



# Shri Vaishnav Vidyapeeth Vishwavidyalaya

**B.Tech.(CSE-Big Data Analytics/Cloud and Mobile Computing/Artificial Intelligence-IBM)**

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

## **SEMESTER III**

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*
<b>BTIT401</b>	<b>UG</b>	<b>Discrete Structures (BDA/CMC)</b>	3	1	0	4	60	20	20	0	0

**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 student will have ability to:

1. To provide the fundamentals of formal techniques for solve the problems in computational domain and algorithm development
2. Apply appropriate mathematical and statistical concepts and operations to interpret data and to solve problems
3. Formulate and evaluate possible solutions to problems, and select and defend the chosen solutions
4. Construct graphs and charts, interpret them, and draw appropriate conclusions

### **Course Outcomes:**

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

1. Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.
2. Understand the basics of discrete probability and number theory, and be able to apply the methods from these subjects in problem solving.
3. Be able to use effectively algebraic techniques to analyze basic discrete structures and algorithms.
4. Understand asymptotic notation, its significance, and be able to use it to analyze asymptotic performance for some basic algorithmic examples.
5. Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.

### **Syllabus:**

#### **UNIT I**

**Set Theory:** Definition Of Sets, Venn Diagrams, Complements, Cartesian Products, Power Sets, Counting Principle, Cardinality and Countability (Countable And Uncountable Sets), Proofs of Some General Identities on Sets, Pigeonhole Principle. **Relation:** Definition, Types of Relation, Composition of Relations, Domain and Range of a Relation, Pictorial Representation of Relation, Properties of Relation, Partial Ordering Relation. **Function:** Definition and Types of Function, Composition of Functions, Recursively Defined Functions.

#### **UNIT II**

**Propositional Logic:** Proposition Logic, Basic Logic, Logical Connectives, Truth Tables, Tautologies, Contradiction, Normal Forms (Conjunctive and Disjunctive), Modus Ponens and

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## **SEMESTER III**

Modus Tollens, Validity, Predicate Logic, Universal and Existential Quantification. Notion of Proof: Proof by Implication, Converse, Inverse, Contrapositive, Negation, and Contradiction, Direct Proof, Proof by Using Truth Table, Proof by Counter Example

### **UNIT III**

**Graph Theory:** Terminology Graph Representation Graph Isomorphism; Connectedness; Various Graph Properties; Euler and Hamiltonian Graph; Shortest Paths Algorithms. Trees: Terminology, Tree Traversals; Prefix Codes, Spanning Trees, Minimum Spanning Trees.

### **UNIT IV**

**Algebraic Structure:** Binary Composition and its Properties Definition of Algebraic Structure; Groyas Semi Group, Monoid Groups, Abelian Group, Properties of Groups, Permutation Groups, Sub Group, Cyclic Group, Rings and Fields (Definition and Standard Results).

### **UNIT V**

**Posets, Hasse Diagram And Lattices:** Introduction, Ordered Set, Hasse Diagram of Partially, Ordered Set, Isomorphic Ordered Set, Well Ordered Set, Properties of Lattices, Bounded and Complemented Lattices. Combinatorics: Introduction, Permutation and Combination, Binomial Theorem, Multinomial Coefficients Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive Algorithms, Linear Recurrence Relations with Constant Coefficients, Homogeneous Solutions, Particular Solutions, Total Solutions, Generating Functions, Solution by Method of Generating Functions.

### **Text Books:**

1. C.L.Liu, "Elements of Discrete Mathematics", 4<sup>th</sup> Edition, Tata McGraw-Hill, 2012.
2. Kenneth H. Rosen, "Discrete Mathematics and its applications", 7<sup>th</sup> Edition, Tata McGraw-Hill, 2012.
3. V. Krishnamurthy, "Combinatorics: Theory and Applications", 2<sup>nd</sup> Edition, East-West Press, 2008.
4. Seymour Lipschutz, M.Lipson, "Discrete Mathemataics", 3<sup>rd</sup> Edition, Tata McGraw Hill, 2009.

### **Reference Books:**

1. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", Tata McGraw Hill.
2. Bisht, "Discrete Mathematics", Oxford University Press, 2015.
3. Biswal, "Discrete Mathematics & Graph Theory", 3<sup>rd</sup> Edition, PHI, 2011.

