B.Sc. (Data Science)
Discipline Specific Course (DSC)
Semester IV
BSDB32402T: Data Communication and Networks

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 40%

Objectives

To enable student to understand various aspects of data communications and computer networking systems. To examine and understand network protocols and architectures.

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER:
1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

Section A

Unit I: Basic concepts: Components of data communication, modes of communication, standards and organizations, Network Classification, Network Topologies; Transmission media, network protocol; layered network architecture.

Unit II: Models: Overview of OSI reference model; TCP/IP protocol suite. Physical Layer: Cabling, Network Interface Card, Transmission Media Devices- Repeater, Hub, Bridge, Switch, Router, Gateway; Transmission impairments.

Unit III: Data Link Layer: Framing techniques; Error Control; Flow Control Protocols; Shared media protocols - CSMA/CD and CSMA/CA.

Unit IV: Network Layer: Virtual Circuits and Datagram approach, IP addressing methods – Subnetting; Routing Algorithms (adaptive and non-adaptive)

Section B

Unit V: Transport Layer: Elements of transport protocols – Addressing, Connection establishment and release, Flow control and buffering, Transport services, Transport Layer protocol of TCP and UDP.

Unit VI: Session and Presentation Layer: Session Layer – Design issues, remote procedure call. Presentation Layer – Design issues, Data compression techniques, Cryptography.

Unit VII: Application Layer: Application layer protocols and services – Domain name system, HTTP, E-mail, WWW, telnet, FTP, SMTP.

Unit VIII: Network Security: Common Terms, Firewalls, Virtual Private Networks.

Suggestive Readings

1. B.A. Forouzan: Data Communication and Networking, 4th Edition, Tata McGraw Hill, 2017.
2. A. S. Tanenbaum, Computer Networks, 5th Edition, Pearson, 2011
3. D.E. Comer, Internetworking with TCP/IP, Vol. I, Prentice Hall of India, 2015
4. W. Stalling, Data & Computer Communication, 8th edition, Prentice Hall of India, 2013
5. D. Bertsekas, R. Gallager, Data Networks, 2nd edition, Prentice Hall of India. 1992