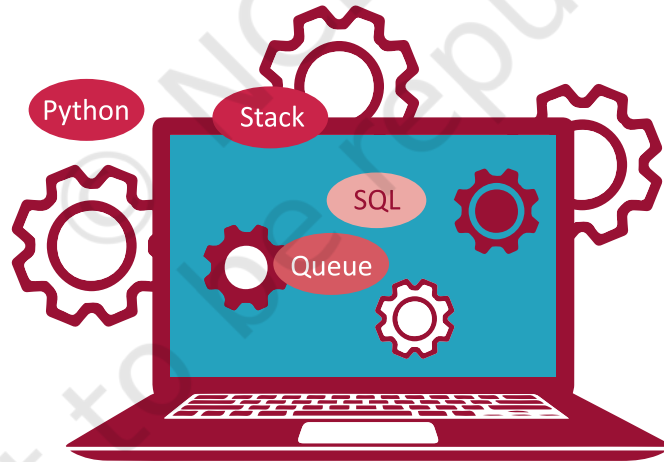


COMPUTER SCIENCE

TEXTBOOK FOR CLASS XII



12130



विद्यया ऽ मृतमश्नुते



एन सी ई आर टी
NCERT

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

12130 – COMPUTER SCIENCE

Textbook for Class XII

ISBN 978-93-5292-338-0

First Edition

September 2020 Bhadrapada 1942

Reprinted

September 2021 Bhadrapada 1943

December 2021 Agrahayana 1943

October 2022 Kartika 1944

March 2024 Chaitra 1946

PD 25T SU

© **National Council of Educational
Research and Training, 2020**

₹ **250.00**

Printed on 80 GSM paper with NCERT
watermark

Published at the Publication Division
by the Secretary, National Council of
Educational Research and Training,
Sri Aurobindo Marg, New Delhi 110 016
and printed at Shree Vrindavan Graphics
(P) Ltd., E-34, Sector-7, Noida 201 301
Uttar Pradesh

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FOREWORD

Computer science as a discipline has evolved over the years and has emerged as a driving force of our socio-economic activities. It has made continuous inroads into diverse areas — be it business, commerce, science, technology, sports, health, transportation or education. With the advent of computer and communication technologies, there has been a paradigm shift in teaching-learning at the school level. The role and relevance of this discipline is in focus because the expectations from the school pass-outs have grown to be able to meet the challenges of the 21st century. Today, we are living in an interconnected world where computer-based applications influence the way we learn, communicate, commute or even socialise!

There is a demand for software engineers in various fields like manufacturing, services, etc. Today, there are a large number of successful startups delivering different services through software applications. All these have resulted in generating interest for this subject among students as well as parents.

Development of logical thinking, reasoning and problem-solving skills are fundamental building blocks for knowledge acquisition at the higher level. Computer plays a key role in problem solving with focus on logical representation or reasoning and analysis.

This textbook focuses on the fundamental concepts and problem-solving skills while opening a window to the emerging and advanced areas of computer science. The newly developed syllabus has dealt with the dual challenge of reducing curricular load as well as introducing this ever evolving discipline. This textbook also provides space to Computational Thinking and Artificial Intelligence, which envisaged in National Education Policy, 2020.

As an organisation committed to systemic reforms and continuous improvement in the quality of its products, NCERT welcomes comments and suggestions which will enable us to revise the content of the textbook.

New Delhi
August 2020

HRUSHIKESH SENAPATY
Director
National Council of Educational
Research and Training

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PREFACE

In the present education system of our country, specialised or discipline based courses are introduced at the higher secondary stage. This stage is crucial as well as challenging because of the transition from general to discipline-based curriculum. The syllabus at this stage needs to have sufficient rigour and depth while remaining mindful of the comprehension level of the learners. Further, the textbook should not be heavily loaded with content.

Computers have permeated in every facet of life. Study of basic concepts of computer science has been desirable in education. There are courses offered in the name of Computer Science, Information and Communication Technology (ICT), Information Technology (IT), etc., by various boards and schools up to secondary stage, as optional. These mainly focus on using computer for word processing, presentation tools and application software.

Computer Science (CS) at the higher secondary stage of school education is also offered as an optional subject. At this stage, students usually opt for CS with an aim of pursuing a career in software development or related areas, after going through professional courses at higher levels. Therefore, at higher secondary stage, the curriculum of CS introduces basics of computing and sufficient conceptual background of Computer Science.

