



GOVERNMENT OF TAMILNADU

**HIGHER SECONDARY  
SECOND YEAR**

**COMPUTER SCIENCE**

A publication under Free Textbook Programme of Government of Tamil Nadu

**Department of School Education**

**Untouchability is Inhuman and a Crime**

## Government of Tamil Nadu

First Edition - 2019

Revised Edition - 2020

(Published under New syllabus)

NOT FOR SALE

## Content Creation



State Council of Educational  
Research and Training  
© SCERT 2019

## Printing & Publishing



Tamil Nadu Textbook and Educational  
Services Corporation

[www.textbooksonline.tn.nic.in](http://www.textbooksonline.tn.nic.in)



## PREFACE

The tremendous effect of the computer and computing technology is in shaping the modern society for the betterment of mankind. Human civilization achieved the highest peak with the development of computer known as “**Internet Era**”.

Python being a high level language is good for beginners to learn due to its easy syntax and powerful memory management. For any internet applications, it is good to learn as python being the better choice.

The user of this textbook being acquainted with the knowledge of C++ in std XI will have no difficulty in studying python language. No substantial knowledge nor experience, is required as the examples illustrated in the book are easy to follow

## HOW TO USE THE BOOK?

- This book does not require prior knowledge in computer Technology
- Each unit comprises of simple activities and demonstrations which can be done by the teacher and also students.
- Technical terminologies are listed in glossary for easy understanding
- The “ Do you know?” boxes enrich the knowledge of reader with additional information
- Workshops are introduced to solve the exercises using software applications
- QR codes are used to link supporting additional
- materials in digital form

### How to get connected to QR Code?

- o Download the QR code scanner from the google play store/ apple app store into your smartphone
- o Open the QR code scanner application
- o Once the scanner button in the application is clicked, camera opens and then bring it closer to the QR code in the textbook.
- o Once the camera detects the QR code, a URL appears in the screen. Click the URL and go to the content page.



# CAREER GUIDANCE AFTER 12<sup>TH</sup>

## Computer Knowledge Hub

- ❖ Centre for Development of Advanced Computing <https://www.cdac.in/>
- ❖ Indian Computing Olympiad <https://www.iarcs.org.in/inoi>
- ❖ International Olympiad of Informatics <https://ioinformatics.org>
- ❖ Microsoft certification exams <https://www.microsoft.com/en-in/learning/exam-list.aspx>
- ❖ National Cyber Olympiad <http://www.nielit.gov.in/>
- ❖ National Institute of Electronics & Information Technology <http://www.niet.ac.in/>
- ❖ National Programme on Technology Enhanced Learning <https://nptel.ac.in/>

## After Completing +2

Arts & Science BSc Courses | Animation & Multimedia  
 Computer Science | Geography  
 Journalism / Mass Media Communication | Library Science  
 Maths / Physics / Chemistry / Statistics | Psychology/ Sociology  
 Social Work | Visual Communication | B.C.A.

## Technical Diploma

Diploma in Engineering

## Professional Degree & Entrance Exams

- ❖ Hotel & Catering Institute <http://www.ihmchennai.org/ihmchennai/>
- ❖ AIEEE- All India Engineering Entrance Exam
- ❖ B.E./B.Tech/ B.Arch (JEE, AIEEE in IITs and NITs)
- ❖ Fashion Technology & Design <http://nift.ac.in>
- ❖ GATE-Graduate Aptitude Test in Engineering [www.gate.iitm.ac.in](http://www.gate.iitm.ac.in)
- ❖ Indian Navy – 10+2 B.Tech Entry Scheme
- ❖ Institute of Chartered Accountants of India <https://icai.org>
- ❖ Institute of Company Secretaries <https://www.icsi.edu>
- ❖ Institute of Cost Accountants of India <http://icmai.in>
- ❖ Institute of Banking Personal Selection IBPS <https://ibps.in>

## PG in Computer Science

Artificial Intelligence	Database Management
Information Management and Data Analytics	Systems
Algorithms	Fundamentals of Algorithms
Applied Computer Science	Graphics
Big Data Analytics	Machine Learning
Bio Informatics	Mobile and Web Computing
Cloud Computing	Mobile Device Programming
Compiler Design & Construction	Modern Programming Practices
Computer and Network Security	Modern Web Applications
Computer Networks	Operating Systems
Computer Security	Parallel Programming
Computer Simulation	Robotics
Cyber Security	Software Engineering
Data Analytics	Software Engineering
Data Mining	Software Testing
	Systems Analysis and Design
	Web Application Architecture
	Web Application Programming

## Scholarships for graduate and post graduate courses

- ❖ DST – INSPIRE Fellowships (for Ph.D)
- ❖ DST – INSPIRE Scholarships (for UG and PG)
- ❖ In addition various fellowships for SC/ST/PWD,
- ❖ Indira Gandhi Fellowship for Single girl child (for UG and PG)
- ❖ Maulana Azad Fellowship for minorities (for Ph.D)
- ❖ UGC National Fellowship (for Ph.D)
- ❖ International Olympiad: for getting stipend for Higher Education in Science and Mathematics
- ❖ OBC etc are available.
- ❖ Visit website of University Grants Commission

