



**Shri Vaishnav Vidyapeeth Vishwavidyalaya**  
**Bachelor of Technology (CSE with Specialization in Enterprise System (Red Hat))**  
**Choice Based Credit System (CBCS)-2018-19**

**SEMESTER - IV**

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
ML301		<b>Environment and Energy Studies</b>	3	-	-	3	60	20	20	-	-

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

\*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**COURSE OBJECTIVES**

The students will be able to:

1. To understand sources of information required for addressing environmental challenges.
2. To identify a suite of contemporary tools and techniques in environmental informatics.
3. To apply literacy, numeracy and critical thinking skills to environmental problem-solving.

**COURSE OUTCOMES**

The students should be able to:

1. Apply the principles of ecology and environmental issues that apply to air, land and water issues on a global scale.
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
3. Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community.

**SYLLABUS**

**UNIT-I**

**Environmental Pollution and Control Technologies:** Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary and Tertiary.

**UNIT-II**

**Natural Resources:** Classification of Resources: Living and Non - Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable energy source, case studies.



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### UNIT-III

**Ecosystems:** Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, ecosystem value, devices and carrying capacity, Field visits.

### UNIT-IV

**Biodiversity and its Conservation:** Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a megadiversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man/wildlife conflicts; Conservation of biodiversity: In-situ and Exsitu conservation. National biodiversity act.

### UNIT-V

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan(EMP).

### TEXT BOOKS/ REFERENCE BOOKS:

1. Agarwal, K.C.,(latest edition).**Environmental Biology**, Bikaner :Nidi Pub. Ltd.,
2. Brunner R.C.(latest edition) **Hazardous Waste Incineration**, McGraw Hill Inc.
3. Clank R.S. .,(latest edition. **Marine Pollution**, Clanderson Press Oxford (TB).
4. **Environmental Encyclopedia**, Jaico Pub. Mumbai,
5. De A.K(latest edition) **Environmental Chemistry**, Wiley Western Ltd.
6. ErachBharucha(2005).**Environmental Studies for Undergraduate Courses** by for University Grants Commission.
7. R. Rajagopalan(2006).**Environmental Studies**. Oxford University Press.
8. M. AnjiReddy(2006).**Textbook of Environmental Sciences and Technology**. BS Publication.
9. Richard T. Wright(2008).**Enviromental Science: towards a sustainable future** PHL Learning Private Ltd. New Delhi.
10. Gilbert M. Masters and Wendell P. Ela.(2008).**Environmental Engineering and science**. PHI Learning Pvt Ltd.
11. Daniel B. Botkin& Edwards A. Keller(2008).**Environmental Science** Wiley INDIA edition.
12. AnubhaKaushik(2009).**EnviromentalStudies**. New age international publishers.



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BTIT502	-	Computer Networks	3	1	2	5	60	20	20	30	20

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### COURSE OBJECTIVES

The student should be made to:

1. Understanding the fundamental concepts of computer networking.
2. Creating students interest in the basic taxonomy and terminology of the computer networking area.
3. Applying advanced networking concepts for student knowledge.
4. Creating the student for entry Advanced courses in computer networking.

### COURSE OUTCOMES

Upon completion of the subject, students will be able to:

1. Understanding basic computer network technology.
2. Understanding and explain Data Communications System and its components.
3. Evaluating the different types of network topologies and protocols.
4. Remembering the layers of the OSI model and TCP/IP. 5. Evaluating the different types of network devices and their functions within a network..

### SYLLABUS

#### UNIT-I

**Computer Network:** Definitions, goals, components, Architecture, Classifications & Types. Layered Architecture: Protocol hierarchy, Design Issues, Interfaces and Services, Connection Oriented & Connectionless Services, Service primitives, Design issues & its functionality. ISO- OSI Reference Model: Principle, Model, Descriptions of various layers and its comparison with TCP/IP. Network standardization.

#### UNIT-II

**Data Link Layer:** Need, Services Provided, Framing, Flow Control, Error control. Data Link Layer Protocol: Elementary & Sliding Window protocol: 1-bit, Go-Back-N, Selective Repeat, Hybrid ARQ. Bit oriented protocols: SDLC, HDLC, BISYNC, LAP and LAPB.

