



**SWAMINARAYAN
UNIVERSITY**
THE RESERVOIR OF ALL KNOWLEDGE

FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: DATA STRUCTURES
(Code: DSCAM105-1C)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Computer Applications-(B.C.A)(Hons.)	Third Semester

Course Objectives -Data structure is a subject of primary importance in Information and Communication Technology. Organizing or structuring data is important for implementation of efficient algorithms and program development. Development of application systems and software that use underlying architecture of machines efficiently and effectively requires the ability to use and manipulate various types of Data Structures and other constructs.

The practice of data structure techniques is essential for all programming. The knowledge of “C” language and data structures will be reinforced by practical exercises during the course of study. The course will help students to develop the capability of selecting a particular data structure.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				100
L	T	P	T	P	Theory Marks		Practical Marks		
			2	2	E	M	I	EV	
2	0	4	4		25	25	25	25	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	INTRODUCTION TO DATA STRUCTURE: <ul style="list-style-type: none">• Data Management concepts• Data types – primitive and non-primitive• Performance Analysis and Measurement (Time and space analysis of algorithms-Average, best and worst case analysis), Types of Data Structures- Linear & Non Linear Data Structures.	8
2	LINEAR DATA STRUCTURE <ul style="list-style-type: none">• Array: Representation of arrays, Applications of arrays, sparse matrix and its representation• Stack: Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi• Queue: Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue• Linked List: Singly Linked List, Doubly Linked list, Circular linked list, Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.	10
3	NONLINEAR DATA STRUCTURE : <ul style="list-style-type: none">• Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees Some balanced tree mechanism, eg. AVL trees, 2-3 trees, Height Balanced, Weight Balance• Graph-Matrix Representation Of Graphs, Elementary Graph operations,(Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree)	10
4	Graph <ul style="list-style-type: none">• Introduction• Basic Terminology• Representation of Graph• Adjacency Matrix (Array)• Adjacency Linked• Traversal of Graph• Breadth First Traversal (Algorithm and Tracing)• Depth First Traversal (Algorithm and Tracing)• Application of Graph• Spanning Tree• Mnimum Spanning Tree (BFS and DFS)• Prim's Algorithm• Kruskal's Algorithm• Shortest Path Algorithm• Dijkstra's Algorithm	8

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES**A. List of Books**

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	An Introduction to Data Structures with Applications	Jean-Paul Tremblay & Paul G. Sorenson	Tata McGraw Hill
2	Data Structures using C & C++	Ten Baum	Prentice-Hall International

B. List of Major Equipment/ Software

1. 'C' Compiler

C. List of Software/Learning Websites

1. 'C' Programming Language: <http://www.w3schools.in>
2. 'C' Programming Language Tutorial : <https://www.javatpoint.com/c-programming-language-tutorial>

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Introduction to pointers. Call by Value and Call by reference	02
2.	Introduction to Dynamic Memory Allocation. DMA functions malloc(), calloc(), free() etc.	02
3.	Implement a program for stack that performs following operations using array. (a) PUSH (b) POP (c) PEEP (d) CHANGE (e) DISPLAY	02
4.	Implement a program to convert infix notation to postfix notation using stack	02
5.	Write a program to implement QUEUE using arrays that performs following operations (a) INSERT (b) DELETE (c) DISPLAY	02

6.	Write a program to implement Circular Queue using arrays that performs following operations. (a) INSERT (b) DELETE (c) DISPLAY	02
7.	Write a menu driven program to implement following operations on the singly linked list. (a) Insert a node at the front of the linked list. (b) Insert a node at the end of the linked list. (c) Insert a node such that linked list is in ascending order.(according to info. Field) (d) Delete a first node of the linked list. (e) Delete a node before specified position. (f) Delete a node after specified position.	12
8.	Write a program to implement following operations on the doubly linked list. (a) Insert a node at the front of the linked list. (b) Insert a node at the end of the linked list. (c) Delete a last node of the linked list. (d) Delete a node before specified position.	08
9.	Write a program to implement following operations on the circular linked list. (a) Insert a node at the end of the linked list. (b) Insert a node before specified position. (c) Delete a first node of the linked list. (d) Delete a node after specified position	08
10.	Implement recursive and non-recursive tree traversing methods inorder, preorder and postorder traversal.	02



