KRISHNA UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE

Board of Studies Meeting

Academic Year 2024-25

held on

17-12-2024

Revision of syllabus for all semesters

(1ˢᵗ, 2ⁿᵈ, 3ʳᵈ , 4ᵗʰ and 5ᵗʰ Semesters)

of

Under Graduate Programs

in

B.Sc (Computer Science and Cognitive Systems)

KRISHNA UNIVERSITY
(Autonomous)
MACHILIPATNAM :: KRISHNA DISTRICT:: ANDHRA PRADESH

Date: 17-12-2024

Department of Computer Science

The department of Computer Science has organized a Board of Studies (BoS) meeting with regard to revision and upgradation of Syllabus for **all Semesters** of Under-Graduate courses that have Computer Science and Cognitive Systems as both major and minor subjects during their course of study.

Agenda:

1. Framing and approval of course structure and syllabus for semesters 1st to 5th of UG Computer Science and Cognitive Systems.

2. Presentation of proposed syllabus to BoS members.

3. Procedure for awarding internal marks

4. Discussion on model question paper

5. Any other academic matters with the permission of the chairman

- **Members of Board of Studies**

1. Sri Vijayadeep Gummadi   **Chairman, SRR&CVR GDC(A), Vijayawada**

2. Dr. R. Kiran Kumar   **University Nominee, Krishna University**

3. Smt. Swarna Jyothi   **Member, Govt. Degree College, Avanigadda**

4. Sri. T. Kamalakar Raju   **Member, Andhra Loyola College, Vijayawada**

5. Smt. P. Durga Bhavani   **Member, Nalanda Degree College, Vijayawada**

6. Dr. V. Laxmi Narasamma   **Industrialist**

7. Sri P. LV Pavan Kalyan   **Student Member, SRR&CVR GDC(A), Vijayawada**

8. Sri D. Rohith Kumar   **Student Member, SRR&CVR GDC(A), Vijayawada**

- **Resolutions**

Agenda-1: Framing and approval of course structure and syllabus for semesters 1st to 4th of UG Computer Science and Cognitive Systems.

Discussion: Chairman of the BoS submitted a draft copy of the course structure to the members for discussion. This was thoroughly examined by all the members of the BoS and was decided to accept the same.

Resolution: It is resolved unanimously to adopt the course structure given by APSCHE.

Agenda-2: Presentation of proposed syllabus to BoS members.

Discussion: Chairman of the BoS submitted a draft copy of the syllabus to the members for discussion. The syllabus was thoroughly examined by all the members of the BoS and was decided to accept the syllabus.

Resolution: It is resolved unanimously to adopt the syllabus given by APSCHE. The syllabus for 1st and 2nd semesters accepted during 2023-24 will be followed even during the academic year 2024-25.

Agenda-3: Procedure for awarding internal marks

Discussion: Dr. R. Kiran Kumar, University nominee has proposed to emphasize more on continuous internal assessment for assessing the understanding of students. Other members of the BoS also agreed for the same.

Resolution: It is resolved to follow the existing pattern of weightage for internals and SEE. The split of marks is as 30 for internal and 70 for SEE. For awarding 30 marks, two midterm examinations, assignments, activities and seminars are to be conducted during semester time.

Agenda-4: Discussion on model question paper

Discussion: Smt. N. Swarna Jyothi, Member of BoS has proposed to include very short answer questions which was not accepted by others members of the BoS.

Resolution: It is resolved to have two sections covering short and essay answer questions with a weightage of 20 and 50 marks each respectively.

- **Short Answers**: 8 questions will be given and students have to answer 5 with each question carrying 4 marks each.

- **Essay Answers**: 2 questions will be given from each unit and students have to answer 1 question with a weightage of 10 marks.

Agenda-5: Any other academic matters with the permission of the chairman

Discussion: The members of the BoS discussed regarding the implementation of Community Service Project and Internship after 2nd semester and 4th semester respectively.

Resolution: It is resolved to send students for Community Service Project and Internship after 2nd semester and 4th semester respectively. The reports submitted by the students will be evaluated and grade will be awarded.

KRISHNA UNIVERSITY :: MACHILIPATNAM
Programme: B.Sc. Honours Computer Science and Cognitive Systems (Major)
w.e.f. AY 2023-24
COURSE STRUCTURE

