**Integral University Lucknow**

**Study & Evaluation Scheme**

**B. Tech. (CSE) Cloud Technology and Information Security**

**YEAR II, Semester- IV**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No** | **Subject Code** | **Category** | **Subject** | **Periods** | | | | **Evaluation Scheme** | | | | **Subject Total** |
| **Sessional** | | | **Exam** |
| **L** | **T** | **P** | **C** | **CT** | **TA** | **CA** | **ESE** |
| 1 | CS-240 | DC | Desktop Operating System | 2 | 1 | 0 | 3 | 25 | 15 | 40 | 60 | 100 |
| 2 | CS-242 | DC | Relational Database Management Systems | 2 | 1 | 0 | 3 | 25 | 15 | 40 | 60 | 100 |
| 3 | CS-244 | DC | Network Security Basics | 3 | 1 | 0 | 4 | 25 | 15 | 40 | 60 | 100 |
| 4 | CS-246 | DC | Enterprise Network Engineering | 3 | 1 | 0 | 4 | 25 | 15 | 40 | 60 | 100 |
| 5 | CS-248 | DC | Introduction to Linux | 2 | 1 | 0 | 3 | 25 | 15 | 40 | 60 | 100 |
| 6 | MT-206 | BS | Mathematical Analysis | 3 | 1 | 0 | 4 | 25 | 15 | 40 | 60 | 100 |
| 6 | CS-247 | DC | Enterprise Network Engineering- Lab | 0 | 0 | 2 | 1 | 30 | 30 | 60 | 40 | 100 |
| 7 | CS-243 | DC | Relational Database Management Systems- Lab | 0 | 0 | 2 | 1 | 30 | 30 | 60 | 40 | 100 |
| 8 | CS-249 | DC | Introduction to Linux Lab | 0 | 0 | 2 | 1 | 30 | 30 | 60 | 40 | 100 |
| 9 | CS-245 | DC | Network Security Basics Lab | 0 | 0 | 2 | 1 | **30** | 30 | 60 | 40 | 100 |
| 10 | CS-241 | DC | Desktop Operating System Lab | 0 | 0 | 2 | 1 | 30 | 30 | 60 | 40 | 100 |
|  |  |  | **TOTAL** | **14** | **6** | **10** | **26** | **300** | **240** | **540** | **560** | **1100** |

**L-**Lecture **T-T**utorial **P-**Practical **C**-Credits **CT-**Class Test **TA-**Teacher Assessment

**Sessional Total (CA)** = Class Test + Teacher Assessment

**Subject Total** = Sessional Total (CA) + End Semester Examination (ESE)

**DC-** Departmental Core **HM-** Humanities

**DE-** Departmental Elective

**ESA-** Engineering Sciences & Arts (Foundation Course & Engineering Courses)

**Integral University, Lucknow**

**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Desktop Operating System, Subject Code: CS-240**

**w.e.f. July-2017**

**L T P C**

**2 1 0 3**

**Unit I**

**Introduction to Operating System**

Introduction to Operating System, Evolution of operating system, Structure of Operating, OS Operations OS Organizations, Distributed Systems, Open source Operating systems, Process Management, Memory Management, Storage Management, Computing Environment. [7]

**Unit II**

**Installing, Upgrading and Managing Windows – 7**

Gathering hardware devices, preparing to install windows 7, upgrading and migrating to windows 7, Clean and Image based installation, Configuring Application Compatibility, administrating windows features, Disk management, and installing and configuring device drivers. [7]

**Unit III**

**File Access, Printers and Network Connectivity with Windows – 7**

Introduction to Authentication and Authorization, Managing file access , Shared Folders, File compression, file archiving, managing printers, connecting windows 7 client with server, configuring ipv4 & ipv6 connectivity, Implementing APIPA, Introduction to Name resolution, troubleshooting network issues, Overview of wireless network, configuring wireless network. [7]

**Unit IV**

**Securing, Optimizing and Maintaining Windows 7 Client**

Overview of local security management, local security policy settings, EFS and Bit locker, Application restrictions, UAC, Windows Firewall, Administrating IE8, Windows Defender. [7]