**SWAMINARAYAN
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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: SYSTEM ANALYSIS AND DESIGN
(Code: MDC103-1C-E)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Computer Applications-(B.C.A)	Third Semester

Course Objectives –

Understand the principles and tools of systems analysis and design Analyze a problem and design an appropriate solution using a combination of software• development tools and techniques. Define and describe the phases of the system development life cycle. • Determine methods for evaluating the effectiveness and efficiency of a system•

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
			3	1	E	M	I	EV
3	0	2	4		25	25	25	25
								100

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva, EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	Introduction: <ul style="list-style-type: none"> System Definition and concepts, System Environments and Boundaries. Realtime and distributed systems, Basic principles of successful systems, Structured System Analysis and Design. Systems Analyst: Role and Need of Systems Analyst. Qualifications and responsibilities. System Analysis as a Profession; System Development Cycle: Introduction to Systems Development Life Cycle (SDLC). Various phases of SDLC: Study, Analysis, Design, 	08

	Development, Implementation, Maintenance	
2	Systems Documentation Consideration: <ul style="list-style-type: none"> Principles of Systems Documentation, Types of documentation and their importance, enforcing documentation discipline in an organization System Planning: Data and fact gathering techniques: Interviews, <ul style="list-style-type: none"> Group Communication Questionnaires, Presentations & Site Visits. Assessing Project Feasibility: <ul style="list-style-type: none"> Technical, Operational, Economic, Cost Benefits Analysis, Schedule, legal and contractual, Political. Modern Methods for determining system requirements. 	12
3	Modular and Structured Design: <ul style="list-style-type: none"> Module specifications. Top-down and bottom-up design. Module coupling and cohesion. Structure Charts. System Design and Modeling: <ul style="list-style-type: none"> Process Modeling, logical and physical design, Conceptual Data Modeling: Entity Relationship Analysis, EntityRelationship Modeling, DFDs, Process Description: Structured English, Decision Tree, Decision Tables. Documentation: <ul style="list-style-type: none"> Data Dictionary, Recording Data Descriptions. Input and Output: Classification of forms, Input/output forms design. User-interface design, Graphical interfaces. Standards and guidelines for GUI design, Unified Modeling Language, The Systems Analysts Toolkit – Communication Tools, CASE Tools, 	14
4	System Implementation, Maintenance/Audit: <ul style="list-style-type: none"> Planning considerations. Conversion methods, procedures and controls. System acceptance criteria. System Implementation and Maintenance, financial Analysis Tools, Project Management tools, System Evaluation and Performance. Testing and Validation. Preparing User Manual. Maintenance Activities and Issues 	08

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Modern Systems Analysis and Design	Jeffrey A. Hoffer, Joey F. George and Joseph S. Valacich,	Pearson
2	Software Engineering	Roger, Pressman,	McGraw Hill
3	System Analysis and Design	Kendal and Kendal	PHI
4	Software Engineering Principles and Practice	Waman S. Jawadekar	McGraw Hill
5	System Analysis and	Latest Edition	Wiley

	Design with UML Version 2.0 An Object Oriented Approach		
6	Systems Analysis and Design Methods	Latest Edition	Cengage Learning

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Describe the concepts of systems analysis and Information Systems Development Cycle.	02
2.	Solve a wide range of problems related to the analysis, design and construction of information systems.	02
3.	Evaluate the role of system analyst worldwide to understand the applications of IT projects in different context.	02
4.	Explore recent trends in software projects.	04
5.	Discuss the professional and ethical responsibilities to learn about the organizational and business context of systems development.	04
6.	Explain the techniques of moving to the implementation phase.	02
7.	Design information system requirements of a business using modeling techniques such as data flow diagrams and entity relationship diagrams.	04
8.	Develop systems maintenance program.	02



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COURSE CURRICULUM

Course Title: OBJECT ORIENTED PROGRAMMING USING JAVA
(Code: OPCAM106-1C)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Computer Applications-(B.C.A)	Third Semester

