study the subject of sociology is very interesting as it helps us to understand the very society in which we live without sometimes realizing that it is so society in which we live without sometimes realizing that it is so society in which we live without sometimes realizing that it is so political institutions economic institutions etc what do sociologists do sociologists try to understand the nature and composition of these various sociologists try to understand the nature and composition of these various sociologists attempt to understand that what is the structure of family say for example if you are talking about family as an institution how many family types are there what are the functions of the family so these are the various aspects that sociologists try to understand so now understanding what is sociology we can say that sociology is an academic or a systematic study of society which emerged in Europe during 17 th and 18 th century it is also very important for the students of sociology to understand that how did the discipline of sociology emerge and develop you will be exploring about the social conditions in which the academic study of society began and how various sociologists later on from Europe and later on from India contributed towards understanding of social system myself dr. Heath L Sharma along with Professor Manju Burt will be taking you through the interesting journey of making sense of social systems in which we operate in everyday life will be taking examples from everyday life to make our understanding interesting.

**COURSE SCHEDULE**

1. Introducing Indian Society
2. Demographic Structure
3. Social Institution
4. Market As A Social
5. Patterns of Social Inequality and Exclusion
6. Challenges of cultural Diversity
7. Suggestions for Project

**ABOUT INSTRUCTOR**

Dr. Sheetal Sharma is Assistant Professor at the Centre for European Studies. Prior to her joining JNU, she was Lecturer since 1998 at Institute of Technology and Management, Gurgaon, India, and taught emergence of Sociological Theory in Europe and Methodology of Social Sciences as curriculum of degree program of London School of Economics and Political Science (LSE). Dr. Sharma holds a BA (Hon) in Sociology from the University of Delhi, and holds post graduate and doctorate degree in Sociology from the Centre for the Study of Social Systems, Jawaharlal Nehru University.



**PROF. ANJUM SIBIA**

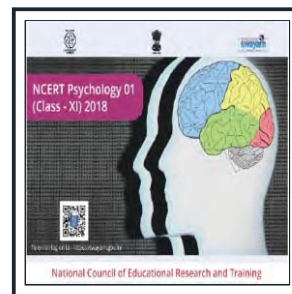
Faculty in Department of Educational Psychology and  
Foundations of Education, NCERT, New Delhi

**FIRST CYCLE : 01/06/2018 to 30/11/2018**

<https://swayam.gov.in/courses/5027-ncert-psychology-class-xi-2018>

**ABOUT THE COURSE**

The subject of psychology, which deals with human mind, behaviour and human relationship, can most appropriately lend itself to teaching with humanistic perspective. Such a perspective aims at enriching students knowledge as well as inspiring and awakening their curiosity, positive feelings, desire to learn, openness, exploration of self and others, etc. Such an approach is also conducive to their personal development and inculcation of positive attitude and love for the subjects. As for class XI students psychology will be a new subject, it would be important to dwell on the potential of the subject, its value in daily life and various career possibilities. Students, it is expected, will be made aware of the empirical nature of the discipline and the importance of adopting scientific approach in studying human behaviour. This course consists of nine chapters on topics considered essential for an introductory course in psychology like learning, thinking, memory, motivation and emotion, etc. Efforts have been made to provide linkages across and within the chapters to maintain continuity and holistic perspective. Meaningful contexts have been provided to relate the subject matter with day-to-day life.

**COURSE SCHEDULE****What is Psychology:**

What is Psychology, Evolution and Development of Psychology, Branches of Psychology and Themes of Research and Applications

**Methods of Enquiry in Psychology:**

Goals of Psychological Enquiry, Nature of Psychological Data and Important Method of its Enquiry, Experimental Method & Correlation Research and Survey Research & Psychological testing

**The Bases of Human Behaviour:**

Evolutionary Perspective of the Basis of Human Behaviour, Biological Basis of Human Behaviour & Cultural Basis of Human Behaviour

**Human Development:**

Meaning & Context of Human Development, Developmental Stages in Human: Childhood, Adolescence, Adulthood and Old Age & Factors influencing Human Development

**ABOUT INSTRUCTOR**

Dr. Anjum Sibia is a Professor of Psychology and has been working at the National Council of Educational Research and Training (NCERT) for last 25 years besides having eight years of prior experience of undergraduate teaching. She has contributed to the field by conducting research studies, preparing monographs and exemplar materials in the area of emotions and learning, innovative school practices, teacher questioning, emotional intelligence, peer tutoring, qualitative techniques, caring in teaching, and aesthetics in education, assessment of personal- social qualities and has undertaken evaluation of psychology textbooks. She has also published/presented papers, contributed book chapters and book reviews in these areas. She has coordinated and contributed as author in the development of the textbooks in psychology for senior secondary stage. As a member of various course committees she also provided academic inputs for designing of psychology syllabi, B.Ed courses, and Guidance and Counseling programmes.



