

E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' Grade | Accredited by NBA

NAGAPATTINAM – 611 002



B.TECH. INFORMATION TECHNOLOGY

Full Time Curriculum and Syllabus

Second Year – Fourth Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1902IT401	Database Management Systems	3	0	0	3	40	60	100
1902IT402	Java Programming	3	0	0	3	40	60	100
1902IT403	Operating Systems	3	0	0	3	40	60	100
1902IT404	Software Engineering and Project Management	3	0	0	3	40	60	100
1902IT405	Computer Networks	3	2	0	4	40	60	100
1902IT406	Principles of Communication	3	0	0	3	40	60	100
Laboratory Course								
1902IT451	Database Management Systems Lab	0	0	2	1	50	50	100
1902IT452	Java Programming Lab	0	0	2	1	50	50	100
1902IT453	Operating Systems Lab	0	0	2	1	50	50	100
1904GE451	Life Skills: Verbal Ability	0	0	2	1	100	-	100
Audit Course								
1901MCX01	Environmental Science	3	0	0	0	00	00	000

L – Lecture | T – Tutorial | P – Practical | CA – Continuous Assessment | ES – End Semester

1902IT401	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

UNIT I INTRODUCTION 9 Hours

Introduction to database - Data Base Architecture - Data Independence - Functional Dependencies –Relational Algebra-Entity relationship model - mapping cardinalities-keys, E-R diagrams.

UNIT II QUERY LANGUAGE & OPTIMIZATION 9 Hours

Relational Calculus – Tuple Relational Calculus – Domain Relational Calculus - SQL — DDL- DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL - Views – Constraints – Query processing and optimization- - Normal Forms – 1NF to 5NF-Domain Key Normal Form.

UNIT III TRANSACTION PROCESSING 9 Hours

Transaction Processing – Properties of Transactions –Serializability - Concurrency Control-Locking Mechanisms – Time Stamp ordering –Two phase Commit Protocol-Deadlock-Recovery systems-Log-based recovery.

UNIT IV FILES AND INDEXING 9 Hours

Overview of Physical Storage Media-RAID -File Organization-File operations – Hashing Techniques – Indexing -Single level and Multi-level Indexes-B+ tree Index Files-B tree Index Files.

UNIT V ADVANCED TOPICS 9 Hours

Data warehousing, heterogeneous component systems-Data mining and knowledge discovery-OODBMS- Object Relational Databases –XML Data Base - Cloud based systems – NOSQL introduction -Hbase data model -Database Tuning -Case Study for Design and Manage the Database for any Project.

TOTAL: 45 HOURS

REFERENCES:

1. AbrahamSilberschatz, Henry F.Korth and S.Sundarshan “Database System Concepts”, Sixth Edition, McGraw Hill, 2017.
2. RamezElmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2013.
- 3.Thomas M. Connolly and Carolyn E. Begg, —Database Systems - A Practical Approach to Design, Implementation, and Management, fifth edition, Pearson Education, 2011
4. C.J.Date, A.Kannan and S.Swamynathan, —An Introduction to Database Systems, Eighth Edition, Pearson Education, 2012.
- 5.Raghu Ramakrishnan, —Database Management Systems, Fourth Edition, McGraw-Hill College Publications, 2015.
- 6.Frank. P. Coyle, “XML, Web Services And The Data Revolution”, Pearson Education, 2012
7. <http://nptel.ac.in/>
8. <http://coursera.org/>

1902IT402	JAVA PROGRAMMING	L	T	P	C
		3	0	0	3
UNIT I	CLASSES AND OBJECTS				9 Hours
Object oriented Programming – Objects - Classes – Encapsulation – Methods – Constructor – Java Documents					
UNIT II	ARRAYS, STRINGS, INHERITANCE				9 Hours
I/O operations - Arrays – Strings – Inheritance – Interface- Polymorphism.					
UNIT III	EVENT DRIVEN PROGRAMMING				9 Hours
Packages - Events Handlers - Applets – Swings.					
UNIT IV	CONNECTIVITY				9 Hours
ODBC-JDBC – Threading – Exception Handling.					
UNIT-V	APPLICATION PROGRAMMING				9 Hours
Scripting – JSP- Servlet – Session Management – Full Stack Development.					
TOTAL:					45 Hours

