



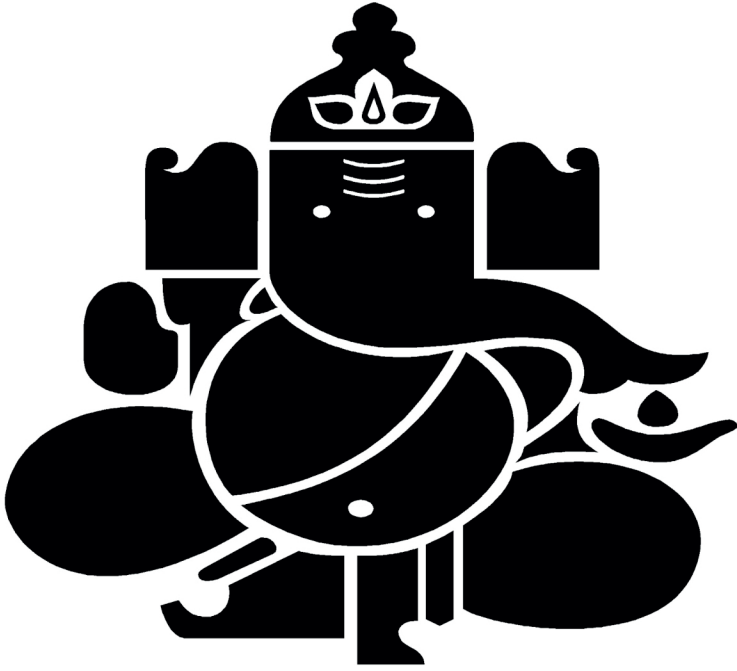
NEW HORIZON COLLEGE OF ENGINEERING

Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade, Accredited by NBA

The Trust is a Recipient of Prestigious Rajyotsava State Award 2012 Conferred by the Government of Karnataka
Awarded Outstanding Technical Education Institute in Karnataka-2016
Ring Road, Bellandur Post, Near Marathalli, Bangalore -560 103, INDIA



Academic Year 2017-18
ISE - Information Science and Engineering
Fifth and Sixth Semesters
Scheme and Syllabus



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NEW HORIZON COLLEGE OF ENGINEERING
DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

VISION

To evolve as a centre of academic excellence and advanced research in information science and engineering discipline and to endeavor the computational competence of students for their dream career achievement and enhancing the managerial and technical skills.

MISSION

To inculcate students with profound understanding of fundamentals related to discipline, attitudes, skills and their application in solving real world problems, with an inclination towards societal issues and research.

Program Educational Objectives

PEO1: To excel in their professional career with expertise in providing solutions to Information Technology problems.

PEO2: To pursue higher studies with profound knowledge enriched with academia and industrial skill sets.

PEO3: To exhibit adaptive and agile skills in the core area of Information Science & Engineering to meet the technical and managerial challenges.

PEO4: To demonstrate interpersonal skills, professional ethics to work in a team to make a positive impact on society.

Program Specific Outcomes

PSO1: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics and networking for efficient design of computer based systems of varying complexity.

PSO2: The ability to apply standard practices and strategies in software project development using innovative ideas and open ended programming environment with skills in teams and professional ethics to deliver a quality product for business success.

PEO to Mission Statement Mapping

MISSION STATEMENTS	PEO1	PEO2	PEO3	PEO4
To impart quality education in Information Technology domain with leadership qualities through best-in class faculty and infrastructure	3	1	2	1
To excel in Research and Development that discovers new knowledge and enables emerging Information Technologies through industry collaboration	2	3	1	2
To inculcate a culture of service towards the society and professionalism	1	2	3	3

Correlation: High-3, Medium-2, Low-1

Sl. No	Graduate Attributes	Program Outcomes (POs)
1	Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals and computing to solve information science and engineering related problems.
2	Problem analysis	Graduates will demonstrate the ability to identify, formulate and solve engineering problems related to information Science and Engineering.
3	Design and Development of Solutions	Graduates will demonstrate the ability to design, analyze and interpret data and implement solutions for software based real life problems

4	Investigation of Problem	Graduates will demonstrate the ability to formulate the problem statement with investigation. Based on the investigation, graduates to design system, component or product as per needs and specifications
5	Modern Tool usage	Graduates will demonstrate the use of modern engineering tools with the latest techniques and skills, software and equipments to analyze and solve the problems
6	Engineer and society	Graduates will appraise the ethical, legal, professional and social norms of engineering practice.
7	Environment and sustainability	Graduates will have the broad education to understand the impact of engineering solution in a global, economic, environmental and societal context
8	Ethics	Graduates to follow the professional and social ethics and positive code of conduct for human welfare.
9	Individual & team work	Graduates will demonstrate the ability to work both as an individual and in team in information science and engineering or multi-disciplinary, exhibiting the leadership qualities

10	Lifelong learning	Graduates will demonstrate the ability and desire towards life-long learning for professional development. Graduates will participate and succeed in competitive examinations.
11	Communication	Graduates will communicate effectively both in verbal and written form.
12	Project management and finance	Apply engineering and management principles to manage projects

Mapping of POs To PEOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PEO1	3	3	3	3	3	1	2	1	1	1	2	2
PEO2	2	2	2	2	2	1	3	1	1	3	1	2
PEO3	1	1	1	1	1	3	3	3	3	1	3	1
PEO4	1	1	1	1	1	3	2	3	1	3	1	3

Correlation: 3- High, 2-Medium, 1-Low

New Horizon College of Engineering
Department of Information Science and Engineering
Fifth Semester B.E Program-Scheme

Sl.No	Course Code	Course	Credit Distribution				Overall Credits	Contact Hours Weekly Theory	Contact Hours Weekly Lab	Marks		
			L	P	T	S				CIE	SEE	TOTAL
1	ISE51	Software Engineering & Best Practices	3	0	0	0	3	4	0	50	50	100
2	ISE52	Database Management System	4	1	0	0	5	4	2	75	75	150
3	ISE53	Operating Systems	3	0	0	0	3	4	0	50	50	100
4	ISE54	Design and Analysis of Algorithm	3	2	0	0	5	4	4	75	75	150
5	ISE55	Java & J2EE	3	2	0	0	5	4	4	75	75	150
6	ISE56x	Professional Electives-1	3	0	0	1	4	3	0	50	50	100
7	ISE57	Mini Project	0	2	0	0	2	0	0	25	25	50
TOTAL							27	23	10	400	400	800

Professional Electives-1	
ISE561	Digital Experience Management using Adobe Experience Manager
ISE562	Virtualization Essentials with VMware
ISE563	Big Data Analytics with HP Vertica

New Horizon College of Engineering
Department of Information Science and Engineering
Sixth Semester B.E Program-Scheme

Sl.No	Course Code	Course	Credit Distribution				Overall Credits	Contact Hours Weekly Theory	Contact Hours Weekly Lab	Marks		
			L	P	T	S				CIE	SEE	TOTAL
1	ISE61	Web Internet Programming	3	1	0	0	4	4	2	75	75	150
2	ISE62	Computer Networks	3	1	0	0	4	4	2	75	75	150
3	ISE63	Data Warehousing & Data Mining	3	0	0	1	4	4	0	50	50	100
4	ISE64	File Structures	3	2	0	0	5	4	4	75	75	150
5	ISE65x	Professional Elective-2	3	0	0	0	3	3	0	50	50	100
6	NHOPXX	Open Elective**	3	0	0	1	4	3	0	50	50	100
7	ISE67	Mini Project	0	2	0	0	2	0	2	25	25	50
TOTAL							26	22	10	400	400	800

** Scheme and Syllabus for Open Electives is available separately.

Professional Electives-2	
ISE651	Python Programming
ISE652	Cloud Computing
ISE653	Wireless Sensor Networks

Open elective list

NHOP01 Big data analytics(HP vertica-1)
 NHOP02 VM ware virtualization essentials-1
 NHOP03 Adobe experience manager-1
 NHOP04 Big data analytics(HP vertica-2)
 NHOP05 VM ware virtualization essentials-2

NHOP06 Adobe experience manager-2
 NHOP07 SAP
 NHOP08 Schneider-Industry automation
 NHOP09 Cisco-routing and switching-1
 NHOP10 Data analytics

FIFTH SEMESTER

(SYLLABUS)

SOFTWARE ENGINEERING& BEST PRACTICES

Course Code : ISE51
 L:P:T:S : 3:0:0:0
 Exam Hours : 3

Credits: 03
 CIE Marks: 50
 SEE Marks: 50

COURSE OUTCOMES: At the end of the Course, the Student will be able to:

CO1	Discuss about the various s/w lifecycle models available and choose the appropriate model to design software.
CO2	Understand the importance of requirements in the software process and collect, document the requirements.
CO3	Plan a project, schedule a project and develop ideas to avert risks involved in project management.
CO4	Design and develop the correct and robust software products.
CO5	Plan the testing strategies and use various metrics.

Mapping of Course Outcomes to Program Outcomes

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	3	3	2	2	1	-	1	-	-	-	-	-
CO2	3	3	2	2	1	-	1	-	-	-	1	-
CO3	3	3	2	2	1	1	1	-	2	-	-	3
CO4	3	3	2	2	1	-	1	-	2	1	-	-
CO5	3	3	2	2	1	-	-	-	-	-	-	-

Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
CO1	2	2
CO2	2	2
CO3	2	2
CO4	2	2
CO5	2	2

Module No	Module Contents	Hours	COs
1	Introduction: Software Engineering; Software Process; Software Processes: Models, Process iteration, Process activities; unified process; Agile development; Agile Process; Extreme Programming; Other agile Process models	9	CO1
2	Requirements: Software Requirements: Functional and Non-functional requirements; User requirements; System requirements; Interface specification; The software requirements document. Requirements Engineering Processes: Feasibility studies; Requirements elicitation and analysis; Requirements validation; Requirements management.	9	CO2

3	Software Design: Architectural Design; Architectural design decisions; System organization; Modular decomposition styles; Control styles. Object-Oriented design; Objects and Object Classes; An Object-Oriented design process; Design evolution. Project Management: Management activities; Project planning; Project scheduling; Risk management. Configuration Management: Configuration Management Planning; Change management; version and release management;	9	CO3, CO4
4	Software Implementation: Structured coding Techniques-Coding Styles-Standards and Guidelines- Documentation Guidelines- Modern Programming Language Features: Type checking-User defined data types-Data Abstraction-Exception Handling-Concurrency Mechanism.	9	CO4
5	Testing: Software Quality; Testing: Strategic Approach to software Testing; Strategic Issues; Testing Strategies for Conventional Software, Object oriented software, Web Apps; Validating Testing; System Testing; Art of Debugging. Product Metrics: A framework for Product Metrics; Metrics for the Requirements Model; Metrics for the Design Model; Metrics for the Source Code; Metrics for the Testing;	9	CO5

TEXT BOOKS:

1. Roger S Pressman, **“Software Engineering – A Practitioner’s Approach”**, McGraw Hill, seventh edition, 2010.
2. Ian Sommerville, **“Software Engineering”**, Pearson Education, 8th edition, 2007

REFERENCE BOOKS:

1. Pankaj Jalote, **“An Integrated Approach to Software Engineering”**, Wiley India, 2009.
2. Hans Van Vliet, **“Software Engineering: Principles and Practices”**, Wiley India, 3rd edition, 2008.
3. Richard Fairley, **“Software Engineering Concepts”**, McGraw Hill, 2008.