#### UNIT-III

**MAC Sublayer:** MAC Addressing, Binary Exponential Back-off (BEB) Algorithm, Distributed Random Access Schemes/Contention Schemes: for Data Services (ALOHA and Slotted- ALOHA), CSMA/CA, CSMA/CD Ethernet, token bus, token ring, (IEEE 802.3, IEEE 802.4, IEEE 802.5)



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**Choice Based Credit System (CBCS)-2018-19**

#### **UNIT-IV**

**Network Layer:** Need, Services Provided, Design issues, Routing and congestion in network layer, Routing algorithms: Least Cost Routing algorithm, Dijkstra's algorithm, Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multi cast Routing. IP protocol, IP Addresses, Subnetting, Comparative study of IPv4 & IPv6, Mobile IP.

#### **UNIT-V**

**Transport Layer:** Design Issues, UDP: Header Format, Per-Segment Checksum, Carrying Unicast/Multicast Real-Time Traffic, TCP: Connection Management, Reliability of Data Transfers, TCP Flow Control, TCP Congestion Control, TCP Header Format, TCP Timer Management. **Session layer:** Authentication, Authorisation, Session layer protocol. **Presentation layer:** Data conversion, Encryption and Decryption, Presentation layer protocol (LPP, Telnet, X.25 packet Assembler/Disassembler). **Application Layer:** WWW and HTTP, FTP, SSH.

#### **TEXT BOOKS:**

1. Andrew S Tanenbaum, Computer Networks, 6th Edition, Pearson Education, 2016.
2. Behrouz A. Forouzan, TCP/IP-Protocol suite, 4th edition, McGraw-Hill, 2010.
3. William Stallings, Data and Computer Communication, 10th edition Pearson, 2014.
4. Comer, Internet working with TCP/IP Volume one, Addison-Wesley, 2015.
5. W. Richard Stevens, TCP/IP Illustrated, Volume 1, 2nd Edition Addison-Wesley Professional Computing Series.

#### **REFERENCE BOOKS:**

1. Kaveh Pahlavan, Prashant Krishnamurthy, Networking Fundamentals, Wiley Publication, 2009.
2. Michael A. Gallo & William M. Hancock, Computer Communications & Networking Technologies, Cengagepearson publications, 2001.
3. Dimitri Bertsekas, Robert Gallager, Data Networks, PHI Publication, Second Edition, 1992.
4. Uyless Black, Computer Networks, PHI Publication, Second Edition, 1993..

#### **LIST OF EXPERIMENTS:**

1. Demonstrate Different Types of Network Equipment's.
2. Color coding standard of CAT 5, 6, 7 and crimping of cable in RJ-45.
3. LAN installations and Configurations.
4. Experiment with basic network command and Network configuration commands.
5. Examine network IP.
6. Write a program to implement various types of error correcting techniques.
7. Write a program to implement various types of farming methods.
8. Implement & simulate various types of routing algorithm.
9. Installation of ONE (Opportunistic Network Environment) Simulator for High Mobility Networks.
10. Simulate STOP AND WAIT Protocols on NS-2.
11. Simulate various Routing Protocol on NS-2.
12. Simulate various Network Topologies on NS-2.
13. Configuring routers, bridges and switches and gateway on NS-2.



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**Choice Based Credit System (CBCS)-2018-19**

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BTCS502	-	Operating System	2	1	2	4	60	20	20	30	20

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### COURSE OBJECTIVES

The student will have ability to:

1. To learn the fundamentals of Operating Systems.
2. To study the mechanisms of Operating System to handle processes and threads and their communication.
3. To gain knowledge of process management concepts that includes architecture, Mutual exclusion algorithms, deadlock detection and recovery algorithms.
4. To learn the mechanisms involved in memory management in Operating System.
5. To know the components and management aspects of disc scheduling.

### COURSE OUTCOMES

Upon completion of the subject, students will be able to:

1. To describe the detail structure of Operating System.
2. To design and Implement Process management Techniques in Operating System.
3. To calculate CPU Scheduling criteria.
4. To understand The Memory Management of Operating System.
5. To elaborate Disc Scheduling.