Course Objectives –

Java is a general-purpose computer programming language that is a class-based, object-oriented. It is intended to let application developers "write once, run anywhere" meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. UML (Unified Modeling Language) is a modeling language used by software developers. UML can be used for modeling a system independent of a platform language. UML is a graphical language for visualizing, specifying, documenting information of software systems. UML is a standard way to write a system model that covers conceptual ideas.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				
L	T	P	T	P	Theory Marks		Practical Marks		100
			2	2	E	M	I	EV	
2	0	4	4		25	25	25	25	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
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DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	<p>Concepts of OOP</p> <ul style="list-style-type: none"> • Introduction OOP • Procedural Vs. Object Oriented Programming • Principles of OOP • Benefits and applications of OOP <p>Basics of Java</p> <ul style="list-style-type: none"> • Features of Java, Byte Code and Java Virtual Machine, JDK, Data types, Operator, Control Statements • If , else, nested if, if-else ladders, Switch, while, do-while, for, for-each, break, continue. <p>Array and String</p> <ul style="list-style-type: none"> • Single and Multidimensional Array, String class, StringBuffer class, Operations on string, Command line argument, Use of Wrapper Class. 	08
2	<p>Classes, Objects and Methods</p> <ul style="list-style-type: none"> • Class, Object, Object reference, Constructor, Constructor Overloading, Method Overloading, Recursion, Passing and Returning object form Method, new operator, this and static keyword, finalize() method, Access control, modifiers, • Nested class, • Inner class, • Anonymous inner class, • Abstract class. <p>Inheritance and Interfaces</p> <ul style="list-style-type: none"> • Use of Inheritance, • Inheriting Data members and Methods, constructor in inheritance, • Multilevel Inheritance method overriding • Handle multilevel constructors super keyword, • Stop Inheritance • Final keywords, • Creation and Implementation of an interface, • Interface reference, • instanceof operator, Interface inheritance, • Dynamic method dispatch , • Understanding of Java Object Class, • Comparison between Abstract Class and interface, • Understanding of System.out.println statement. 	12
3	<p>Package:</p> <ul style="list-style-type: none"> • Use of Package, CLASSPATH, Import statement, Static import, Access control <p>Exception Handling :</p> <ul style="list-style-type: none"> • Exception and Error, Use of try, catch, throw, throws and finally, Built in Exception, Custom exception, Throwable Class. <p>Multithreaded Programming:</p> <ul style="list-style-type: none"> • Use of Multithread programming, Thread class and Runnable interface , Thread priority, Thread synchronization, Thread communication, Deadlock <p>IO Programming:</p> <ul style="list-style-type: none"> • Introduction to Stream, Byte Stream, Character stream, Readers and Writers, File Class, File InputStream, File 	14

	Output Stream, InputStreamReader, OutputStreamWriter, FileReader, FileWriter, Buffered Reader	
4	Collection Classes: <ul style="list-style-type: none"> List, ArrayList, LinkedList, Enumeration, Vector, Properties, Introduction to Java.util package Networking with java.net : <ul style="list-style-type: none"> InetAddress class, Socket class, DatagramSocket class, DatagramPacket class Introduction to Object orientation, Modeling as a Design Technique Modeling Concepts ,abstraction, The three models, Class Model, State model and Interaction model. Class Modeling : Object and class concepts, link and association, Generalization and Inheritance Advanced class Modeling : Advanced Object and class concepts, Association Ends, N-ary associations, aggregation, abstract classes, multiple inheritance, Metadata, Constraints, Derived data, Packages. State modeling : Events, states, Transition and conditions, state diagram, state diagram behavior Interaction Modeling Use case Models, sequence models, activity models 	08

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Java Fundamentals A comprehensive introduction	Herbert Schildt, Dale Skrien	TMH
2	Programming with Java A Primer	Balaguruswami,E.	TMH
3	The Complete Reference	Herbert Schild	TMH
4	Core Java Volume-I Fundamentals	Horstmann & Cornell	Pearson Education
5	Object Oriented Modeling and Design with UML	Michael Blaha and James Rumbaugh	Pearson Education

B. List of Major Equipment/ Software

1. JDK,JRE

C. List of Software/Learning Websites

1. <http://www.oracle.com/technetwork/java/javase/downloads/index.html>
2. <http://www.javatpoint.com/>
3. <http://www.tutorialspoint.com/java/>