CIE - Continuous Internal Evaluation (50 marks)

Bloom’s Taxonomy	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Curricular/ Co-curricular (10 Marks)
Remember	5	-	5	-
Understand	5	5	-	5
Apply	5	-	-	5
Analyze	5	5	-	-
Evaluate	5	-	-	-
Create	-	-	-	-

SEE – Semester End Examination (50 Marks)

Bloom's Taxonomy	Tests (50 Marks)
Remember	5
Understand	10
Apply	10
Analyze	15
Evaluate	10
Create	-

DATABASE MANAGEMENT SYSTEMS

Course Code : ISE52

Credits: 05

L: P: T: S : 4:1:0:0

CIE Marks: 50+25

Exam Hours : 3+3

SEE Marks: 50+25

Course Outcomes: At the end of the course the student will be able to:

CO1	Understand the database concepts, different database models, and database management systems and design database schema.
CO2	Develop the ER structures for real world examples using the concept of Entity Relationship models with constraints and cardinalities.
CO3	Apply the concepts of Normalization and design database which possess no anomalies.
CO4	Apply the concepts of relational database theory to manage relational database management system.
CO5	Exhibit database programming skills in SQL.

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	-	-	1	-	-	1	-	1
CO2	3	2	3	2	-	1	-	1	-	1	-	1
CO3	3	2	3	2	-	-	-	-	-	1	-	-
CO4	3	2	3	2	-	-	1	-	-	1	-	1
CO5	3	2	3	2	2	-	1	-	1	1	-	1

Mapping of Course Outcomes with Program Specific Outcomes

	PSO1	PSO2
CO1	2	1
CO2	2	1
CO3	2	1
CO4	2	1
CO5	2	1

Module	Module Contents	Hours	COs
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No.			
1	Introduction: Introduction, An example, Characteristics of Database Approach. Database Applications: Need for data management, Advantages of using DBMS approach. Data models & Database Architecture: Data models, schemas and instances, Three-schema architecture and data independence, Centralized and client-server architectures.	9	CO1
	1. Creation of tables, insertion of values with Data Definition Commands (use constraints while creating tables) and exercises on Data Manipulation Commands.	4	
2	ER Diagrams: Entity Types, Entity Sets, Attributes and Keys, Relationship types, Roles and Structural Constraints, Weak Entity Types, ER Diagrams.	9	CO2
	2. Developing Queries using clauses SELECT, FROM, WHERE, GROUP BY, HAVING.	4	
3	Relational Model: ER to Relational Mapping, Constraints, Keys Dependencies. Functional Dependencies: Normalization First, Second, Third & Fourth Normal Forms,BCNF.	9	CO3
	3. Developing Queries using clauses Aggregate functions COUNT, SUM, AVG, MAX and MIN.	4	
4	Relational Algebra: UpdateOperations, UnaryRelational Operations: SELECT and PROJECT, Relational AlgebraOperations from Set Theory, Binary Relational Operations: JOIN andDIVISION; Additional Relational Operations; Examples of Queries inRelational Algebra; Relational Database Design Using ER- to-RelationalMapping.	9	CO4
	4. Developing Queries (along with NESTED Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSECT Constraints. Creation and Manipulation of Views.	4	
5	Introduction to SQL: Basic DDL , Data Constraints ,Triggers Database Security , AdvancedSQL - Embedded & Dynamic SQL , Views Basic queries in SQL, Morecomplex SQL Queries,Insert, Delete and Update statements in SQL.	9	CO5
	5. Creation of simple PL/SQL programs and usage of cursor and triggers.	4	

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “**Database System Concepts**”, Sixth Edition, Tata McGraw Hill, 2010.
2. RamezElmasri, Shamkant B. Navathe, “**Fundamentals of Database S y s t e m s**” , Sixth Edition, Pearson / Addison - Wesley, 2010
3. Raghu Ramakrishnan, “**Database Management Systems**”, Third Edition, McGraw Hill, 2003.

REFERENCES:

1. C.J. Date, A. Kannan, S. Swamynatham, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2006.

CIE - Continuous Internal Evaluation (50+25 Marks)

Bloom's Taxonomy	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Curricular/Co-curricular (10 Marks)	Lab (25 Marks)
Remember	5	-	5	-	-
Understand	10	5		5	-
Apply	10	5	5	5	-
Analyze	-	-	-	-	-
Evaluate	-	-	-	-	25
Create	-	-	-	-	-

SEE – Semester End Examination (50+25 marks)

Bloom's Taxonomy	Tests	Lab
Remember	5	-
Understand	20	-
Apply	25	-
Analyze	-	
Evaluate	-	25
Create	-	

OPERATING SYSTEMS

Course Code : ISE53

Credits: 03

L:P:T:S : 3:0:0:0

CIE Marks: 50

Exam Hours : 3

SEE Marks: 50

Course Outcomes:At the end of the Course, the Student will be able to:

CO1	Understand the concept of services provided by and the structure of an operating system.
CO2	Compare, implement and know when to apply various process scheduling algorithms
CO3	Ability to Learn and implement various operations on deadlock
CO4	Evaluate the efficiency aspect of using system resources
CO5	Handle operations like disk scheduling and file operations.

Mapping of Course Outcomes to Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	-	1	1	-	1	2	-	1
CO2	3	2	2	2	-	-	1	-	1	2	-	1
CO3	3	2	2	2	-	1	1	-	1	2	1	1
CO4	3	2	2	2	-	1	1	1	1	2	1	1
CO5	3	2	2	2	-	1	1	1	1	2	1	1

Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	2
CO5	3	2

Module No	Module Contents	Hours	COs
1	OPERATING SYSTEMS OVERVIEW: What is an operating system; history of operating system; operating system concepts, system calls ; operating system structure; operating system operations; process management; memory management; storage management; protection and security; system boot.	9	CO1
2	PROCESS MANAGEMENT: Processes-Process Concept, Process Scheduling, Scheduling algorithms, Preemptive strategies Non preemptive strategies, Operations on Processes, Inter process Communication; Threads Overview, Multithreading Models, process synchronization, critical section problem, semaphores.	9	CO2
3	DEADLOCKS: Deadlocks: system model; deadlock characterization; methods for handling deadlocks; deadlock prevention; deadlock avoidance; deadlock detection and recovery.	9	CO3
4	STORAGE MANAGEMENT: Memory management strategies ;swapping; contiguous memory allocation; paging; Page replacement, Allocation of frames; segmentation.	9	CO4
5	I/O SYSTEMS: File system storage-File concept, file system structure,, Access methods, Directory structure, File-system mounting ;disk structure ;disk scheduling, sharing and protection.	9	CO5

TEXT BOOKS:

1. Andrew S Tanenbaum, Albert S Woodhull, “**Operating systems design and implementation**”, 2nd edition.
2. Abraham Silberchatz, Peter B. Galv, Greg Gagne, “**Operating System Concepts**”, 8th edition, John Wileyin
3. Matthew portnoy, “**Virtualization Essentials**”, 2nd edition ,Wiley India pvt.ltd

CIE - Continuous Internal Evaluation (50 Marks)

Bloom’s Taxonomy	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Curricular/ Co-Curricular (10 Marks)
Remember	5	-	5	-
Understand	10	5	5	5
Apply	10	5		5
Analyze	-	-	-	-
Evaluate	-	-	-	-
Create	-	-	-	-

SEE – Semester End Examination (50 marks)

Bloom’s Taxonomy	Tests
Remember	5
Understand	20
Apply	25
Analyze	-
Evaluate	-
Create	-

Design and Analysis of Algorithm

Course Code : ISE54

Credits: 05

L:P:T:S : 3:2:0:0

CIE Marks: 50+25

Exam Hours : 3+3

SEE Marks: 50+25

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Learning characteristics of algorithms, time and space complexity.
CO2	Implement string matching and parallel algorithms.
CO3	Analyze and understand greedy algorithms.
CO4	Design network flow problems.
CO5	Analyze P and NP classes of problems and understand Back tracking.

Mapping of Course Outcomes to Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	1	1	1	-	1	2	1	1
CO2	3	2	2	2	1	1	1	-	1	2	1	1
CO3	3	2	2	2	-	1	1	-	1	2	1	1
CO4	3	2	2	2	1	1	1	-	1	2	1	1

CO5	3	2	2	2	-	1	-	-	-	2	-	1
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Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	2
CO5	3	2

Module No	Module Contents	Hours	COs
1	Definition and Characteristics of Algorithms: Role of Algorithms in Computing. Notion of Optimality and Satisfiability: Practical Considerations, Deterministic and Heuristic Algorithms. Performance Analysis: Space Complexity, Time Complexity, Asymptotic Notations, Recursive functions. Divide and Conquer: Quick sort, Merge sort.	9	CO1, CO5
	List of programs: <ol style="list-style-type: none"> 1. Implement and analyze quick sort Algorithm. 2. Implement and analyze Merge sort Algorithm. 	8	
2	String Matching, Parallel Algorithms& Optimization Algorithms Simple string matching, KMP String matching algorithm, Boyer Moore String matching algorithm. Parallel algorithms: PRAM models, Prefix computation, List ranking, Finding the maximum, Odd-Even merge sort, Sorting on a mesh. Optimization Algorithms	9	CO2, CO3, CO5
	List of programs: <ol style="list-style-type: none"> 1. Implement and compare simple string matching and KMP algorithms. 2. Implement prefix computation algorithm by using multiple threads or processes. 	8	
3	Greedy & Dynamic Programming Greedy Approach: General Method, Knapsack problem, Minimum cost spanning trees, and Single source shortest path problem. Dynamic Programming: Principle of optimality, All pairs shortest path problem, Longest common subsequence, Traveling salesperson problem.	9	CO4, CO5
	List of programs: <ol style="list-style-type: none"> 1. Implement and analyze Minimum spanning tree problem 2. Implement and analyze Traveling salesperson problem. 	8	
4	Graph Algorithms Representation of Graphs, Breadth-First Search, Depth-First Search,	9	CO1, CO5

	Topological Sort, Minimal Spanning Trees (Prim's Algorithm, Kruskal's Algorithm), Travelling Salesman Problem, Single-Source Shortest Paths, All-Pairs Shortest Paths, Maximum Flow, Topological Sort, Network Flow		
	List of programs: <ol style="list-style-type: none"> 1. Write a program to find the shortest path using Dijkstra's algorithm. 2. Write a program to sort the vertices of the graph using Topological sorting. 	8	
5	Back Tracking The General Method, 8 Queens Problem, Sum of Subsets, Graph Coloring Hamiltonian Cycle, Knapsack Problem, Branch and Bound Method – Traveling Salesman problem, P and NP Completeness.	9	CO1
	List of programs: <ol style="list-style-type: none"> 1. Implement N-Queens problem. 2. Implement Sum of Subset program. 	8	

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, “**Fundamentals of Computer Algorithms**”, Second Edition, Universities Press, Hyderabad, 2008.
2. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, “**Introduction to Algorithms**”, Second Edition, Prentice Hall of India, New Delhi, 2007
3. Michael T. Goodrich and Roberto Tamassia, “**Algorithm Design: Foundations, Analysis and Internet Examples**”, Second Edition, Wiley-India, 2006.