Semester	Course Number	Course Name	No. of Hrs/Week	No. of Credits
Semester-I	1	Essentials and Applications of Mathematical, Physical and Chemical Sciences	3+1	4
	2	Advances in Mathematical, Physical and Chemical Sciences	3+1	4
Semester-II	3	Computer Networks	3	3
		Computer Networks Lab	2	1
	4	Data Structures		
		Data Structures Lab		
Semester-III	5	Database Management Systems	3	3
		Database Management Systems Lab	2	1
	6	Python Programming	3	3
		Python Programming Lab	2	1
	7	IT Infrastructure Management	3	3
		IT Infrastructure Management Lab	2	1
	8	Object Oriented Programming using Java	3	3
		Object Oriented Programming using Java Lab	2	1
Semester-IV	9	Virtualization and Cloud Computing	3	3
		Virtualization and Cloud Computing Lab	2	1
	10	Process Management	3	3
		Process Management Lab	2	1
	11	Introduction to Digital Technology	3	3
		Introduction to Digital Technology Lab	2	1
Semester-V	12	Software Engineering and Testing	3	3
		Software Engineering and Testing Lab	2	1
	13	Client Relationship Management	3	3
		Client Relationship Management Lab	2	1
	14	IT Infrastructure Library	3	3
		IT Infrastructure Library Lab	2	1
	15	Campus to Corporate	3	3
		Campus to Corporate Lab	2	1

Semester-VI		Internship		
Semester-VII	16	MERN Full Stack Development	3	3
		MERN Full Stack Development Lab	2	1
	17	Data Mining and Warehousing	3	3
		Data Mining and Warehousing Lab	2	1
	18	Introduction to Kotlin	3	3
		Introduction to Kotlin Lab	2	1
	SEC			
	19	PHP Programming	3	3
		PHP Programming Lab	2	1
	20	Digital Marketing	3	3
		Digital Marketing Lab	2	1
Semester-VIII	21	Programming Using R	3	3
		Programming Using R Lab	2	1
	22	Big Data and HADOOP	3	3
		Big Data and HADOOP Lab	2	1
	23	IOT Applications Development	3	3
		IOT Applications Development Lab	2	1
	SEC			
	24	Cyber security and malware analysis	3	3
		Cyber security and malware analysis Lab	2	1
	25	Image Processing	3	3
		Image Processing Lab	2	1

COURSE 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL ANDCHEMICAL SCIENCES

Theory   Credits: 4   5 hrs/week

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations

3. To Explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.

UNIT I: ESSENTIALS OF MATHEMATICS:

Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus-Amplitude form and conversions

Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of

angles**Vectors:** Definition of vector addition – Cartesian form – Scalar and vector product and

problems **Statistical Measures**: Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS:

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

UNIT III: ESSENTIALS OF CHEMISTRY: :

Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY:

Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications.

Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.

2. Elementary Trigonometry by H.S.Hall and S.R.Knight

3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd.

4. Basic Statistics by B.L.Agarwal, New age international Publishers

5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman

6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker

7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.

8. Physics for Technology and Engineering" by John Bird

9. Chemistry in daily life by Kirpal Singh

10. Chemistry of bio molecules by S. P. Bhutan

11. Fundamentals of Computers by V. Raja Raman

12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

STUDENT ACTIVITIES

UNIT I: ESSENTIALS OF MATHEMATICS:

1: Complex Number Exploration

Provide students with a set of complex numbers in both rectangular and polar forms.

They will plot the complex numbers on the complex plane and identify their properties

2: Trigonometric Ratios Problem Solving

Give students a set of problems that require the calculation of trigonometric ratios and their relations.

Students will solve the problems using the appropriate trigonometric functions (sine, cosine, tangent, etc.) and trigonometric identities.

3: Vector Operations and Applications

Provide students with a set of vectors in Cartesian form.

Students will perform vector addition and subtraction operations to find the resultant vectors.

They will also calculate the scalar and vector products of given vectors.

4: Statistical Measures and Data Analysis

Give students a dataset containing numerical values.

Students will calculate the mean, median, and mode of the data, as well as other statistical measures if appropriate (e.g., range, standard deviation).
They will interpret the results and analyze the central tendencies and distribution of the data.

UNIT II: ESSENTIALS OF PHYSICS:

1. Concept Mapping

Divide students into groups and assign each group one of the topics.

Students will create a concept map illustrating the key concepts, relationships, and applications related to their assigned topic.

Encourage students to use visual elements, arrows, and labels to represent connections and interdependencies between concepts.

2. Laboratory Experiment

Select a laboratory experiment related to one of the topics, such as motion of objects or electric and magnetic fields.
Provide the necessary materials, instructions, and safety guidelines for conducting the experiment.
Students will work in small groups to carry out the experiment, collect data, and analyze the results.

After the experiment, students will write a lab report summarizing their findings, observations, and conclusions.

UNIT III: ESSENTIALS OF CHEMISTRY

1: Chemistry in Daily Life Presentation

Divide students into groups and assign each group a specific aspect of daily life where chemistry plays a significant role, such as food and nutrition, household products, medicine,or environmental issues.
Students will research and create a presentation (e.g., PowerPoint, poster, or video) that showcases the importance of chemistry in their assigned aspect.
2: Periodic Table Exploration

Provide students with a copy of the periodic table.

Students will explore the periodic table and its significance in organizing elements based on their properties.
They will identify and analyze trends in atomic structure, such as electronic configuration, atomic size, and ionization energy.