**Unit V**

**Configuring Mobile Computing and Remote Access in Windows 7**

Configure Mobile computer and device settings, Remote desktop, remote assistance, direct access, branch cache. [7]

**Text Book**

1. Milan Milenkovic - Operating Systems – TATA McGraw HILL, 2009

**Reference Books**

1. Operating Systems Fundamentals D. Irtegov, 2005

2. A Short Introduction to Operating Systems (M. Burgess), 2010

3. Operating Systems: Design and Implementation (Second Edition)., Andrew S. Tanenbaum, 2010

**Integral University, Lucknow**

**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Relational Database Management Systems, Subject Code: CS-242**

**w.e.f. July-2017**

**L T P C**

**2 1 0 3**

**Unit I**

**Introduction**

Purpose of Database System -– Views of data – Data Models – Database Languages –– Database System Architecture – Database users and Administrator – Entity– Relationship model (E-R model) – E-R Diagrams -- Introduction to relational databases. [5]

**Unit II**

**Relational Model**

The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations – Additional Operations- SQL fundamentals

Oracle data types, Data Constraints, Column level & table Level Constraints, working with Tables.

Defining different constraints on the table, Defining Integrity Constraints in the ALTER TABLE Command, Select Command, Logical Operator, Range Searching, Pattern Matching, Oracle Function, Grouping data from Tables in SQL, Manipulation Data in SQL.

Joining Multiple Tables (Equi Joins), Joining a Table to itself (self Joins), Sub queries Union, intersect & Minus Clause, Creating view, Renaming the Column of a view, Granting Permissions, - Updating, Selection, Destroying view Creating Indexes, Creating and managing User

Integrity – Triggers - Security – Advanced SQL features –Embedded SQL– Dynamic SQL- Missing Information– Views – Introduction to Distributed Databases and Client/Server Databases. [13]

**Unit III**

**Database Design**

Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce Codd Normal Form-Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form. [7]

**Unit IV**

**Transactions**

Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery – Media Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery –Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Intent Locking – Deadlock- Serializability – Recovery Isolation Levels – SQL Facilities for Concurrency. [11]

**Text Books:**

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006
2. RamezElmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Fourth Edition, Pearson/Addision Wesley, 2007.
3. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2003.

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**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Network Security Basics, Subject Code: CS-244**

**w.e.f. July-2017**

**L T P C**

**3 1 0 4**

**Unit I**

**Introduction to Network Security**

Perimeter Security - Overview of Network Security, Access Control, Device Security, Security features on Switches, Firewall, Types of firewall, Attack vector and Mitigation techniques; Access Management - Securing Management Access, Multifactor Authentication, Layer 2 Access Control, Wireless LAN (WLAN) Security and Network Admission Control (NAC). [9]

**Unit II**

**Threats, Vulnerabilities and Attacks**

Threat; Vulnerabilities – vulnerability assessment and vulnerability scanning; Attacks – Application Attack, Network Attack and Mitigating & Deterring Attacks; Network Security – Security through network devices, Security through Network Technologies and Security through Network Design Elements; Administering a Secure Network – Network Administrative Principles and Securing Network Application. [8]

**Unit III**

**Network Security Management**

Secure Socket Layer (SSL) – Introduction to SSL, Open SSL basics, Problems with SSL, Cryptography, Message Digits Algorithms, Digital Signature and Public Key Infrastructure (PKI); Data Privacy – IPsec VPN, Dynamic Multipoint VPN (DMVPN), Group Encrypted Transport VPN (GET VPN), Secure Sockets Layer VPN (SSL VPN) and Multiprotocol Label Switching VPN (MPLS VPN). [9]

**Unit IV**

**Network Security Controls**

Network Intrusion Prevention – Overview of Intrusion Prevention System (IPS), Intrusion Detection System (IDS), Deploying IPS and IPS High Availability; Host Intrusion Prevention; Anomaly Detection and Mitigation. [8]

**Unit V**

**Network Management**

Security Monitoring and correlation; Security Management - Security and Policy Management and Security Framework and Regulatory Compliance; Best Practices Framework, Case Studies. [6]