REFERENCES:

1. Kenneth A. Berman and Jerome L. Paul, “**Algorithms**”, Cengage learning India Edition, New Delhi, 2002.
2. Sara Baase and Allen Van Gelder, “**Computer Algorithms – Introduction to Design & Analysis**”, Third Edition, Pearson Education, New Delhi, 2000.

CIE - Continuous Internal Evaluation (50+25 Marks)

Bloom's Taxonomy	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Curricular/Co-Curricular (10 Marks)	Lab
Remember	5	-	5	-	-
Understand	10	5	-	-	-
Apply	15	5	5	5	-
Analyze	-	-	-	5	-
Evaluate	-	-	-	-	25
Create	-	-	-	-	-

SEE – Semester End Examination (50+25marks)

Bloom's Taxonomy	Tests	Lab
Remember	5	-
Understand	20	-
Apply	25	-

Analyze	-	-
Evaluate	-	25
Create	-	-

JAVA and J2EE

Course Code: ISE55

Credits : 05

L:P:T:S : 4:2:0:0

CIEMarks : 50+25

Exam Hours : 3+3

SEE Marks : 50+25

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	To understand the concepts of Java language and will model the real world applications using Object Oriented Programming concepts
CO2	Develop applications using collections for managing user defined types and to learn the importance of string handling.
CO3	To understand and apply the concept of Multithreading in concurrent programming.
CO4	Apply the JDBC concepts to create applications based on database.
CO5	To apply the Servlets and JSP concepts for building dynamic web pages by reducing the code complexity

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1	1	1	1	1	2	-	1
CO2	3	2	3	1	1	1	1	1	1	2	-	-
CO3	3	2	3	1	1	-	-	-	1	2	-	-
CO4	3	2	3	1	1	-	-	-	-	2	-	-
CO5	3	2	3	1	1	-	-	-	-	2	-	-

Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
CO1	3	1
CO2	3	1
CO3	3	1
CO4	3	1
CO5	3	1

Module No.	Module Contents	Hours	COs
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	<p>Introduction to Java: The Java Language, Java Development Kit (JDK); Java Buzzwords, Byte Code, JVM ,JRE and Java environment,Datatypes, Arrays;Object Oriented Programmingwith JAVA:Object Oriented concepts, Classes, Objects and Methods, Method Overloading, Constructor, static members, Implicit this , Package Fundamentals,Inheritance,Method Overriding,Access specifiers,Abstract Classes, Final members, The Object Class, Interfaces</p>	9	CO1
1	<p>1.) A library needs to develop an online application for two types of users/roles, Adults and children. Both of these users should be able to register an account. Any user who is less than 12 years of age will be registered as a child and they can borrow a “Kids” category book for 10 days, whereas an adult can borrow “Fiction” category books which need to be returned within 7 days. Note: In future, more users/roles might be added to the library where similar rules will be enforced. Develop Interfaces and classes for the categories mentioned above.</p> <ol style="list-style-type: none"> 1. Create an interface LibraryUser with the following methods declared, <ul style="list-style-type: none"> • Method Name • registerAccount • requestBook 2. Create 2 classes “KidUsers” and “AdultUser” which implements the LibraryUser interface. 3. Both the classes should have two instance variables as specified below. <ul style="list-style-type: none"> • Instance variables Data type • age int • bookType String 4. The methods in the KidUser class should perform the following logic. registerAccount function: <ul style="list-style-type: none"> • if age < 12, a message displaying “You have successfully registered under a Kids Account” should be displayed in the console. • If(age>12), a message displaying, “Sorry, Age must be less than 12 to register as a kid” should be displayed in the console. • requestBook function: <ul style="list-style-type: none"> • if bookType is “Kids”, a message displaying “Book Issued successfully, please return the book within 10 days” should be displayed in the console. • Else, a message displaying, “Oops, you are allowed to take only kids books” should be displayed in the console. 5. The methods in the AdultUser class should perform the following logic. 	8	

	<p>RegisterAccount function:</p> <ul style="list-style-type: none"> • if age > 12, a message displaying “You have successfully registered under an Adult Account” should be displayed in the console. • If age<12, a message displaying, “Sorry, Age must be greater than 12 to register as an adult” should be displayed in the console. • requestBook function: • if bookType is “Fiction”, a message displaying “Book Issued successfully, please return the book within 7 days” should be displayed in the console. • Else, a message displaying, “Oops, you are allowed to take only adult Fiction books” should be displayed in the console. <p>6. Create a class “LibraryInterfaceDemo.java” with a main method which performs the below functions,</p> <p>2.)Design a class that can be used by a health care professional to keep track of a patient’s vital statistics. Here’s what the class should do:</p> <ol style="list-style-type: none"> 1. Construct a class called Patient 2. Store a String name for the patient 3. Store weight and height for patient as doubles 4. Construct a new patient using these values 5. Write a method called BMI which returns the patient’s BMI as a double. BMI can be calculated as $BMI = (Weight \text{ in Pounds} / (Height \text{ in inches} \times Height \text{ in inches})) \times 703$ 6. Next, construct a class called “Patients” and create a main method. Create a Patient object and assign some height and weight to that object. Display the BMI of that patient. 		
	<p>Exceptionhandling:Fundamentals,Types,Usingtry,catch,throw,throws,finally,User Defined Exceptions.Collection Framework:Collections Overview,Collection Interfaces,Collection Classes,Type Wrappers,Accessing a collection using an Iterator.</p>	9	CO2
2	<ol style="list-style-type: none"> 1.) Write a Program to take care of Number Format Exception if user enters values other than integer for calculating average marks of 2 students. The name of the students and marks in 3 subjects are taken from the user while executing the program. <ul style="list-style-type: none"> • In the same Program write your own Exception classes to take care of Negative values and values out of range (i.e. other than in the range of 0-100) • Include finally to output the statement “Program terminated”. 2.) Create an Employee class with the related attributes and behaviours. Create one more class EmployeeDB which has the following methods. a. booleanaddEmployee(Employee e) b. 	8	

	<p>booleandeleteEmployee(inteCode) c. String showPaySlip(inteCode) d. Employee[] listAll() Use an ArrayList which will be used to store the employees and use enumeration/iterator to process the employees. Write a Test Program to test that all functionalities are operational.</p> <p>3.) Create a HashMap to create a Telephone book storing name and phone number. Write a program so that when a name is given, corresponding phone number should be given back.</p>		
	<p>String Manipulation:Constructors,Length,Operations,Character Extraction,Comparison,Searching,Modifying,Conversion,Multi Threading:Java Thread Model,The main method,Creating Threads,Thread Priorities,Synchronization</p>	9	CO3
3	<p>1.)1. Create class of SalesPersons as a thread that will display fives sales persons name. 2. Create a class as Days as other Thread that has array of seven days. 3. Call the instance of SalesPersons in Days and start both the threads 4. suspend SalesPersons on Sunday and resume on wednesday Note: use suspend, resume methods from thread</p> <p>2.)Create three threads- with different priorities – MAX, MIN, NORM- and start the threads at the same time. Observe the completion of the threads.</p> <p>3.) Given a string and a non-empty word string, return a string made of each char just before and just after every appearance of the word in the string. Ignore cases where there is no char before or after the word, and a char may be included twice if it is between two words.</p> <ul style="list-style-type: none"> • If inputs are "abcXY123XYijk" and "XY", output should be "c13i". • If inputs are "XY123XY" and "XY", output should be "13". <p>If inputs are "XY1XY" and "XY", output should be "11".</p>	8	
	<p>Database Handling :Exploring web architecture models, Exploring the MVC architecture. Working with JDBC: Introducing JDBC, Exploring JDBC Drivers, Describing JDBC APIs, Exploring JDBC processes with java.sql package</p>	8	CO4
4	<p>1.) Develop a jdbc program containing main method, which should instantiate a class called DAOClass, which should contain methods called insert, delete, modify and display. Description of what each of these methods are expected to do is given below. Necessary details required for executing these methods, are passed from command line argument. For e.g. If the name of the class containing the main method is JBCCalls, then if you want to insert a record, you will execute this class as java JBCCalls 1 101 "Ajit" "IV" "20-Nov-2001" 4000</p> <p>Where 1 is the option for inserting the record and all other details are the values for the columns in each row of the student table. The structure of student table is given below. Similarly, for</p>	8	

	deleting a record, you have to execute the code as java JDBCcalls 2 101 where 2 is the option for deleting a record and 101 is the rollno of the student, whose record has to be deleted. For modifying a record, you will use java JDBCcalls 3 101 4500, where 3 is the option for modifying a record and the 4500 is the new fee which needs to replace the old fee value. For Displaying records, if the main class is executed as follows java JDBCcalls 4 101 it should display only one record, that of the student with roll no. 101. 4 option is for displaying the record. If the main class is executed as java JDBCcalls 4 (without specifying the rollno.), it means that details of all the students should be displayed.		
5	Working with servlets 3.0: Exploring the features of java servlets, Exploring the servlets API, Servlets life cycle, Working with the Http servlets request and Http servlets response interfaces, Exploring request delegation and request scope, session tracking, Working with java server pages: Introducing JSP, Listing advantages of JSP over java servlets, Exploring the architecture of a JSP page, Describing the life cycle of a JSP page, Working with JSP basic tags and implicit objects, Working with the action tags in JSP	9	CO5
	<ol style="list-style-type: none"> 1.) Write a servlet to show all the parameters sent to the servlet via either GET or POST. 2.) Create a HTML Page, which asks the user to enter a number in a textbox. On clicking the submit button, it places the request to a Servlet. The Servlet generates all Prime numbers which are less than the given number and adds them to an ArrayList and forwards the control to a JSP page. The JSP page iterates through the ArrayList and prints them. 	8	

TEXT BOOKS

1. Herbert Schildt, "Java: The Complete Reference", 9th Edition, Oracle Press, Tata McGraw Hill.
2. "Java Server Programming Java EE6 (J2EE 1.6)", Kogent learning solution, Dreamtech press 2014.

REFERENCES:

1. Y. Daniel Liang, "Introduction to JAVA Programming", 7th Edition, Pearson Education, 2007.
2. Stephanie Bodoff et al, "The J2EE Tutorial", 2nd Edition, Pearson Education, 2004.