3: Chemical Changes and Classification of Matter

Provide students with various substances and chemical reactions, such as mixing acids and bases or observing a combustion reaction.
Students will observe and describe the chemical changes that occur, including changes in color, temperature, or the formation of new substances.
4: Biomolecules Investigation

Assign each student or group a specific biomolecule category, such as carbohydrates,proteins, fats, or vitamins.
Students will research and gather information about their assigned biomolecule category, including its structure, functions, sources, and importance in the human body.

They can create informative posters or presentations to present their findings to the class.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

1: Interdisciplinary Case Studies

Divide students into small groups and provide them with interdisciplinary case studies that involve the interdisciplinary application of mathematics, physics, and chemistry.

Each case study should present a real-world problem or scenario that requires the integration of concepts from all three disciplines.

2: Design and Innovation Project

Challenge students to design and develop a practical solution or innovation that integrates mathematics, physics, and chemistry principles.
Students can choose a specific problem or area of interest, such as renewable energy, environmental conservation, or materials science.
3: Laboratory Experiments

Assign students laboratory experiments that demonstrate the practical applications of

mathematics, physics, and chemistry.

Examples include investigating the relationship between concentration and reaction rate, analyzing the behavior of electrical circuits, or measuring the properties of materials.

.4: Mathematical Modeling

Present students with real-world problems that require mathematical modeling and analysis.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

1. Identifying the attributes of network (Topology, service provider, IP address and bandwidth of

2. your college network) and prepare a report covering network architecture.

3. Identify the types of malwares and required firewalls to provide security.

4. Latest Fraud techniques used by hackers**.**

COURSE 2: ADVANCES IN MATHEMATICAL, PHYSICALAND CHEMICAL SCIENCES

Theory   Credits: 4   5 hrs/week

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes:

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.

3. Understand the different sources of renewable energy and their generation processes and advances in nanomaterials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.

3. Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics.Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

UNIT I: ADVANCES IN BASICS MATHEMATICS

Straight Lines: Different forms – Reduction of general equation into various forms – Point ofintersection of two straight lines

Limits and Differentiation: Standard limits – Derivative of a function –Problems on product ruleand quotient rule

Integration: Integration as a reverse process of differentiation – Basic methods of integration

Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices – Transpose ofa matrix and determinants

UNIT II: ADVANCES IN PHYSICS:

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. **Recent advances in the field of nanotechnology**: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT III: ADVANCES IN CHEMISTRY:

Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS &CHEMISTRY

Mathematical Modelling applications in physics and chemistry

Application of Renewable energy: Grid Integration and Smart Grids,

Application of nanotechnology: Nanomedicine,

Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics,

Application of medical physics: Radiation Therapy, Nuclear medicine

Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT V: Advanced Applications of computer Science

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.

Recommended books:

1. Coordinate Geometry by S.L.Lony, Arihant Publications

2. Calculus by Thomas and Finny, Pearson Publications

3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.

4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle

5. "Energy Storage: A Nontechnical Guide" by Richard Baxter

6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara

7. "Biophysics: An Introduction" by Rodney Cotterill

8. "Medical Physics: Imaging" by James G. Webster

9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas

10. Nano materials and applications by M.N.Borah

11. Environmental Chemistry by Anil.K.D.E.

12. Digital Logic Design by Morris Mano

13. Data Communication & Networking by Bahrouz Forouzan.

STUDENT ACTIVITIES

UNIT I: ADVANCES IN BASIC MATHEMATICS

1: Straight Lines Exploration

Provide students with a set of equations representing straight lines in different forms, suchas slope-intercept form, point-slope form, or general form.

Students will explore the properties and characteristics of straight lines, including theirslopes, intercepts, and point of intersection.
2: Limits and Differentiation Problem Solving

Students will apply the concept of limits to solve various problems using standard limits.

Encourage students to interpret the results and make connections to real-world applications,such as analyzing rates of change or optimizing functions.

3: Integration Exploration
Students will explore the concept of integration as a reverse process of differentiation andapply basic methods of integration, such as the product rule, substitution method, or
integration by parts.

Students can discuss the significance of integration in various fields, such as physics andchemistry
4: Matrices Manipulation

Students will perform operations on matrices, including scalar multiplication, matrixmultiplication, and matrix transpose.

Students can apply their knowledge of matrices to real-world applications, such as solvingsystems of equations or representing transformations in geometry.

UNIT II: ADVANCES IN PHYSICS:

1: Case Studies

Provide students with real-world case studies related to renewable energy, nanotechnology,biophysics, medical physics, or shape memory materials.
Students will analyze the case studies, identify the challenges or problems presented, andpropose innovative solutions based on the recent advances in the respective field.
They will consider factors such as energy generation, energy storage, efficiency,
sustainability, materials design, biomedical applications, or technological advancements.
2: Experimental Design

Assign students to design and conduct experiments related to one of the topics: renewableenergy, nanotechnology, biophysics, medical physics, or shape memory materials.
They will identify a specific research question or problem to investigate and design anexperiment accordingly.