**Reference/ Text Books:**

1. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole
2. Network Security Bible by Eric Cole

**Integral University, Lucknow**

**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Enterprise Network Engineering, Subject Code: CS-246**

**w.e.f. July-2017**

**L T P C**

**3 1 0 4**

**Unit I**

**Networking Fundamentals**

The TCP/IP and OSI Networking Models, Fundamentals of Ethernet LANs, fundamentals of WANs, Fundamentals of IPv4 Addressing and Routing, Fundamentals of TCP/IP Transport and Applications. [7]

**Unit II**

**Ethernet LANs and Switches**

Building Ethernet LANs with Switches, Cisco LAN Switches, Configuring Ethernet Switching. [6]

**Unit III**

**IP Version 4 Addressing and Subnetting**

Perspectives on IPv4 Subnetting, AnalyzingClassfull IPv4 Networks, Analysing Subnet Masks, Analysing Existing Subnets, Implementing IP Version 4: Operating Cisco Routers, Configuring IPv4 Addresses and Routes, Implementing Ethernet Virtual LANs, Troubleshooting Ethernet LANs, Spanning Tree Protocol Concepts, Troubleshooting LAN Switching. [9]

**Unit IV**

**LAN Routing**

Configure IPv4 Routing, Configure and Verify Host Connectivity, Advanced IPv4 Addressing Concepts, Describe the boot process of Cisco IOS routers; Operation status of a serial interface; Manage Cisco IOS files; Routing and Routing Protocols; OSPF (multi-area); EIGRP (single AS); Passive Interface. [9]

**Unit V**

**IPv4 Services and IP Version 6**

Basic IPv4 Access Control Lists, Advanced IPv4 ACLs and Device Security, Network Address Translation, Recognize high availability (FHRP); Describe SNMP v2 and v3, IPV6 addressing. [9]

**Reference Books:**

1. CCNA Cisco Certified Network Associate: Study Guide (With CD) 7th Edition (Paperback), Wiley India, 2011

**Text Books:**

1. CCENT/CCNA ICND1 640-822 Official Cert Guide 3 Edition (Paperback), Pearson, 2013
2. Routing Protocols and Concepts CCNA Exploration Companion Guide (With CD) (Paperback), Pearson, 2008
3. CCNA Exploration Course Booklet : Routing Protocols and Concepts, Version 4.0 (Paperback), Pearson, 2010

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**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Introduction to Linux, Subject Code: CS-248**

**w.e.f. July-2017**

**L T P C**

**2 1 0 3**

**Unit I**

**Linux Introduction**

Introduction to Multi user System, History of UNIX, Features & Benefits, Versions of UNIX, Features of UNIX File System,, Commonly Used Commands like who, pwd, cd, mkdir, rm, rmdir, ls, mv, ln, chmod, cp, grep, sed, awk ,tr, yacc etc. getting Started (Login/Logout) . Creating and viewing files using cat, file comparisons, View files, disk related commands, checking disk free spaces. **Exploring Linux Flavours: Introduction** to various Linux flavours. , Debian and rpm packages, Vendors providing DEBIAN & RPM distribution & Features. Ubuntu. History, Versions, Installation, Features, Ubuntu one. Fedora: History, Versions, Installation, Features. [9]

**Unit II**

**The UNIX File System**

I nodes - Structure of a regular file – Directories - Conversion of a path name to an I node -

Super block – Inode assignment to a new file - Allocation of disk blocks. System calls for the file System: Open – Read - Write - Lseek – Close - File creation - Creation of special files - Changing directory and root - changing owner and mode – stat and fstat - pipes - Dup - Mounting and Un mounting file systems - Link and Un link. [8]

**Unit III**

**UNIX Process Management**

The Structure of Processes: Process States and Transitions - Layout of system memory - Context of a process. Process Control: Process Creation – Signals – Process Termination – Invoking other programs – PID & PPID – Shell on a Shell. [7]

**Unit IV**

**VI editor**

Vi Editor: Introduction to Text Processing, Command & edit Mode, Invoking vi, deleting & inserting Line, Deleting & Replacing Character, Searching for Strings, Yanking, Running Shell Command Macros, Set Window, Set Auto Indent, Set No. Communicating with Other Users: who, mail, wall, send, mesg, ftp. [7]