CIE- Continuous Internal Evaluation (50+25 Marks)

Bloom's Category	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Curricular/ Co-curricular (10 Marks)	Lab (25 Marks)
Remember	-	-	-	-	-
Understand	5	-	5	5	5
Apply	5	5	5	5	5
Analyze	5	5	-	-	5
Evaluate	5	-	-	-	-
Create	5	-	-	-	10

SEE- Semester End Examination (50+25 Marks)

Blooms Category	Tests	Lab
Remember	-	-
Understand	15	-
Apply	20	10
Analyze	5	5
Evaluate	5	-
Create	10	10

Digital Experience Management Using Adobe Experience Manager

Course Code : ISE561

L:P:T:S : 3:0:0:1

Exam Hours : 3

Credits: 04

CIE Marks: 50

SEE Marks: 50

Course Outcomes:At the end of the Course, the Student will be able to:

CO1	Gain a fresh perspective on online marketing in a global scenario. Understand the concepts of object oriented programming in JAVA.
CO2	Understand the programming concepts in Web scripting languages and will be able develop web pages using scripting languages.
CO3	Understand the architecture,technologies and frameworks in Adobe Experience Manager.
CO4	Create online webpages, Digital asset management and campaigning using AEM
CO5	Integrate new digital marketing techniques into the strategic marketing plan using AEM. Drive change and foster innovation in Digital Marketing with AEM.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	2	1	-	2	1	-	1	-	-
CO2	2	2	1	2	1	-	-	-	-	1	-	-
CO3	2	2	1	2	1	-	-	-	-	1	-	-
CO4	2	2	1	2	1	1	-	-	-	1	-	1
CO5	2	2	1	2	1	1	-	-	-	-	-	1

Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
CO1	3	2

CO2	3	2
CO3	3	2
CO4	3	2
CO5	3	2

SYLLABUS			
Module	Contents of the Module	Hours	
1	<p>Introduction to DM & AEM Getting started with DM: What is online marketing? Characteristics of good domain name? What is digital marketing? Different methods of digital Marketing, Main methods of DM, Search engine optimization, pay per click & display advertising, email marketing, content marketing, social media marketing.</p> <p>Introduction Object Oriented Programming with JAVA Fundamentals: Class Objects, Methods, Constructor, this reference, inheritance, and polymorphism, Introduction to JSP</p> <p>Hands on : 1. Write a program to calculate and area of four different geometric shapes: triangles, squares, rectangles, and circles. Use Method overriding. 2. Employee program to create 'n' object to find gross salary. Data: empid, empname, gender, basic, hra = 25% of basic, DA = 125% of basic, CCA=Rs 300, IT=10% if gross >1L. <ul style="list-style-type: none"> • Display all information. • Use constructors • Implement required methods. 3. Student program to create 'n' objects to find Grade. Data: usn, studname, sem, sub name[], sub marks[], percentage, Grade. 90 -100 = S 80 – 89 = A 70-79 =B 60 – 69 = C 50 – 59 = D 40 – 49 =E < 40 = F</p>	8	
2	<p>Introduction to Scripting Languages: Web and XHTML: Internet, WWW, Web Browsers and Web Servers, URLs, HTTP, XHTML: Basic syntax, Standard structure, Basic text markup, Images, Hypertext Links, Lists, Tables, Forms, Frames CSS: Introduction, Levels of style sheets, formats, selector forms, The box model, conflict resolution Javascript: Overview , Object orientation and Javascript, Syntactic characteristics, Primitives, operations, and</p>	9	

	expressions, Screen output and keyboard input, Control statements, Arrays, Functions, Pattern matching using regular expressions, Errors in scripts. Introduction to Sightly		
	Hands on: <ol style="list-style-type: none"> 1. Create a web page using HTML forms for email registration. 2. Create a web page using HTML frames. 3. Develop a XHTML file that includes Javascript script for that accepts a number n using prompt and outputs the first n Fibonacci numbers 4. Develop a XHTML file that includes Javascript script for that accepts a number n using prompt and outputs a table of numbers from 1 to n and their squares using alert 5. Develop a web page using HTML and apply the various CSS styles. 6. Develop a web page using HTML and apply selector forms. 	4	
3	Getting started with AEM: Introduction to Web content management, History of AEM ,The adobe marketing cloud, Install & deploy AEM, Author Instance, Publish Instance,AEM Consoles: Authoring in AEM, work with user interfaces: Classic UI, Touch optimized UI, AEM web console: OSGi management console, CRX Explorer, CRXDE Lite AEM Architecture OSGi framework: Introduction ,AEM functional building blocks, Architecture stack, OSGi framework. Content Repository: JCR, Jackrabbit Oak, Adobe CRX Web Framework: REST, Apache Sling.	9	
	Hands on: <ol style="list-style-type: none"> 1. AEM installation & deployment. 2. Working in AEM Environment 3. Familiarize yourself with a Repository structure. 4. Create a Node and add properties. 	4	
4	Managing Content AEM Authoring Framework —Templates, Create Templates, Components and Design ,components ,Create a Page-Rendering Component ,Modularize the Page Component ,Inheriting Foundation Components , Design , Adding a design to a page ,Creating Components and Include them in Scripts, Create a Top Navigation Component, Dialog Boxes ,Create Dialog Boxes for Components, Dialog Box -Classic-UI ,touch-optimized UI ,Use Design Dialog Boxes for Global Content , Create a logo component.	9	
	Hands On <ol style="list-style-type: none"> 1. Create the Structure of Your Website 2. Create a Template for Your Website 3. Create a Page-Rendering Component 4. Create a Website Structure 5. Modularize the Page Component 6. Inherit the Sightly Foundation Component Page 	4	

	<ul style="list-style-type: none"> 7. Add a Design to the Page 8. Create a Top Navigation Component and Include it in a Script 9. Create a Training Title Component 10. Create a Logo Component 		
5	<p>Digital Asset Management, Mobile pages, Managing Campaign : Introduction to DAM, Basic DAM functions, DAM Metadata, DAM Components, Finding Assets, Asset Management, Adding New content, Authoring Responsive& Mobile Pages,Managing Campaigns& Content Targeting.</p>	9	
	<p>Hands on:</p> <ul style="list-style-type: none"> 1. Create and customize asset share page 2. Add a predicate to the asset share page 3. Add an asset editor page 4. Versioning for assets 5. Create folders 6. Add CUG properties to folders 7. Use tags to organize assets 8. Edit images 9. Upload thumbnail 10. View references to assets 11. Edit metadata of an asset 12. Create a Page 13. Insert a New Paragraph 14. Edit the next Paragraph 15. Add an image from the content finder 16. Insert an image from your file system 17. Add more Components 18. Annotate a component 19. Move or delete a component 20. Working with responsive page Layout 21. Create a Mobile page 22. Add content to Mobile Page 23. Creating brand 24. Creating campaign 25. Defining a new segment 26. Create experiences 27. Turn a component into targeted component 28. Test the campaign 	4	

Text Books:

1. Ryan D Lunka, **“Adobe Experience Manager: Classroom in a Book”**, 2014, Adobe Press .
2. Shane closser, **“Adobe Experience Manager: Quick Reference Guide”**, 2014, Adobe Press .
3. Shivanikarwal, **“Digital Marketing Handbook”** , 2015 , CreateSpace Independent Publishing Platform.
4. RobertW.Sebesta , **“Programming the World Wide Web”**, 4th Edition, Pearson Eductaion , 2008

5. M.Deitel,P.JDeitel,A.B.Goldberg,“**Internet and World Wide Web How to Program**”,4thEdition,PearsonEductaion , 2004
6. Shivanikarwal,“**Digital Marketing Handbook:A Guide to Search Engine Optimization, Pay Per Click Marketing, Email Marketing, Social Media Marketing and Content Marketing**”,2015 , CreateSpace Independent Publishing Platform
7. HerbertSchild, “**Java:The Complete Reference**”, 9thEdition,OraclePress,Tata McGraw Hill.

CIE - Continuous Internal Evaluation (50 Marks)

Bloom’s Taxonomy	Lab (25 Marks)	Mini Project (25 Marks)
Remember	-	-
Understand	-	-
Apply	-	-
Analyze	-	-
Evaluate	25	-
Create	-	25

SEE – Semester End Examination (50marks)

Bloom’s Taxonomy	Lab (50 Marks)
Remember	
Understand	
Apply	
Analyze	25
Evaluate	25
Create	

Virtualization Essentials with VMware

Course Code : ISE562
L:P:T:S : 3:0:0:1
Exam Hours : 3

Credits: 04
CIE Marks: 50
SEE Marks: 50

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Learn the common terms and definitions of Operating System, Cloud Computing and
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	Virtualization.
CO2	Learning the business benefits and considerations of VMware virtualization.
CO3	Knowing various approaches to server virtualization, its relevance to the modern data center, available platforms and important features.
CO4	Analyzing the implications of virtualization on Data Center Challenges.
CO5	Enable to configure the VMware vSphere storage and network virtualization.

Mapping of Course Outcomes to Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	-	1	1	1	1	2	-	1
CO2	2	2	2	2	2	1	-	-	1	2	-	1
CO3	2	2	2	2	2	1	-	-	1	2	-	1
CO4	2	2	2	2	2	1	-	-	1	2	1	1
CO5	2	2	2	2	2	1	-	-	1	2	1	1

Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	2
CO5	3	2

Module No	Module Contents	Hours	COs
1	<p>Understanding Virtualization: Operating Systems Essentials: Process Management, Memory Management, Storage Management. Cloud Computing Essentials: Introduction to Cloud Computing, Cloud Deployment Models, Challenges. Virtualization Essentials: Importance of Virtualization, Examining today's trends, Virtualization Software Operations: Virtualizing Servers, Virtualizing Desktop, Virtualizing Applications.</p> <p>List of programs:</p> <ol style="list-style-type: none"> Using vSphere Web Client. Creating a Virtual Machine. 	8	CO1

2	<p>VMware vSphere Virtualization Overview: Introduction to Data Center Virtualization: Traditional Architecture, Virtual Architecture, Types of Virtualization. Understanding Hypervisors: Describing hypervisor, Type-1 Hypervisor, Type-2 Hypervisor. vSphere Products & Features: vSpherevMotion, vSphere HA, vSphere DRS, vSphere FT, vSphere replication, vSphere data protection.</p> <p>List of programs:</p> <ol style="list-style-type: none"> 1. Deploying Virtual Machines Using Cloning, Templates, and a Content Library 2. Modifying Virtual Machine Settings 	9	CO2
3	<p>Creating & Managing Virtual Machines: Creating, Managing, Monitoring & Configuring VM: vSphere Client and vSphere Web Client, vSphere Web Client UI, Creating VM:VM Components, Installing Guest OS, ManagingVM: Startup and Shutdown of VM's, Creating and Managing Snapshots, RDM, Configuring VM: Memory/CPU Hot Plug, Swap Files. Creating Clones, Templates & Content LibrariesCloning VM, Creating Templates, OVF Templates, Types of Content Library.</p> <p>List of programs:</p> <ol style="list-style-type: none"> 1. Managing Virtual Machines and Using Snapshots 2. Monitoring Virtual Machine Performance 	9	CO3
4	<p>vSphere Solutions to Data Center Challenges: Data Center Challenges: Availability, Scalability, Optimization, Management, Application Upgrade & Cloud Challenges.vSphere for Scalability and Business Continuity: vSpherevMotion, vSphere HA, vSphere DRS, vSphere FT, vSphere replication, vSphere data protection.</p> <p>List of programs:</p> <ol style="list-style-type: none"> 1. Managing Tasks, Events, and Alarms 2. Using vSpherevApps, Managing Multitiered Applications 	9	CO4
5	<p>Understanding VMware vSphere Storage & Network Virtualization</p> <p>Storage Virtualization: Storage Concepts, iSCSI Concepts, NFS Data stores, VMFS Data stores, Virtual SAN Data stores, Virtual Volume</p> <p>Network Virtualization: Introduction to vSphere Standard Switch, Configuring Standard Switch Policies, Introduction to vSphere Distributed Switch.</p> <p>List of programs:</p> <ol style="list-style-type: none"> 1. Using vSpherevMotion and Storage vMotion to Migrate Virtual Machines 2. Implementing a vSphere DRS Cluster 	9	CO5

TEXT BOOKS:

1. Nick Marshall, Scott Lowe (Foreword by) with Grant Orchard, Josh Atwell, **“Mastering VMware vSphere 6”**, Publisher:Sybex; 1 edition (24 March 2015).
2. Matthew Portnoy, **“Virtualization Essentials”**, 2nd Edition, Wiley India Pvt. Ltd.