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Write a program to convert rupees to dollar. 60 rupees=1 dollar.	02
2.	A. Write a program that calculate percentage marks of the student if marks of 6 subjects are given. B. Write a program to enter two numbers and perform mathematical operations on them. C. Write a program to find length of string and print second half of the string.	06
3.	A. Write a program to accept a line and check how many consonants and vowels are there in line. B. Write a program to count the number of words that start with capital letters. C. Write a program to find that given number or string is palindrome or not. D. Create a class which ask the user to enter a sentence, and it should display count of each vowel type in the sentence. The program should continue till user enters a word "quit". Display the total count of each vowel for all sentences.	08
4.	Write an interactive program to print a string entered in a pyramid form. For instance, the string "stream" has to be displayed as follows: <div style="text-align: center;"> S S t S t r S t r e S t r e a S t r e a m </div>	02
5.	Write an interactive program to print a diamond shape. For example, if user enters the number 3, the diamond will be as follows: <div style="text-align: center;"> * * * * * * * * * </div>	02
6.	A. Create a class called Student. Write a student manager	

	<p>program to manipulate the student information from files by using FileInputStream and FileOutputStream</p> <p>B. Refine the student manager program to manipulate the student information from files by using the BufferedReader and BufferedWriter</p> <p>C. Refine the student manager program to manipulate the student information from files by using the DataInputStream and DataOutputStream. Assume suitable data</p>	08
7.	<p>A. Prepare a class diagram for given group of classes using multiplicity, generalization, association concepts. And add at least 5-7 attributes and 3-5 operations for particular class Page, Shape, Point, Line, Arc, Ellipse, Rectangle, Circle</p> <p>B. Prepare a class diagram for given group of classes using multiplicity, generalization, association concepts. And add at least 5-7 attributes and 3-5 operations for particular class. City, Airport, Airline, Pilot, Flight, Plane, Seat, Passenger</p>	04
8.	<p>Categorize the following relationships into generalization, aggregation or association.</p> <p>[A] A country has a capital city</p> <p>[B] A dining philosopher uses a fork</p> <p>[C] A file is an ordinary file or a directory file</p> <p>[D] Files contains records</p> <p>[E] A polygon is composed of an ordered set of points</p> <p>[F] A drawing object is text, a geometrical object, or a group</p> <p>[G] A person uses a computer language on a object</p> <p>[H] Modems and keyboards are input/output devices</p> <p>[I] Classes may have several attributes</p> <p>[J] A person plays for a team in a certain year</p> <p>[K] A route connects two cities</p> <p>[L] A student takes a course from a professor</p>	10
9.	<p>A. Prepare a state diagram for an interactive diagram editor for selecting and dragging objects</p> <p>B. Prepare a use case diagram and sequence diagram for a computer email system</p>	04
10.	<p>A. Prepare an activity diagram for computing a restaurant bill, there should be charge for each delivered item. The total amount should be subject to tax and service charge of 18% for group of six and more. For smaller groups there should be a blank entry. Any coupons or gift certificates submitted by the customer should be subtracted</p> <p>B. Prepare a sequence diagram for issuing a book in the library management system</p>	04



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COURSE CURRICULUM

Course Title: ENTERPRIZE RESOURCE PLANNING
(Code: SEC103-1C-E)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Computer Applications-(B.C.A)	Third Semester

Course Objectives –

The course would make students aware about ERP theory and practice. This course provides the students with the knowledge of evolution of ERP systems, business process reengineering, ERP technologies, process mapping, ERP life cycle and ERP auditing and risk issues.

The student would be able

- 1) To comprehend the technical aspects of ERP systems.
- 2) To learn concepts of reengineering and how they relate to ERP system implementations.
- 3) To understand the success and failure factors of ERP implementation.
- 4) To understand the steps and activities in the ERP life cycle.
- 5) To identify and describe typical functionality in an ERP system.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
			0	2	E	M	I	EV
0	0	4	2		0	0	25	25

