

**VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY**  
JNANASAGARA CAMPUS, BALLARI-583105

**Department of Studies in**  
**Computer Science**

**SYLLABUS**

**Master of Science in Computer Science**  
(II Semester)

**With effect from**  
**2021-22**



# VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

## Department of Studies in Computer Science

Jnana Sagara, Ballari - 583105



### Distribution of Courses/Papers in Postgraduate Programme II Semester as per Choice Based Credit System (CBCS) Proposed for PG Programs With Practical

Semester No.	Category	Subject code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
				IA	Sem. Exam	Total	L	T	P		
SECOND	DSC5	21CSC2C5L	Database Management Systems	30	70	100	4	-	-	4	3
	DSC6	21CSC2C6L	Python Programming	30	70	100	4	-	-	4	3
	DSC7	21CSC2C7L	Software Engineering	30	70	100	4	-	-	4	3
	DSC8	21CSC2C8L	Operating System	30	70	100	4	-	-	4	3
	SEC2	21CSC2S2	Advanced Web Programming	20	30	50	-	1	2	2	1
	DSC5P4	21CSC2C5P	Database Management Systems Lab	20	30	50	-	-	4	2	4
	DSC6P5	21CSC2C6P	Python Programming Lab	20	30	50	-	-	4	2	4
DSC7P6	21CSC2C7P	Mini Project based on DBMS & Software Engineering	20	30	50	-		4	2	4	
<b>Total Marks for II Semester</b>						<b>600</b>				<b>24</b>	

**Dept Name: Dept. of Studies in Computer Science**  
**Semester-II**  
**DSC5: Database Management Systems**

Course Title: Database Management Systems	Course code: 21CSC2C5L
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 30	Duration of ESA/Exam: 03 hrs.
Summative Assessment Marks: 70	

**Course Outcomes (CO's):**

**At the end of the course, students will be able to:**

1. Describe the Entity–Relationship (ER) modeling and model the real world database systems using Entity Relationship Diagrams (ERD) from the requirements specification
2. Apply the Relational Data Model, its Constraints and the Relational Database Schemas Formulate queries in Relational Algebra & SQL (Knowledge)
3. Apply normalization techniques to normalize a database
4. Illustrate how a DBMS enforces recovery from failure and concurrency control

**DSC5: Database Management Systems**

Unit	Description	Hours
1	Introduction: Data modeling for a database, abstraction and data integration, the three-level architecture, components of DBMS, advantages and disadvantages, data associations, data model classification, Entity Relationship model.	10
2	File organization and storage, secondary storage devices, operations in file, heap files and sorted files, hashing techniques, type of single level ordered index, multi-level indexes indexes on multiple keys, other types of indexes.	10
3	The Relational Model: Relational database, relational algebra, relational calculus SQL- Data definition, relational database manipulation using SQL, views, embedded data manipulation. Relational Database Design: Anomalies in a database, functional dependency, normal forms, lossless join and dependency, BCNF, normalization through synthesis, higher order normal forms.	12
4	Transaction processing, desirable properties of transaction, schedules and recoverability, serializability of schedules concurrency control, locking techniques, time stamp ordering multi version concurrency control, granularity of data items.	10
5	Database recovery techniques based on deferred up data and immediate updating, shadow pages, ARIES recovery algorithm, database security and authorization, security issue access control based on granting/revoking of privileges, introduction of statistical database security.	10

**References:**

1. Elmasri and Navathe, Fundamentals of Database Systems, AddisonWesley, 5th edition, 2018.
2. Bipin C Desai, An Introduction to Database Systems, Galgotia Publications, 2012.

**Dept Name: Dept. of Studies in Computer Science**  
**Semester-II**  
**DSC6: Python Programming**

Course Title: Python Programming	Course code: 21CSC2C6L
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 30	Duration of ESA/Exam: 03 hrs.
Summative Assessment Marks: 70	

**Course Outcomes (CO's):**

**At the end of the course, students will be able to:**

1. Explain basic principles of Python programming language
2. Implement object oriented concepts
3. Implement database and GUI applications.
4. Explain basic principles of Python programming language