REFERENCES:

1. Thomas Kraus, KamauWanguhu, Jason Kames ,”VMware Network Virtualization: Connectivity for the Software-Designed Data Center”, VMware Press Technology 1st Edition.
2. Bill Ferguson ,”vSphere 6 Foundations Exam Official Cert Guide (Exam #2V0-620): VMware Certified Professional 6 VMware Press”, 1st Edition.

CIE - Continuous Internal Evaluation (50 Marks)

Bloom’s Taxonomy	CIE (25 Marks)	LAB (25 Marks)
Remember	-	-
Understand	10	-
Apply	10	10
Analyze	5	-
Evaluate	-	-
Create	-	15

SEE – Semester End Examination (50marks)

Bloom’s Taxonomy	LAB (50 Marks)
Marks	50
Remember	-
Understand	5
Apply	15
Analyze	-
Evaluate	-
Create	20

Big Data Analytics with HP Vertica**Course Code : ISE563****Credits: 04****L:P:T:S : 3:0:0:1****CIE Marks: 50****Exam Hours : 3****SEE Marks: 50****Course Outcomes:At the end of the Course, the Student will be able to:**

CO1	Understand Big data with SQL, architecture of HP Vertica
CO2	Apply projections and database designer for query performance
CO3	Apply copy,merge,delete,truncateetc to manage data effectively
CO4	Analyze HDFS, Map Reduce and its uses to manage big data
CO5	Apply hadoop related various tools and techniques to solve big data problems

Mapping of Course Outcomes to Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	1	-	1	-	2	1	2
CO2	3	2	2	2	2	-	-	-	2	2	1	2
CO3	3	2	2	2	2	-	-	-	2	2	1	2
CO4	3	2	2	2	2	-	-	-	2	2	-	2
CO5	3	2	2	2	2	-	-	-	2	2	-	2

Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	2
CO5	3	2

Module No	Module Contents	Hours	COs
1	<p>Introduction to SQL and HP Vertica: Types of SQL, Data Types, Constrains, JOINS, Types of JOINS, Clause, Group by, Having, Order by, Where Clause with examples, SQL Alias, Views, Union, Union all, aggregate functions, Operators, SQL exists, Introduction to HP-Vertica Database, Vertica Analytics Platform, Columnar Orientation, Advanced Compression, High Availability, Automatic Database design, Massively Parallel Processing, Application Integration.</p> <p>Hands on sessions</p> <ol style="list-style-type: none"> Creation of tables with constrains and insertion of values into tables Hands-on DML commands to apply different aggregate function, Group by-Having-Order by clause, Operators. Creation of views and working with joins. 	9	CO1
2	<p>HP Vertica- 1 Projections, Query Execution ,Vertica Transactions, Hybrid data store – WOS & ROS,</p> <p>Projection Design: Projection fundamentals, Projection types, Projection properties, Replication and Segmentation, Database Designer, Comprehensive mode, Incremental mode, Sample data, Sample queries, DBD Advantages</p> <p>Hands on sessions</p> <ol style="list-style-type: none"> Creation of schema, tables and execution of SQL statements on Vertica Database, Running Database designer Hands-on projections 	9	CO2
3	<p>HP Vertica -2 Loading data via INSERT-COPY-MERGE, Deleting data in Vertica- delete vector, design for delete, process of deleting, Truncate, Purge, Update, Partitioning, Tuple Mover- MoveOut Parameter, MergeOut</p>	9	CO3

	Parameter, Working with Vertica Management Console. Hands on sessions a) Loading data files from different sources to Vertica database. b) Verifying the log files after loading the data into Vertica database. c) Hands-on partitions.		
4	Big Data Analytics with Hadoop Big data overview, Introduction to Hadoop, Overview of Hadoop Distribution File Systems[HDFS] and Map reduce Operations, Clustering types in Hadoop- Standalone mode, Pseudo distributed mode, Fully distributed mode. Hands on Sessions : Verifying Hadoop installation (Pseudo distributed mode) <ul style="list-style-type: none"> • Java path • Hadoop location • Hadoop configuration files • Name Node setup • Job Tracker • Metadata files • Accessing Hadoop on browser 	9	CO4
5	Hadoop Ecosystem Introduction to SGOOP, Overview of PIG -Standalone mode, cluster mode, when to use PIG latin, Introduction to HIVE- data types, Manage table, External table, Creation of database through HIVE, Introduction to HBASE- comparison of Hadoopdfs and HBASE . Hands on Sessions : a) Moving data from local file system to Hadoop file system b) Performing MAP Reduction operation in Hadoop c) Verification of operation results through terminal and browser	9	CO5

REFERENCES

1. Boris lublinsky, Kevin t. Smith, AlexeyYakubovich, **“Professional Hadoop Solutions”**, Wiley, ISBN: 9788126551071, 2016.
2. Chris Eaton,Dirkderooset al. , **“Understanding Big data ”**, McGraw Hill, 2016.
3. Tom White, **“HADOOP: The definitive Guide”**, O Reilly 2015.
4. VigneshPrajapati, **“Big Data Analytics with R and Haoop”**, Packet Publishing 2013.
5. James Taylor, **“Decision Management Systems-A Practical guide to using Business rules and Predictive Analytics”**, IBM Press, 2015.
6. EfraimTurban , Jay E. Aronson , Ting-Peng Liang, **“Decision Support Systems & Intelligent Systems”**, 9th edition, Prentice Hall, 2014.
7. Alberto Cordoba, **“Understanding the Predictive Analytics Lifecycle”**, Wiley, 2014.
8. Eric Siegel, Thomas H. Davenport, **“Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die”**, Wiley, 2013.

CIE - Continuous Internal Evaluation (50 Marks)

Bloom's Taxonomy	CIE Test (25 Marks)	Assignments (10 Marks)	Hands on Laboratory experiments (15 Marks)
Remember	5	-	-
Understand	5	5	5
Apply	10	5	10
Analyze	5	-	-
Evaluate	-	-	-
Create	-	-	-

SEE – Semester End Examination (50 Marks)

Bloom's Taxonomy	Hands on Laboratory experiments (50 Marks)
Remember	-
Understand	10
Apply	30
Analyze	5
Evaluate	-
Create	5

Mini Project

Course Code : ISE57

L:P:T:S : 0:2:0:0

Exam Hours : 3

Credits: 02

CIE Marks: 25

SEE Marks: 25

The student shall be capable of identifying a problem related to the field of Computer Science and carry out a mini project on the problem defined. Each student is expected to do the mini project individually. The code developed towards the project will be reviewed by a panel of experts during the course of the semester. Plagiarized projects will automatically get an "F" GRADE and the student will be liable for further disciplinary action. At the completion of a project the student will submit a project report, which will be evaluated by duly appointed examiner(s).

CIE - Continuous Internal Evaluation (25 Marks)

Bloom's Taxonomy	Mini Project
Remember	
Understand	
Apply	
Analyze	

Evaluate	25
Create	

SEE – Semester End Examination (25marks)

Bloom's Taxonomy	Mini Project
Remember	
Understand	
Apply	
Analyze	
Evaluate	25
Create	

SIXTH SEMESTER

(SYLLABUS)

WEB INTERNET PROGRAMMING

Course Code: ISE61

Credits: 04

L:P:T:S: 3:1:0:0

CIE Marks: 50+25

Exam Hours: 3+2

SEE Marks: 50+25

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Design web pages using XHTML.
CO2	Apply Cascading Style Sheets to web pages.
CO3	Develop JavaScript programs to validate and create dynamic WebPages.
CO4	Describe the declaration rules for web pages using XML schema, methods to handle data through the web and design XML document.
CO5	Develop programs using Perl and describe the concepts of CGI Programming.
CO6	Develop server side programs using PHP and accessing database through PHP.

Mapping of Course Outcomes to Program Outcomes:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	1	-	1	1	1	-	-	1
CO2	2	3	3	2	1	-	1	1	1	-	-	1
CO3	2	3	3	2	1	-	1	1	1	-	-	1
CO4	2	3	3	2	1	-	1	1	1	-	-	1
CO5	2	3	3	2	1	-	1	1	1	-	-	1
CO6	2	3	3	2	1	-	1	1	1	-	-	1

Mapping of Course Outcomes to Program Specific Outcomes:

CO	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	2
CO5	3	2
CO6	3	2

Module No	Module Contents	Hours	COs
1	<p>XHTML: Basic syntax, Standard XHTML document structure; Basic text markup, Images; Hypertext Links, Lists, Tables, Forms, Syntactic differences between HTML and XHTML.</p> <p>Cascading Style Sheets: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Alignment of text, Color, The Box model, Background images, The and <div> tags, Conflict resolution.</p> <p>List of programs:</p> <ol style="list-style-type: none"> Using Linux platform with Apache, design an XHTML document to store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, Name of the College, Branch, Year of Joining, and e-mail id. Make up sample data for 2 students. Create a CSS style sheet and use it to display the document. 	9	CO1 CO2
		4	

2	<p>JAVASCRIPT: Overview of JavaScript, Object orientation and JavaScript, General syntactic characteristics, Primitives, Operations and Expressions, Screen output and keyboard input, Control statements, Object creation and modification, Arrays, Functions, Constructor, Pattern matching using regular expressions.</p> <p>JavaScript and HTML Documents: The JavaScript execution environment, The Document Object Model, Element access in JavaScript, Events and event handling, Handling events from the Body elements, Button elements, Text box and Password elements.</p> <p>Dynamic documents with JavaScript: Introduction, Positioning elements, Moving elements, Element visibility, Changing colors and fonts, Dynamic content, Stacking elements, Locating the mouse cursor, Reacting to a mouse click, Slow movement of elements.</p>	9	CO3
	<p>List of programs:</p> <ol style="list-style-type: none"> 1. Using Linux platform with Apache, develop and demonstrate a XHTML file that includes Javascript script for the following problem: <ol style="list-style-type: none"> a) Input: A number n obtained using prompt Output: The first n Fibonacci numbers 2. Develop and demonstrate, using Javascript, a XHTML document that collects the USN (the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper-case characters followed by three digits; no embedded spaces allowed) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected. 	4	
3	<p>XML: Introduction to XML, Uses of xmlsyntax, The Syntax of XML, Document structure, Namespaces, XML schemas, Displaying raw XML documents, Displaying XML documents with CSS, XSLT style sheets, XML processors, Web services.</p>	7	CO4
	<p>List of programs:</p> <ol style="list-style-type: none"> 1. Using Linux platform with Apache, design XML document to store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, Name of the College, Branch, Year of Joining, and e-mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document. 	4	
4	<p>Perl, CGI Programming:Origins and uses of Perl, Scalars and their operations, Assignment statements and simple input and output, Control statements, Fundamentals of arrays, Hashes, References, Functions, Pattern matching, File input and output; Examples. The Common Gateway Interface; CGI linkage; Query string format; CGI.pm module; A survey example; Cookies.</p>	10	CO5