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							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
<b>BTAI301</b>	<b>UG</b>	<b>Computational Learning (AI)</b>	3	1	0	4	60	20	20	0	0

**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 student will have ability to:

1. Understand probabilistic reasoning for learning systems.
2. Understand distribution of data over sample space.
3. Infer model parameters for best fitting.
4. Learn from latent variables for finding hidden patterns.
5. Examine new hypothesis.

### **Course Outcomes:**

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

1. Analyze conditional independence of sample data.
2. Calculate the expectation of sample data.
3. Estimate the model parameter.
4. Optimize the learning process.
5. Evaluate hypothesis and design new hypothesis.

### **Syllabus:**

#### **UNIT I**

**Probabilistic Reasoning:** Probabilistic Reasoning, Prior, Likelihood and Posterior, Probabilistic Inference in Structured Distributions, Belief Networks: Conditional independence, d-Separation, d-Connection and dependence, Markov equivalence in belief networks, Belief networks - limited impressibility.

#### **UNIT II**

**Distributions:** Distributions, Estimator Bias, Discrete Distributions, Continuous Distributions, Multivariate Distributions, Multivariate Gaussian, Exponential Family, The Kullback-Leibler Divergence. Mixture Models: The Gaussian Mixture Model.

#### **UNIT III**

**Learning as Inference:** Learning as Inference, Maximum A Posteriori and Maximum Likelihood, Maximum Likelihood for Undirected models, Properties of Maximum Likelihood, Naive Bayes and Conditional Independence, Bayesian Naive Bayes. **Density Estimation:** Limit

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## **SEMESTER III**

Theorem, Parzen Windows, Exponential Families, Naive Bayes Estimation using Maximum Likelihood

### **UNIT IV**

**Learning with Hidden Variables:** Learning with Hidden Variables; Hidden Variables and Missing Data, Expectation Maximization, Extensions of EM, Optimizing the Likelihood by Gradient Methods. **Optimization:** Optimization Unconstrained Smooth Convex Minimization, Constrained Optimization, Stochastic Optimization, Non-convex Optimization

### **UNIT V**

**Hypothesis Testing:** Hypothesis Tests for Two classes, Error Probability in Hypothesis Testing, Upper Bounds on the Bayes Error, Sequential Hypothesis Testing.

### **Text Books:**

1. David Barber, Bayesian Reasoning and Machine Learning, Cambridge University Press, 2010
2. Andrew R. Webb, Statistical Pattern Recognition, Second Edition, John Wiley & Sons, Ltd., 2002
3. Alex Smola and S.V.N. Vishwanathan, Introduction to Machine Learning, Cambridge University Press 2008

### **Reference Books:**

1. Luc Devroye, Laszlo Györfi and Gabor Lugosi, A Probabilistic Theory of Pattern Recognition, Springer, 1996
2. Keinosuke Fukunaga, Introduction to Statistical Pattern Recognition, Second Edition, Morgan Kaufmann, 1990
3. Christopher M. Bishop, Pattern Recognition and Machine Learning, Springer, 2006

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<b>BTCS302</b>	<b>UG</b>	<b>Data Communication</b>	3	1	0	4	60	20	20	0	0

**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 student will have ability to:

1. To understand the concepts of data communications.
2. To be familiar with the Transmission media and Tools.
3. To study the functions of OSI layers.
4. To learn about IEEE standards in computer networking.
5. To get familiarized with different protocols and network components.

### **Course Outcomes:**

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

1. Understand the Process and functions of data communications
2. Understand Transmission media and Tools
3. Understand the functions of OSI layers
4. Understand IEEE standards in computer networking
5. Understand different protocols and network components

### **Syllabus:**

#### **UNIT I**

**Introduction:** Data Communication Components, Types of Connections, Transmission Modes, Network Devices, Topologies, Protocols and Standards, OSI Model, Transmission Media, Bandwidth, Bit Rate, Bit Length, Baseband and Broadband Transmission, Attenuation, Distortion, Noise, Throughout, Delay and Jitter.

#### **UNIT II**

**Data Encoding:** Unipolar, Polar, Bipolar, Line and Block Codes. Multiplexing: Introduction and History, FDM, TDM, WDM, Synchronous and Statistical TDM. Synchronous and Asynchronous transmission, Serial and Parallel Transmission.