**Unit V**

**System Administration**

Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of user’s accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command. [9]

**Reference Books:**

1. The Design of Unix Operating System, Maurice J. Bach, Pearson Education, 2010
2. Advance UNIX, a Programmer’s Guide, S. Prata, BPB Publications, and New Delhi, 2011
3. Unix Concepts and Applications, Sumitabh Das, 2010
4. The UNIX Programming Environment, B.W. Kernighan & R. Pike, Prentice Hall of India. 2009
5. Guide to UNIX Using LINUX, Jack Dent Tony Gaddis, Vikas/ Thomson Pub. House Pvt. Ltd. 2010

**Integral University, Lucknow**

**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Mathematical Analysis, Subject Code: MT-206**

**w.e.f. July-2017**

**L T P C**

**3 1 0 4**

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**Unit-I**

**Errors:** Error and their analysis, Computer Arithmetic, Floating-Point Number Operation, Normalization & their consequences.

**Statistics:** Correlation and Regression analysis, Binomial Distribution, Poisson Distribution, Normal Distribution. [8]

**Unit-II**

**Algebraic & Transcendental Equations**:

Bisection Method, Iteration Method, False Position Method, Secant method, Newton-Raphson Method, Lin-Bairstow’s Method. Rate of Convergence of Methods. Solution of system of linear equations by LU decomposition method and Gauss Seidel Method. [8]

**Unit-III**

**Interpolation:** Finite differences, Newton’s forward & backward Formula, Gauss, Stirling and Bessel’s Formula for Equal Interval. Lagrange’s Formula and Newton’s Divided Difference Formula for Unequal Interval, Numerical Differentiation. [8]

**Unit-IV**

**Numerical Integration & Solution of Ordinary Differential Equations:**

Numerical Integration by Trapezoidal Rule, Simpson’s 1/3 Rule, Simpson’s 3/8 Rule, Boole’s & Weddle’s Rule, Euler-Maclaurin’s Formula.

Taylor’s Series Method, Euler’s Method, Modified Euler’s Method, Runge-Kutta Method. [8]

**Unit-V**

**Integral Transform & Complex Analysis:**

Introduction to Fourier Transform, Sine and Cosine transforms, Z-transform.

Analytic functions, C-R equations and harmonic functions, Cauchy’s integral theorem, Cauchy’s integral formula for derivatives of analytic functions, Conformal mapping and bilinear transformations. [10]

**References:**

1. Sastry, Introductory method of Numerical Analysis, PHI
2. Balaguruswamy, Numerical method, TMH
3. Jain, Iyengar, Jain, Numerical Methods for Scientific & Engineering Computations, New Age International
4. P. Kandasamy, Numerical methods, S. Chand & Company
5. H.K. Dass, Advanced Engineering Mathematics, S. Chand & Company
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Pub.

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**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Enterprise Network Engineering Lab, Subject Code: CS-247**

**w.e.f. July-2017**

**L T P C**

**0 0 2 1**

**List of Programs**

1. Executing of  Switch Configuration - Basic Commands
2. Recognize  Switch Configuration  - Switch Port Security
3. Schematize  Router - Configuration
4. Demonstrate Configuration of IP Address for a Router
5. Classify  Setting up of Passwords
6. Compare PPP Encapsulation, PPP PAP Authentication, PPP CHAP Authentication
7. Differentiate Configuration of Static and Dynamic Routing
8. Analyse Configuration of Default Route
9. Execute Implementation of EIGRP
10. Execute Implementation of OSPF
11. Interpret VLAN Configuration
12. Show Switch Troubleshooting
13. Justify Configuration of Access-lists - Standard & Extended ACLs
14. Analyse Cisco Discovery Protocol
15. Illustrate DHCP, DHCP Relay & DHCP Exclusions
16. Demonstrate Configuring Logging to a Remote Syslog Server

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**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Relational Database Management Systems Lab, Subject Code: CS-243**

**w.e.f. July-2017**

**L T P C**

**0 0 2 1**

**List of programs**

1. Create User in Oracle Database and grant and revoke the privileges and use of commit savepointroleback command.
2. Create the following:

* Synonym sequences and Index
* Create alter and update views.