	List of programs: <ol style="list-style-type: none"> 1. Write a Perl program to accept the User Name and display a greeting message randomly chosen from a list of 4 greeting messages. 2. Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings. 	4	
5	PHP Programming Creating PHP Pages Using PHP6 : Overview of PHP Structure and Syntax, Creating Your First Program, Using HTML to Spice Up Your Pages, Using Constants and Variables to Add Functionality, Passing Variables between Pages, Using if/else Arguments, Using Includes for Efficient Code, Using Functions for Efficient Code, All about Arrays. Database Access with PHP and MySQL.	10	CO6
	List of programs: <ol style="list-style-type: none"> 1. Using Linux platform with Apache, write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page. 2. Using Linux platform with Apache, write a PHP program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table. 	4	

Text Books:

1. Robert W. Sebesta, "Programming the World Wide Web", 8th Edition, Pearson Education, 2015.
2. Timothy Boronczyk, Elizabeth Naramore, Jason Gemer, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass, "Beginning PHP6, Apache, MySQL® Web Development", John Wiley & Sons, 2009.

Reference Books:

1. Paul Deitel, Harvey Deitel, Abbey Deitel, "Internet & World Wide Web How to program", 5th Edition, Pearson Education / PHI, 2012.
2. Chris Bates, "Web Programming Building Internet Applications", 3rd Edition, Wiley India, 2007.
3. XueBai et al, "The web Warrior Guide to Web Programming", Cengage Learning, 2003.

CIE - Continuous Internal Evaluation (50+25 Marks)

Bloom's Taxonomy	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Curricular/Co- Curricular (10 Marks)	Lab (25 Marks)
Remember	5		5		
Understand	10				
Apply	10	10		5	
Analyze					
Evaluate				5	
Create					25

SEE – Semester End Examination (50+25marks)

Bloom's Taxonomy	Tests	Lab
Remember	10	-
Understand	20	-
Apply	20	-
Analyze	-	-
Evaluate	-	-
Create	-	25

COMPUTER NETWORKS

Course Code : ISE62

Credits: 04

L:P:T:S : 3:1:0:0

CIE Marks: 50+25

Exam Hours : 3+3

SEE Marks: 50+25

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	To understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks and to Enumerate the layers of the OSI model and TCP/IP and ATM Reference Model.
CO2	Describe physical layer signalling and encoding and List the basic characteristics of copper cable, fiber optic cable, and other transmission media and To apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.
CO3	Apply IP addressing and apply routing algorithms to find shortest paths for network-layer packet delivery and To contrast the IPv4 and IPv6 headers.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	-	-	-	-	-	1	-	-
CO2	3	2	2	2	-	-	-	-	-	1	-	-
CO3	3	2	2	2	2	-	-	-	-	1	-	1
CO4	3	2	2	2	2	-	-	-	-	1	-	1

CO4	Describe the essential principles of a transport layer protocol (reliable data transfer, flow control, congestion control) .
CO5	To Analyze internals of main protocols such as DNS,HTTP, FTP, SMTP, TCP, UDP, IP.

Mapping of Course Outcomes to Program Outcomes:

Module No	Module Contents	Hours	Cos
1	Introduction to computer networks: Network hardware, Network software, Types of Networks, network topologies , Protocols & Standards ,Reference Models: OSI Reference model, TCP/IP	9	CO1

Mapping of Course Outcomes to

	PSO1	PSO2
CO1	3	1
CO2	3	1
CO3	3	1
CO4	3	1
CO5	3	1

Program Specific Outcomes:

	Reference model.		
	<ol style="list-style-type: none"> Using TCP/IP sockets, write a client – server program to make the client send the file name and to make the server send back the contents of the requested file if present. Simulate a three nodes point – to – point network with duplex links between them. Set the queue size and vary the bandwidth and find the number of packets dropped. 	4	
2	Physical Layer: Analog & Digital transmission, Transmission media. Datalink Layer: design issues, CRC codes, Elementary Data Link Layer Protocols, sliding window protocol.	9	CO2
	<ol style="list-style-type: none"> Write a program for error detecting code using CRC-CCITT (16- bits). Simulate an Ethernet LAN using n nodes (6-10), change error rate and data rate and compare throughput. Simulate an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination. 	4	
3	Network Layer: Internetworking basics, IP addressing and subnet addressing, IPv4, IPv6, Transition from IPv4 to IPv6, Routing algorithms.	9	CO3
	<ol style="list-style-type: none"> Write a program for distance vector algorithm to find suitable path for transmission. Implementation of Bellman-Ford Algorithm . 	4	
4	Transport Layer: User Datagram Protocol (UDP) , Transmission Control Protocol (TCP) , Congestion Control , Quality of services (QOS).	9	CO4
	<ol style="list-style-type: none"> Write a program for congestion control using leaky bucket algorithm. Simulate a four node point-to-point network with the links connected as follows: n0 – n2, n1 – n2 and n2 – n3. Apply TCP agent between n0-n3 and UDP between n1-n3. Apply relevant applications over TCP and UDP agents changing the parameter and determine the number of packets sent by TCP / UDP. 	4	
5	Application layer overview: Domain Name System (DNS), Remote Login Protocols, E-mail, File Transfer, World Wide Web and HTTP .	9	CO5

	<ol style="list-style-type: none"> 1. Simulate the transmission of ping messages over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion. 2. Simulate simple ESS and with transmitting nodes in wire-less LAN by simulation and determine the performance with respect to transmission of packets. 	4	
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TEXT BOOKS:

1. Behrouz A. Forouzan, “Data Communications and Networking”, 5th Edition ,Tata McGraw-Hills,2013.
2. Andrew S Tanenbaum, “Computer Networks”, 4th Edition, Pearson Education,2013.

REFERENCE BOOKS:

1. William Stallings, “Data and Computer Communication”, 10th Edition, Pearson Education,2014.
2. James F.Kurose and Keith W.Ross, “Computer Networking”, 6th Edition, Pearson Education,2013.
3. Larry L. Peterson and Bruce S. Davie, “Computer Networks – A Systems Approach”, 4th Edition, Elsevier, 2007.

CIE- Continuous Internal Evaluation (50 Marks+25 Marks)

Bloom’s Taxonomy	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Curricular/ Co-curricular (10 Marks)	Lab (25 Marks)
Remember	5	-	-	-	-
Understand	10	5	5	-	-
Apply	5	5	5	-	-
Analyze	5	-	-	5	-
Evaluate	5	-	-	5	25
Create	-	-	-	-	-

SEE – Semester End Examination (50 marks + 25 Marks)

Bloom’s Taxonomy	Tests	Lab
Remember	10	-
Understand	20	-
Apply	05	-
Analyze	10	-
Evaluate	05	25

Create	-	-
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DATA WAREHOUSING AND DATA MINING

Course Code : ISE63

Credits: 04

L:P:T:S : 3:0:0:1

CIE Marks: 50

Exam Hours : 3

SEE Marks: 50

Course Outcomes:At the end of the Course, the Student will be able to:

CO1	Define the fundamental concepts benefits and problem areas associated with data warehousing
CO2	Describe the various architectures and main components of a data warehouse.
CO3	Design a data warehouse, and be able to address issues that arise when implementing a data warehouse.
CO4	Compare and contrast OLAP and data mining as techniques for extracting knowledge from a data warehouse
CO5	Implementation of association rule mining, classification in data mining clustering methods in data mining

Mapping of Course Outcomes to Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	1	1	1	1	1	2	1	1
CO2	3	2	2	2	1	1	1	1	1	2	1	1
CO3	3	2	2	2	1	1	1	-	1	2	1	1
CO4	3	2	2	2	1	-	1	-	1	2	1	1
CO5	3	2	2	2	1	-	1	-	1	2	1	1

Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	2
CO5	3	2

Module No	Module Contents	Hours	COs
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1	Data Warehousing: Introduction, Differences Between Operational Database Systems and Data Warehouses, A Multitier Architecture, Data Extraction, Transformation and Loading.	9	CO1, CO2
2	Online Analytical Processing(OLAP): Data warehouse modelling, Data warehouse design and Data warehouse implementation.	8	CO2, CO3, CO4
3	Data Mining: Introduction, Kinds of Data, Kinds of Patterns, Technologies used, Kinds of applications, Major Issues in Data Mining,Data Pre-processing.	8	CO1, CO4
4	Association Rule Mining: Mining Frequent Patterns, Associations, And Correlations: Basic Concepts and Methods, Pattern Mining in Multilevel, Multidimensional Space, Sequential Pattern Mining. Classification: Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Bayesian Belief Networks, Classification by Backpropagation, Support Vector Machines, Classification Using Frequent Patterns, Lazy Learners, Other Classification Methods.	10	CO1, CO5
5	Cluster Analysis: Basic Concepts and Methods, Types of data, Types of cluster analysis methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Dealing with large databases. Outlier Detection: Outliers and Outlier Analysis, Outlier Detection Methods. Data Mining Trends: Mining Complex Data, Types Data Mining Applications, Data Mining and Society, Data Mining Trends.	10	CO1, CO5

TEXT BOOKS:

1. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw Hill Edition, Thirteenth Reprint 2008.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Third Edition, Elsevier, 2012.
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2007.
4. G. K. Gupta, "Introduction to Data Mining with Case Studies", 3rd Edition, PHI, New Delhi, 2009.

REFERENCES:

1. K.P. Soman, Shyam Diwakar and V. Aja, "Insight into Data Mining Theory and Practice", Eastern Economy Edition, Prentice Hall of India, 2006.
 2. Daniel T. Larose, "Data Mining Methods and Models", Wiley-Interscience, 2006
- CIE - Continuous Internal Evaluation (50 Marks)**

Bloom's Taxonomy	Tests (25 Marks)	SSA (10 Marks)	Quizzes (5 Marks)	Curricular/Co-Curricular (10 Marks)
Remember	5	-	5	-
Understand	5	-	-	-
Apply	5	5	-	-
Analyze	5	5	-	-
Evaluate	5	-	-	-
Create	-	-	-	10

SEE – Semester End Examination (50 Marks)

Bloom's Taxonomy	Tests
Remember	10
Understand	10
Apply	10
Analyze	10
Evaluate	10
Create	-

FILE STRUCTURES

Course Code:ISE64

Credits: 05

L:P:T:S: 3:2:0:0

CIE Marks: 50+25

Exam Hours : 3+3

SEE Marks: 50+25

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Retrieve and explain different techniques for organization and manipulation of data in secondary storage which include basic file structure concepts, file operations, secondary storage devices and system software.
CO2	Illustrate management of records and organization of files for performance by applying object oriented concepts.
CO3	Compare primary and secondary indexing and construct model for implementing consequential processing and sorting large files.
CO4	Construct B trees and illustrate indexed sequential access and prefix B+ trees with appropriate data structures.
CO5	Discuss hashing and its methods and demonstrate collision resolution using different techniques.
CO6	Interpret high level file structures tools which include indexing, co-sequential processing, Btrees and hashing and apply the techniques in designing C++ Programs for solving various file management problems.