#### **UNIT III**

**Error Detection & Correction:** Correction, Introduction–Block Coding–Hamming Distance, CRC, Flow Control and Error Control, Stop and Wait, Error Detection and Error Go Back– N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, CSMA/CD, CDMA/CA

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**SEMESTER III**

## UNIT IV

**Network Switching Techniques:** Circuit, Message, Packet and Hybrid Switching Techniques. X.25, ISDN. Logical Addressing, Ipv4, Ipv6, Address Mapping, ARP, RARP, BOOTP and DHCP, User Datagram Protocol, Transmission Control Protocol, SCTP.

## UNIT V

**Application Layer Protocols:** Domain Name Service Protocol, File Transfer Protocol, TELNET, WWW and Hyper Text Transfer Protocol, Simple Network Management Protocol, Simple Mail Transfer Protocol, Post Office Protocol v3.

### Text books:

1. Behrouz A. Forouzan, “Data communication and Networking”, Fourth Edition, Tata McGraw Hill, 2011.

### Reference Books:

1. Larry L. Peterson, Peter S. Davie, “Computer Networks”, Fifth Edition, Elsevier, 2012.
2. William Stallings, “Data and Computer Communication”, Eighth Edition, Pearson Education, 2007.
3. James F. Kurose, Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education, 2005.

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							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
<b>BTIT305</b>	<b>UG</b>	<b>Analysis and Design of Algorithms</b>	3	1	2	5	60	20	20	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 Objective:**

The student will have ability to:

1. Ability to analyze asymptotic runtime complexity of algorithms including formulating recurrence relations. How to develop efficient algorithms for simple computational tasks and reasoning about the correctness of them?
2. The emphasis is on choosing appropriate data structures and designing correct and efficient algorithms to operate on these data structures.
3. Write rigorous correctness proofs for algorithms.
4. Synthesize efficient algorithms in common engineering design situations.

### **Course Outcomes:**

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

1. Define the basic concepts of algorithms and analyze the performance of algorithms.
2. Discuss various algorithm design techniques for developing algorithms.
3. Discuss various searching, sorting and graph traversal algorithms.
4. Understand NP completeness and identify different NP complete problems.
5. Discuss various advanced topics on algorithms.

### **Syllabus:**

#### **UNIT 1**

**Algorithms Designing:** Algorithms, Analyzing Algorithms, Asymptotic Notations, Heap and Heap Sort, Brief Review of Graphs, Sets and Disjoint Set Union, Sorting and Searching Algorithms and their Analysis in terms of Space and Time Complexity. Divide and Conquer: General Method, Binary Search, Merge Sort, Quick Sort, Selection Sort, Strassen's Matrix Multiplication Algorithms.

#### **UNIT II**

**Greedy Method:** General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-Cost Spanning Trees, Single Source Shortest Paths.

#### **UNIT III**

**Dynamic Programming:** General Method, Optimal Binary Search Trees, 0/1 Knapsack, Traveling Salesperson Problem, All Pairs Shortest Paths.

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### **UNIT IV**

**Backtracking:** General Method, 8-Queens Problem, Graph Coloring, Hamiltonian Cycles, Sum of Subsets. Branch and Bound: Method, 0/1 Knapsack Problem, Traveling Salesperson Problem, Efficiency Considerations, Techniques for Algebraic Problems, Some Lower Bounds on Parallel Computations.

### **UNIT V**

**NP Hard and NP Complete Problems:** Basic Concepts, Cook's Theorem, NP Hard Graph and NP Scheduling Problems, Some Simplified NP Hard Problems.

### **Text Books:**

1. Ellis Horowitz and Sartaj Sahni, "Fundamental of Computer Algorithms", 2<sup>nd</sup> Edition, Galgotia Publication, 2001.
2. Thomas H Cormen, Charles E Leiserson and Ronald L Rivest "Introduction to Algorithms", 3<sup>rd</sup> Edition, MIT Press. 2009.
3. Donal E Knuth, "Fundamentals of Algorithms: The Art of Computer Programming" Vol 1, 3<sup>rd</sup> Edition, Pearson Educatio, 1997.

### **Reference Books:**

1. Goodman, S.E. & Hedetniemi, "Introduction to Design and Analysis of Algorithm", Tata McGraw Hill, 1977.
2. S. Dasgupta, C. H. Papadimitriou, and U. V. Vazirani, "Algorithms", Tata McGraw Hill, 2006.
3. J.E Hopcroft, J.D Ullman, "Design and analysis of algorithms" TMH Publication.
4. Michael T Goodrich and Roberto Tamassia "Algorithm Design", Wiley India.