**DSC6: Python Programming**

<b>Unit</b>	<b>Description</b>	<b>Hours</b>
1	INTRODUCTION TO PYTHON PROGRAMMING: Python interpreter and interactive mode; values and types variables, expressions, statements, tuple assignment, Order of operations, comments, debugging; modules and functions: function Calls, adding new functions, Definitions and Uses, flow of execution, parameters and arguments, Fruitful functions. Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, range, break, continue, pass; recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays.	12
2	LISTS, TUPLES, DICTIONARIES: Lists: Traversing a List, list operations, list slices, list methods, Map, Filter and Reduce, list loop, mutability, aliasing, cloning lists, list parameters; Dictionaries: operations and methods; advanced list processing - list comprehension; Tuples: tuple assignment, tuple as return value.	12
3	FILES, MODULES, PACKAGES: Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages: PANDAS, NUMPY, SCIKIT-LEARN	08
4	CLASSES AND OBJECTS: Introduction, Defining Classes, Creating Objects, Data Abstraction and Hiding through Classes, Class method and self argument, Class Constructor (init() Method), Data Members, Calling a Class Method from another Class Method, Class Methods and Static Methods, Inheritance, Types of Inheritance, Abstract Classes and Interfaces, Operator Overloading, Overriding Methods.	10

5	Multithreading, GUI Programming, Graphics, Plotting and Web Programming: Multithreading- Introduction, Threading Module (Creating a Thread, Synchronizing Threads) GUI Programming with tkinter Package, Simple Graphics using Turtle, Plotting Graphs in Python, Web Programming using Python.	10
<p><b>References:</b></p> <ol style="list-style-type: none"> <li>1. Allen B. Downey, Think Python: How to Think Like a Computer Scientist, 2nd edition, Updated for Python 3, Shroff/O Reilly Publishers, 2016.</li> <li>2. Guido van Rossum and Fred L. Drake Jr, An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.</li> <li>3. John V Guttag, Introduction to Computation and Programming Using Python, Revised and expanded Edition, MIT Press , 2013.</li> <li>4. Robert Sedgewick, Kevin Wayne, Robert Dondero, Introduction to Programming in Python: An Inter- disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.</li> </ol>		

Course Title: Software Engineering	Course code: 21CSC2C7L
Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 30	Duration of ESA/Exam: 03 hrs.
Summative Assessment Marks: 70	

**Course Outcomes (CO's):**

**At the end of the course, students will be able to:**

1. Analyze the process model chosen for the development of software and its merits and demerits
2. Identify the clear, correct and consistent requirements for the project
3. Design suitable data, architecture and user interface that copes with the requirements
4. Estimate the cyclomatic complexity and design the corresponding test cases.
5. Conduct various integration testing approaches and note down pit falls in requirements, design.

**DSC7: Software Engineering**

Unit	Description	Hours
1	THE NATURE OF SOFTWARE: The Nature of Software, The Changing Nature of Software SOFTWARE ENGINEERING: Defining the Discipline, The Software Process, Software Engineering Practice, Software Development Myths. THE SOFTWARE PROCESS STRUCTURE: A Generic Process Model, Defining a Framework Activity, Identifying a Task set, Process Patterns	10
2	PROCESS MODELS: Perspective Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models. AGILE DEVELOPMENT: What is Agility, Agility and the Cost of Change, What is an Agile Process, Extreme Programming, Scrum. UNDERSTANDING REQUIREMENTS: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Analysis Model, Negotiating Requirements and Validating Requirements.	12
3	REQUIREMENTS MODELING: SCENARIOS and CLASS BASED METHODS: Requirements Analysis, Scenario-Based Modeling, Identifying Analysis Classes, Specifying Attributes, Defining Operations, Class Responsibility-Collaborator Modeling, Association and Dependencies. DESIGN CONCEPTS: Design within the Context of Software Engineering, The Design Process, Design Concepts, The Design Model.	10
4	ARCHITECTURAL DESIGN: Software Architecture, Architectural Genres, Architectural Styles. COMPONENT-LEVEL DESIGN: What is a Component, Designing Class-Based Components, Conducting Component-Level Design. USER INTERFACE DESIGN: The Golden Rules, User interface Analysis and Design.	10

5	<p><b>SOFTWARE TESTING STRATEGIES:</b> A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object Oriented Software, Validation Testing, System Testing and The Art of Debugging.</p> <p><b>TESTING CONVENTIONAL APPLICATIONS:</b> Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing, Control Structure Testing and Black-Box Testing.</p>	10
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**References:**

1. Roger S Pressman Software Engineering - A Practitioner's Approach, 8th Edition, TMH publication, 2014.
2. Ian Sommerville Software Engineering, Pearson Education limited, 8th Edition 2007.
3. Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Publications, 3<sup>rd</sup> Edition 2005.
4. Rajib Mall Fundamentals of Software Engineering, PHI India Publications. 5th Edition, 2018.