Mapping of Course Outcomes to Program Outcomes:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	1	-	-	-	-	-	2
CO2	3	3	3	-	-	1	-	1	-	-	1	2
CO3	3	3	3	3	-	1	-	1	1	-	1	2
CO4	3	3	3	3	-	1	-	1	1	-	1	2
CO5	3	3	3	3	-	1	-	1	1	-	1	2
CO6	3	3	3	3	-	1	-	1	1	-	1	2

Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
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CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	2
CO5	3	2
CO6	3	2

Module No	Module Contents	Hours	COs
1	<p>Introduction: File Structures: The Heart of the file structure Design, A ShortHistory of File Structure Design, Fundamental File Operations: Physical Files and Logical Files, Opening Files, Closing Files, Reading and Writing, Seeking, Physical devices and Logical Files, File-related Header Files, Secondary Storage and System Software:Disks, Magnetic Tape, Disk versus Tape; CD-ROM: Introduction, PhysicalOrganization, Strengths and Weaknesses, A journey ofa Byte.</p>	9	CO1
	<p>List of programs:</p> <ol style="list-style-type: none"> 1. Write a C++ program to read series of names, one per line, from standard input and write these names spelled in reverse order to the standard output using I/O redirection and pipes. Repeat the exercise using an input file specified by the user instead of the standard input and using an output file specified by the user instead of the standard output. 	4	
2	<p>Fundamental File Structure Concepts, Managing Files of Records :Field and Record Organization, File Access and File Organization.Organization of Files for Performance, Indexing: Data Compression,Reclaiming Space in files, Internal Sorting and Binary Searching; What is an Index? A Simple Index for Entry-Sequenced File, Indexes that are too large to hold in Memory, Indexing to provide access by Multiple keys, Retrieval Using Combinations of Secondary Keys.</p>	9	CO2, CO6
	<p>List of programs:</p> <ol style="list-style-type: none"> 2. Write a C++ program to read and write student objects with fixed-length records and the fields delimited by " ". Implement pack (),unpack (), modify () and search () methods. 3. Write a C++ program to read and write student objects with Variable - Length records using any suitable record structure. Implement pack (), unpack (), modify () and search () methods 4. Write a C++ program to write student objects with Variable – Length Records using any suitable record structure and read from this file a student record using RRN 5. Write a C++ program to implement simple index on 	20	

	<p>primary key for a file of student objects. Implement add (), search (), delete () using the index.</p> <p>6. Write a C++ program to implement index on secondary key, the name, for a file of student objects. Implement add (), search (), delete () using the secondary index</p>		
3	<p>Consequential Processing and the Sorting of Large Files: A Model for Implementing Consequential Processes, Extension of the Model to include Multiway Merging, A Second Look at Sorting in Memory, Merging as a Way of Sorting Large Files on Disk.</p> <p>Introduction to Multi-Level Indexing and B-Trees: : The invention of B-Tree, Statement of the problem, Indexing with Binary Search Trees; Multi-Level Indexing.</p>	9	CO3, CO6
	<p>List of programs:</p> <p>7. Write a C++ program to read two lists of names and then match the names in the two lists using Consequential Match based on a single loop. Output the names common to both the lists.</p> <p>8. Write a C++ program to read k Lists of names and merge them using k-way merge algorithm with k = 8.</p>	8	
4	<p>Creation, Deletion, Merging and redistribution of B Trees: BTrees, Example of Creating a B-Tree, B-Tree Methods, Formal Definition of B-Tree Properties, Deletion, Merging and Redistribution, Redistribution during insertion; B* Trees, Buffering of pages: Virtual BTrees</p> <p>Indexed Sequential File Access and Prefix B + Trees: Indexed Sequential Access, Maintaining a Sequence Set, Adding a Simple Index to the Sequence Set, The Content of the Index: Separators Instead of Keys, The Simple Prefix B+ Tree and its maintenance</p>	9	CO4, CO6
	<p>List of programs:</p> <p>9. Write a program that builds a B-tree of order 3 from an input sequence of key values.</p>	4	
5	<p>Hashing: Introduction, A Simple Hashing Algorithm, Hashing Functions and Record Distribution, How much Extra Memory should be used?, Collision resolution by progressive overflow, Buckets, Making deletions, Other collision resolution techniques, Extendible Hashing: Working of Extendible hashing.</p>	9	CO5, CO6
	<p>List of programs:</p> <p>10. Write a C++ program to store and retrieve student data from file using hashing. Use any collision resolution technique.</p>	4	

Text Books:

1. RMichael J. Folk, Bill Zoellick, Greg Riccardi, "File Structures-An Object Oriented Approach with C++", 3rd Edition, Pearson Education, 1998.

Reference Books:

1. K.R. Venugopal, K.G. Srinivas, P.M. Krishnaraj, "File Structures Using C++", Tata McGraw-Hill, 2008.
2. Raghu Ramakrishan and Johannes Gehrke, "Database Management Systems" , 3rd Edition, McGraw Hill, 2003.

CIE - Continuous Internal Evaluation (50+25 Marks)

Bloom's Taxonomy	Tests (25 Marks)	SSA (10 Marks)	Quizzes (5 Marks)	Curricular/Co-Curricular (10 Marks)	Lab (25 Marks)
Remember	5	-	5	-	-
Understand	10	5	-	-	-
Apply	10	5	-	10	-
Analyze	-	-	-	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	25

SEE – Semester End Examination (50+25marks)

Bloom's Taxonomy	Tests	Lab
Remember	10	-
Understand	20	-
Apply	20	-
Analyze	-	-
Evaluate	-	-
Create	-	25

PYTHON PROGRAMMING

Course Code : ISE651

Credits : 03

L:P:T:S : 3:0:0:0

CIE Marks : 50

Exam Hours : 3

SEE Marks : 50

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Understand the benefits of python programming over other languages and program using python language.
CO2	Understand and implement classes and objects in python.
CO3	Implement various data structures in Python language.
CO4	Apply exception handling and gain efficient testing, debugging skills in python.
CO5	Apply python programming in solving computational problems in real time

	applications, web frameworks and cloud operations.
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Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2			2			2		
CO2	3	3	3	2			2			2		
CO3	3	3	3	2			2			2		
CO4	3	3	3	2			2			2		
CO5	3	3	3	2		1	2	1	1	2		

Mapping of Course Outcomes to Program Specific Outcomes(PSOs):

	PSO1	PSO2
CO1	2	2
CO2	2	2
CO3	2	2
CO4	2	2
CO5	2	2

Module No.	Module Contents	Hours	COs
1	<p>Introduction to Python</p> <p>The basic elements of Python, Objects, Expression, Numerical Types, Variables, Keywords and Assignments, Operators and Operands, Order of operations, Installing Python, The first Program, IDLE, Branching programs, if tests, Strings and Input, Iterations, While loop, for loop.</p> <p>Hands-on:</p> <ol style="list-style-type: none"> 1. Write a Python program to get the Python version you are using. 2. Write a Python program which accepts the radius of a circle from the user and compute the area. 3. Write a Python program to calculate the sum of the digits in an integer. 	9	CO1
2	<p>Functions, Scoping and Abstraction:</p> <p>Functions and Scoping, Function calls, Type conversion, Type coercion, Math functions , Composition, Adding new functions , Definitions and use, Variables and parameters are local, Stack diagrams, Functions with results, Specifications, Recursion, Global variables, Modules, Files, Text Files, writing variables, Directories, Pickling.</p> <p>Hands-on</p> <ol style="list-style-type: none"> 1. Write a Python program to display the current date and time 2. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn 3. Write a program to get execution time for a Python method. 	9	CO2

3	<p>Structured Types, Mutability and Higher-order Functions</p> <p>Tuples, Sequences and Multiple Assignment, Lists and Mutability, Cloning, List Comprehension, Functions as Objects, Strings, Tuples and Lists, Dictionaries.</p> <p>Hand-on</p> <ol style="list-style-type: none"> 1. Write a Python program which accepts the user's first and last name and print them in reverse order with a space between them. 2. Write a Python program which accepts a sequence of comma-separated numbers from user and generate a list and a tuple with those numbers. 3. Write a Python program to test whether a passed letter is a vowel or not 	9	CO3
4	<p>Exceptions and assertions</p> <p>Handling exceptions, Exceptions as a control flow mechanism, Assertions,</p> <p>Classes and Object-oriented Programming: Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding.</p> <p>Hands-on</p> <ol style="list-style-type: none"> 1. Write a Python program to create an intersection of sets and calculate the length of a set 	9	CO4
5	<p>Python Application</p> <p>Amazon EC2, Launching of an Amazon Ec2 instance, shutting down, Amazon Auto Scaling, Django: Google Application Engine Architecture and python usage.</p> <p>Hands-on</p> <ol style="list-style-type: none"> 1. Write a python program to demonstrate the usage with frameworks. 	9	CO5

TEXT BOOKS:

1. John V Guttag, "Introduction to Computation and Programming Using Python", , 2015, Prentice Hall of India
2. Allen Downey, Jeffrey Elkner and Chris Meyers, "How to think like a Computer Scientist, Learning with Python", , Green Tea Press, 2014
3. Arshadeep Bahga, Vijay Madiseti, "Cloud computing: A Hands-on Approach", Universities Press, 2014.