**PROF. NEERAJA RASHMI**

Faculty in Department of Education in Social Sciences,  
NCERT, New Delhi

**FIRST CYCLE : 01/06/2018 to 30/11/2018**

<https://swayam.gov.in/courses/4940-ncert-economics-01-class-xi-2018>

**ABOUT THE COURSE**

The course on Indian Economic Development will give an idea to the learners about the foundation of Indian Economics & its development since Independence. The course will begin with a brief background of the Indian Economy on the eve of Independence. It will familiarise the learners with sectors of Indian Economy. It will also explain the planning process in India & its impact on different sectors of the economy. The reasons & processes of Economic reforms and the impact of economy will also be analysed. The learners will get an opportunity to know some of the major challenges facing the economy such as poverty, human capital formation, rural development, inflation, employment, infrastructure & sustainable development. A comparison of the development experience of India and its neighbouring countries will provide an idea of the perspective of development in these countries. We welcome you on the online course of Indian Economic Development. The course will deal with "Indian Economic Development" from class XI Economics. This is a 6 months duration course (26 weeks). Every two week one module will deliver. Each module of the course will have four quadrants, text, video, weblinks (to know more about the concept from other resources over the web), self assessment questions (MCQs, true/false, one word answers etc.).

**OBJECTIVES OF THE COURSE**

This course is intended to acquaint the students with the knowledge about:

- To expose the learners to some of the key issues facing the Indian economy
- To understand about foundation of Indian Economics & its development since Independence
- To familiarise the learners with sectors of Indian Economy
- To identify the reasons & processes of Economic reforms and the impact of economy
- To acquire skills to understand macroeconomic events which occur around them, and to critically evaluate and interpret the relevant information provided by the media

**COURSE SCHEDULE****1 Indian Economy on the Eve of Independence:**

Low level of Economic Development under Colonial Rule, Agricultural Sector, Foreign Trade, Industrial Sector, Demographic Condition, Occupational Structure, Infrastructure

**2 Indian Economy 1950-1990:**

The goals of Five Year Plans, Agriculture, Industry and Trade, Trade Policy

**3 Liberalisation, Privatisation and Globalisation:**

Liberalisation, Privatisation, Globalisation, Indian Economy During Reforms

**4 Poverty:**

Who are Poor?, How are Poor People Identified, The Number of Poor in India, Causes of Poverty, Policies and Programmes towards poverty Alleviation, poverty Alleviation Programmes

**5 Human Capital Formation in INDIA:**

Human Capital, Sources of Human Capital, Human Development, Education Sector in India,

**6 Rural Development:**

Rural Development, Credit and Marketing in Rural Areas, Agricultural Marketing System, Sustainable Development and Organic Farming

**7 Employment: Growth, Informalisation and Other Issues:**

Workers and Employment, Self Employed and Hired Workers, Employment in farms, factories and Offices, Unemployment, Government and Employment Generation

**8 Infrastructure:**

Infrastructure, Relevance of Infrastructure, The state of Infrastructure in India, Energy, Health

**9 Environment and Sustainable Development:**

Environment, State on India's Environment, Sustainable Development, Strategies for Sustainable Development

**10 Comparative Development Experiences of India and Its Neighbours:**

Developmental Path, Demographic Indicators, Gross Domestic Product, Indicators of Human Development, Development Strategies

**11 Recent Government Initiatives having Demonetisation, GST and Cashless Society:**

Recent Government Initiatives having Demonetisation, GST and Cashless Society

**ABOUT INSTRUCTOR**

She is Professor in Department of Education in Social Sciences (DESS), NCERT. Her area of interest



**DR. PRABHAT K. MISHRA**

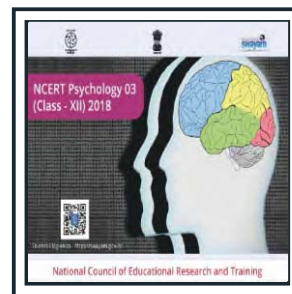
Assistant Professor in Department of Education in  
Social Sciences, NCERT, New Delhi

**FIRST CYCLE : 01/06/2018 to 30/11/2018**

**<https://swayam.gov.in/courses/5028-ncert-psychology-03-class-xii-2018>**

**ABOUT THE COURSE**

Psychology is one of the youngest sciences but one of the fastest growing. There are many who believe that the 21st century is going to be the century of biological sciences along with psychological sciences. Development in the fields of neurosciences, as well as physical sciences have opened new doors to solve the mysteries of mind and behaviour. There is no human endeavor which is going to remain unaffected by this new knowledge which is getting created. One only hopes that it will enable people to live their lives more meaningful and to organise human system better. Contents of the course will cover like variations in psychological attributes, personality, attitude psychological disorders, group processes etc., efforts have been made to provide linkages across and within the chapters to maintain continuity and holistic perspective. The course will introduce you to the fundamentals of psychology. Besides providing basic disciplinary knowledge, it focuses on enhancing your curiosity and understanding of people's behaviour and that of your own. The interactive nature of the course will help you understand psychology as a discipline as well as the practical applications of psychology in day-to-day life. The course will help you to explore yourself and the world of which you are the part.