### **List of Practical:**

1. Write a program for Iterative and Recursive Binary Search.
2. Write a program for Merge Sort.
3. Write a program for Quick Sort.
4. Write a program for Strassen's Matrix Multiplication.
5. Write a program for minimum spanning trees using Kruskal's algorithm.
6. Write a program for minimum spanning trees using Prim's algorithm.
7. Write a program for single sources shortest path algorithm.
8. Write a program for Floyd-Warshall algorithm.
9. Write a program for traveling salesman problem.
10. Write a program for Hamiltonian cycle problem.

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							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
<b>BTCS303</b>	<b>UG</b>	<b>Principles of Programming Languages</b>	3	0	2	4	60	20	20	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 student will have ability to:

1. To improve the background for choosing appropriate programming languages for certain classes of programming problems.
2. To be able in principle to program in an imperative (or procedural), an object-oriented, a functional, and a logical programming language.
3. To understand the significance of an implementation of a programming language in a compiler or interpreter
4. To Increase the ability to learn new programming languages
5. To Increase the capacity to express programming concepts and choose among alternative ways to express things.

### **Course Outcomes:**

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes:

1. Students will gain insight and develop understanding to the underlying principles and concepts of programming languages. Also Gain an overview of programming language translation process.
2. Students will be able to competent with analyzing programming language design issues related to data types, expressions and control structures.
3. Students will be able to describe the concept of sub-programming with the help of Functions. Also develop understanding with the parameter passing techniques and concept of function overloading.
4. Students will be able to analyze various memory management techniques as well as apply various concepts of object oriented programming.
5. Students will be able to develop understanding with the exception handling concept and gain knowledge of logical and functional programming.

### **Syllabus:**

#### **UNIT I**

**Preliminary Concepts:** Reasons for Studying, Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Programming Paradigms – Imperative, Object Oriented, Functional Programming, Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, Programming Environments.

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## **SEMESTER III**

### **UNIT II**

**Data Types:** Introduction, Primitive, Character, User Defined, Array, Associative, Record, Union, Pointer and Reference Types, Design and Implementation Uses Related to these Types. Names, Variable, Concept of Binding, Type Checking, Strong Typing, Type Compatibility, Named Constants, Variable Initialization.

### **UNIT III**

**Expressions and Statements:** Arithmetic Relational and Boolean Expressions, Short Circuit Evaluation Mixed Mode Assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, Guarded Commands.

### **UNIT IV**

**Subprograms and Blocks:** Fundamentals of Sub-Programs, Scope and Lifetime of Variable, Static and Dynamic Scope, Design Issues of Subprograms and Operations, Local Referencing Environments, Parameter Passing Methods, Overloaded Sub-Programs, Generic Sub-Programs, Design Issues for Functions Overloading and Overloaded Operators, Co-Routines.

### **UNIT V**

**Abstract Data Types:** Abstractions and Encapsulation, Introductions to Data Abstraction, Static and Stack Based Storage Management. Heap Based Storage Management. Garbage Collection. Object Oriented Programming in Smalltalk, C++, Java, C#, Php, Perl. Concurrency: Subprogram Level Concurrency, Semaphores, Monitors, Message Passing, Java Threads, C# Threads.

### **Text Books:**

1. Robert .W. Sebesta “Concepts of Programming Languages”, 10<sup>th</sup> Edition, Pearson Education,2008.
2. D. A. Watt, “Programming Language Design Concepts, Wiley dreamtech,rp-2007.
3. Louden and Lambart,“Programming Languages: Principles and Practices”, 3<sup>rd</sup> Edition, Cengage Learning, 2011

### **Reference Books:**

1. Gabbrielli and Martini “Programming Languages: Principles and Paradigms., Springer, 2010.
2. Peter Sestoft,“Programming Language Concepts”, Springer, 2017.
3. A.B. Tucker, R.E. Noonan, “Programming Languages”, 2nd Edition, Tata McGraw Hill.
4. Terrance W Pratt, "Programming Languages: Design and Implementation" Pearson Education.

### **List of Practical:**

1. Type compatibility rules of a C compiler.
2. Compare time efficiency to run for matrix multiplication with and without subscript range checking.
3. Investigate the safety of enumeration types. Perform at-least 5 operations to determine what incorrect or silly things are legal.