REFERENCE BOOKS:

1. Mark Lutz "Learning Python", , 5th Edition, O'Reilly publication, 2016
2. Wesley J. Chun, "Core Python Programming", , 2nd Edition, Prentice Hall, 2013
3. "The Python Tutorial", <http://docs.python.org/release/3.0.1/tutorial/>
4. "Learn Python the Hard way", <http://learnpythonthehardway.org/>

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Taxonomy	Tests (25 marks)	Assignments (15 Marks)	Quizzes (10 Marks)
Remember	5	-	-
Understand	5	5	5
Apply	15	10	5
Analyze	-	-	-
Evaluate	-	-	-
Create	-	-	-

SEE- Semester End Examination (50 Marks)

Bloom's Taxonomy	Tests
Remember	5
Understand	15
Apply	20
Analyze	5
Evaluate	-
Create	5

Cloud Computing

Course Code: ISE652

Credits : 03

L:P:T:S : 3:0:0:0

CIE Marks : 50

Exam Hours : 3

SEE Marks : 50

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Understand the cloud computing model, Types and Characteristics.
CO2	Understand the cloud services, Applications and Virtualization
CO3	Explore the Cloud Services provided by the Cloud providers
CO4	Apply the Technology of the cloud computing
CO5	Describe the different services, company offerings, Migration to the cloud

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2	3	-	3	-		3	-	-	3	-	2	-
CO3	3	3	3	3	3	3	2	1	3	2	2	2
CO4	3	3	3	3	3	3	2	1	3	2	2	-
CO5	3		3	3	3	3	2	1	3		2	

Module No.	Module Contents	Hours	COs
1	Introduction: Defining Cloud Computing, Cloud Types, Cloud NIST, cloud cube models, Deployment models, service models, Examining the Characteristics of Cloud Computing, Benefits, disadvantages of cloud computing, Assessing the Role of Open Standard.	7	CO1
2	Understanding Services and Applications by Type: Defining Infrastructure as a Service, Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS),SaaS characteristics, Open SaaS and SOA ,Salesforce.com and CRM SaaS ,Defining Identity as a Service (IDaaS), Defining Compliance as a Service (CaaS). Understanding Abstraction and Virtualization: Using Virtualization Technologies, Load Balancing and Virtualization, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications	9	CO1 CO2
3	Cloud Services: Using Amazon Web Services: Understanding Amazon Web Service, Amazon Web Service Components and Service, working with the Elastic Compute Cloud (EC2), Working with Amazon Storage System, Understanding Amazon Database Service Using Microsoft Cloud Services: Exploring Microsoft Cloud Service, Defining the Windows Azure Platform, Using Windows Live. Using Google Web Services: Exploring Google Applications, Surveying the Google Application Portfolio, Exploring the Google Toolkit, Working with the Google App Engine.	9	CO3 CO4
4	Technology, Cloud Storage, Standards: Cloud Computing Technology: Clients, Security, Network, Services. Overview of Cloud storage, Some providers of Cloud storage. Standards: Applications, Clients, Infrastructure, Service.	9	CO4
5	Issues: Overview of SaaS (Software as a Service), Driving forces, Company offerings: Google, Microsoft, IBM. Software plus Service: Overview, Mobile device integration Local Clouds, Thin Clients, Migrating to the Cloud: Virtualization, Server solutions, Thin clients, Cloud services for individuals, mid-markets, and enterprises, Migration.	9	CO2 CO5

TEXT BOOKS:

1. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing, Inc, 2011
2. Cloud Computing - A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, Tata McGraw Hill.

References:

1. RajkumarBuyya , James Broberg, AndrzejGoscinski: Cloud Computing Principles and Paradigms, Wiley 2014.
2. Soyata, Tolga, "Enabling Real-Time Mobile Cloud Computing through Emerging Technologies", IGI Global, 2015, ISBN: 978-1-4666-8662-5
3. Cloud computing from Beginning to End by Mr.Ray J Rafaeis.
4. Cloud Computing: Concepts, Technology & Architecture by Thomas Erl, Ricardo Puttini, Zaigham Mahmood

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes
	(25Marks)	(15 Marks)	(10 Marks)
Remember	5	-	-
Understand	5	5	5
Apply	5	5	5
Analyze	5	5	-
Evaluate	5	-	-
Create	-	-	-

SEE- Semester End Examination (50 Marks)

Blooms Category	Tests
Remember	10
Understand	10
Apply	15
Analyze	10
Evaluate	5
Create	-

WIRELESS SENSOR NETWORKS

Course Code :ISE653

Credits: 03

L:P:T:S : 3:0:0:0

CIE Marks: 50

Exam Hours : 3

SEE Marks: 50

COURSE OUTCOMES:At the end of the Course, the Student will be able to:

CO1	Define and list the concepts of overview of sensor technologies and architectures.
CO2	Design of new technology for sensor networks using MAC and routing layer protocols.
CO3	Demonstrate the routing protocols for Sensor Networks and Infrastructure establishment through the creation of small test beds.
CO4	To analyze the need for security in Wireless Sensor Networks.
CO5	Evaluate the Sensor Network platforms and tools and design of new applications for Wireless Sensor Networks.

Mapping of Course Outcomes to Program Outcomes

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	2	2	3	3	2	-	-	-	-	-	-	-
CO3	2	2	3	3	2	-	-	-	-	-	-	-
CO4	2	2	3	3	2	-	-	-	-	-	-	-
CO5	2	2	3	3	2	-	-	-	-	-	-	-

Module No	Module Contents	Hours	COs
1	<p>Overview of Wireless Sensor Networks:Key definitions of Sensor Networks, Advantages of Sensor Networks, Unique constraints and challenges, Driving applications, Enabling technologies for Wireless Sensor Networks.Architectures: Layered architecture, Clustered architecture, Single-Node architecture-hardware components, Energy consumption of sensor nodes, Operating systems and Execution Environments, Network Architecture-Sensor Network Scenarios, Optimization goals and Figures of Merit, Gateway concepts.</p>	9	CO1
2	<p>Data Dissemination and Data Gathering:Flooding, Gossiping, Rumor Routing, Sequential assignment Routing, Directed Diffusion, Sensor protocols for Information via Negotiation, Cost-field approach, Geographic hash table, Small minimum energy communication network. Direct Transmission, Power efficient gathering for sensor information systems, Binary scheme, Chain-based three level scheme.</p> <p>MAC Protocols for Wireless Sensor Networks Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC protocol for Ad Hoc Wireless Networks, Classifications of MAC protocols, Contention-Based protocols, Contention-Based protocols with reservation mechanisms, Contention-Based MAC protocols with scheduling mechanisms, MAC protocols that use Directional Antennas, Other MAC protocols.</p>	9	CO2
3	<p>Routing protocols in Sensor Networks:Location-based Protocols: MECN, SMECN, GAF, GEAR, Span, TBF, BVGF, GeRaF, Data-centric Protocols: SPIN, Directed Diffusion, Rumor Routing, COUGAR, ACQUIRE, EAD, Information-Directed Routing, Gradient, Based Routing, Energy-aware Routing, Information-Directed Routing, Quorum-Based Information Dissemination, Home Agent Based Information Dissemination, Hierarchical Protocols: LEACH, PEGASIS, HEED, TEEN, APTEEN, Mobility-based Protocols: SEAD, TTDD, Joint Mobility and Routing, Data MULES, Dynamic Proxy Tree-Base Data Dissemination, Multipath-based Protocols: Sensor-Disjoint Multipath, Braided Multipath, N-to-, Multipath Discovery,</p>	9	CO3

	Heterogeneity-based Protocols: IDSQ, CADR, CHR, QoS-based protocols: SAR, SPEED, Energy-aware routing.		
4	Location Discovery, Infrastructure Establishment and Quality of a Sensor Network: Indoor localization, Topology Control, Clustering, Time Synchronization, Localization and Positioning, sensor Tasking and Control, Sensor Network localization, Coverage, Exposure, Other Issues. Security in Wireless Sensor Networks Security in Ad Hoc Wireless Networks, Network Security requirements, Issues and Challenges in security provisioning, network Security Attacks, Key management, Secure Routing in Ad Hoc Networks.	9	CO4
5	Sensor Network Platforms and Tools: Sensor node Hardware-Berkeley Motes, programming Challenges, Node-level software platforms, Node-level simulators, State-centric programming. Applications of WSNs: S Ultra wide band radio communication, Wireless fidelity systems, Future directions, Home automation, Smart metering applications.	9	CO5

TEXT BOOKS:

1. C. SivaRam Murthy and B.S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols, PHI, 2012 Edition, Prentice Hall communications Engineering and Emerging Technology Series, ISBN-10: 0133007065.
2. Holger Karl and Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley, 2007 ISBN: 0470519231, 9780470519233.
3. William B. Frakes, Ricardo Baeza-Yates; Information Retrieval Data Structures and Algorithms; First Edition; Pearson Education Limited; 2012; ISBN-9788131716922.
4. HinrichSchutze, PrabhakarRaghavan, Christopher D Manning; Introduction To Information Retrieval; First Edition; Cambridge University Press India Pl; 2014; ISBN-9781107666399

REFERENCE BOOKS:

1. KazemSohraby, Daniel Minoli, &TaiebZnati, "Wireless Sensor Networks- Technology, Protocols, and Applications", John Wiley, 2007.
2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.
3. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh ,1 ed. Pearson Education.

CIE - Continuous Internal Evaluation (50 marks)

Bloom's Taxonomy	Tests (25 Marks)	Assignments (15 Marks)	Quizzes (10 Marks)
Remember	5	5	5
Understand	5	5	5
Apply	5	5	5
Analyze	5	5	5
Evaluate	5	5	5
Create	5	5	5

SEE – Semester End Examination (50 Marks)

Bloom's Taxonomy	Tests
Remember	5
Understand	15
Apply	10
Analyze	10
Evaluate	10
Create	-

Mini Project**Course Code : ISE67****Credits: 02****L:P:T:S : 0:2:0:0****CIE Marks: 25****Exam Hours : 3****SEE Marks: 25**

The student shall be capable of identifying a problem related to the field of Computer Science and carry out a mini project on the problem defined. Each student is expected to do the mini project individually. The code developed towards the project will be reviewed by a panel of experts during the course of the semester. Plagiarized projects will automatically get an "F" GRADE and the student will be liable for further disciplinary action. At the completion of a project the student will submit a project report, which will be evaluated by duly appointed examiner(s).

CIE - Continuous Internal Evaluation (25 Marks)

Bloom's Taxonomy	Mini Project
Remember	
Understand	
Apply	
Analyze	
Evaluate	25
Create	

SEE – Semester End Examination (25marks)

Bloom's Taxonomy	Mini Project
Remember	
Understand	
Apply	
Analyze	
Evaluate	25
Create	

APPENDIX A

Outcome Based Education

Outcome-based education (OBE) is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience each student should have achieved the goal. There is no specified style of teaching or assessment in OBE; instead classes, opportunities, and assessments should all help students achieve the specified outcomes.

There are three educational Outcomes as defined by the National Board of Accreditation:

Program Educational Objectives: The Educational objectives of an engineering degree program are the statements that describe the expected achievements of graduate in their career and also in particular what the graduates are expected to perform and achieve during the first few years after graduation. [nbaindia.org]

Program Outcomes: What the student would demonstrate upon graduation. Graduate attributes are separately listed in Appendix C

Course Outcome: The specific outcome/s of each course/subject that is a part of the program curriculum. Each subject/course is expected to have a set of Course Outcomes

Mapping of Outcomes

COURSE OUTCOME

PROGRAM OUTCOME

PROGRAM EDUCATIONAL OBJECTIVES

DEPARTMENTAL MISSION

DEPARTMENTAL VISION

APPENDIX B

The Graduate Attributes of NBA

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems.

Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Conduct investigations of complex problems: The problems that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline that may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions that require consideration of appropriate constraints/requirements not explicitly given in the problem statement (like: cost, power requirement, durability, product life, etc.) which need to be defined (modeled) within appropriate mathematical framework that often require use of modern computational concepts and tools.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

APPENDIX C

BLOOM'S TAXONOMY

Bloom's taxonomy is a classification system used to define and distinguish different levels of human cognition—i.e., thinking, learning, and understanding. Educators have typically used Bloom's taxonomy to inform or guide the development of assessments (tests and other evaluations of student learning), curriculum (units, lessons, projects, and other learning activities), and instructional methods such as questioning strategies. [eduglosarry.org]