**COURSE SCHEDULE****Variations in Psychological Attributes:**

Individual Differences in Psychological Attributes and its Assessment, Theories & Measurement of Intelligence, Variation in Intelligence & Creativity and Intelligence

**Self and Personality:**

Concept of Self & Personality, Major Approaches to the Study of Personality 1, Major Approaches to the Study of Personality 2, Major Approaches to the Study of Personality 3 & Projective Techniques & Behavioural Analysis

**Meeting Life Challenges:**

Nature, Types and Sources of Stress, Effect of Stress on Psychological Functioning and Coping with Stress & Stress Management Techniques & Promoting Positive Health

**Psychological Disorders:**

Abnormality and Psychological Disorders: An Introduction, Major Psychological Disorders 1 Major Psychological Disorders 2, & Major Psychological Disorders 3

**Therapeutic Approaches:**

Nature, Types and Sources of Stress, Effect of Stress on Psychological Functioning and Coping with Stress & Stress Management Techniques & Promoting Positive Health

**ABOUT INSTRUCTOR**

Dr. Prabhat K. Mishra has been working in the Department of Educational Psychology and Foundations of Education, NCERT, New Delhi since July, 2002. He has been involved in teaching the courses on Guidance for Human Development and Adjustment, and Basic Statistics in Diploma Course in Guidance and Counselling. Dr. Mishra has also been a Member Coordinator of the Textbooks in Psychology for Classes XI and XII brought out by the NCERT. He has also developed self-learning resource materials for teachers, teacher educators and counsellors, primarily on the theme of stress and coping. Dr. Mishra is a regular contributor of book chapters and a number of articles to various journals of repute.





**DR. JAYA SINGH**

Associate Professor in Department of Education in Social Sciences  
(DESS), NCERT

**FIRST CYCLE : 01/06/2018 to 30/11/2018**

<https://swayam.gov.in/courses/4941-ncert-economics-03-class-xii-2018>

**ABOUT THE COURSE**

It is a course which offers understanding of the various principles of microeconomics. Here effort has been made to familiarize learners with the beauty of economic analysis without burdening them with the technical details. Here, there is discussion on the various aspects of consumer behavior, producer behavior and their interaction in the market. One such market i.e perfect market includes discussion on how to maximize efficiency and generate surplus for both consumers and the producers. Such a market is very rare in the economy. Thus there is also a discussion on different types of imperfect market like monopoly etc. We hope these steps will take us significantly towards the child centered education as advocated in the National Policy of Education (1986). The course will motivate the teachers to reflect on their own teaching and treat children as participant in learning.

The course will deal with "Microeconomics" from class XII Economics. This is a 6 months duration course (26 weeks). Every two week/one week one module will deliver. Each module of the course will have four quadrants, text, video, weblinks (to know more about the concept from other resources over the web), self assessment questions (MCQs, true/false, one word answers etc.).

**OBJECTIVES OF THE COURSE**

This course is intended to acquaint the students with the knowledge about:

- To introduces the learner to economics as a science of abstraction and reasoning
- To Understand some basic economic concepts and developing economic reasoning which the learners can apply in their day-to-day life as citizens, workers and consumers.
- To Realise the role in nation building and sensitise the learners about the economic issues that the nation is facing today.
- To equip learners with basic tools of economics and statistics to analyse economic issues.
- To develop an understanding that there can be more than one view on any economic issue and to develop the skills to argue logically with reasoning.
- To introduce some basic concepts and tools to understand economic issues of an individual or a firm and how decisions are taken in variety of markets

**COURSE SCHEDULE****1 Introduction:**

Simple Economy, Central Problems of Economy, Organisation of Economic activity, Positive and Normative economies, Microeconomics, Macroeconomics

**2 Theory Of Consumer Behaviour:**

Utility, Consumer Budget, Demand, Market Demand, Elasticity of Demand

**3 Production and Costs:**

Production Function, Short Run and Long Run, Total Product, Average Product and Marginal Product, Law of Diminishing Marginal Product, Costs

**4 The Theory of the Firm under Perfect Competition:**

Perfect Competition, Revenue, Profit Maximisation, Supply Curve of a FIRM, Market Supply Curve, Price Elasticity of Supply

**5 Market Equilibrium:**

Equilibrium, Excess Demand, Excess Supply, Price Ceiling, Price Floor

**6 Non Competitive Markets:**

Monopoly in commodity Market, Average and Marginal Revenues, Short Run Equilibrium, Non Perfect Competitive Market, Oligopoly

**ABOUT INSTRUCTOR**

She is Associate Professor in Department of Education in Social Sciences (DESS), NCERT.





