

Computer Application in Pharmacy

Theory and Practical

is designed to serve as a textbook to cover the theoretical aspects and as a practical book to cover the practical applied aspects of the subject of computer applications for all Semester II BPharm students, strictly following the latest syllabus prescribed by Pharmacy Council of India (Courses BP205T and BP210P).

The main objective of the book is to explain the fundamentals of computers in the simplest possible language easy to understand by the students. The present textbook keeps the balance between the basic essentials and advanced areas of knowledge, apart from the usual topics.

It would also help in bridging the existing gap of long-needed demand for budding pharmacy technocrats, academicians and pharmacists, especially the young professionals of pharmacy who require the requisite knowledge on computer science to upgrade themselves to modern times.

Gaurav Agarwal M.Pharm, PhD is presently Dean, Faculty of Pharmacy, RP Inderaprashta Institute of Technology, Karnal. He has to his credit numerous projects and publications. He is the author of renowned books *Pharmaceutics*, *Formulative Pharmacy*, *Pharmaceutical Technology-I and II*, and *Drug Regulatory Affairs*, all published by CBSPD. He has worked on taste masking techniques at F&D Department, IPCA Labs, Mumbai. He has an excellent track record in academic institutions of high repute like IFTM, Moradabad, and SGIT, Ghaziabad, and is actively engaged in teaching, research, administration and service to pharmacy profession.



Parmeet Kaur M.Tech (CSE) is presently working as Head, CSE Department, RPIIT, Karnal. She has published a number of review and research papers in the field of computer science and engineering. She organized IIT-Bombay Sponken tutorial tests in 2017 and 2018; has received many awards for excellence in work performance in the last few years; and was the coordinator of the international conference held at RPIIT, Karnal.



CBS Publishers & Distributors Pvt Ltd

4819/XI, Prahlad Street, 24 Ansari Road, Daryaganj, New Delhi 110 002, India
E-mail: delhi@cbspd.com, cbspubs@airtelmail.in; Website: www.cbspd.com
New Delhi | Bengaluru | Chennai | Kochi | Kolkata | Mumbai
Hyderabad | Jharkhand | Nagpur | Patna | Pune | Uttarakhand



QR code to access online CBS Catalogue

ISBN: 978-81-948986-3-4



Computer Application in Pharmacy

Theory and Practical

Agarwal | Kaur



Computer Application in Pharmacy

Theory and Practical

for Second Semester Bachelor in Pharmacy

As per the latest syllabus prescribed by Pharmacy Council of India



Gaurav Agarwal
Parmeet Kaur



Dedicated to Education
CBS Publishers & Distributors Pvt Ltd

Computer Application in Pharmacy

Theory and Practical

for Second Semester Bachelor in Pharmacy

As per the latest syllabus prescribed by Pharmacy Council of India

Computer Application in Pharmacy

Theory and Practical

for Second Semester Bachelor in Pharmacy

As per the latest syllabus prescribed by Pharmacy Council of India

Gaurav Agarwal M Pharma, PhD

Dean, Faculty of Pharmacy
RP Inderprastha Institute of Technology
Karnal, Haryana

Parmeet Kaur M Tech (CSE)

Head, Department of CSE
RP Inderprastha Institute of Technology
Karnal, Haryana



CBS Publishers & Distributors Pvt Ltd

New Delhi • Bengaluru • Chennai • Kochi • Kolkata • Mumbai
Hyderabad • Jharkhand • Nagpur • Patna • Pune • Uttarakhand

Disclaimer

Science and technology are constantly changing fields. New research and experience broaden the scope of information and knowledge. The authors have tried their best in giving information available to them while preparing the material for this book. Although, all efforts have been made to ensure optimum accuracy of the material, yet it is quite possible some errors might have been left uncorrected. The publisher, the printer and the authors will not be held responsible for any inadvertent errors, or inaccuracies.

The authors have taken all the reasonable care to ensure that the contents of the book do not violate any existing copyright or other intellectual property rights of any person in any manner. In the event the authors have been unable to track any source, and if any copyright has been inadvertently infringed, please do notify the publisher in writing.



ISBN: 978-81-948986-3-4

Copyright © Authors and Publisher

First Edition: 2021

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system without permission, in writing, from the authors and the publisher.