**Dept Name: Dept. of Studies in Computer Science**  
**Semester-II**  
**DSC8: Operating System**

Course Title: Operating System	Course code: 21CSC2C8L
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Total Contact Hours: 52	Course Credits: 04
Formative Assessment Marks: 30	Duration of ESA/Exam: 03 hrs.
Summative Assessment Marks: 70	

### Course Outcomes (CO's):

#### At the end of the course, students will be able to:

1. Explain the core structure and functionality of operating system.
2. Discuss and analyze various inter process communication mechanisms.
3. Evaluate and analyze the different techniques for solving CPU scheduling problems
4. Describe and Apply the knowledge of deadlock concepts to provide wide range of functionality to applications
5. Identify and analyze the problems that occur in the design of OS based on knowledge gained through process synchronization techniques
6. Analyze the performance of different memory management techniques and page replacement algorithms

### DSC8: Operating System

Unit	Description	Hours
1	Introduction: What operating systems do - User view, System view, Defining operating systems, Operating System Structure, Operating System Operations – Dual mode and multimode operation, Timer, Process Management; Memory Management; Storage Management; Protection and Security. System structures: Operating System Services; User-Operating System interface –Command interpreters, Graphical user interface, Choice of Interface System calls; Types of system calls; System programs; Operating System Structure –Simple structure, Layered approach, Microkernels, Modules, Hybrid Systems – Mac OS X, iOS, Android.	10
2	Process: Process concept, Process state, Process control block, Process scheduling, Scheduling queues, Schedulers, Context switch, Operations on processes – Process creation and termination, Inter-process communication, Shared memory and message passing systems. Threads: Overview, Benefits, Multicore Programming, Types of parallelism, Multithreading models. Process management: Basic concepts, CPU scheduler, Preemptive and non-preemptive scheduling, Scheduling criteria, Scheduling algorithms – FCFS, SJF, Priority and Round robin scheduling, Multi- level and multilevel feedback queue scheduling, Multiple-Processor Scheduling.	11
3	Process synchronization: Background, The Critical section problem, Petersons solution, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Bounded buffer problem, Readers writer's problem, Dining philosopher's problem. Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection and recovery from deadlock	10

4	<p>Memory management: Background, Basic hardware, Address binding, Dynamic loading and linking, Swapping – Standard swapping, Swapping on Mobile Systems, Contiguous memory allocation</p> <p>Fragmentation, Segmentation. Paging, Structure of page table – Hierarchical paging, Hashed paging, Inverted paging, Oracle SPARC Solaris</p> <p>FILE SYSTEM: File concept, File operations, File types, File structure, Access methods, Sequential access, Direct access, other access methods.</p>	11
5	<p>Virtual memory management: Basic concepts, Demand paging, Copy-on-write, Page replacement – FIFO, LRU, Optimal, LRU-approximation, counting based page replacement algorithms, Page buffering algorithms, Applications, Thrashing – causes of thrashing, Working set model, Page fault frequency. Case study: Linux operating system, Linux history, Process management, Scheduling, Memory management.</p>	10
<p><b>References:</b></p> <ol style="list-style-type: none"> <li>1. Abraham Silberschatz, Peter Baer Galvin Greg Gagne Operating System Concepts, Wiley-India, 9th edition, 2013.</li> <li>2. D.M Dhamdhare Operating Systems- A Concept Based Approach, Tata McGraw-Hill, 2nd Edition, 2002.</li> <li>3. P.C.P. Bhatt Operating Systems, PHI, 4th Edition, 2013.</li> </ol>		

**Dept Name: Dept. of Studies in Computer Science**  
**Semester-II**  
**SEC2: Advanced Web Programing**

**SEC 2: Advanced Web Programming**

Course Title: Advanced Web Programming	Course code: 21CSC2S2
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Total Contact Hours: 0 - 1 - 2	Course Credits: 02
Formative Assessment Marks: 20	Duration of ESA/Exam: 01 hr.
Summative Assessment Marks: 30	

### Course Outcomes (COs):

At the end of the course, students will be able to:

1. Understand client server architecture and able to use the skills for web project development Develop a static, interactive and well-formed webpage using JavaScript, CSS and HTML5
2. Apply PHP to improve accessibility of a web document.
3. Understand client server architecture and able to use the skills for web project development Develop a static, interactive and well-formed webpage using JavaScript, CSS and HTML5

