

## Detailed Syllabus

### Lab-wise Breakup

<b>Course Code</b>	15B17CI372	<b>Semester Odd</b>	<b>Semester III Session 2024</b> <b>Month from July '24 to Dec'24</b>
<b>Course Name</b>	Database System & Web Lab		

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dhanalekshmi Gopinathan, Vartika Puri
	<b>Teacher(s) (Alphabetically)</b>	Anubhuti Mohindra, Anuja Arora, Anuradha Surolia, Arti, Deepika Varshney, Devpriya Soni, Diksha Chawla, Janardan Verma, Kirti Agarwal, Kirti Jain, Lalita Mishra, Neetu Sardana, Neetu Singh, Shariq, Sumeshwar Singh, Shivendra Singh, Tanvi Gautam, Vartika Puri

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>C271.1</b>	Develop web page using HTML, CSS with client-side scripting using JavaScript.	Apply (Level III)
<b>C271.2</b>	Make use of relational database and SQL commands for query processing.	Apply (Level III)
<b>C271.3</b>	Develop a simple web application with client and server-side scripting using JavaScript and PHP and connect to a given relational database.	Apply (Level III)
<b>C271.4</b>	Make use of PL/SQL commands including stored procedures, stored functions, cursors, triggers for query processing.	Apply (Level III)
<b>C271.5</b>	Design a Project based on database management system including a normalized database and a user interface.	Create (Level VI)

<b>Module No.</b>	<b>Title of the Module</b>	<b>List of Experiments</b>	<b>CO</b>
1.	Client-Side Web Technology	1. Design web page using SGML, HTML 5, DHTML, CSS, Java script.	C271.1
2.	Server-Side Web Technology	1. Develop a web application with client and server-side scripting using JavaScript. 2. Develop a web application with client and server-side scripting using PHP. 3. Design web application with database connectivity. 4. Design web application with entering user data into database. 5. Design web application for user - database interaction through PHP.	C271.1, C271.3

3.	SQL	<ol style="list-style-type: none"> <li>1. MySQL Create Insert, Update, Delete and Select Statements.</li> <li>2. Simple Queries, Sorting Results (ORDER BY Clause)</li> <li>3. SQL Aggregate Functions</li> <li>4. Grouping Results (GROUP BY Clause)</li> <li>5. Subqueries, ANY and ALL, Multi-Table Queries, EXISTS and NOT EXISTS</li> <li>6. Combining Result Tables (UNION, INTERSECT, EXCEPT)</li> </ol>	C271.2
4.	Pprocedural Language	<ol style="list-style-type: none"> <li>1. Write PL/SQL program for storing data using procedures.</li> <li>2. Write PL/SQL program for storing data using stored functions.</li> <li>3. Write PL/SQL program for storing data using cursors and Triggers</li> </ol>	C271.4
5.	Project	Students are expected to design a web application based on PHP or JavaScript which is connected with database to execute insert, update, retrieve and delete data queries.	C271.5

#### Evaluation Criteria

Components	Maximum Marks
Lab Test-1	20
Lab Test-2	20
Day-to-Day (Project, Lab Assessment, Attendance)	60
Total	100

**Project based learning:** Each student in a group of 3-4 will have to develop a project based on different real-world problems. Students must study the web and database related technologies before finalizing the objectives. For handling the multiple records, they will implement cursors and triggers. Student will design the webpage of the application area and connect with the database. Project development will enhance the knowledge and employability of the students in IT sector.

**Recommended Reading material:** Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

#### Text Books

1.	Henry F Korth, Abraham Silberschatz, S. Sudurshan, Database system concepts, 7 <sup>th</sup> Edition, McGraw-Hill,2019
2.	RamezElmasri ,Shamkant B. Navathe, Fundamentals of Database Systems, 5 <sup>th</sup> Edition, Pearson Education, 2015.
3.	Ramakrishnan, Gehrke, Database Management Systems, Mcgraw-Hill, 3 <sup>rd</sup> Edition,Addison-Wesley,2014.