### SYLLABUS

#### UNIT-I

##### Introduction to Operating System

Introduction and need of operating system, layered architecture/logical structure of operating system, Type of OS(Multiprogramming , Time Sharing, Real Time ,Networked, Distributed, Clustered, Hand Held), operating system as resource manager and virtual machine, OS services, BIOS, System Calls/Monitor Calls, Firmware- BIOS, Boot Strap Loader.

Threads- processes versus threads, threading, concepts, models, kernel & user level threads, thread usage, benefits, multithreading models.

#### UNIT-II

**Process Management:-** Process model, creation, termination, states & transitions, hierarchy, context switching, process implementation, process control block, Basic System calls- Linux & Windows.



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Basic concepts, classification, CPU and I/O bound, CPU scheduler- short, medium, long-term, dispatcher, scheduling:- preemptive and non-preemptive, Static and Dynamic Priority Criteria/Goals/Performance Metrics, scheduling algorithms- FCFS, SJFS, shortest remaining time, Round robin, Priority scheduling, multilevel queue scheduling, multilevel feedback queue scheduling.

### **UNIT-III**

**Interprocess communication-** Introduction to message passing, Race condition, critical section problem, Peterson's solution, semaphore, classical problems of synchronization Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem, Sleeping Barber Problem etc... **Deadlock-** System model, resource types, deadlock problem, deadlock characterization, methods for deadlock handling, deadlock prevention, Deadlock Avoidance: Banker's algorithm, deadlock detection, recovery from deadlock.

### **UNIT-IV**

**Memory management-** concepts, functions, logical and physical address space, address binding, degree of multiprogramming, swapping, static & dynamic loading- creating a load module, loading, static & dynamic linking, shared libraries, memory allocation schemes- first fit, next fit, best fit, worst fit and quick fit. Free space management- bitmap, link list/free list.

**Virtual Memory-** concept, virtual address space, paging scheme, pure segmentation and segmentation with paging scheme hardware support and implementation details, memory fragmentation, demand paging, working set model, page fault frequency, thrashing, page replacement algorithms- optimal, FIFO, LRU; Bledy's anomaly; TLB (translation look aside buffer).

### **UNIT-V**

**File Management-** concepts, naming, attributes, operations, types, structure, file organization & access (Sequential, Direct, Index Sequential) methods, memory mapped files, directory structures one level, two level, hierarchical/tree, acyclic graph, general graph, file system mounting, file sharing, path name, directory operations, overview of file system in Linux & windows.

**Input/output subsystems-** concepts, functions/goals, input/output devices- block and character, spooling, disk structure & operation, disk attachment, disk storage capacity, disk scheduling algorithm- FCFS, SSTF, scan scheduling, C-scan schedule.

### **TEXT BOOKS:**

1. Abraham Silberschatz, "Operating system concepts", 7<sup>th</sup>, John Wiley & Sons. INC, 2005
2. Andrew S. Tannenbaum, "Modern operating system", 3<sup>rd</sup>, Pearson Education, 2009
3. Dhananjay M. Dhamdhere, "Operating Systems: A concept Based Approach", 3<sup>rd</sup> TMH, 2012,
4. Sibsankar Haldar, Alex Alagarsamy Aravind, "Operating System", 8<sup>th</sup>, Pearson Education India, 2010,

### **REFERENCE BOOKS:**

1. Achyut S Godbole, "Operating System", 3<sup>rd</sup> TMH, 2010.
2. William Stallings, "operating system" 7<sup>th</sup>, Pearson Education, ,2012.
3. Vijay Shukla, "Operating System", 3<sup>rd</sup>, Kataria & Sons, 2010.
4. Singhal & Shivratri, "Advanced Concept in Operating Systems", Tata Mc-Graw Hill Education, edition 2001.