## PROF. POONAM AGRAWAL

Faculty in Department of Gender Studies,  
NCERT, New Delhi

## PROF. SUNITI SANWAL

Faculty in Department of Elementary  
Education, NCERT, New Delhi

## DR. YASH PAUL SHARMA

Assistant Professor in Central Institute of  
Educational Technology, NCERT, New Delhi

**FIRST CYCLE : 01/06/2018 to 30/11/2018**

<https://swayam.gov.in/courses/5066-food-nutrition-for-healthy-living>

### ABOUT THE COURSE

Who can imagine life without Food! Food is basic to our existence. Food is a key player in socialisation and social cohesion. There have been several reports of malnutrition or deaths due to poor nutrition, which have stirred the conscience of many. If you are one among those, we have this course for you. These days, nearly everyone is conscious about health and fitness. They want to know what to eat, how much to eat, how to prepare and how frequently to eat to remain active, healthy and fit. If you are one among those, this course is certainly for you. The course has 20 interesting modules which will answer most of your questions and concerns. If any remain, here are we, I and my team who will be there to interact with you and satisfy your quest for knowing what you are looking for. The 20 modules of the course deal with all aspects of Food, Nutrition, Health, Fitness and Hygiene and their interrelationships. Some of the titles include General knowledge about food selection for health and fitness; assessment of nutritional status, malnutrition; meal planning and minimising food wastage; healthy lifestyle - eating behaviour, physical activity, sleep and stress management; food labelling; food safety; nutraceuticals and functional foods etc.

Some of the things the course takers will be able to do after doing this course are

1. Assess nutritional status.
2. Preventive measures for better health.
3. Identify what lifestyle changes are required for health and wellness.
4. Interpret the food labels and make appropriate selection of foods and beverages.
5. Identify the medicinal properties of foods and food ingredients.

This is a 5 months duration course. One module shall be delivered per week. Each module of the course will have four quadrants, text, Video along with transcription; web links (to know more about the concept from other resources over the web), self assessment questions (MCQs, true/false, one word answers etc.) and learner will be motivated to have more interaction in discussion forums.

### COURSE SCHEDULE

**FNHL\_10101** Food, Nutrition, Health and Hygiene – Interrelationships

**FNHL\_10102** Assessment of Nutritional Status

**FNHL\_10103, FNHL\_10104** Common Health Problems

**FNHL\_10105, FNHL\_10106** Nutrients in Food

**FNHL\_10107** Balanced Diet

**FNHL\_10108** Conserving and Enhancing nutritive value of Food

**FNHL\_10109, FNHL\_101010** Food Selection for Health and Fitness

**FNHL\_101011, FNHL\_101012** Meal Planning and minimizing food wastage

**FNHL\_101013, FNHL\_101014** Life style for Health and Wellness

**FNHL\_101015** Food labels: Understanding and Interpreting

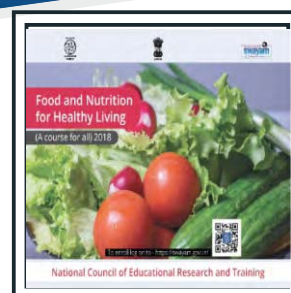
**FNHL\_101016** Malnutrition

**FNHL\_101017** Personal Hygiene

**FNHL\_101018** Food safety

**FNHL\_101019** Medicinal properties of Food ingredients

**FNHL\_101020** Nutraceuticals/ Functional Food



### ABOUT INSTRUCTOR

1. Professor Poonam Agrawal, a scholar in Food and Nutrition possess Master's degree in Foods & Nutrition, Doctorate in Biochemistry and Post Doctorate in Biotechnology from reputed national and international academic institutions including G.B. Pant University of Agriculture and Technology, Pantnagar; IARI, New Delhi; Institute of Wool Research, Aachen and Institute for Microbiology, University of Dusseldorf, W. Germany.

Professor Suniti Sanwal is working in the DEE, NCERT. She also served as Professor and Head in Department of Humanities, Science, Education and Research at PSSCIEVE, Bhopal.

Dr. Yash Paul Sharma: Dr. Yash Paul Sharma has worked as Assistant Professor in the Central Institute of Educational Technology, NCERT, New Delhi. With Ph.D. degree in Zoology and one-year PostDoc from CSIR, Dr. Sharma has interests in Taxonomy, evolutionary Biology and integrating ICT to teach biological concepts. Dr. Sharma has discovered several new species of ants with co-workers with publications in many international journals of repute.





स्वयं पढ़ें,  
आगे बढ़ें!



Ministry of Human Resource Development  
Government of India

July 2018

विद्यया ऽ नृवभ्रमन्ते