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	Introduction to Enterprise and ERP <ul style="list-style-type: none"> • Introduction • Business Functions and Business Processes • Integrated Management Information • Role of the Enterprise in Implementing the ERP System • Business Modeling • Introduction • Common ERP Myths • A Brief History of ERP • The Advantages of ERP • Why ERP Package Now • Over Expectation in ERP • Roadmap for successful ERP implementation • The Role of CIO • Will ERP fit the ways A Company does Business? • Why is ERP important to A Company? • ERP market has Grown and will continue to Grow • How does ERP create Value? 	08
2	Risk, Benefits and Technologies related to ERP <ul style="list-style-type: none"> • Risks of ERP • Risk Factors of ERP Implementation People Issues • Process Risks Technological Risks Implementation Issues • Operation and Maintenance issues • Benefits of ERP • Information Integration Reduction of Lead-time On-time Shipment Reduction in Cycle Time • Improved Resource Utilization Better Customer Satisfaction Improved Supplier Performance Increased Flexibility • Reduced Quality Costs • Better Analysis and Planning Capabilities • Introduction • Business Process Reengineering (BPR) • Data Warehousing • Data Mining • On-line Analytical Processing (OLAP) • Product Life Cycle Management (PLM) • Supply Chain Management (SCM) • Customer Relationship Management (CRM) • Geographical Information Systems (GIS) • Intranet and Extranets • Advanced Technology and ERP Security • Middleware • Security and ERP 	08
3	ERP Functional Modules, ERP- Implementations <ul style="list-style-type: none"> • Functional Modules • Introduction • Functional Module of ERP Software Financial Module Manufacturing Module • HR Module • Materials Management Module Production Planning Module Plant Maintenance Module Quality Management Module Purchasing Module 	08

	<ul style="list-style-type: none"> • Marketing Module • Sales and Distribution Module • ERP-Implementation Basics Why ERP? • Technological, Operational, and Business Reasons for Implementing ERP Implementation Challenges • ERP Implementation Life Cycle Objectives of ERP Implementation • Different Phases of ERP Implementation 	
4	Success & Failure Factors of an ERP Implementation, Present & Future <ul style="list-style-type: none"> • Success Factors • Failure Factors • ERP and eBusiness • eBusiness Supply Chain Integration The eBusiness Process Model • ERP / eBusiness Integration • ERP, Internet and WWW ERP II ERP, Internet and WWW • ERP to ERP II Bringing ERP to the ERP Enterprise 	08

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Enterprise Resource Planning	Alexis Leon	TMH
2	Enterprise Resource Planning	Mahadeo Jaiswal and Ganesh Vanapalli	MacMillan Publications
3	Enterprise Resource Planning	Summer	Pearson Education

B. List of Software/Learning Websites

1. <https://www.javatpoint.com/erp-full-form>
2. <https://www.investopedia.com/terms/e/erp.asp>

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Study practical about Integrated Management Information and Role of the Enterprise in Implementing the ERP System.	02
2.	Study practical about Business Modeling.	02
3.	Study practical about Roadmap for successful ERP implementation and The Role of CIO.	
4.	Study practical about ERP important to A Company.	02
5.	Study practical about Risk, Benefits and Technologies related to ERP .	02
6.	Study practical about ERP related technologies.	02
7.	Study practical about ERP Functional Modules.	02
8.	Study practical about ERP- Implementations.	02
9.	Study practical about Success & Failure Factors of an ERP Implementation.	02
10.	Study practical about Present & Future of ERP.	02



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COURSE CURRICULUM

Course Title: ADVANCED DATABASE MANAGEMENT SYSTEM
(Code: ADCAM107-1C)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Computer Applications-(B.C.A)	Third Semester

Course Objectives –

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.

- i. Execute various advance SQL queries related to Transaction Processing & Locking using concept of Concurrency control.
- ii. Demonstrate use of Database Object.
- iii. Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Triggers.
- iv. Understand Functional Dependency and Functional Decomposition.
- v. Apply various Normalization techniques.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				100
L	T	P	T	P	Theory Marks		Practical Marks		
			2	2	E	M	I	EV	
2	0	4	4		25	25	25	25	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	Advanced SQL <ul style="list-style-type: none">• Transactional Control : Commit, Save point, Rollback• DCL Commands :Grant and Revoke• Types of locks : i. Row level locks,ii. Table level locks,iii. Shared lock,iv. Exclusive lock, v. Deadlock• Synonym : Create synonym• Sequences: Create and alter sequences• Index : Unique and composite• Views : Create/Replace, Update and alter views	08
2	PL / SQL and Triggers <ul style="list-style-type: none">• Basics of PL / SQL• Datatypes• Advantages• Control Structures : Conditional, Iterative, Sequential• Exceptions: Predefined Exceptions ,User defined exceptions• Cursors: Static (Implicit & Explicit), Dynamic• Procedures & Functions• Packages : Package specification, Package body, Advantages of package• Fundamentals of Database Triggers• Creating Triggers• Types of Triggers : Before, after for each row, for each statement	12
3	Functional Dependency and Decomposition <ul style="list-style-type: none">• Basics of Functional Dependency• Functional dependency diagram and examples• Full function dependency (FFD)• Armstrong's Axioms for functional dependencies• Redundant functional dependencies• Closures of a set of functional dependencies• Lossy Decomposition• Lossless join decomposition• Dependency-Preserving Decomposition	14
4	Normalization <ul style="list-style-type: none">• Basics of Normalization• Normal Forms : i. First Normal Form (1NF),ii. Second Normal Form (2NF) ,iii. Third Normal Form (3NF) Transaction Processing <ul style="list-style-type: none">• Introduction to transaction concepts• Concurrency• Methods for Concurrency control : i. Locking Methods,ii. Timestamp methods,iii. Optimistic methods	08