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**LIST OF EXPERIMENTS:**

1. Implement and update the BIOS settings of your PC.
2. If there are 5 printers are connected in a system each process to print will take different time to complete, and CPU will give a fixed time to each process after that deadline next process will enter in CPU. If a process not completed in a given slot then that process will be reenter as per the FCFS, on rotation basis? Apply the scheduling on this?
3. Implement Non Preemptive Priority CPU Scheduling.
4. Implement Non Preemptive Shortest Job first CPU Scheduling.
5. If there are 5 different resources like 3 printer, 2 scanner are connected to a system each taking different time to complete the task. Which scheduling is best and gives best performance of CPU?
6. Implement the scheduling for that where CPU give chance to complete those process first which comes first?
7. Implement Round-Robin CPU scheduling.
8. Write a program to implement Semaphore.
9. Find the solution for the situation where 5 faculties are sitting in a round table. There are 4 ball pens are placed on this table. At a time only one pen can be picked by one faculty to writing work. What will happen if all picked the pen for writing simultaneously?
10. Find the solution for dentist checkup clinic where only one chair and one dentist is available for treatment. And having n chairs to waiting for patient.
  - If there is no patient, then the doctor sleeps in his own chair.
  - When a patient arrives, he has to wake up the doctor.
  - If there are many patients and the doctor is doing treatment of him, then the remaining patients either wait if there are empty chairs in the waiting room or they leave if no chairs are empty.
11. Write a program for Memory Management Algorithms e.g. First Fit, Best Fit, Worst Fit.
12. Demonstrate Virtual memory Techniques like, LRU, FIFO etc.
13. Implement Shortest Seek Time First Disk Scheduling Algorithm.
14. Implement Scan Scheduling Disk Scheduling Algorithm.
15. Implement Circular Scan Disk Scheduling Algorithm.
16. Implement Look Disk Scheduling Algorithm.



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BTCS405		<b>Data Base Management System</b>	3	1	2	5	60	20	20	30	20

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### **COURSE OBJECTIVES**

The student will have ability to:

1. To understand the dissimilar issues concerned in the intend and implementation of a database system.
2. To learn the physical and logical database design, database modeling, relational, hierarchical, and network models
3. To understand and develop data manipulation language to query, modernize, and manage a database
4. To expand an understanding of necessary DBMS concepts such as: database security, integrity, concurrency,
5. To intend and build a straightforward database system and show competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

### **COURSE OUTCOMES**

Upon completion of the subject, students will be able to:

1. Evaluate business information problem and find the requirements of a problem in terms of data.
2. Understand the uses the database schema and need for normalization.
3. Design the database schema with the use of appropriate data types for storage of data in database.
4. Use different types of physical implementation of database
5. Use database for concurrent use.
6. Backup data from database.

### **SYLLABUS**

#### **UNIT-I**

Introduction: Concept & Overview of DBMS, Three Schema Architecture of DBMS, Database Approach v/s Traditional File Accessing Approach, Advantages of Database Systems, Data Models, Schema and Instances, Data Independence, Data Base Language and Interfaces, Overall Database Structure, Functions of DBA and Designer, Database Users. Entity-Relationship Model: Basic concepts, Design Issues, Mapping Constraints, Keys, EntityRelationship Diagram, Weak Entity Sets and Extended E-R features.ER Diagram to Relational Table conversion.



**Shri Vaishnav Vidyapeeth Vishwavidyalaya**  
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**Choice Based Credit System (CBCS)-2018-19**

### **UNIT-II**

Relational Model: Structure of Relational Databases, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Views, Modifications of the Database. Domains, Tuples, Attributes, Relations, Characteristics of Relations, Joins and its type. Keys, Key Attributes of Relation, Relational database, Schemas, Integrity Constraints. Referential Integrity, Intension and Extension.

### **UNIT-III**

SQL and Integrity Constraints: Concept of DDL, DML and DCL. Basic Structure, Set operations, Aggregate Functions, Null Values, Domain Constraints, Referential Integrity Constraints, Assertions, Views, Nested Sub Queries, Database Security Application development using SQL, Stored Procedures and Triggers. Relational Database Design: Functional Dependency, Different Anomalies in designing a Database. Normalization using Functional Dependencies, Decomposition, Boyce-Codd Normal Form, 3NF, Normalization using Multi-Valued Dependencies, 4NF, Join Dependency, 5NF.