### SEC 2: Advanced Web Programming

Unit	Description	Hours
1	Web Programming concepts: Architecture of the Web, HTTP Protocols (GET, POST, HEAD, PUT, DELETE), HTTP session. HTML: Document Object Model (DOM), Elements, Events. HTML5: Elements, Objects, Events, Canvas, Audio & Video Support, Geo-location Support CSS: Styling HTML with CSS, Inline Styling (Inline CSS), External Styling (External CSS), CSS Fonts, The CSS Box Model, The id Attribute, The class Attribute, HTML Style Tags.	08
2	JavaScript: Javascript console, Scope, Events, Strings, String Methods, Numbers, Number Methods, Dates, Date Formats, Date, Methods, Arrays, Array Methods, Booleans, Comparisons. Control Structures: Conditions, Switch, Loop For, Loop While, Break. Functions: Function Definitions, Function Parameters, Function Invocation, Function Closures. Object Oriented Programming: Method, Constructor, Inheritance, Encapsulation, Abstraction, Polymorphism, Javascript Validations, Document Object Model, Document and Events (DOM Manipulation).	09
3	Forms: Forms Validation, Forms API, JS Browser BOM, Window, Screen, Location, History, Navigator, Popup Alert, Timing, Cookies, Javascript Windows, Pushing code quality via JSLint tool, Security in Java Script Introduction to PHP: What is PHP, How to install XAMPP on Windows, PHP Data Types, Variables, Constant, Operators, PHP Comments, PHP Array.	09

#### References (indicative)

1. Programming the World Wide Web – Robert W. Sebesta, 4th Edition, Pearson Education, 2008.
2. Internet & World Wide Web How to Program – M. Deitel, P.J. Deitel, A. B. Goldberg, 3rd Edition, Pearson Education / PHI, 2004.
3. The Joy of PHP Programming, Fifth Edition, Alan Forbes, Plum Island
4. Web Programming Building Internet Applications – Chris Bates, 3rd Edition, Wiley India, 2006
5. The Web Warrior Guide to Web Programming – Xue Bai et al, Thomson, 2003
6. <https://www.tutorialspoint.com/restful/index.htm> (REST Web Services topics are referred to this link)

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**Dept Name: Dept. of Studies in Computer Science**  
**Semester-II**  
**DSC5P4 : Database Management Systems Lab**

Course Title: Database Management Systems Lab	Course code: 21CSC2C5P
Teaching Hours/Week (L-T-P): 0 - 0 - 4	Course Credits: 02
Formative Assessment Marks: 20	Duration of ESA/Exam: 04 hrs.
Summative Assessment Marks: 30	

### **Course Outcomes (COs):**

**At the end of the course, students will be able to:**

1. Design database schema for a given application and apply normalization
2. Acquire skills in using SQL commands for data definition and data manipulation.
3. Develop solutions for database applications using procedures and triggers.

### **DBMS Laboratory**

Consider the following relations for a central store which receives raw materials from its vendors and issues them to its different sections.

ITEM (Item-Code, Item-Description, Unit-Price, EOQ, ROL, SOH, Back-Order-Qty)

EOQ: Economic Order Quantity, ROL: Reorder level, SOH: Stock On Hand

ORDERING (Order-No, Item-Code, Quantity-Received)

ORDER (Order-No, Order-Date, Voucher-No, Vender-No, Due-date)

VENDER (Vender-No, Vender-Name, Vender-Address)

VOUCHER (Voucher-No, Voucher-Date, Vender-No, Cheque-No)

INDENT (Indent-No, Quantity-Demanded, Quantity-Issued, Section-Code, Item-Code)

SECTION (Section-Code, Section-Name)

CHEQUE (Cheque-No, Cheque-date, Cheque-Amount)