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :AnalyzeandE :EvaluateC :Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Database Systems Concepts, design and Applications	Singh, S. K.	Pearson Education, New Delhi, 2012
2	Education, New Delhi, 2012	Bayross, Ivan	BPB
3	Sql/ Pl/SQL	Date, C. J.	Pearson Education, New Delhi, 2012
4	An Introduction to Database Systems	Korth, Henry	MGH

B. List of Major Equipment/ Software

Software: Oracle 10e/11g express edition

C. List of Software/Learning Websites

1. DBMS:<http://nptel.iitm.ac.in/video.php?subjectId=106106093>
2. SQL Plus Tutorial: <http://holowczak.com/oracle-sqlplus-tutorial/>
3. DatabaseTutorials:[http://www.roseindia.net/programming-tutorial/Database- Tutorials](http://www.roseindia.net/programming-tutorial/Database-Tutorials)
4. Notes : <http://service.felk.cvut.cz/courses/X36SQL//cviceni/plsql/pdf/>
5. SQL Basic Concepts: <http://www.w3schools.com/sql/>
6. SQL Tutorial : <http://beginner-sql-tutorial.com/sql.htm>

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Perform queries for DCL Commands and Locks	02
2.	Implement authorization, authentication, privileges on database.	06
3.	Perform queries to Create synonyms, sequence and index	06
4.	Perform queries to Create, alter and update views	02
5.	Implement PL/SQL programmes using control structures	02
6.	Implement PL/SQL programmes using Cursors	06

7.	Implement PL/SQL programmes using exception handling.	04
8.	Implement user defined procedures and functions using PL/SQL blocks	06
9.	Perform various operations on packages.	04
10.	Implement various triggers	04
11.	Practice on functional dependencies	04
12.	Practice on Normalization – using any database perform various normal forms.	04
13.	Practice on transaction processing	04



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: ENVIRONMENT SCIENCE
(Code: AEC103-1C-E)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Computer Applications-(B.C.A)	Third Semester

Course Objectives –

1. After learning the course the students should be able to
2. Understand and realize the multi-disciplinary nature of the environment, its components, and inter-relationship between man and environment.
3. Understand the relevance and importance of the natural resources in the sustenance of life on earth and living standard.
4. Comprehend the importance of ecosystem, biodiversity and natural bio geo chemical cycle.
5. To correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevention.
6. Identify different types of environmental pollution and control measures.
7. To correlate the exploitation and utilization of conventional and non-conventional resources.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
			2	0	E	M	I	EV
2	0	0	2		25	25	0	0
50								