#### Reference Books

1.	Thomas Connolly, Carolyn Begg, Database Systems-A Practical Approach to design, Implementation and Management, 6 <sup>th</sup> Edition, Addison-Wesley,2015.
2.	“PHP and MYSQL Manual” by Simon Stobart and Mike Vassileiou

3.	“PHP and MYSQL Web Development” by Luke Welling and Laura Thomson(Pearson Education), 5 <sup>th</sup> Edition, 2016.
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**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	15B11CI311	<b>Semester Odd (specify Odd/Even)</b>	<b>Semester III Session 2024 -2025 Month from July to December</b>
<b>Course Name</b>	Data Structures		
<b>Credits</b>	4	<b>Contact Hours</b>	4

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Tribhuwan Kumar Tewari (J62), Dr. Snigdha Agrawal (J128)
	<b>Teacher(s) (Alphabetically)</b>	J62- Dr. Manish Kumar Thakur, Dr. Meenal Jain, Mr. Mohit Singh, Dr. Niyati Aggrawal, Dr. Suma Dawn, Dr. Tribhuwan Kumar Tewari  J128- Dr. Neeraj Jain, Dr. Pulkit Mehndiratta, Dr. Rashmi Kushwah, Dr. Shruti Gupta, Dr. Snigdha Agrawal, Dr. Varsha Garg

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>C210.1</b>	Explain abstract data types, memory allocation schemes. and need of linear and non-linear data structures	Understand Level (Level 2)
<b>C210.2</b>	Apply and implement various linear data structures, like array, linked list, stack, and queue in different problems and applications	Apply Level (Level 3)
<b>C210.3</b>	Analyze the performance of various sorting and searching techniques	Analyze Level (Level 4)
<b>C210.4</b>	Demonstrate and implement various operations like search, traverse, insertion, deletion, <i>etc.</i> on different non-linear data structures	Apply Level (Level 4)
<b>C210.5</b>	Apply appropriate data structure to design an efficient solution for given and identified problem	Create Level (Level 6)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Introduction	Fundamentals of Linear and Non-Linear Data Structures, Memory Allocation – Static and dynamic, Abstract Data Types	2

2.	Linear Data Structures	Implementation of Array, Linked List: Singly, Doubly, Circular, Implementation of Stack and Queue, Stack and Queue operations using STL, Recursion, Recursion removal using Stack	5
3.	Searching and Sorting	Searching – Linear Search, Binary Search, Interpolation Search, Median Search; Hashing – Hash Table, Chaining, Probing; Sorting – Merge, Quick, Radix, Bucket, and Count; Time and Space complexity analysis of searching and sorting algorithms	8
4.	Non-Linear Data Structure – Multi List and Tree	Implementation of Multi List, Binary Tree, K-ary Tree, Binary Search Tree, Threaded Tree, Balanced BST: AVL Tree and RB Tree, B Tree, B+ Tree, Priority Queue using Binary Heap, Binomial Heap, and Fibonacci Heap	17
5.	Non-Linear Data Structure – Graph	Fundamentals of Graph, Adjacency Matrix and List; Graph Traversal using DFS and BFS, Basic Algorithms – Shortest Path, Minimum Spanning Tree	4
6.	Advanced Data Structures	Interval Tree, Segment Tree, Range Tree, KD Tree, Quad Tree, String Data Structures: Suffix Tree, Tries, Suffix Array	6
<b>Total number of Lectures</b>			<b>42</b>

<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
T1	20
T2	20
End Semester Examination	35
TA	25 (Mini Project (10), Attendance (5), Assignment/ Quiz / Programming Contest (10))
<b>Total</b>	<b>100</b>

**Project based learning: Project based learning:** Each student in a group of 3-4 will have to develop a mini project based on data structures. The students can opt any real-world application where these data structures can be used. The students have to implement the mini project using C/C++/Java language. Project development and its presentation will enhance coding skills, knowledge, and employability of the students in IT sector.

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
<b>Text Books:</b>	
1	Dinesh P. Mehta and Sartaj Sahni, Handbook of Data Structures and Applications, 2 <sup>nd</sup> Ed., Chapman and Hall / CRC Computer and Information Science Series, CRC Press. Freely available at: <a href="https://bjpcjp.github.io/pdfs/math/book-Data_Structures_and_Apps-DSA.pdf">https://bjpcjp.github.io/pdfs/math/book-Data_Structures_and_Apps-DSA.pdf</a>

2	Ellis Horowitz, Sartaj Sahni and Dinesh P. Mehta, Fundamentals of Data Structures in C++, Galgotia Press, 2009
3	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, Introduction to Algorithms, MIT Press, 3rd Edition, 2009
4	Seymour Lipschutz, Data Structures with C, Schaum's Outline Series, McGraw Hill, 2010
<b>Reference Books</b>	
1	Alfred V. Aho, J.E. Hopcroft, Jeffrey D. Ullman, Data Structures and Algorithms, Addison-Wesley Series in Computer Science, and Information Processing, 1983
2	John R. Hubbard, Data Structures with C++, Schaum's Outline Series, McGraw Hill, First Edition, 2017.
3	Robert Lafore, Object Oriented Programming in C++, SAMS, 2002