REFERENCES:

1. Herbert Schidt, “The Complete Reference of Java”, Ninth Edition, Oracle Press, 2017
2. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, Eighth Edition, Sun Microsystems Press, 2012.
3. K. Arnold and J. Gosling, “The JAVA programming language”, Pearson Education, 2016.
4. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2012.
5. C. Thomas Wu, “An introduction to Object-oriented programming with Java”, Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2015.
6. <https://ilearning.oracle.com/>
7. <http://nptel.ac.in/>

1902IT403

OPERATING SYSTEMS

L	T	P	C
3	0	0	3

UNIT I INTRODUCTION AND PROCESS MANAGEMENT 9 Hours

Operating system functions and characteristics - historical evolution of operating systems - Different types of Operating Systems - Issues in operating system design. Process abstraction - process address space - process management - system calls, threads - process hierarchy.

UNIT II CPU SCHEDULING AND DEADLOCK 9 Hours

Levels of scheduling, comparative study of scheduling algorithms – Dead Lock: Characterization, Prevention Detection , Avoidance and Recovery.

UNIT III CONCURRENT PROCESSES AND MEMORY MANAGEMENT 9 Hours

Critical section problem: Semaphores, monitors, Inter-process communication, message passing - Storage allocation methods, virtual memory concept, demand paging, page replacement algorithms, segmentation, thrashing.

UNIT IV FILE SYSTEMS AND DEVICE MANAGEMENT 9 Hours

Functions, file access and allocation methods, directory system, file protection mechanisms, implementation issues, file system hierarchy. Hardware organization, device scheduling policies, device drivers.

UNIT V CASE STUDY 9 Hours

Linux System- Basic Concepts; System Administration-Requirements for Linux System Administrator, Setting up a LINUX Multifunction Server, Domain Name System, Setting Up Local Network Services; Virtualization- Basic Concepts, Setting Up Xen,VMware on Linux Host and Adding Guest OS

TOTAL: 45 Hours

REFERENCES:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley & Sons (Asia) Pvt. Ltd, Ninth Edition, 2017
2. Gary Nutt, —Operating Systems- A Modern Perspectivel, Pearson Education Pvt. Ltd, Second Edition, 2013.
3. Andrew S. Tanenbaum, —Modern Operating Systems, 3rd edition Prentice Hall of India Pvt. Ltd, 2015.
4. Harvey M. Deitel, Operating Systems, Pearson Education Pvt. Ltd, Third Edition, 2013.
5. William Stallings, Operating System, Pearson Education, Sixth edition, 2015.
6. <http://nptel.ac.in/>

1902IT404	SOFTWARE ENGINEERING AND PROJECT MANAGEMENT	L	T	P	C
		3	0	0	3

UNIT I SOFTWARE PROCESS AND SPECIFICATIONS 9 Hours

Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models, Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management.

UNIT II SOFTWARE DESIGN 9 Hours

Overview of System Design -System Design Concepts – System Design Activities – Addressing Design Goals – Managing System Design-Architectural Design -User Interface Design-Component level.

UNIT III SOFTWARE IMPLEMENTATION AND TESTING 9 Hours

Software Implementation Techniques: Coding practices-Refactoring- Software testing fundamentals & Techniques: White box testing- Black box testing-Case study- Levels of testing : Unit Testing ,Integration Testing – System Testing and Debugging-Regression Testing- Acceptance testing-reverse engineering and re-engineering.

UNIT IV ASPECT ORIENTED SOFTWARE DEVELOPMENT 9 Hours

AO Design Principles -Separations of Concerns, Subject Oriented Decomposition, Traits, Aspect Oriented Decomposition, Theme Approach, Designing Base and Crosscutting Themes, Aspect-Oriented Programming using Aspect-J.