1. Create the above tables by properly specifying the primary keys and the foreign keys.
2. Enter at least five tuples for each relation.
3. Increase the unit price by 1% for all items
4. Add check constraint to Unit Price in Item table, which should allow only positive values.
5. Delete a voucher details from voucher table given by voucher no and make sure that, this operation automatically inserts null to all related tuples in a system.
6. Demonstrate with suitable example, group by, having, order by clauses.
7. Demonstrate all aggregation operations in SQL ,with suitable examples,
8. Produce the list of orders between Jan 2000 to Jan 2006.
9. Demonstrate with suitable example, Left outer join, Right outer join and Full outer join.
10. Demonstrate Create Index and Drop index on any table.
11. Demonstrate with suitable example, Union, Intersect and Except operations
12. Alter the table SECTION by adding section In-charge-Code.
13. Produce the list of order with the following details: item code, descriptions and Unit-Price, given by Order-No & Vendor –No.
14. Produce the daily items receipt summary with the following details: Order-no, Order date, Vender no, vender date, vender address item code item description EOQ, quantity received. [Note: result should be displayed on date wise]
15. Produce the daily items issue summary with the following details: Indent no, section code, section name, item code, item description, quantity demanded, quantity issued. [Note: result should be displayed on date wise]

16. Produce the list of orders with the following details: order no, order date, due date, vender no and vender name, given by delay duration. [Note: Delay duration=current date- due date]
17. Produce the everyday bill payment voucher with the following details: item code, item description unit price, EOQ, quantity Received and item order value in Rs. (EOQ x quantity-received) given by order no, voucher no & vender no.
18. Produce the monthly bill settlement summery of given vendor no with the following details: voucher no, voucher date, cheque no, cheque date cheque amount.
19. Produce the monthly stores materials consumption summary with the following details: item code, item description, Unit price, quantity consumed and item consumption values in Rs.
20. Write a trigger to notify back order quantity (ROL-SOH) with suitable message whenever SOH crosses ROL.
21. Write a Stored procedure to display the details of ITEM which are ordered on specific Order-Date.
22. Write a Stored procedure which accepts Item-Code and vendor-no as parameter and displays the number of orders on the Item ordered by the vendor.

**Dept Name: Dept. of Studies in Computer Science**  
**Semester-II**  
**DSC6P5 : Python Programming Lab**

Course Title: Python Programming Lab	Course code: 21CSC2C6P
Teaching Hours/Week (L-T-P): 0 - 0 – 4	Course Credits: 02
Formative Assessment Marks: 20	Duration of ESA/Exam: 04 hrs.

**Course Outcomes (COs):****At the end of the course, students will be able to:**

1. To write, test, and debug simple Python programs.
2. To implement Python programs with conditionals and loops.
3. Use functions for structuring Python programs.
4. Represent compound data using Python lists, tuples, dictionaries

**Python Laboratory**

1. Compute the GCD of two numbers.
2. Find the square root of a number. (Newton's method)
3. Exponentiation. (power of a number)
4. Find the maximum of a list of numbers.
5. Linear search and Binary search.
6. Selection sort, Insertion sort.
7. How to create, slice, change, delete and index elements using Tuple.
8. Find first n prime numbers.
9. How to create, slice, change, add, delete and index elements using list.
10. Programs that take command line arguments (word count)
11. Write a program to reverse the string.
12. How to change, delete, add and remove elements in Dictionary.
13. Find the most frequent words in a text read from a file.
14. Simulate elliptical orbits in Pygame.
15. Simulate bouncing ball using Pygame.

**Dept Name: Dept. of Studies in Computer Science****Semester-II****DSC7P6: Mini Project based on DBMS & Software Engineering**

Course Title: Mini Project based on DBMS & Software Engineering	Course code: 21CSC2C7P
Teaching Hours/Week (L-T-P): 0 - 0 - 4	Course Credits: 02
Formative Assessment Marks: 20	Duration of ESA/Exam: 04 hrs.

**Course Outcomes (COs):****At the end of the course, students will be able to:**

1. Apply the knowledge of database management system development process and conduct the experiments using SQL queries to find the solution for given database problem.
2. Apply the knowledge of Software Engineering concepts like SDLC model, UML Concepts, Software Design, Testing for the development of applications.
3. Analyze and design solutions for Database system components to meet the specified needs of online transaction processing and information systems like Banking systems, Ticket Reservation systems etc..
4. Develop code for stored programs, triggers assertions and to generate reports.
5. Contribute to the team as a member, lead the team

Develop a Software Application with database connectivity with which you are familiar (Eg. Library Database, Employee Database, Student Database, Inventory database etc...). Also apply the concepts of Software Engineering during the development of an application.