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	15B11HS211	<b>Semester :ODD</b> (specify Odd/Even)	<b>Semester :III Session 2024-25</b> Month from: July-December
<b>Course Name</b>	Economics		
<b>Credits</b>	03	<b>Contact Hours</b>	2-1-0

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr.Amba Agarwal(Sec 128) & Dr. Amandeep Kaur(Sec 62)
	<b>Teacher(s)</b> (Alphabetically)	Dr.Anshu Banwari Dr. Amandeep Kaur Dr. Amba Aggarwal Dr. Kanupriya Misra Bakhru Dr. Manas Behera Dr. Mukta Mani Dr. Neha Singh Dr. Vandana Sehgal Dr. Praveen Sharma Dr.Purwa Srivastava Dr. Sakshi Varshney

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>C206.1</b>	<i>Understand</i> the fundamental concepts of micro and macro economics.	Understanding Level(C2)
<b>C206.2</b>	<i>Apply</i> the concepts of opportunity cost, national income accounting and various business forecasting methods.	Applying Level (C3)
<b>C206.3</b>	<i>Analyze</i> the concepts of demand, supply, market equilibrium, consumer choices and production in micro-economic decision making.	Analyzing Level (C4)
<b>C206.4</b>	<i>Evaluate</i> the different market structures and their implications on the behavior of the firm.	Evaluating Level(C5)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Introduction	Economics Definition, Basic economic problems, Resource constraints and welfare maximization. Micro and Macro economics. Production Possibility Curve. Circular flow of economic activities.	2
2.	Basics of Demand, Supply and Equilibrium	Demand side and supply side of the market. Factors affecting demand & supply. Elasticity of demand & supply – price, income and cross-price elasticity. Market equilibrium price.	6
3.	Theory of Consumer Choice	Theory of Utility and consumer's equilibrium. Indifference Curve analysis, Budget Constraints, Consumer Equilibrium.	2
4.	Demand forecasting	Regression Technique Time-series Smoothing Techniques: Exponential, Moving Averages Method	4

5.	Production theory and analysis	Production function. Isoquants, Isocostlines, Optimal combination of inputs. Stages of production, Law of returns, Return to scale.	2
6.	Cost Theory and Analysis	Nature and types of cost. Cost functions- short run and long run Economies and diseconomies of scale	2
7.	Market Structure	Market structure and degree of competition Perfect competition Monopoly Monopolistic competition Oligopoly	6
8	National Income Accounting	Overview of Macroeconomics, Basic concepts of National Income Accounting,	2
9	Macro Economics Issues	Introduction to Business Cycle, Inflation-causes, consequences and remedies: Monetary and Fiscal policy.	2
<b>Total number of Lectures</b>			28 (lectures)
<b>Evaluation Criteria</b>			
<b>Components</b>		<b>Maximum Marks</b>	
T1		20	
T2		20	
End Semester Examination		35	
TA		25 (Quiz+ Project+ Class Participation)	
<b>Total</b>		<b>100</b>	

**Project based learning:** Students have to form a group (maximum 5 students in each group) and have to do an economic analysis on the topic assigned. An economic impact analysis assesses the impact of an event on the economy in a particular area. It generally measures the effect on revenue, profits, wages and jobs. The knowledge gained in conducting economic analysis will enhance student's decision-making skills.

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	H.C. Petersen, W.C. Lewis, <i>Managerial Economics</i> , 4th ed., Pearson Education 2001.
2.	D. Salvatore, <i>Managerial Economics in a Global Economy</i> , 8 <sup>th</sup> ed., Oxford University Press, 2015.
3.	S. Damodaran, <i>Managerial Economics</i> , 2 <sup>nd</sup> ed., Oxford University Press, 2010.
4.	M. Hirschey, <i>Managerial Economics</i> , 12 <sup>th</sup> ed., Cengage India, 2013.
5.	P.A. Samuelson, W.D. Nordhaus, S. Nordhaus, <i>Economics</i> , 18 <sup>th</sup> ed., Tata Mc-Graw Hill, 2006.
6.	S.K. Misra & V. K. Puri, <i>Indian Economy</i> , 38 <sup>th</sup> ed., Himalaya Publishing House, 2020.