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	<p>Introduction to Environment and Environmental Studies:</p> <ul style="list-style-type: none"> Definition and Components of Environment, Relationship between the different components of Environment, Man and Environment relationship, Impact of technology on Environment, Environmental Degradation, Multidisciplinary nature of the Environment studies, its scope and importance in the present day Education System <p>Ecology and Ecosystems:</p> <ul style="list-style-type: none"> Introduction: Ecology- Objectives and Classification ,Concept of an ecosystem- structure and functions of ecosystem Components of ecosystem- Producers, Consumers, Decomposers Bio-Geo- Chemical Cycles- Hydrologic Cycle, Carbon cycle, Energy Flow in Ecosystem, Food Chains, Food webs ,Ecological Pyramids Major Ecosystems: Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem, Aquatic Ecosystem, Estuarine Ecosystem. <p>Natural Resources:</p> <ol style="list-style-type: none"> Renewable and Nonrenewable resources, exploitation and conservation, Role of individual in conservation of natural resources. Water resources: Water sources- Surface and Ground water sources, Indian and Global scenario. Land as a resource, social issues Forest resources: Definition and Classification of Forests Ecological and Economic importance and benefits of forest, Indian scenario, Deforestation: causes and effects, remedial measures. Food resources: Sources of food, Global and Indian food demand scenario, Limits of food production, Environmental effects of Agriculture. 	12
2	<p>Human Population and Environment:</p> <ul style="list-style-type: none"> Population Growth, World and Indian scenario, Population and Environmental Degradation, Malthusian theory, Optimum theory, Population explosion – Causes, Effects and Control. Urbanization: Urban population growth and Environmental problems <p>Environmental pollution:</p> <ol style="list-style-type: none"> Types of Environmental Pollution: <ul style="list-style-type: none"> Water Pollution: Introduction – Water Quality Standards, Sources of Water Pollution: Industrial ,Agricultural, Municipal; Classification of water pollutants, Effects of water pollutants, Eutrophication Marine pollution- Air Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO₂, NO_x, Natural & Anthropogenic Sources, Effects of common air pollutants Land Pollution: Land uses ,Land degradation: causes, effects and control, soil erosion Noise Pollution: Introduction, Sound and Noise, Noise 	12

	measurements, Causes and Effects e. Thermal Pollution: Causes and effects f. Role of individual in the prevention of pollution	
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***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Textbook of Environmental Studies for Undergraduate Courses	Erach Bharucha Second edition,2013	Universities Press (India) Private Ltd, Hyderabad
2	Basics of Environmental Studies	Prof Dr N S Varandani	Academic Publishing , Germany
3	Environmental Studies	Anindita Basak	Pearson

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: ETHICS AND CULTURE
(Code: CVA103-1C-E)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Computer Applications-(B.C.A)	Third Semester

Course Objectives –

- The course aims to help students explore ethical and cultural dimensions of their lives.
- The course provides a forum for students to pause, revisit their assumptions and beliefs, and become mindful of their thoughts, emotions and actions.
- It gives the students an opportunity to express themselves and inquire into their decision making processes.
- This will enable them to cultivate ethical values and participate in the creation of a society based on acceptance, compassion, and justice.
- Explore perspectives on ethics in thoughts, words and actions
- Evolve ethical decision making practices Understand the need for an ethical society and culture Introspect, become conscious of and assess one's stance in life
- Cultivate empathy, tolerance and compassion
- Apply the values learnt in the course to everyday life.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
			2	0	E	M	I	EV
2	0	0	2		25	25	0	0

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	Introduction The Basis of Ethics <ul style="list-style-type: none"> Getting to Know Each Other What to Expect from the Course? Recognition of Our Common Humanity Empathy, Compassion and Justice The Role of Intelligence, Reason and Emotions <ul style="list-style-type: none"> Discernment: What Is The Right Thing To Do? The Art of Conflict Resolution Destructive and Constructive Emotions The Need for Emotional Balance 	12
2	Cultivating Inner Values Ethics in the World of Work and Play <ul style="list-style-type: none"> Training the Mind: Mindfulness and Kindness Meditation Discovering your Vocation and Interests Self-discipline, Integrity, Commitment, Creativity Work-Life Balance Striving for a Better World Outreach Activities <ul style="list-style-type: none"> Means and Ends Debate and Dialogue Culture as Shared Values Creating and Sustaining Ethical Cultures: The Role of Philosophy, Religion, Literature, Theatre, Cinema, Music, Media Outreach Activities 	12

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

SUGGESTED LEARNING RESOURCES**A. List of Books**

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Nichomachean Ethics	Aristotle	Penguin Classics, 2004
2	The Complete Works of Swami Vivekananda	Swami Vivekananda	Academic Publishing , Germany
3	Panch Parmeshwar in English translation as The Holy Panchayat	Munshi Premchand	-
4	The Silas Marner	George Eliot	-
5	We are Seven	Wordsworth	-
6	The Chimney Sweeper	William Blake	-

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)