UNIT V SOFTWARE PROJECT MANAGEMENT AND CONTROL 9 Hours

Estimation – FP Based, LOC Based, Make/Buy Decision, COCOMO Models - Project Plan, Planning Process, RFP Risk Management – Identification, Projection, RMMM - Scheduling and Tracking –Process and Project Metrics- Document Preparation and Production- Cost monitoring – Earned Value Analysis – Change control- Software Configuration Management – Managing contracts – Contract Management-Managing people.

TOTAL: 45 Hours

REFERENCES:

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, Seventh Edition, Mc Graw-Hill International Edition, 2017.
2. Bernd Bruegge, Alan H Dutoit, Object-Oriented Software Engineering, 2nd ed, Pearson Education, 2014
3. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2015.
4. Stephen Schach, Software Engineering 7th ed, McGraw-Hill, 2015.
5. AspectJ in Action, RamnivasLaddad, Manning Publications, 2013
6. Aspect-Oriented Software Development, Robert E. Filman, TzillaElrad, Siobhan Clarke, and Mehmet Aksit, October 2014.
7. <http://nptel.ac.in/>.

1902IT405 **COMPUTER NETWORKS** **L T P C**
3 2 0 4

UNIT I PHYSICAL AND DATA LINK LAYER 9 Hours

Computer Network – OSI Model – Communication Systems – Protocol and Standards – Wired vs Wireless – Data link layer – Error and Flow Control – Hamming Code – MAC - Case study: CSMA/CD & CA, Token Bus, Token Ring, Hub, Bridges.

UNIT II NETWORK AND TRANSPORT LAYER 12 Hours

Internetworking – Virtual and Datagram - IP Address: IPv4, IPv6 – Routing: Link state, Distance vector – UDP – TCP – Case study: Switch, Router.

UNIT III ROUTING SERVICES 12 Hours

Inter domain Routing – RIP – OSPF – BGP – ICMP – ARP – DHCP – Multicast routing.

UNIT IV APPLICATION LAYER 12 Hours

Link Layer Services – Framing – FTP – Web Services - Email – HTTP – DNS.

UNIT V CASE STUDY 12 Hours

IEEE Standards - Blue tooth – Wi-Fi – Network Management – SNMP – SNA – QoS – Congestion Control – Gateway.

TUTORIALS 12 Hours

1. Write a network application program
2. Use tools to visualize packet flow
3. Configure Router/Switch to set up network (network administration)
4. Simple Chat Program using TCP Sockets
5. Simulation of HTTP Protocol using TCP Sockets
6. Simulation of Sliding Window Protocol using TCP Sockets
7. Simulation of DNS using UDP Sockets
8. Simulation of Ping using Raw Sockets
9. Learn to use commands like TCP Dump, Netstat, Trace Route
10. Simulate networks using network simulators like NS-2
11. Performance comparison of MAC protocols using simulation tool
12. Performance comparison of Routing protocols using simulation tool

TOTAL: 60 Hours

REFERENCES:

1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A systems approach, Fifth Edition, Morgan Kaufmann Publishers, 2016.
2. Forouzan, Behrouz A., and Firouz Mosharraf. "Computer networks: a top-down approach", McGraw-Hill, Special Indian Edition 2016.
3. James F. Kurose, Keith W. Ross, —Computer Networking - A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.
4. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, —Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2012.
5. Nader. F. Mir, —Computer and Communication Networks, Pearson Prentice Hall Publishers, 2015
6. <http://nptel.ac.in/>

1902IT406	PRINCIPLES OF COMMUNICATION	L	T	P	C
		3	0	0	3

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9 Hours

Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

UNIT II DIGITAL COMMUNICATION 9 Hours

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery – squaring loop, Costas loop, DPSK.