### **UNIT-IV**

Transaction and Concurrency Control: Physical Data Structures, Query Optimization: Join Algorithm, Statistics and Cost based Optimization. Transaction Processing, Concurrency Control and Recovery Management: Transaction Model properties, State Serializability, Lock base protocols, Two Phase Locking, Time Stamping Protocols for Concurrency Control, and Validation Based Protocol, Multiple Granularities, Granularity of Data Item. Multi version schemes, Recovery with Concurrent Transaction, Recovery technique based on Deferred Update and Immediate Update, Shadow Paging, Recovery in MultiDatabase System and Database Backup and Recovery from Catastrophic Failure

### **UNIT-V**

File Organization and Index Structure: File & Record Concept, Placing file records on Disk, Fixed and Variable sized Records, Types of Single-Level Index (primary, secondary, clustering), Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree . Mongo DB, No SQL types, Features and tools.

### **TEXT BOOKS:**

1. Henry F. Korth and Silberschatz Abraham, "Database System Concepts", Mc.GrawHill, 6th Edition, 2015.
2. C J Date, "An Introduction to Database System", Pearson Educations, 8th Edition, 2004
3. Elmasri, Navathe, "Fundamentals of Database Systems", Pearson Educations 7th Edition, 2016.
4. Seema Kedar, Database Management System, Technical Publications, 2009.
5. Rajiv Chopra, Database Management System (DBMS) A Practical Approach. Kindle Edition, S Chand (December 1, 2010), 2017.

### **REFERENCE BOOKS:**

1. R Elmasri and S Navathe "Fundamentals of Database Systems" 7 th edition Publisher: Pearson 2017.
2. Abraham Silberschatz and S Sudarshan "Database System Concepts" 6th Edition McGraw-Hill Education – Europe 2013.
3. Raghu Ramakrishnan and Johannes Gehrke "Database Management Systems" McGrawHill Education, 2003.



**Shri Vaishnav Vidyapeeth Vishwavidyalaya**  
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**Choice Based Credit System (CBCS)-2018-19**

4. Kahate, Atul “Introduction to Database Management Systems” Pearson Education India, 2006

**LIST OF EXPERIMENTS:**

1. Design a Database and create required tables. For e.g. Bank, College Database.
2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
3. Write a SQL statement for table and record handling like implementing INSERT statement, Using SELECT and INSERT together, DELETE, UPDATE, TRUNCATE statements and DROP, ALTER statements.
4. Write the queries for Retrieving Data from a Database Using the WHERE clause , Using Logical Operators in the WHERE clause , Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING Clause, Using Aggregate Functions and Combining Tables Using JOINS.
5. Write the query for implementing the following functions: MAX (), MIN (), AVG (), COUNT ().
6. Write the query to implement the concept of Integrity constrains.
7. Write the query to create the views.
8. Perform the queries for triggers.
9. Perform the following operation for demonstrating the insertion , updating and deletion using the referential integrity constraints.
10. Write the query for creating the users and their role. Using GRANT and REVOKE operations.



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**Choice Based Credit System (CBCS)-2018-19**

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BTCS409		<b>Advanced Java programming</b>	3	1	2	5	60	20	20	30	20

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### **COURSE OBJECTIVES**

The student will have ability to:

1. Understand Event Handling.
2. Understand structured and unstructured queries
3. Design and develop Web applications
4. Designing Enterprise based applications by encapsulating an application's business logic.
5. Designing applications using pre-built frameworks.

### **COURSE OUTCOMES**

Upon completion of the subject, students will be able to:

1. Design full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings and JavaFX
2. Learn to access database through Java programs, using SQL and No-SQL
3. Create dynamic web pages, using Servlets and JSP
4. Make a reusable software component, using advanced Frameworks
5. Invoke the remote methods in an application using Remote Method Invocation (RMI)

### **SYLLABUS**

#### **UNIT-I**

##### **J2EE Event Handling & GUI Design**

Event handling, AWT: Windows, Graphics, Text, AWT Controls, Layout Managers, and Menus, Images, GUI Programming with Swing, Exploring Swing, Swing Menu

#### **UNIT-II**

##### **Java Servlet**

Overview, Servlet Interface, Request, Servlet context, response, Session, Dispatching request, Web Application



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**UNIT-III**

**JDBC Standard Extension 2.0**

Introduction to databases (SQL ,No - SQL) Connecting to Databases – JDBC principles – Databases access – Interacting – Database search – Database support in Web applications MySQL , Model View Controller, JSP , HTML , CSS.