Students will collect and analyze data, interpret the results, and draw conclusions based ontheir findings.

They will discuss the implications of their experimental results in the context of recentadvances in the field.

3: Group Discussion and Debate

Organize a group discussion or debate session where students will discuss the ethical, social, and environmental implications of the recent advances in renewable energy, nanotechnology, biophysics, medical physics, and shape memory materials.

Assign students specific roles, such as proponent, opponent, or moderator, and provide them with key points and arguments to support their positions.

UNIT III: ADVANCES IN CHEMISTRY:

1. Experimental Design and Simulation

In small groups, students will design experiments or simulations related to the assigned topic.

For example, in the context of computer-aided drug design, students could design a virtual screening experiment to identify potential drug candidates for a specific disease target.

For nano sensors, students could design an experiment to demonstrate the sensitivity and selectivity of nano sensors in detecting specific analytes.
Chemical biology-related activities could involve designing experiments to study enzyme-substrate interactions or molecular interactions in biological systems.
Students will perform their experiments or simulations, collect data, analyze the results, and draw conclusions based on their findings.

2. Case Studies and Discussion

Provide students with real-world case studies related to the impact of chemical pollutants on ecosystems and human health.
Students will analyze the case studies, identify the sources and effects of chemical pollutants, and propose mitigation strategies to minimize their impact.

Encourage discussions on the ethical and environmental considerations when dealing with chemical pollutants.
For the dye removal using the catalysis method, students can explore case studies where catalytic processes are used to degrade or remove dyes from wastewater.

Students will discuss the principles of catalysis, the advantages and limitations of the catalysis method, and its applications in environmental remediation.
3: Group Project

Assign students to work in groups to develop a project related to one of the topics.

The project could involve designing a computer-aided drug delivery system, developing a nano sensor for a specific application, or proposing strategies to mitigate the impact of chemical pollutants on ecosystems.
Students will develop a detailed project plan, conduct experiments or simulations, analyze data, and present their findings and recommendations.
Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY
1: Mathematical Modelling Experiment

Provide students with a mathematical modelling experiment related to one of the topics. For example, in the context of renewable energy, students can develop a mathematical model to optimize the placement and configuration of solar panels in a solar farm.
Students will work in teams to design and conduct the experiment, collect data, and analyze the results using mathematical models and statistical techniques.
They will discuss the accuracy and limitations of their model, propose improvements, and interpret the implications of their findings in the context of renewable energy or the specific application area.

2: Case Studies and Group Discussions

Assign students to analyze case studies related to the applications of mathematical modellingin nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.
Students will discuss the mathematical models and computational methods used in the case studies, analyze the outcomes, and evaluate the effectiveness of the modelling approach.
Encourage group discussions on the challenges, ethical considerations, and potentialadvancements in the field.

Students will present their findings and engage in critical discussions on the advantages and limitations of mathematical modelling in solving complex problems in these areas.

3. Group Project

Assign students to work in groups to develop a group project that integrates mathematical modelling with one of the application areas: renewable energy, nanotechnology, biophysics,medical physics, solid waste management, environmental remediation, or water treatment.

The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize wastemanagement practices.
Students will plan and execute their project, apply mathematical modelling techniques,analyze the results, and present their findings and recommendations.
Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT V: Advanced Applications of computer Science
Students must be able to convert numbers from other number system to binary numbersystems

1. Identify the networking media used for your college network

2. Identify all the networking devices used in your college premises.

COURSE 3: COMPUTER NETWORKS

Theory   Credits: 3   3 hrs/week

Course Objectives:

1. Learn about Network hardware and software

2. Learn basics about Networking.

3. Learn about IP Addressing and Switches

4. Learn about VLAN and Routing Protocols.

5. Learn about Network Monitoring, WLAN, NAT

Course Outcom eNo	Upon successful completion of this course, students should have the knowledge and skills to:	Progra m Outcom eNo
CO1	Understand about Network hardware and software	PO7
CO2	Understand the concept of Networking	PO1
CO3	Understand the concepts of IP Addressing and Switching	PO7
CO4	Understand and know about VLAN and Routing protocols	PO1
CO5	Understand and know about Network Monitoring, WLAN, NAT	PO1

Unit I : Need of Network

Network classifications: LAN, MAN, WAN, Data and Signals Analog and Digital, Bit Rate, Baud Rate, Bandwidth,Transmission Impairments - Attenuation, Distortion and Noise.

Network models - OSI model layers and their functions, TCP/IP protocol suite.

Unit II: Bandwidth Utilization and Multiplexing

Multiplexing - FDM, TDM,Transmission Media - Guided and Unguided Media,

Switching: Message, Circuit and Packet switched networks,Datagram Networks and Virtual Circuit Networks.