UNIT III DIGITAL TRANSMISSION 9 Hours

Introduction, Pulse modulation, PCM sampling, sampling rate, signal to quantization noise rate, companding analog and digital percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Intersymbol interference, eye patterns.

UNIT IV SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9 Hours

Introduction, Pseudonoise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications.

UNIT V SATELLITE AND OPTICAL COMMUNICATION 9 Hours

Satellite Communication Systems Keplers Law, LEO and GEO Orbits, footprint, Link model Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.

TOTAL: 45 HOURS

REFERENCES:

1. Wayne Tomasi, “Advanced Electronic Communication Systems”, Pearson Education, 2016.
2. Simon Haykin, “Communication Systems”, 7th Edition, John Wiley & Sons. 2012.
3. H. T. A. B., D. L. Schilling, G. Saha, “Principles of Communication” 3/e, 2011.
4. B. P. Lathi, “Modern Analog And Digital Communication systems”, 3/e, Oxford University Press, 2012
5. Blake, “Electronic Communication Systems”, Thomson Delmar Publications, 2012.
6. Martin S. Roden, “Analog and Digital Communication System”, 5th Edition, PHI, 2012.
7. <http://nptel.ac.in>
9. <http://coursera.org>

1902IT451	DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	C
		0	0	2	1

LIST OF EXPERIMENTS:

- 1 DDL and DML commands
- 2 Transaction control commands and aggregate functions
- 3 Joins and Nested Queries
- 4 Constraints and Views
High level programming language extensions (Control structures, Procedures and Functions).
- 5
- 6 Cursors and Triggers
- 7 Embedded SQL
- 8 Procedures, Functions and Report
- 9 Database Design and implementation with any one front end tool (Mini Project)

Sample list of Projects

1. Hospital management
2. Railway ticket reservation
3. Student Mark list processing
4. Employee pay roll processing
5. Inventory control

TOTAL: 30 HOURS

REFERENCES:

1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan “Database System Concepts”, Sixth Edition, McGraw Hill, 2017.
2. RamezElmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2013.
3. Thomas M. Connolly and Carolyn E. Begg, —Database Systems - A Practical Approach to Design, Implementation, and Management, fifth edition, Pearson Education, 2011
4. C.J.Date, A.Kannan and S.Swamynathan, —An Introduction to Database Systems, Eighth Edition, Pearson Education, 2012.
5. Raghu Ramakrishnan, —Database Management Systems, Fourth Edition, McGraw-Hill College Publications, 2015.
6. Frank. P. Coyle, “XML, Web Services And The Data Revolution”, Pearson Education, 2012
7. <http://nptel.ac.in/>
8. <http://coursera.org/>

1902IT452

JAVA PROGRAMMING LAB

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0	0	2	1

LIST OF EXPERIMENTS:

MODULE – 1

10 Hours

1. Study of key features of the Java language, intro to the Java Development Kit (JDK) and Java Virtual Machine
2. Play with Data types, keywords, encapsulation, conditional and control statements, looping, branching
3. Implement Java programming concepts using Classes and Objects
4. Implement Java programming concepts using Arrays, Inheritance and Interfaces
5. Perform event handlers program using Java

MODULE – 2

20 Hours

1. Design a class for Complex numbers in Java. In addition to methods for basic operations on complex numbers, provide a method to return the number of active objects created.
2. Develop a simple paint-like program that can draw basic graphical primitives in different dimensions and colors. Use appropriate menu and buttons.
3. Develop a scientific calculator using event-driven programming paradigm of Java.
4. Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and Fibonacci number
5. Develop Mini-Project for Library Automation System using Events, JDBC and Exception Handling

Requirement for a batch of 30 students

Software:

Operating System: Windows /Linux operating system

Tool: JDK 1.6 (or above)

IDE: Net beans or Eclipse

TOTAL: 30 Hours

REFERENCES:

1. Herbert Schidt, “The Complete Reference of Java”, Ninth Edition, Oracle Press, 2017
2. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, Eighth Edition, Sun Microsystems Press, 2012.
3. K. Arnold and J. Gosling, “The JAVA programming language”, Pearson Education, 2016.
4. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2012.
5. C. Thomas Wu, “An introduction to Object-oriented programming with Java”, Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2015.
6. <https://ilearning.oracle.com/>
7. <http://nptel.ac.in/>

1902IT453

OPERATING SYSTEMS LAB

L	T	P	C
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LIST OF PROGRAMS

1. Installing of operating system and resource allocation
2. Shell Programming: Creating a script, making a script executable, shell syntax (variables, conditions, control structures, functions, commands).
3. Simulate the following CPU scheduling algorithms
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate Bankers Algorithm for Dead Lock Prevention
6. Simulate all file allocation strategies
7. Process synchronization using semaphores
8. Simulate all File Organization Techniques
9. Simulate all page replacement algorithms
10. Study of Linux OS, Microsoft, Mobile OS

Requirement for a batch of 30 students

Software:

Operating System: Windows /Linux operating system

Tool: C++ Compiler / JDK 1.6 (or above)

IDE: Net beans or Eclipse

TOTAL: 30 Hours

REFERENCES:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley & Sons (Asia) Pvt. Ltd, Ninth Edition, 2017
2. Gary Nutt, —Operating Systems- A Modern Perspective, Pearson Education Pvt. Ltd, Second Edition, 2013.
3. Andrew S. Tanenbaum, —Modern Operating Systems, 3rd edition Prentice Hall of India Pvt. Ltd, 2015.
4. Harvey M. Deitel, Operating Systems, Pearson Education Pvt. Ltd, Third Edition, 2013.
5. William Stallings, Operating System, Pearson Education, Sixth edition, 2015.
6. <http://nptel.ac.in/>

1901MCX01

ENVIRONMENTAL SCIENCE
(Common to all Branches of B.E/ B.Tech)

L T P C
3 0 0 0

MODULE I ECOSYSTEMS AND BIODIVERSITY

10 Hours

Concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers- Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Documentation of the medicinal plants in your native place.

MODULE II NATURAL RESOURCES

10 Hours

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water, dams- benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Documentation of the effect of modern Agriculture in your nearby Village.

MODULE III ENVIRONMENTAL POLLUTION

9 Hours

Definition – Source, causes, effects and control measures of: (a) Air pollution - Mitigation procedures- Control of particulate and gaseous emission, Control of SO_x, NO_x, CO and HC) -Technology for capturing CO₂ (metallo organic frame works)(b) Water pollution – Waste water treatment processes. (c) Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards–role of an individual in prevention of pollution – pollution case studies.

Documentation study of local polluted site – Urban / Rural / Industrial / Agricultural.

MODULE IV SOCIAL ISSUES AND THE ENVIRONMENT

8 Hours

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management -environmental ethics: Issues and possible solutions – 12 Principles of green chemistry – consumerism and waste products – environment protection act – Air act – Water act – Wildlife protection act – Forest conservation act – The Biomedical Waste (Management and Handling) Rules; 1998 and amendments- scheme of labeling of environmentally friendly products (Ecomark) central and state pollution control boards- disaster management: floods, earthquake- Public awareness. Analyze the recent steps taken by government of India to prevent pollution (Green India and Clean India).

MODULE V HUMAN POPULATION AND THE ENVIRONMENT

8 Hours

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare –Environmental impact analysis (EIA) -GIS-remote sensing-role of information technology in environment and human health – Case studies.

Documentation study of the Human health and the environment in nearby Hospital (Statistical report).

TOTAL: 45 HOURS

REFERENCES:

1. Trivedi.R.K., "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media, 3rd edition, BPB publications, 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai,

2001.

3. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi,2007.
4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.
5. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006
6. Ravikrishnan“Environmental Science and Engineering” Sri Krishna Hi-tech Publishing Company Pvt .
7. https://en.wikipedia.org/wiki/Carbon_capture_and_storage