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4. Calculate time efficiency for large number of references to two dimensional array between subscripting and pointer arithmetic
5. Illustrates the order of evaluation of expressions used as actual parameters to a method.
6. Consider the following programming problem: The values of three integer variables—first, second, and third—must be placed in the three variables max, mid, and min, with the obvious meanings, without using arrays or user-defined or predefined subprograms. Write two solutions to this problem, one that uses nested selections and one that does not. Compare the complexity and expected reliability of the two.
7. Produces different behavior depending on whether pass-by-reference or pass-by-value-result is used in its parameter passing.
8. Write a program in some language that has both static and stack dynamic local variables in subprograms. Create six large (at least 100 \* 100) matrices in the subprogram—three static and three stack dynamic. Fill two of the static matrices and two of the stack-dynamic matrices with random numbers in the range of 1 to 100. The code in the subprogram must perform a large number of matrix multiplication operations on the static matrices and time the process. Then it must repeat this with the stack-dynamic matrices. Compare and explain the results.
9. Write an abstract data type for complex numbers, including operations for addition, subtraction, multiplication, division, extraction of each of the parts of a complex number, and construction of a complex number from two floating-point constants, variables, or expressions.
10. Define semaphores in Ada and use them to provide both cooperation and competition synchronization in the shared-buffer example
11. Prepare a case study on C and C++ for Readability, Writability and. Reliability.

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							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
<b>BTCS308</b>	<b>UG</b>	<b>Object Oriented Programming Using Java</b>	3	0	2	4	60	20	20	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:**

1. Students will be able to understand object oriented programming concepts using java fundamentals.
2. Gain knowledge about basic Java language syntax and semantics to write Java programs
3. Use concepts such as variables, conditional and iterative execution methods etc.
4. Understand the principles of inheritance, packages and interfaces.

### **Course Outcomes:**

1. Identify classes, objects, members of a class and relationships among them needed for a specific problem
2. Write Java application programs using OOP principles and proper program structuring
3. Demonstrate the concepts of polymorphism and inheritance
4. Write Java programs to implement error handling techniques using exception handling

### **Syllabus:**

#### **UNIT I: Object-Oriented Approach**

State the advantages of an object-oriented approach to software development, Describe essential object-oriented concepts and terminology, Describe the fundamentals of object-oriented programming

#### **UNIT II: JAVA Classes with Object Oriented Approach**

Create Java classes that implement an object-oriented design, Apply Java language constructs that enable and enforce OO-related concepts such as data encapsulation, strict typing and type conversion, inheritance, and polymorphism. Use Java syntax to develop applications in Java, Use inheritance and interfaces in Java applications, Refactor Java code.

#### **UNIT III: API classes and interfaces**

Describe and use some of the important API classes and interfaces available in Java, including: Primitive wrapper classes, Classes in the Collections Framework, Utility classes, I/O classes, Threads, Exceptions

#### **UNIT IV: Java development tools in Eclipse V3.5**

Use the Java development tools in Eclipse V3.5, Debug Java programs, Describe Java EE component model and its use in building server- side applications, Develop, debug, and test server-side applications.

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## **UNIT V: Servlet & JSP**

Develop and test servlets, Develop and test JSP pages, Learn how to use JSPs and servlets in accordance with the Model/View/Controller(MVC) programming model, Develop, test, and use JSP custom tags

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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*
<b>BTCS307</b>	<b>UG</b>	<b>Advanced Java</b>	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:**

1. Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
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:**

1. Use various tools, and Validation techniques, use of different templates available in Intelligent IDEA, Implementation and testing strategies in real time applications.
2. Learn the Internet Programming, using Java Applets.
3. Create a 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.
4. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC).
5. Create dynamic web pages, using Servlets and JSP.

### **Syllabus:**

#### **UNIT I**

**Introduction of Java Programming:**Java Networking :Network Basics and Socket overview, TCP/IP client sockets, URL, TCP/IP server sockets, Datagrams, java.net package Socket, ServerSocket, InetAddress, URL, URL Connection.

#### **UNIT II**

**JDBC Programming:**JDBC Programming :The JDBC Connectivity Model, Database Programming: Connecting to the Database, Creating a SQL Query, Getting the Results, Updating Database Data, Error Checking and the SQLException Class, The SQLWarning Class, The Statement Interface, PreparedStatement, CallableStatement The ResultSet Interface, Updatable Result Sets, JDBC Types, Executing SQL Queries, ResultSetMetaData, Executing SQL Updates, Transaction Management.

