INFORMATICS PRACTICES

11149

TEXTBOOK FOR CLASS XI

विद्यया ऽमृतमश्नुते

एन सी ई आर टी
NCERT

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

2022-23

11149 – INFORMATICS PRACTICES
Textbook for Class XI

ISBN 978-93-5292-148-5

First Edition
August 2019 Shravana 1941

Reprinted
June 2021 Ashadha 1943

PD 30T BS

₹ 140.00

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 110016 and printed at Sagar Offset Printer India (P.) Ltd., 518, Ecotech III, Udyog Kendra II, G.B. Nagar, Greater Noida (U.P.)

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Foreword

Information Technology has continuously been crossing the barriers of access and communication and reaching more and more people. The number of internet users in India has been on the rise. The tremendous growth in computer science, telecommunications and information technology has resulted in automation of various tasks and contributed to the ease of living. Technology has made continuous inroads into diverse areas—be it business, commerce, science, sports, health, transportation or education. Today, we are living in an interconnected world where computer based applications influence the way we learn, communicate, commute, or even socialise.

With so many users of information and communication technology (ICT), huge volumes of data are continuously generated at an unprecedented rate. Many innovative business models are being evolved which utilise such data to reach potential customers in a more targeted way. Government agencies are also using data to deliver services and fast track progress of different programmes, strengthen accountability and to make more informed decisions. This has been creating better opportunities for our youth not only to enter the field of technical education but also in the world of work. NCERT, for the first time, has developed a textbook on 'Informative Practices' to develop skill sets in students to make use of the opportunities provided by ICT.

This book focuses on the fundamental concepts related to handling of data while opening a window to the emerging areas of data processing. It seeks to address the dual challenges of reducing curricular load as well as introducing the latest development in the field of ICT.

As an organisation committed to systemic reforms and continuous improvement in the quality of its curricular material, NCERT welcomes comments and suggestions to enable us to bring about necessary changes in its further publications.

Hrushikesh Senapaty
Director
National Council of Educational
Research and Training

New Delhi
July 2019

Preface

In the present education system of our country, specialised/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.

We are living in an era where information drives many of our socio-economic decisions. Millions of people are accessing internet round the clock for availing various services and thereby generating vast amount of data. Processing of data is becoming a key skill with applications across the disciplines. Thus, study of basic concepts of data handling and analysis is becoming more and more desirable. 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 the secondary stage, as an optional subject. These mainly focus on using computer for word processing, presentation tools and application software.

Informatics Practices (IP) at the higher secondary stage of school education is also offered as an optional subject. At this stage, students can take up IP with the aim of pursuing a career in data science or related areas after going through professional courses at higher levels. Therefore, at the higher secondary stage, the curriculum of IP introduces the basics of database management systems and data processing. The book has eight chapters covering the following broader themes:

- Basic understanding of computer systems and their evolution, introduction to software and their categorisation, computer memory, awareness of emerging trends in the field of information and communication technology.
- Basic constructs of a program using Python programming language — program structure, identifiers, variables, flow of control, advanced data types like Lists and Dictionaries.
- Handling data using specialised Python library called NumPy — concept of single and multi-dimensional Array.
- Concepts of data, database, and relational database management system using MySQL. Structured query language — data definition, data manipulation and data querying.

Python programming language and NumPy are introduced using both the interactive and script mode. A number of hands-on examples are given in Python, NumPy and MySQL to gradually explain the methodology to solve different types of problems and handle data. The programming and database related examples as well as the exercises in those chapters are required to be solved in a computer and verified with the given outputs.

The chapters in this book have two additional components — activities for self assessment and 'think and reflect' to generate further interest in the learner.

Group projects through case studies are proposed to solve complex problems. Some exercises have been made in case-study form to promote problem-finding and problem-solving skills.

These chapters have been written by involving practicing teachers as well as subject experts. These have been iteratively peer-reviewed. Several iterations have resulted into this book. Thanks to the authors and reviewers for their valuable contribution.

Comments and suggestions are welcome to make this endeavour par excellence.

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Acknowledgements

The National Council of Educational Research and Training acknowledges the valuable contributions of the individuals and organisation involved in the development of Informatics Practices textbook for Class XI.

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 CSpathshala team; 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; Vandana Tyagi, *PGT* (Computer Science), Kendriya Vidyalaya, JNU, Delhi and Mamur Ali, *Assistant Professor*, Central Institute of Educational Technology, NCERT, New Delhi.

The council is thankful to the following resource persons for their contribution in editing, reviewing, and refining the manuscript of this book: D.N. Sansanwal, Retd. Professor, Devi Ahilya Vishwavidyalaya, Indore; Veer Saini Dixit, *Assistant Professor*, Atma Ram Sanatan Dharma College, University of Delhi, Delhi; Mukesh Kumar, *Teacher*, DPS RK Puram, Delhi; Gautam Sarkar, *Teacher*, Modern School, Barakhamba Road, Delhi; Aswin K. Dash, *Teacher,* Mother's International School, Delhi; Nancy Sehgal, *Teacher,* Mata Jai Kaur Public School, Delhi; Neelima Gupta, *Professor*, Department of Computer Science, University of Delhi; Anamika Gupta, *Assistant Professor*, Shaheed Sukhdev College of Business Studies, University of Delhi. The council further acknowledges the contribution of Anuja Krishn, *freelance editor*, for refining the chapters from language point of view.

The council in greatful to Dinesh Kumar, *Professor* and *Head*, DESM for his valuable cooperation and support throughout the development of this book.

The council also gratefully acknowledges the contributions of Meetu Sharma, *Graphic Designer;* Kanika Walecha, *DTP Operator*; Pooja, *Junior Project Fellow;* Hari Darshan Lodhi and Junaid Ahmed, *DTP Operator* (Contractual); Chanchal Chauhan, *Proofreader* (Contractual) and Aishwarya Bhattacharyya, *Assistant Editor* (Contractual), 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.

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