Unit III: IP Addressing
Addressing Version 4 – IP Addressing Version 6, Subnetting VLAN - VTP /CDP - Subnetting Basic Version 4

Unit IV: Routing Algorithms

Routing algorithms – Congestion Control Algorithms, CISCO IOS / Managing / Password recovery, Routing Dynamic Routing protocols OSPF RIP EIGRP

Unit V: Monitoring Network Devices

Overview of ACL (Access Control List),**NAT (**Network **Address Translation),WAN** (Widearea network)

Recommended Books:

- B A Forouzan, Data Communications and Networking, 4th Ed,, M C Graw Hill Publications [PDF]
- David J.Wetherall, Andrew S.Tanenbaum, "Computer Networks", 5th Edition, Pearson Education, 2012 [PDF]

Online Resources:

https://www.youtube.com/watch?v=-6Uoku-M6oY

https://www.youtube.com/watch?v=ZhEf7e4kopM

https://youtu.be/8npT9AALbrI?t=70

ecommended Co – Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. **Measurable**
   1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
   2. Student seminars (on topics of the syllabus and related aspects (individual activity))
   3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
   4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))
B. **General**
   1. Group Discussion
   2. Others

COURSE 3: COMPUTER NETWORKS

Practical   Credits: 3   3 hrs/week

COURSE OUTCOME No.	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME No.
CO1	Demonstration of Cisco packet tracer software	PO7
CO2	Perform Configuration of a Switch	PO5
CO3	Perform Configuration of a Router	PO5
CO4	Demonstration of Routing protocols OSPF, RIP	PO5
CO5	Demonstration of Routing protocol EIGRP	PO5

Requirements:

Cisco packet tracer software (Freeware)

Exercises

1. Installation of Cisco Packet Tracer
2. Perform an Initial Switch Configuration
3. Configuring Switch Interfaces
4. Performing an Initial Router Configuration
5. VLAN and VTP Configuration
6. Basic Router Setup
7. Demonstrate Static Routing
8. Demonstrate Dynamic Routing
9. Demonstrate Dynamic Routing protocol OSPF
10. Demonstrate Dynamic Routing protocol RIP
11. Demonstrate Dynamic Routing protocol EIGRP

Faculty & Student Resources:

- Software Download
  - Cisco Packet Tracer Software (Details provided in Getting Started Course)
- Free Online Courses for Cisco Packet Tracer
  - Getting Started with Cisco Packet Tracer
  - Exploring Networking with Cisco Packet Tracer
  - Introduction to Packet Tracer Exam
- Lab Resources
  - Free Cisco Lab
  - Free CCNA Lab
  - Cisco Virtual Lab Simulations
    - Packet Tracer Labs

COURSE 4: DATA STRUCTURES

Theory   Credits: 3   3 hrs/week

Course Objectives:

To introduce the fundamental concept of data structures and to emphasize the importance of various data structures in developing and implementing efficient algorithms.

Course Outcome:

1. Learn the concepts of ADT and understand the concept of searching and sorting.(PO5)

2. Understand available Data Structures for data storage and processing.(PO5,PO7)

3. Learn stacks, queues and their applications.(PO5,PO7)

4. Understand trees and implement their operations.(PO5,PO7)

5. Understand graphs and implement their operations.(PO5)

UNIT – I:

Introduction to Data Structures: Introduction to the Theory of Data Structures, Data Representation, Abstract Data Types, Data Types, Primitive Data Types.

Searching and sorting: Sorting – An Introduction, Bubble Sort, Insertion Sort, Merge Sort, searching – An Introduction, Linear or Sequential Search, Binary Search.

UNIT – II:

Linked Lists: Introduction to Lists and Linked Lists, Basic Linked List Operations, Doubly Linked List, Circular Linked List, Linked List in Arrays, Linked List versus Arrays.

UNIT – III:

Stacks: Introduction to Stacks, Stack as an Abstract Data Type, Representation of Stacks through Arrays, Representation of Stacks through Linked Lists, Applications of Stacks.

Queues: Introduction, Queue as an Abstract data Type, Representation of Queues, Circular Queues, Double Ended Queues- Deques, Priority Queues, Application of Queues.

UNIT – IV:

Binary Trees: Introduction to Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees,

Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Counting Number of nodes in Binary Trees, Applications of Binary Tree

UNIT – V:

Graphs: Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs, Spanning Trees, Shortest Path, Application of Graphs.

TEXT BOOKS:
- "Data Structures using C", ISRD group Second Edition,TMH
- Data Structures through C", YashavantKanetkar, BPBPublications
- "Data Structures Using C" Balagurusamy E.TMH

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A.   Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual andchallenging)
2. Student seminars (on topics of the syllabus and related aspects (individualactivity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups asteams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1.   Group Discussion
2.   Others

COURSE 4: DATA STRUCTURES

Practical	Credits: 1	2 hrs/week

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Demonstration of arrays and operations on stacks.	PO7
CO2	Perform Operations on Queues, Circular queues, and dequeues.	PO5
CO3	Perform Operations on tree traversals and linked lists.	PO5
CO4	Demonstration of Searching and Sorting.	PO5
CO5	Demonstration of Graph traversals.	PO5

Requirements:

Turbo C Software

Experiment – 1:

Exercises

Write a program to read „N" numbers of elements into an array and also perform the following operation on an array

- Add an element at the beginning of an array
- Insert an element at given index of array
- Update a element using a values and index
- Delete an existing element

Experiment – 2:

Write Program to implement the Stack operations using an array.