**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	15B11CI312	<b>Semester: Odd 24-25</b>	<b>Semester: III Session: 2024-2025</b> <b>Month from July'24 to Dec'24</b>
<b>Course Name</b>	Database Systems & Web		
<b>Credits</b>	4	<b>Contact Hours</b>	<b>4 (3+1)</b>

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Devpriya Soni, Kirti Jain
	<b>Teacher(s) (Alphabetically)</b>	Aarti Goel, Aditi Priya, Anubhuti Roda Mohindra, Anuradha Surolia, Archana Purwar, Devpriya Soni, Janardan K Verma, Kedar Nath Singh, Kirti Jain, Lalita Mishra, Naveen Chauhan, Neetu Singh, Shivenendra Singh, Sonal, Tanvi Gautam, Vartika Puri

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>C212.1</b>	Explain the basic concepts of Database systems and Web components.	Understand Level (Level II)
<b>C212.2</b>	Model the real-world systems using Entity Relationship Diagrams and convert the ER model into a relational logical schema using various mapping algorithms	Apply Level (Level III)
<b>C212.3</b>	Make use of SQL commands and relational algebraic expressions for query processing.	Apply Level (Level III)
<b>C212.4</b>	Simplify databases using normalization process based on identified keys and functional dependencies	Analyze Level (Level IV)
<b>C212.5</b>	Solve the atomicity, consistency, isolation, durability, transaction, and concurrency related issues of databases	Evaluate Level (Level V)
<b>C212.6</b>	Develop a simple web application with client and server-side scripting using Javascript and PHP and connect with a given relational database	Create Level (Level VI)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Introduction to Databases	Introduction to Databases, Physical Level of Data Storage, Structure of relational databases, Review of SQL Create, Insert, Update, Delete and Select Statements, Overview of NoSQL databases	4
2.	Web Architecture & Introduction	Motivation, characteristics and complexities of web applications, Basics of Web Server and Application server, differences between web application and conventional software, architecture layers.	2
3.	Client Side Web Technology	SGML, HTML 5, DHTML, CSS, Java script	4
4.	Server Side Web Technology	PHP, Database Connectivity with PHP	4
5.	Database Design and ER Model	Entity type, Attributes, Relation types, Notations, Constraints, Extended ER Features	4

6.	Relational Model and Structured Query Language	SQL: Data Definition and Data Manipulation, Relational Algebra	9
7.	Procedural Language	PL/SQL: Stored Procedures, Functions, Cursors, Triggers	3
8.	Normalization	Data Dependencies, 2NF, 3NF, BCNF, building normalized databases	5
9.	Transaction Management	Transactions, Concurrency, Recovery, Security	7
<b>Total number of Lectures</b>			<b>42</b>

### Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25(Attendance:10, Assignments/Min-Project/Class Test/Quiz/Tutorial:15)
<b>Total</b>	<b>100</b>

**Project Based Learning:** Each student in a group of 3-4 will choose a real-life application area. To make a project, the students will analyze and define the need of database systems in terms of functional requirements. Each group will design the Entity Relationship diagram to understand the organizational structure of the application area and implement the database in MySQL. Each group will identify 15-20 typical queries and execute them. For handling the multiple records, they will implement cursors and triggers. Students will design the webpage of the application area and connect with the database.

**Recommended Reading material:** Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

### Text Books:

1. Henry F Korth, Abraham Silberschatz, S. Sudurshan, Database system concepts, 5<sup>th</sup> Edition, McGraw-Hill,2006
2. RamezElmasri, Shamkant B. Navathe, Fundamentals of Database Systems, 4<sup>th</sup> Edition, Pearson Education, 2006.

### Reference Books:

1. Ramakrishnan, Gehrke, Database Management Systems, Mcgraw-Hill, 3<sup>rd</sup>Edition, Addison-Wesley, 2006.
2. Thomas Connolly, Carolyn Begg, Database Systems-A Practical Approach to design, Implementation and Management, 3<sup>rd</sup> Edition, Addison-Wesley,2002.
3. "PHP and MYSQL Manual" by Simon Stobart and Mike Vassileiou
4. "PHP and MYSQL Web Development" by Luke Welling and Laura Thomson(Pearson Education)
5. "An introduction to database systems" by Bipin C. Desai, West Publishing Company, College & School Division, 1990 - Computers - 820 pages
6. Christopher J. Date, Database Design and Relational Theory: Normal Forms and All That Jazz, 2012.
7. Rajiv Chopra, Database Management System (DBMS): A Practical Approach, 5th Edition, 2016, 682 pages.