**MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES**

(Deemed to be University under section 3 of the UGC Act 1956)

**NAAC 'A' Grade University**

# BCS-DS-725: Network Security & Management

Periods/week Credits Max. Marks : 200

L :3 T: 0 3.0 Continuous Evaluation : 100

Duration of Exam: 3 Hrs End Term Examination : 100

**Pre-Requisite: Basic Knowledge of computers**

**Course Type: Program Electives**

**Course Outcomes:** The students will be able to-

BSC-DS-725.1 Learn security concepts and ethics in Network Security.

BSC-DS-725.2 Understand security standards of symmetric and asymmetric cryptography

BSC-DS-725.3 Recognize about the security threats and viruses.

BSC-DS-725.4 Identify the concept of Digital Signatures, authentication services and mechanisms

BSC-DS-725.5 Get familiar with existing protocols for email as well for web security.

BSC-DS-725.6 Understand about concepts of network management and various associated protocols.

## PART –A

**Unit-1: Introduction**

* 1. OSI Security Architecture
  2. Network security Models
  3. Classical Encryption Techniques: Symmetric cipher model
  4. Substitution Techniques
  5. Transposition techniques, Rotor Machines.

**Unit-2: Block Ciphers and Public Key Cryptography**

* 1. Block Cipher Principles and its Modes of Operation
  2. Data Encryption Standard, DES Encryption and Description.
  3. Variants of DES: Double DES and Triple DES.
  4. Principles of Public Key Cryptosystems
  5. RSA Algorithm
  6. Public Key Cryptosystems-Key Management
  7. Diffie Hellman-key-Exchange.

**Unit-3: System Security**

* 1. Intruders, Intrusion Detection
  2. Password Management
  3. Malicious Software: Viruses and related Threats, Virus Countermeasures.
  4. Firewalls: Design principles and Trusted Systems.

## PART –B

**Unit-4: Authentication and Digital Signatures**

* 1. Authentication, Authentication requirements and functions
  2. Hash functions, MD5 Message digest Algorithm
  3. Secure Hash Algorithm( SHA)
  4. Digital Signatures.

**Unit-5: Network Security**

1. Electronics Mail Security: PGP (Pretty Good Privacy), MIME, Data Compression techniques.
2. IP Security: Architecture, Authentication Header, Encapsulating security Payload, Key Management.
3. Web security: Secure Socket Layer & Transport Layer security
4. Secure electronic transactions.

**Unit-6: Network Management**

1. Network Management Model,
2. Infrastructure for Network Management,
3. SNMP v1, SNMP2 & SNMP3
4. Security Management, Security Analysis,
5. Change Management, Protecting Storage Area,
6. Risk Management, Identifying the risk to an Organization.

**Text Books/ Reference Books:**

1. William Stalling, Cryptography and Network Security Principal & Practices, PHI
2. Subramanian, Mani, Network Management Principles & Practices: AWL.
3. William Stalling, Simple Network Management Protocols: A Guide to Network Management: TMH.
4. Wang H.H., Telecom Network Management: TMH.
5. U. Black, Network Management: TMH.

**Software Required/Weblinks:**

https://onlinecourses.nptel.ac.in/explorer/search?category=COMP\_SCI\_ENGG

**Instructions for paper setting:** Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit) Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

**Distribution of Continuous Evaluation:**

|  |  |
| --- | --- |
| Sessional- I | 30% |
| Sessional- II | 30% |
| Assignment/Tutorial | 20% |
| Class Work/ Performance | 10% |
| Attendance | 10% |

**Evaluation Tools:**

Assignment/Tutorials

Sessional tests

Surprise questions during lectures / Class Performance

Term end examination

**COURSE ARTICULATION MATRIX :**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO Statement**  **(BCS-DS-725)** | PO  1 | PO  2 | PO  3 | PO  4 | PO  5 | PO  6 | PO  7 | PO  8 | PO  9 | PO  10 | PO  11 | PO  12 | PSO  1 | PSO  2 | PSO  3 |
| BCS-DS-725.1 | 3 | - | - | - | - | - | - | - | - | - | - | 2 | 1 | 2 | 2 |
| BCS-DS-725.2 | 2 | - | 2 | - | - | - | - | - | - | - | - | 2 | 1 | 2 | 2 |
| BCS-DS-725.3 | 2 | - | - | 3 | - | 2 | - | 1 | - | 1 | - | 3 | - | 2 | 2 |
| BCS-DS-725.4 | 3 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 1 | 2 | 2 |
| BCS-DS-725.5 | 2 | - | - | - | - | - | - | - | - | - | - | 2 | - | 2 | 2 |
| BCS-DS-725.6 | 2 | 1 | 2 | 2 | - | - | - | - | - | - | 2 | 1 | 1 | - | - |