1. Create PL/SQL program using cursors, control structure, exception handling
2. Create following:

* Simple Triggers
* Package using procedures and functions.

1. Create the table for

* COMPANY database
* STUDENT database and Insert five records for each attribute.

1. Illustrate the use of SELECT statement
2. Conditional retrieval - WHERE clause
3. Query sorted - ORDER BY clause
4. Perform following:

* UNION, INTERSECTION and MINUS operations on tables.
* UPDATE, ALTER, DELETE, DROP operations on tables

1. Query multiple tables using JOIN operation.
2. Grouping the result of query - GROUP BY clause and HAVING clause
3. Query multiple tables using NATURAL and OUTER JOIN operation.

**Integral University, Lucknow**

**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Introduction to Linux Lab, Subject Code: CS-249**

**w.e.f. July-2017**

**L T P C**

**0 0 2 1**

**List of Programs**

1. Execute 25 basic commands of UNIX.

2. Basics of functionality and modes of VI Editor.

3. WAP that accepts user name and reports if user is logged in.

4. WAP which displays the following menu and executes the option selected by user:

1. ls 2. Pwd 3. ls –l 4. ps –fe

5. WAP to print 10 9 8 7 6 5 4 3 2 1 .

6. WAP that replaces all “\*.txt” file names with “\*.txt.old” in the current.

7. WAP that echoes itself to stdout, but backwards.

8. WAP that takes a filename as input and checks if it is executable, if not make it executable.

9. WAP to take string as command line argument and reverse it.

10. 1. Create a data file called employee in the format given below:

a. EmpCode Character

b. EmpName Character

c. Grade Character

d. Years of experience Numeric

e. Basic Pay Numeric

$vi employee

A001 ARJUN E1 01 12000.00

A006 Anand E1 01 12450.00

A010 Rajesh E2 03 14500.00

A002 Mohan E2 02 13000.00

A005 John E2 01 14500.00

A009 Denial SmithE2 04 17500.00

A004 Williams E1 01 12000.00

Perform the following functions on the file:

a. Sort the file on EMPCode.

b. Sort the file on

(i) Decreasing order of basic pay

(ii) Increasing order of years of experience.

c. Display the number of employees whose details are included in the file.

d. Display all records with ‘smith’ a part of employee name.

e. Display all records with EmpName starting with ‘B’.

f. Display the records on Employees whose grade is E2 and have work experience of 2 to 5 years.

g. Store in ‘file 1’ the names of all employees whose basic pay is between 10000 and 15000.

h. Display records of all employees who are not in grade E2.

**Integral University, Lucknow**

**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Network Security Basics Lab, Subject Code: CS-245**

**w.e.f. July-2017**

**L T P C**

**0 0 2 1**

**List of Programs**

1. Firewall Configuration - I

2. Firewall Configuration - II

3. VPN Configuration - I

4. VPN Configuration - II

5. IDS Configuration - I

6. IDS Configuration - II

7. IDS Configuration - III

8. Router Security - I

9. Router Security - II

10. Router Security - III

11. Traffic Monitoring using WireShark - I

12. Traffic Monitoring using WireShark – II

**Integral University, Lucknow**

**Department of Computer Science & Engineering**

**B.Tech (CSE) CTIS, 2nd Year/4th Semester**

**Subject Name: Desktop Operating System Lab, Subject Code: CS-241**

**w.e.f. July-2017**

**L T P C**

**0 0 2 1**

**List of programs**

1. Installing Windows 7
2. Using Windows Upgrade Advisor or Upgrade Assistance
3. Migrating to Windows 7 using Windows Easy Transfer and User State Migration Tool
4. Creating a Small Office Network or Home Network.
5. Configuring TCP/IP in Windows.
6. Sharing Resources in Windows
7. Creating Users and Groups
8. Performing a Windows Update
9. Capturing image of existing installed operating system and deploy it to another system using imagex.
10. Configuring disk partitions, Virtual HD in Disk Management. S