Experiment – 3:

Write a program using stacks to convert a given infix expression to postfix.

Experiment –4:

Write a program for arithmetic expression evaluation.

Experiment –5:

Write Program to implement the Stack operations using Linked List.

Experiment –6:

Write Program to implement the Queue operations using an array.

Experiment –7:

Write Program to implement the Queue operations using Liked List.

Experiment –8:

Write Program to implement circular Queue operations using an array.

Experiment –9:

Write a program to implement de-queues.

Experiment –10:

Write a program to implement single linked list.

Experiment –11:

Write a program to implement double linked list.

Experiment –12:

Write a program for Binary Search Tree Traversals.

Experiment –13:

Write a program to search an item in a given list using the following
Searching   Algorithms
· Linear Search
· Binary Search.

Experiment –14:

Write a program for implementation of the following Sorting Algorithms

· Bubble Sort
· Insertion Sort
· Merge sort

Experiment –15:

Write a program for implementation of the following graph traversals.

· BFS
· DFS

Faculty & Student Resources:

- Software Download
  o Turbo C software.
- Free Online Courses for Data Structures using C
  o Data Structures in C by Udemy
  o Data Structures and Algorithms in C by NPTEL

COURSE 5: DATABASE MANAGEMENT SYSTEMS

Theory	Credits: 3	3 hrs/week

Course Objectives: Able to understand the Database concepts and design.
1. **Able to processes the Database Development using SQL**
2. **Able to know Data Retrieval and Database manipulation using SQL**
3. **Develop efficient PL/SQL programs to access Oracle databases**

Course Outcomes: At the end of this course, students should be able to:

CO1: **Understand** database concepts and design. (PO5, P07)

CO2: **Create** databases using structured query language. (PO5, P07)

CO3: **Apply** data manipulation commands in SQL. (PO5, P07)

CO4: **Learn** the programming basics of PL/SQL. (PO5, P07)

CO5: **Implementation** of cursors in PL/SQL. (PO5, P07)

UNIT- I

Database Concepts-A Relational approach: Database - Relationships - DBMS - Relational data model - Integrity rules.

Database Design: Data modeling -Dependency - Database design - Normal forms - Dependency diagrams – De normalization.

UNIT-II

Structured Query Language (SQL): Introduction – DDL - Naming rules and conventions - D a t a t ypes -Constraints- C reating a table- Displaying t able information - Altering an existing table – Dropping, renaming, and truncating table.

UNIT-III

Working with tables: DML - Adding a new Row - Updating and deleting an existing rows/records - Retrieving data from table - Arithmetic operations - Restricting data with WHERE clause.

Functions and Grouping: Built-in functions - Grouping data.

Joins and Views: Join - join types-**Views:** Views - Creating a view - Removing a view - Altering a view.

UNIT-IV
PL/SQL: **Fundamentals - Block structure - comments - Data types - Variable declaration -Assignment operation.**

Control Structures and Embedded SQL: Control structures - Nested blocks - SQL in PL/SQL - Data manipulation - Transaction control statements.

UNIT-V

PL/SQL Cursors and Exceptions: Cursors - Implicit & explicit cursors and attributes – cursor FOR loops - cursor with parameters - Cursor variables

Exceptions - Types of exceptions -Procedures -Functions –Triggers.

Reference Text Books:

	Author	Title	Publisher
1	Nilesh Shah	Database Systems Using ORACLE", 2nd Edition, 2011	PHI

Course Delivery method: Face-to-face / Blended

Course has focused on: Skill Development.

Websites of Interest:
- https://www.tutorialspoint.com/dbms/index.htm
- https://www.tutorialspoint.com/plsql/index.htm
- **https://www.adamenfroy.com/database-software**

COURSE 5: DATABASE MANAGEMENT SYSTEMS

Practical   Credits: 1   2 hrs/week

Course Objectives:
1. Enhance the knowledge and understanding of Database concepts and design.

2. Enhance the knowledge of the processes of Database Development using SQL

3. Enhance the knowledge of the processes of Database manipulation using SQL

4. Develop efficient PL/SQL programs to access Oracle databases

Course Outcomes: At the end of this course, students should be able to:
   CO1: Understand database concepts and design. (PO5, P07)

   CO2: Create databases using structured query language. (PO5, P07)

   CO3: Apply data manipulation commands in SQL. (PO5, P07)

   CO4: Learn the programming basics of PL/SQL. (PO5, P07)

   CO5: Implementation of cursors in PL/SQL. (PO5, P07)

LAB LIST
1. Using Different operators
2. Using Control Structures
3. Implement Built-in functions
4. Implement update and Alter table
5. Implementing PL/SQL Block
6. Implement PL/SQL table and record
7. Using Functions
8. Using Cursors
9. Using Triggers

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COURSE 6: PYTHON PROGRAMMING

Theory	Credits: 3	3 hrs/week

Course Objectives:
1. To learn and understand python programming basics.
2. To learn and understand python looping, control statements and string manipulations.
3. To make students familiar with the concepts of file handling, exception handling.