**UNIT-IV**

**ORM and J2EE Frameworks:**

Introduction to Frameworks:- Struts, Spring basics, Spring AOP , Introduction to JavaScript and JQuery.

**UNIT-V**

**Advance J2EE Topic:**

JavaMail 1.2(Sending and Receiving Mail, Mail body design, different components), Java Messaging Service (JMS) 1.0.2 (Architecture, Programming Model, Connection, Session, Producer, Consumer), Java API for XML Parsing (JAXP) 1.1 (Introduction, Parsing and XML, when to use SAX)

**TEXT BOOKS:**

1. Arnold, Ken, James Gosling, and David Holmes. The Java programming language. Addison Wesley Professional, 2005.
2. Keogh, James. "The Complete Reference J2ME." published by McGrawHill OSBORNE Edition (2003)..
3. Allamaraju, Subrahmanyam, et al. "Professional Java Server Programming J2EE 1." (2001).
4. Deshmukh, Hanumant, and Jignesh Malavia. SCWCD exam study kit: Java web component developer certification. Manning Publications Co., 2002.
5. Cay, Horstmann, and Cornell Gary. "Core Java 2, Volume II–Advanced Features." (2005)

**REFERENCE BOOKS:**

1. Kito D. Mann, "Java Server Faces in Action", 2nd Edition, Dreamtech Press , 4 January 2005 .
2. Maydene Fisher, Jon Ellis, Jonathan Bruce, Addison Wesley, "JDBC™ API Tutorial and Reference" Third Edition, Addison Wesley, 11 June 2009).
3. Giulio Zambon , "Beginning JSP, JSF and Tomcat", 2nd Edition , Apress , 29 September 2012.
4. Anghel Leonard , "JSF2.0 CookBook" , 3rd Edition , PACKT publication , 2010.
5. Bryan Basham, Kathy Sierra & Bert Bates, "Head First Servlets and JSP" , 3rd Edition , O'Reilly Media, 2012.

**LIST OF EXPERIMENTS:**

1. How to set up multiple panels, compound borders, combo boxes.
2. Write a Program to implement Event handling.
3. Write a Program to develop Java Servlet and use request and response
4. Write a Program which allows the user to enter data in a jsp form and display in webpage
5. Show basic JDBC operation
6. Create Servlet file which contains following function: 1) Connect 2) Create Database 3) Create table 4) Insert records into respective table 5) Update records of particular table of database 6) Delete records from table 7) Delete table and also Database.



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7. Write a program to demonstrate Spring.
8. Write a program to demonstrate Spring JDBC operation.
9. Write a program to demonstrate Java Mail functionalities.
10. Write to program to demonstrate JMS queue

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							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
<b>JB183</b>	-	<b>Red Hat Application Development I - Java EE</b>	-	-	2	1	-	-	-	-	<b>50</b>

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

\*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**JB183**

*Helping Java SE developers write Java EE applications*

Red Hat Application Development I: Programming in Java EE (JB183) exposes experienced Java Standard Edition (Java SE) developers to the world of Java Enterprise Edition (Java EE).

**Outline for this course**

- Transition to multi-tiered applications
  - Describe Java EE features and distinguish between Java EE and Java SE applications.
- Package and deploying applications to an application server
  - Describe the architecture of a Java EE application server, package an application, and deploy the application to an EAP server.
- Create Enterprise Java Beans
  - Develop Enterprise Java Beans, including message-driven beans.
- Manage persistence
  - Create persistence entities with validations.
- Manage entity relationships
  - Define and manage JPA entity relationships.
- Create REST services
  - Create REST APIs using the JAX-RS specification.
- Implement Contexts and Dependency Injection
  - Describe typical use cases for using CDI and successfully implement it in an application.
- Create messaging applications with JMS
  - Create messaging clients that send and receive messages using the JMS API.
- Secure Java EE applications
  - Use JAAS to secure a Java EE application.
- Comprehensive review of Red Hat JBoss Development I: Java EE
  - Demonstrate proficiency of the knowledge and skills obtained during the course.