The primary focus is on fostering the development of computational thinking and problem-solving skills. This book has 13 chapters covering the following broader themes:

- **Data Structure:** understanding of important data structure Stack, Queue; Searching and Sorting techniques.
- **Database:** basic understanding of data, database concepts, and relational database management system using MySQL. Structured query language—data definition, data manipulation and data querying.
- **Programming:** handling errors and exceptions in programs written in Python; handling files and performing file operations in Python.
- **Network and Communication:** fundamentals of Computers networks, devices, topologies, Internet, Web and IoT, DNS. Basics of Data communication—transmission channel, media; basics of protocols, mobile communication generations.
- **Security Aspects:** introduction to basic concepts related to network and Internet security, threats and prevention.

Each chapter has two additional components—(i) activities and (ii) think and reflect for self assessment while learning as well as to generate further interest in the learner. A number of hands-on examples are given to gradually explain methodology to solve different types of problems across the Chapters. The programming examples as well as the exercises in the

chapters are required to be solved in a computer and verify with the given outputs.

Box items are pinned inside the chapters either to explain related concepts or to describe additional information related to the topic covered in that section. However, these box-items are not to be assessed through examinations.

Project Based Learning given as the end includes exemplar projects related to real-world problems. Teachers are supposed to assign these or similar projects to be developed in groups. Working in such projects may promote peer-learning, team spirit and responsiveness.

The chapters have been written by involving practicing teachers as well as subject experts. Several iterations have resulted into this book. Thanks are due to the authors and reviewers for their valuable contribution. I would like to place on record appreciation for Professor Om Vikas for leading the review activities of the book as well as for his guidance and motivation to the development team throughout. Comments and suggestions are welcome.

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ACKNOWLEDGEMENTS

The National Council of Educational Research and Training acknowledges the valuable contributions of the individuals and organisations involved in the development of Computer Science textbook for Class XII.

The Council expresses its gratitude to the syllabus development team including MPS Bhatia, *Professor*, Netaji Subhas Institute of Technology, Delhi; T. V. Vijay Kumar, *Professor*, School of Computer and Systems Sciences, Jawaharlal Nehru University, New Delhi; Zahid Raza, *Associate Professor*, School of Computer and Systems Sciences, Jawaharlal Nehru University, New Delhi; Vipul Shah, *Principal Scientist*, Tata Consultancy Services, and the CSpashshala team; Aasim Zafar, *Associate Professor*, Department of Computer Science, Aligarh Muslim University, Aligarh; Faisal Anwer, *Assistant Professor*, Department of Computer Science, Aligarh Muslim University, Aligarh; Smruti Ranjan Sarangi, *Associate Professor*, Department of Computer Science and Engineering, Indian Institute of Technology, Delhi; Vikram Goyal, *Associate Professor*, Indraprastha Institute of Information Technology (IIIT), Delhi; and Mamur Ali, *Assistant Professor*, Department of Teacher Training and Non-formal Education (IASE), Faculty of Education, Jamia Millia Islamia, New Delhi.

The Council is thankful to the following resource persons for providing valuable inputs in developing this book — Veer Sain Dixit, *Assistant Professor*, Atma Ram Sanatan Dharma College, University of Delhi; Mukesh Kumar, DPS RK Puram, Delhi; Aswin K. Dash, Mother's International School, Delhi; Anamika Gupta, *Assistant Professor*, Shaheed Sukhdev College of Business Studies, University of Delhi, Sajid Yousuf Bhat, *Assistant Professor*, University of Kashmir, Jammu and Kashmir.

The council is grateful to Prof. Sunita Farkya, *Head*, Department of Education in Science and Mathematics, NCERT and Prof. Amarendra P. Behera, *Joint Director*, CIET, NCERT for their valuable cooperation and support throughout the development of this book.

The Council also gracefully acknowledges the contributions of Meetu Sharma, *Graphic Designer cum DTP Operator*, Kanika Walecha, *DTP Operator*, Pooja, *Junior Project Fellow*; in shaping this book. The contributions of the office of the APC, DESM and Publication Division, NCERT, New Delhi, in bringing out this book are also duly acknowledged.

The Council also acknowledges the contribution of Ankeeta Bezboruah *Assistant Editor (Contractual)* Publication Division, NCERT for copy editing this book. The efforts of Naresh Kumar, *DTP Operator (Contractual)*, Publication Division, NCERT are also acknowledged.



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PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a ¹**[SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC]** and to secure to all its citizens :

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the ²[unity and integrity of the Nation];

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949 do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

1. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Sovereign Democratic Republic" (w.e.f. 3.1.1977)
2. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Unity of the Nation" (w.e.f. 3.1.1977)