COURSE OUTCOMES:
1. implement a given algorithm as a computer program (in Python)(PO5,PO7)
2. Able to understand functions, modules and data types in python(PO5,PO7)
3. Able to use standard programming constructs: repetition, selection and aggregated data(arrays, lists, etc.)(PO5,PO7)
4. Able to learn how to use lists, tuples, dictionaries in python programs(PO5,PO7)
5. To identify and repair coding errors in a program(PO5,PO7)

UNIT -I

Algorithmic Problem Solving: Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving.

Illustrative problems: find minimum in a list, Towers of Hanoi.

UNIT -II

Data, Expressions, Statements: Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments and functions, function definition and use parameters and arguments.
Illustrative programs: exchange the values of two variables.

UNIT -III

Control Flow, Functions: conditional (if), alternative (if-else), chained conditional (if-else if-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, Strings: string slices, string functions and methods, string module.
 Illustrative programs: square root, linear search, binary search

UNIT -IV

Lists, Tuples, Dictionaries: Lists: list operations, list slices, list methods, list loop, aliasing, cloning lists, Tuples: tuple assignment,
  Dictionaries: operations and methods; advanced list processing - list comprehension;
Illustrative programs: selection sort, insertion sort, merge sort,

UNIT -V

Files, Modules, Packages: Files and exception: reading and writing files, errors and exceptions, handling exceptions, modules, packages.
 Illustrative programs: word count.

Text Books		
Author	**Title**	**Publisher**

	Allen B. Downey	"Think Python: How to Think Like a Computer Scientist""	2nd edition, Updated for Python 3, Shroff/O"Reilly Publishers, 2016.
	Guido van Rossum and Fred L. Drake Jr	"An Introduction to Python – Revised and updated for Python 3.2"	Network Theory Ltd., 2011
	Charles Dierbach	"Introduction to Computer Science using Python: A Computational Problem-Solving Focus	Wiley India Edition, 2013.
	John V Guttag	"Introduction to Computation and Programming Using Python""	Revised and expanded Edition, MIT Press , 2013

Course Delivery method : Face-to-face / Blended
Course has focus on : Skill Development
Websites of Interest:
https://www.tutorialspoint.com/python/index.htm
https://www.w3schools.com/python/

Practical   Credits: 1   2 hrs/week

Course Objectives:

1. To learn and understand python programming basics.
2. To learn and understand python looping, control statements and string manipulations.
3. To make students familiar with the concepts of file handling, exception handling.

Course Outcomes:

1. To write, test, and debug simple python programs. (PO5, PO7)
2. Implement python programs with conditionals and loops(PO5,PO7)
3. Read and write data from/to files in python(PO5, PO7)
4. Implementation of searchings and sortings using lists(PO5,PO7)
5. Simulation using pygame (PO5, PO7)

Exercises

1. Find the maximum of a list of numbers

2. Linear search and Binary search

3. Selection sort, Insertion sort

4. Merge sort

5. First n prime numbers

6. Multiply matrices

7. Programs that take command line arguments (word count)

8. Find the most frequent words in a text read from a file

9. Simulate elliptical orbits in Pygame

10. Simulate bouncing ball using Pygame

COURSE 7: IT INFRASTRUCTURE MANAGEMENT

Theory   Credits: 3   3 hrs/week

Course Prerequisites (if any): Basic knowledge in computers and Windows 10 concepts.

Course Description:

This course enables students to gain a fundamental knowledge regarding infrastructure management using Windows Server.

Course Objectives:

1. To educate student in various deployment techniques of Windows 10 and Configuring devices and drivers.
2. To educate students in MS SCCM, SCOM basic concepts.
3. To educate students in Agent deployment and monitoring concepts in operations manager.

Course Outcomes: At the end of this course, students should be able to:

CO1: Perform post installation configuration task and configure devices and drivers. (PO5, PO7)

CO2: Manage content of SCCM in configuration manager its features and capabilities(PO5, PO7)

CO3: Understand basic concepts of Application Management, Operating System Deployment, protection and Troubleshooting SCCM(PO5, PO7)

CO4: Understand the SCOM Features and Capabilities. (PO5, PO7)

CO5: Create rules for monitoring and gain knowledge in operations manager reporting along with Creating Reports using SCOM Reporting. (PO5, PO7)

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	**Introducing Windows 10**: Introducing Windows 10, Overview of Deploying Windows 10, Configure Devices and Drivers, Perform Post installation Configuration Tasks, Managing Apps in Windows	9
II	**Introduction to SCCM**:System Center Configuration Manager Overview, SCCM Features and Capabilities, SCCM Setup & Installation, Configuration Manager Basics, Deploying SCCM Client, User and Device Collections in SCCM	9