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# BCS-DS-726: Distributed Operating System

Periods/week Credits Max. Marks : 200

L :3 T: 0 3.0 Continuous Evaluation : 100

Duration of Exam: 3 Hrs End Term Examination : 100

**Pre-Requisite: Operating Systems(BCS-DS-403)**

**Course Type: Program Electives**

**Course Outcomes:** Students will be able to-

1. Distinguish between operating systems and communication in distributed system.
2. Apply different mutual exclusion algorithm on the basis of the problem and the concept of deadlock condition in the system .
3. Create threads and process using various commands.
4. Demonstrate the file management scenario in distributed file system and the various trends in distributed file system.
5. Interpret the concept of memory management in distributed system, various consistency model and issue related to the shared memory system.
6. Examine the process communication and memory management process in MACH operating system.

PART –A

**Unit-1: Distributed Operating System Concepts**

1. Introduction to Distributed System, Goals of Distributed system
2. Hardware and Software concepts, Design issues
3. Communication in distributed system: Layered protocols, ATM networks, Client–Server mode
4. Remote Procedure Calls and Group Communication. Middleware and Distributed Operating Systems.

**Unit-2: Synchronization in Distributed System**

1. Clock synchronization, Mutual Exclusion
2. Election algorithm, the Bully algorithm, a Ring algorithm, Atomic Transactions
3. Deadlock in Distributed Systems, Distributed Deadlock Prevention, Distributed Deadlock
4. Detection

**Unit-3: Processes and Processors in Distributed Systems**

1. Threads, System models
2. Processors Allocation, Scheduling in Distributed System
3. Real Time Distributed Systems.

##### PART -B

**Unit-4: Distributed File Systems**

* 1. Distributed file system Design
  2. Distributed file system Implementation
  3. Trends in Distributed file systems.

**Unit 5: Distributed Shared Memory**

1. Concept of shared memory, Consistency models
2. Page based distributed shared memory
3. Shared variables distributed shared memory.

**Unit-6: Case Study MACH**

* 1. Introduction to MACH, process management in MACH, communication in MACH
  2. UNIX emulation in MACH.

**Text /Reference Books:**

1. Andrew S. Tanenbaum, 2002, Distributed Operating Systems,1st edition, PHI.
2. Pradeep K. Sinha, 1998, Distributed Operating System, 1st edition,Wiley
3. O.S, M. Singhal & Shivratri, 2006, Advanced Concepts in Operating System Distributed Databases & Multiprocessor, 2nd edition, McGH

**WebLinks:**

http://nptel.ac.in/

<https://www.tutorialspoint.com/>

<https://en.wikipedia.org/wiki/Distributed_operating_system>

http://ieeexplore.ieee.org

**Instructions for paper setting:** Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit) Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

**Distribution of Continuous Evaluation:**

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| Sessional- II | 30% |
| Assignment/Tutorial | 20% |
| Class Work/ Performance | 10% |
| Attendance | 10% |

**Evaluation Tools:**

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

**COURSE ARTICULATION MATRIX:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO Statement**  **(BCS-DS-726)** | **PO**  **1** | **PO**  **2** | **PO**  **3** | **PO**  **4** | **PO**  **5** | **PO**  **6** | **PO**  **7** | **PO**  **8** | **PO**  **9** | **PO**  **10** | **PO**  **11** | **PO**  **12** | **PSO**  **1** | **PSO**  **2** | **PSO**  **3** |
| BCS-DS-726.1 | 1 | - | - | - | 3 | - | - | - | - | 1 | - | - | - | 3 | 3 |
| BCS-DS-726.2 | 1 | 1 | - | 3 | 2 | - | - | - | 2 | - | - | - | - | 3 | - |
| BCS-DS-726.3 | - | - | 2 | 3 | - | - | - | - | - | - | - | 3 | - | - | 2 |
| BCS-DS-726.4 | - | - | - | - | - | - | 3 | - | - | - | - | - | 2 | - | - |
| BCS-DS-726.5 | - | - | 2 | 3 | - | - | - | - | 2 | - | - | - | 3 | - | - |
| BCS-DS-726.6 | 3 | 2 | - | - | - | - | - | 2 | - | - | 3 | - | - | 3 | 3 |