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## **SEMESTER III**

### **UNIT III**

**SEVELET & API:**Servlet API and Overview : Servlet Model: Overview of Servlet, Servlet Life Cycle, HTTP Methods Structure and Deployment descriptor ServletContext and ServletConfig interface, Attributes in Servlet, Request Dispatcher interface The Filter API: Filter, FilterChain, Filter Config Cookies and Session Management: Understanding state and session, Understanding Session Timeout and Session Tracking, URL Rewriting .

### **UNIT IV**

**Java Server Pages:**Java Server Pages : JSP Overview: The Problem with Servlets, Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment ,JSP Directives, JSP Action, JSP Implicit Objects JSP Form Processing, JSP Session and Cookies Handling, JSP Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag, JSP Expression Language, JSP Exception Handling, JSP XML Processing

### **UNIT V**

**Java Server Faces:**Java Server Faces2.0 : Introduction to JSF, JSF request processing Life cycle, JSF Expression Language, JSF Standard Component, JSF Facelets Tag, JSF Converter Tag, JSF Validation Tag, JSF Event Handling and Database Access, JSF Libraries: PrimeFaces

### **Text Books:**

1. Kathy walrath, Black Book Java server programming J2EE, 1st ed., Dream Tech Publishers, 2008.
2. James Keogh Complete Reference J2EE by Mcgraw publication 2016.
3. Subrahmanyam Allamaraju, Cedric Buest, Professional Java Server Programming by Wiley Publication 2011.
4. Matthew Scarpino, HanumantDeshmukh, JigneshMalavie SCWCD, Manning publication,2014.
5. Cay Horstmann and Gary Cornell Core Java, Volume II: Advanced Features Pearson Publication 2011.

### **Reference Books:**

1. Kito D. Mann, Java Server Faces in Action, Manning Publication 2016.
2. Maydene Fisher, Jon Ellis, Jonathan Bruce JDBC™ API Tutorial and Reference, Third Edition, Addison Wesley ,2018 .
3. CookBook, Anghel Leonard, GiulioZambon Beginning JSP, JSF and Tomcat, Apress.JSF2.0, PACKT publication 2016.
4. Bryan Basham, Kathy Sierra & Bert Bates Head First Servlets and JSP, Publisher: O'Reilly Media 2015.

### **List of Practical:**

1. Create chat application using either TCP or UDP protocol.
2. Implement TCP Server for transferring files using Socket and ServerSocket
3. Implement any one sorting algorithm using TCP/UDP on Server application and Give Input On Client side and client should sorted output from server and display sorted on input side.

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4. Implement Concurrent TCP Server programming in which more than one client can connect and communicate with Server for sending the string and server returns the reverse of string to each of client
5. Write RMI application where client supplies two numbers and server response by summing it. Provide your custom security policy for this application.
6. Implement Student information system using JDBC and RMI.
7. Create Servlet file which contains following functions:  
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.
8. User can create a new database and also create new table under that database. Once database has been created then user can perform database operation by calling above functions. Use following Java Statement interface to implement program: Statement 2. Prepared statement 3. Callable statement.
9. Create Servlet file and study web descriptor file.
10. Create login form and perform state management using Cookies, Http Session and URL Rewriting.

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**SEMESTER III**

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*
<b>BTIT407</b>	<b>UG</b>	<b>Web Development Lab-II (PHP/JSP)</b>	0	0	4	2	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 course content should be taught and implemented with the aim to develop required skills in the students so that they are able to acquire following competencies:

1. Develop interactive web based application using PHP/JSP and MySQL.
2. Effective use of format and design for print documents
3. Design dynamic websites that meet specified needs and interests.

### Course Outcomes:

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

1. Create small programs using basic PHP concepts.
2. Apply In-Built and Create User defined functions in PHP programming.
3. Design and develop a Web site using form controls for presenting web based content.
4. Debug the Programs by applying concepts and error handling techniques of PHP.
5. Create dynamic Website/ Web based Applications, using PHP, MySQL database.
6. Create dynamic Website/ Web based Applications, using JSP, MySQL database.

### Syllabus:

#### UNIT-I

**Introduction to PHP:** Identify Relationship Between Apache, Mysql and PHP, Steps to Install and Test Web Server, Configure Apache to Use PHP, Create Simple PHP Page Using PHP Structure and Syntax, Use of PHP Variables, Data Types and PHP Operators, Apply Control Structures in Programming, Steps to Create User Defined Functions.