**Shri Vaishnav Vidyapeeth Vishwavidyalaya**  
**Bachelor of Technology (CSE with Specialization in Enterprise System (Red Hat))**  
**Choice Based Credit System (CBCS)-2018-19**

**LIST OF EXPERIMENTS:**

1. Transition to multi-tiered applications
2. Package and deploying applications to an application server
3. Create Enterprise Java Beans
4. Manage persistence
5. Manage entity relationships
6. Create REST services
7. Implement Contexts and Dependency Injection
8. Create messaging applications with JMS
9. Secure Java EE applications

**Chairperson**  
Board of Studies  
(Computer Science & Engineering,  
Information Technology & Computer Applications)  
Shri Vaishnav Vidyapeeth Vishwavidyalaya  
Indore

**Joint Registrar**  
Shri Vaishnav Vidyapeeth Vishwavidyalaya  
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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCS410	-	System Programming	0	0	2	1	0	0	0	30	20

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

\*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

### COURSE OBJECTIVES

The students will be able to:

1. Understand the basic concepts of Linux Kernel
2. Examine the working of the processes
3. Demonstrate the Input-Output operations
4. Illustrate the hardware signals to the Kernel
5. Analyze the memory management.

### COURSE OUTCOMES

The students should be able to:

1. Infer the working of Linux Kernel
2. Create a parallel programs
3. Understand the Input-Output operations
4. Generate and handle the Interrupts
5. Manipulate the system time

### SYLLABUS

#### UNIT-I

**Introduction & Essential Concepts:** Introduction to System Programming, Need of System Programming, Compiling with GCC, Automating the Process with GNU, Debugging with GNU Debugger, Linux Kernel, Obtaining the Kernel Source, The Kernel Source Tree, Building the Kernel.

#### UNIT-II

**Process Management:** Process, Running a New Process, Process Termination, User & Groups, Sessions and Process Groups, Daemons, Process Scheduling, Process Priorities, Multithreading, Threading Models, Concurrency, Parallelism, and Races, Synchronization.



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**UNIT-III**

**File I/O:** Opening Files, Reading via read(), Writing with write(), Synchronized I/O, Direct I/O, Closing Files, User-Buffered I/O, Reading from a Stream, Writing to a Stream, Seeking a Stream, Flushing a Stream, Scatter/Gather I/O, Mapping Files into Memory, I/O Schedulers and I/O Performance.

**UNIT-IV**

**Interrupts:** Introduction, Interrupt Handlers, Top Halves versus Bottom Halves, Registering an Interrupt Handler, Writing an Interrupt Handler, Interrupt Context, Implementing Interrupt Handlers, Interrupt Control.

**UNIT-V**

**Timers:** Time's Data Structures, POSIX Clocks, Getting & Setting Time, Tuning the System Clock, Sleeping and Waiting.

**Memory Management:** The Process Address Space, Allocating Dynamic Memory, Advanced Memory Allocation, Stack-Based Allocations, Manipulating Memory, Locking Memory.

**TEXT BOOKS/ REFERENCE BOOKS:**

1. Robert Love, Linux System Programming, Second Edition, O'Reilly Media, 2013
2. Robert Love, Linux Kernel Development, Third Edition, Addison Wesley, 2010
3. Mark Mitchell, Jeffrey Oldham, Alex Samuel, Advanced Linux Programming, First Edition, New Riders Publishing, 2001
4. Michael Kerrisk, The Linux Programming Interface, No Starch Press, 2010
5. Brian W. Kernighan, Rob Pike, The UNIX Programming Environment, Bell Laboratories, Prentice-Hall, 1984

**LIST OF EXPERIMENTS:**

1. Understanding GCC compilation and debugging with GNU Debugger
2. Manipulating the Linux Kernel
3. Process Management
4. Process Synchronization
5. Manipulation the files.
6. Mapping Files into Memory
7. Writing an Interrupt Handler
8. Manipulating System Time
9. Dynamic Memory Allocation
10. Manipulating the Memory