Published by Satish Kumar Jain and produced by Varun Jain for

CBS Publishers & Distributors Pvt Ltd

4819/XI Prahlad Street, 24 Ansari Road, Daryaganj, New Delhi 110 002, India

Ph: 011-23289259, 23266861, 23266867 Website: www.cbspd.com

Fax: 011-23243014

e-mail: delhi@cbspd.com; cbspdpubs@airtelmail.in

Corporate Office: 204 FIE, Industrial Area, Patparganj, Delhi 110 092

Ph: 011-4934 4934

Fax: 011-4934 4935

e-mail: publishing@cbspd.com; publicity@cbspd.com

Branches

- **Bengaluru:** Seema House 2975, 17th Cross, K.R. Road, Banasankari 2nd Stage, Bengaluru 560 070, Karnataka
Ph: +91-80-26771678/79 Fax: +91-80-26771680 e-mail: bangalore@cbspd.com
- **Chennai:** 7, Subbaraya Street, Shenoy Nagar, Chennai 600 030, Tamil Nadu
Ph: +91-44-26260666, 26208620 Fax: +91-44-42032115 e-mail: chennai@cbspd.com
- **Kochi:** 42/1325, 1326, Power House Road, Opp KSEB Power House, Ernakulam 682 018, Kochi, Kerala
Ph: +91-484-4059061-65 Fax: +91-484-4059065 e-mail: kochi@cbspd.com
- **Kolkata:** No. 6/B, Ground Floor, Rameswar Shaw Road, Kolkata-700014 (West Bengal), India
Ph: +91-33-2289-1126, 2289-1127, 2289-1128 e-mail: kolkata@cbspd.com
- **Mumbai:** PWD shed, Gala No. 25/26, Ramchandra Bhatt Marg, Next JJ Hospital Gate No. 2, OPP. Union Bank of India, Noorbaug, Mumbai-400009, Maharashtra
Ph: +91-22-66661880/89, Mob: 0-8424005858 e-mail: mumbai@cbspd.com

Representatives

- **Hyderabad** 0-9885175004
- **Jharkhand** 0-9811541605
- **Nagpur** 0-9421945513
- **Patna** 0-9334159340
- **Pune** 0-9623451994
- **Uttarakhand** 0-9716462459

Printed at Mudrak, Noida, UP, India

to

my loving parents
Mr Harbhajan Singh and Mrs Gurdev Kaur
my dear brother Lucky
and
my dear and loving husband Harjot Singh

— Parmeet Kaur

Preface

This book *Computer Application in Pharmacy* is designed specifically for B Pharmacy second semester students as per PCI (Pharmacy Council of India) course curriculum. This book covers wide areas and contains a comprehensive description of existing knowledge of computer applications. The book is a thoughtful compilation for beginners in pharmacy. The text not only deals with the basic concepts but also emphasizes technical and practical aspects of the subject. The book is primarily intended as textbook for students of pharmacy for degree and diploma courses. Being an interdisciplinary subject, it is today covering a wide range of interest, both among the students and the teaching communities. Taking this increasing interest into account, this book gives a comprehensive introduction to the subject.

The book contains numerous specimens, vivid illustrations, tables, diagrams and flow diagrams to present the ideas. The distinguishing feature is ample question bank at the end of the book. The structure and the content of the book have changed to reflect modern thinking and current university curricula throughout the world. The distinguishing feature is practical related to subject at the end of the book. In spite of great care, there might be some mistakes and deficiencies. We will be grateful for giving suggestions to improve. Please go through the content and send us mail at gbitsian@rediffmail.com.

Gaurav Agarwal
Parmeet Kaur

Acknowledgements

I am especially thankful to Shri RP Singal Ji, Chairman, RP Educational Trust, for his all time support and encouragement.

My special thanks to Er Bharat Singal, Secretary, RP Educational Trust, for inspiring us to bring out this book.

I am indebted to Dr Rajiv Singal, Vice Chairman, RP Educational Trust, and Shri DL Mittal, RPIIT Technical and Medical Campus, for their motivation.

I express my gratefulness to Mr YN Arjuna, Senior Vice President—Publishing, and Mr Satish K Jain, CMD, CBS Publishers and Distributors, for their sincere efforts.

I express my gratitude to my father Er VK Agarwal and my mother Asha Agarwal for their blessings and moral support.

Last but not least, I express my love to my wife Dr Shilpi and my loving kids Shreya and Vaidish for their all time inspiration and support. They are always a constant source of motivation in bringing out this achievement.

I thank my numerous students, whom I cannot possibly name individually, for their class interactions which have been the guiding spirit in selection of the subject matter and its logical arrangement.

Gaurav Agarwal

First of all I would like to thank God for giving me the strength to do work on this book.

Then, I would like to thank Dr Gaurav Agarwal, who helped me and guided me in the right way to do work and completion of book.

I would like to thank Er Bharat Singal, Secretary, RP Educational Trust, for inspiring us to bring out this book, and Shri DL Mittal, RPIIT Technical and Medical Campus, for his motivation.

In the end I would like to thank all my teachers and students.

Parmeet Kaur

Contents

<i>Preface</i>	<i>vii</i>
1. Number System in Computers	1
2. Number System in Computers in Place of Concept of Information System and Software	23
3. Web Technologies	36
4. Application of Computers in Pharmacy	67
5. Bioinformatics in Computers	83
6. Computer as Data Analysis in Preclinical Development	89
7. Experiments in Computers	95
<i>Glossary and Appendix</i>	<i>113</i>
<i>Index</i>	<i>121</i>