## COMPUTER SCIENCE

# CAREER GUIDANCE

## After PG courses

MPhil –Computer Science | PhD – Computer Science

**Following are the latest topics for PhD in computer science:**

Bioinformatics and Computational Biology  
 Capturing and Visualizing Persona Through Faces  
 Comprehensive analysis of RNA sequencing experiments  
 Designing and Evaluating Information Gathering Robots  
 Digital Pathology: Diagnostic Errors, Viewing Behavior and Image Characteristics  
 Embedded Systems | Game Theory | Graph Theory  
 Graphics and Visualization | Human Computer Interaction – HCI  
 Improving Fault Tolerance and Performance of Data Center Networks  
 Increasing Access to Computer Science for Blind Students  
 In-situ Semantic 3D Modeling  
 Intelligent Crowdsourcing for Natural Language Learning and Other AI Applications  
 Learning Robust Tractable Models for Vision Manipulators And Manipulation In High Dimensional Spaces  
 New Algorithmic Tools for Distributed Similarity Search  
 Reproducible measurements of web security and privacy  
 The Security and Privacy of Web and Mobile Advertising  
 Towards More Practical Reinforcement Learning, with Applications to Educational Games

## Topics for Research after PG in Computer Studies

Architectures, Compiler Optimization, and Embedded Systems.  
 Bioinformatics and Computational Biology | Cloud Computing  
 Data Mining, Databases, and Geographical Information Systems.  
 Graphics and Visualization | High Performance Computing.  
 Human Computer Interaction | Internet of Things  
 Natural Language Processing | Networks, Distributed Systems, and Security.

## Competitive Exams for Govt. Jobs

Airforce Common Admission Test – AFCAT | Army Education Officer Entry- AEC  
 Combined Defence Services –CDS | Defence Service Staff College, Nilgiris  
 Indian Defence Services | Indian Military Academy  
 Judge Advocate General Department-JAG | NCC Entry | Railway Board Examination  
 SSC NAVY (Pilot/Observer) | SSC Tech Entry – Officers Training School  
 Staff Selection Examination | Tamil Nadu Public Service Commission  
 Teacher Recruitment Board | Technical Graduate Course –TGC  
 Territorial Army | Union Public Service Examination | Women Special Entry Scheme

## Computer Related Jobs

Applications Software Developer | Big Data Analysts  
 Cloud Computing Programmer | College/ University Faculty  
 Computer Programmer | Computer Teacher  
 Computer Vocational Instructor | Computer Information Research Scientist  
 Computer Information Systems Manager | Computer Network Architect  
 Computer Support Specialist | Computer System Analysts  
 Data Mining Specialist | Database Administrator  
 Information Security Analysts | Market Research Analysts  
 Network & Computer System Administrator | Research Assistant  
 Systems Software Developer | User Interface Designer | Web Developer



## Research Institutions in various areas of science

- ❖ Bhabha Atomic Research centre (BARC) Mumbai [www.barc.gov.in](http://www.barc.gov.in)
- ❖ BITS Pilani, <https://www.bits-pilani.ac.in>
- ❖ Central Universities [www.ugc.ac.in](http://www.ugc.ac.in)
- ❖ Chennai Mathematical Institute (CMI) Chennai [www.cmi.ac.in](http://www.cmi.ac.in)
- ❖ Delhi University, Delhi [www.du.ac.in](http://www.du.ac.in)
- ❖ Hyderabad central university, Hyderabad [www.uohyd.ac.in](http://www.uohyd.ac.in)
- ❖ IISER Educational Institutions [www.iiseradmission.in](http://www.iiseradmission.in)
- ❖ Indian Institute of Technology in various places (IIT's) [www.iitm.ac.in](http://www.iitm.ac.in)
- ❖ Institute of Mathematical Sciences (IMSc) Chennai [www.imsc.res.in](http://www.imsc.res.in)
- ❖ Jawaharlal Nehru University (JNU) [www.jnu.ac.in](http://www.jnu.ac.in)
- ❖ Mumbai University, Mumbai [www.mu.ac.in](http://www.mu.ac.in)
- ❖ National Institute of Science Education and Research (NISER), [www.niser.ac.in](http://www.niser.ac.in)
- ❖ National Institute of Technology (NITs) [www.nit.edu](http://www.nit.edu)
- ❖ SavitribaiPhule Pune university, Pune [www.unipune.ac.in](http://www.unipune.ac.in)
- ❖ State Universities [www.ugc.ac.in](http://www.ugc.ac.in)
- ❖ Tata Institute of Fundamental Research (TIFR) Mumbai [www.tifr.res.in](http://www.tifr.res.in)

# Table of Contents

Computer Science-II Year				
UNIT NO.	CHAPTER	COMPUTER SCIENCE	PAGE NO	MONTH
UNIT- I Problem Solving Techniques	1	Function	1	June
	2	Data Abstraction	11	June
	3	Scoping	21	June
	4	Algorithmic Strategies	31	June
UNIT- II Core Python	5	Python -Variables and Operators	47	July
	6	Control Structures	67	July
	7	Python functions	89	July
	8	Strings and String manipulation	114	Aug
UNIT-III Modularity and OOPS	9	Lists, Tuples, Sets and Dictionary	132	Aug
	10	Python Classes and objects	170	Aug
UNIT-IV Database concepts and MySQL	11	Database Concepts	189	Oct
	12	Structured Query Language (SQL)	205	Oct
	13	Python and CSV files	232	Oct
UNIT-V Integrating Python with MySQL and C++	14	Importing C++ programs in Python.	267	Oct
	15	Data manipulation through SQL	291	Nov
	16	Data visualization using pyplot: line chart, pie chart and bar chart	320	Nov
		Glossary	335	
Annexure-1		List of Python functions	341	
Annexure-2		Installation of MySQL and Creating a Database	345	
Annexure-3		Installation of MinGW	346	
Annexure-4		Installation of pip	351	



E - book



Assessment



DIGI links