#### UNIT-II

**Working with in Built Functions:** Apply Various Inbuilt variable (Gettype, Settype, Isset, Strval, Floatval, Intval, Print\_R), String (Chr, Ord, Strtolower, Strtoupper, Strlen, Ltrim, Rtrim, Trim, Substr, Strcmp, Strcasecmp, Crops, Strops, Stristr, Str\_Replace, Strrev, Echo, Print), Math (Abs, Ceil, Floor, Round, Fmod, Min, Max, Pow, Sqrt, Rand), Date (Date, Getdate, Setdate, Checkdate, Time, Mktime), Array (Count, List, In\_Array, Current, Next, Previous, End, Each, Sort, Array\_Merge, Array\_Reverse), File Functions (Fopen, Fread, Fwrite, Fclose) in Programming .

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**SEMESTER III**

## **UNIT-III:**

**Working With Data And Forms:** Steps to Create an Input Form (Text Fields, Text Areas, Check Boxes, Radio Buttons, List Boxes, Password Controls, Hidden Controls, Image Maps, File Uploads, Buttons), Steps to Use Using PHP\$\_Get And \$\_Post, \$\_Request Method for a Given Application, Combining HTML and PHP Codes Together on Single Page, Redirecting the User.

## **UNIT-IV:**

**Session, Cookies And Error Handling:** Use Cookie to Store and Retrieve Data, Use Querystring to Transfer Data, Create Session Variable and Handle Session, Starting and Destroying Session Working with Session Variables, Passing Session IDs, Handle Runtime Errors Through Exception Handling, Error Types in PHP.

**Database Connectivity Using MYSQL:** Concepts and Installation Of Mysql, Mysql Structure and Syntax, Types of Mysql Tables and Storage Engines, Mysql Commands, Integration of PHP with Mysql, Connection to the Mysql Database, Creating And Deleting Mysql Database Using PHP, Updating, Inserting, Deleting Records in the Mysql Database, Hosting Website (Using “C” Panel, Using FileZilla Software)

## **UNIT-V:**

**Java Server Pages Basics:** Integrating Scripts in JSP, JSP Objects and Components, Configuration and Troubleshooting, JSP: Request and Response Objects, Retrieving the Contents of An HTML Form, Retrieving a Query String, Working with Beans, Cookies, Creating and Reading Cookies. Using Application Objects and Event Handling.

## **Text Books:**

1. W. Jason Gilmore, “Beginning PHP and MySQL”, 4th Edition, Apress, 2010
2. Steven Holzner, “PHP: The Complete Reference”, Tata McGraw-Hill, 2008
3. Robin Nixon, “Learning PHP, MySQL, JavaScript, CSS & HTML5”, Third Edition, O’reilly Media, 2014

## **Reference Books:**

1. Julie C. Meloni, “Teach yourself PHP, MySQL and Apache All in one”, 5th Edition, Pearson Education, 2012
2. Phil Hanna, “JSP 2.0: The Complete Reference”, Tata McGrawHill, 2011.

## **List of Practical’s:**

1. Write a PHP script to display Welcome message.
2. Write a PHP script to demonstrate arithmetic operators, comparison operator, and logical operator.
3. Write PHP Script to print Fibonacci series.
4. Write PHP script to demonstrate Variable function
5. Write PHP script to demonstrate string function.
6. Write PHP script to demonstrate Array functions.
7. Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
8. Write two different PHP script to demonstrate passing variables through a URL.
9. Write PHP script to demonstrate passing variables with cookies.
10. Write an example of Error-handling using exceptions.

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## **SEMESTER III**

11. Write a PHP script to connect MySQL server from your website.
12. Write a program to read customer information like cust\_no, cust\_name, Item\_purchase, and mob\_no, from customer table and display all these information in table format on output screen.
13. Write a program to read employee information like emp\_no, emp\_name, designation and salary from EMP table and display all this information using table format.
14. Create a dynamic web site using PHP and MySQL.
15. Write a program for JSP scriptlet tag that prints the user name
16. Write a program for JSP expression tag that prints current time
17. Write a program for JSP declaration tag that declares method
18. Write a program for JSP for request and response implicit object
19. Write a program for JSP for session implicit object
20. Write a program for JSP for exception implicit object
21. Write a program for JSP for Simple example of java bean class
22. Write a program for JSP for JSP Action Tags

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