Perform the following assuming a Relational Database Management System:

1. List the set of requirements
2. Identify the following:
  - a. Entities and attributes
  - b. Entity Types, Entity Sets, keys and Value Sets.
  - c. Relationship types, Relationship Degree and Recursive Relationships.
  - d. Relationship Constraints: Cardinality Ratio and Participation.
  - e. Attributes of Relationship Types.
  - f. Weak Entity Types.
3. Design an ER Diagram.
4. Draw the UML diagram.
5. Draw the Schema Diagram with Referential Integrity Constraints.
6. Design Test Cases.
7. Normalize the table.
8. Create the database.
9. Insert suitable records in your database.
10. Execute any five typical queries on your database.
11. Generate any three typical reports on your database.
12. Write any three stored procedures on your database.

**Guidelines:**

- Group work: [Not more than 2 members in a group]
- Group has to chose any familiar database (DB) application
- Activities should be performed during lab hours.



**Dept Name: Dept. of Studies in Computer Science**  
**Semester-II**  
**SEC2: Advanced Web Programming**

Course Title: Advanced Web Programming	Course code: 21CSC2S2
Teaching Hours/Week (L-T-P): 0 - 0 - 2	Course Credits: 02
Formative Assessment Marks: 20	Duration of ESA/Exam: 01 hrs.
Summative Assessment Marks: 30	

## **Course Outcomes (COs):**

**At the end of the course, students will be able to:**

1. Design and develop dynamic web pages with good aesthetic sense of designing.
2. Understand the concepts of Web Application Terminologies, Internet Tools other Web services.
3. Design and develop pages using the JavaScript, XML, CSS, PHP.

### **Advanced Web Programming Laboratory**

1. Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.
2. Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.
3. Write a JavaScript code that displays text “TEXT-GROWING” with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays “TEXT-SHRINKING” in BLUE color. Then the font size decreases to 5pt.
4. Develop and demonstrate a HTML5 file that includes JavaScript script that uses functions for the following problems:
  - a. Parameter: A string
  - b. Output: The position in the string of the left-most vowel
  - c. Parameter: A number
  - d. Output: The number with its digits in the reverse order
5. Design an XML document to store information about a student admission to computer science department, VSKUB. The information must include USN, Name, and Name of the College, Branch, Year of Joining, and email id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.
6. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
7. Write a PHP program to display a digital clock which displays the current time of the server.
8. Write the PHP programs to do the following:
  - a) Implement simple calculator operations.
  - b) Find the transpose of a matrix.
  - c) Multiplication of two matrices.
  - d) Addition of two matrices.
9. Write a PHP program to sort the student records which are stored in the database using selection sort.

**CBCS Question Paper Pattern for PG Semester End Examination  
with Effect from the AY 2021-22**

**Disciplines Specific Core (DSC) and Discipline Specific Elective (DSE)**

**Paper Code:**

**Paper Title:**

**Time: 3 Hours**

**Max. Marks: 70**

**Note: Answer any *FIVE* of the following questions with Question No. 1 (Q1) Compulsory, each question carries equal marks.**

Q1.

14 Marks

Q2.

14 Marks

Q3. 14 Marks

Q4. 14 Marks

Q5. 14 Marks

**Note: Question No.1 to 5, one question from each unit i.e. (Unit I, Unit II, ....). The Questions may be a whole or it may consists of sub questions such as a,b, c etc...**

Q6. 14 Marks

**Note: Question No.6, shall be from Unit II and III, the Question may be a whole or it may consists of sub questions such as a,b, c etc...**

Q7. 14 Marks

**Note: Question No.7, shall be from Unit IV and V, the Question may be a whole or it may consists of sub questions such as a,b, c etc...**

Q8. 14 Marks

**Note: Question No-8 shall be from Unit II, Unit III , Unit IV and Unit V. The question shall have the following sub questions and weightage. i.e a – 05 marks, b – 05 marks, c – 04 marks.**

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### **Skill Enhancement Courses (SECs)**

**Paper Code:**

**Paper Title:**

**Time: 1 Hours**

**Max. Marks: 30**

There shall be Theory examinations of Multiple Choice Based Questions [MCQs] with Question Paper set of A, B, C and D Series at the end of each semester for SECs for the duration of One hour (First Fifteen Minutes for the Preparation of OMR and remaining Forty-Five Minutes for Answering thirty Questions). The Answer Paper is of OMR (Optical Mark Reader) Sheet.

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## **Question Paper Pattern for Subjects with Tutorial**

For the subjects with Tutorial component, there is no Semester-End Examination (SEE) to the component C3. The liberty of assessment of C3 is with the concerned faculty. The faculty must present innovative method of evaluation of component C3 before the respective BoS for approval and the same must be submitted to the Registrar and Registrar (Evaluation) before the commencement of the academic year.

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