III	**Managing Systems with SCCM** Application Management using SCCM, Operating System Deployment using SCCM, Endpoint Protection using SCCM, Troubleshooting SCCM Server, Troubleshooting SCCM Clients, Creating Reports using SCCM Reports	9
IV	**Introduction to SCOM** System Center Operations Manager Overview, SCOM Features and Capabilities, SCOM Setup & Installation, Operations Manager Basics, Deploying SCOM Clients, Management Packs in SCOM	9
V	**Monitoring Systems with SCOM** Managing & Administering SCOM Environment, Managing Alerts using SCOM, Creating Custom Management Packs and Alerts, Troubleshooting SCOM Server, Troubleshooting SCOM Clients, Creating Reports using SCOM Reporting	9

ReferenceTextBooks:			
	Author	**Title**	**Publisher**
1	Woody Leonhard, CiprianRusen	Windows 10 All-in-One For Dummies(2021)	John Wiley & Sons, Inc.,
2	Kerrie Meyler, Gerry Hampson, Saud Al-Mishari, Greg Ramsey, Kenneth van Surksum, Michael Gottlieb Wiles	System Center Configuration Manager C Unleashed(2018)	Pearson
3	Kevin Greene	Getting Started with Microsoft System Center Operations Manager(2016)	Packt Publishing

Course Delivery method: Face-to-face / Blended

Course has focus on: Employability, Skill Development

Websites of Interest: https://support.microsoft.com/en-gb/windows
Co-curricular Activities: Certification Courses, Quiz, Seminars, Group Discussions.

Faculty & Student Resources:
- **Windows 10**
    - o Windows 10 Tutorial - 3.5 Hour Windows Guide + Windows 10 Tips
    - o Windows 10 for Dummies, Newbies, and other Fine Beginners
- **System Center Configuration Manager (SCCM)**
    - o System Center Configuration Manager Overview
    - o SCCM Features and Capabilities

- o SCCM Setup & Installation
- o Configuration Manager Basics
- o Deploying SCCM Client
  - Configuration Manager client application
  - Client installation methods in Configuration Manager
- o User and Device Collections in SCCM
  - Introduction to collections in Configuration Manager
  - Prerequisites for collections in Configuration Manager
  - How to create collections in Configuration Manager
  - How to manage collections in Configuration Manager
- o Application Management using SCCM
  - Create applications in Configuration Manager
  - Deploy applications with Configuration Manager
  - Manage Applications
  - Monitor applications from the Configuration Manager console
- o Operating System Deployment using SCCM
  - Introduction to operating system deployment in Configuration Manager
  - Infrastructure requirements for OS deployment in Configuration Manager
  - Scenarios to deploy enterprise operating systems with Configuration Manager
- o Endpoint Protection using SCCM
  - Endpoint Protection Overview
  - Endpoint Protection Client
  - Example Scenario: Use Endpoint Protection to protect computers from malware
- o Troubleshooting SCCM Server
- o Troubleshooting SCCM Clients
- o Creating Reports using SCCM Reports
  - Operations and maintenance for reporting in Configuration Manager
  - List of reports in Configuration Manager
- **System Center Operations Manager (SCOM)**
  - o System Center Operations Manager Overview
    - Operations Manager key concepts
  - o SCOM Features and Capabilities
  - o SCOM Setup & Installation
    - Deploying System Center Operations Manager
    - Single-server deployment of Operations Manager
  - o Operations Manager Basics
    - Management server
    - Web console server
    - Reporting server
    - Operational database
    - Data warehouse database
  - o Deploying SCOM Clients
    - Install Agent on Windows Using the Discovery Wizard
  - o Management Packs in SCOM

Vijayadeep   N. S. Jyothi

J. Ramachar

COURSE 7: IT INFRASTRUCTURE MANAGEMENT

Practical   Credits: 1   2 hrs/week

Course Prerequisites (if any): Basic knowledge in computers and Windows 10 concepts.

Course Description:

This course enables students to gain a fundamental knowledge regarding infrastructure management using Windows 10.

Course Objectives:

1. To educate student in various deployment techniques of Windows 10 and Configuring devices and drivers.
2. To educate students in MS SCCM, SCOM basic concepts.
3. To educate students in Agent deployment and monitoring concepts in operations manager.

Course Outcomes: At the end of this course, students should be able to:

CO1:Perform post installation configuration task and configure devices and drivers. (PO5, PO7)

CO2: Manage content in configuration manager and maintaining and monitoring system center 2012 configuration manager. (PO5, PO7)

CO3: Understand basic concepts of operations manager and its system requirements along with installing SQL server, operations and web console. (PO5, PO7)

CO4: Understand Agent and Agent less managed systems and gain fundamental knowledge in management packs. (PO5, PO7)

CO5: Create rules for monitoring and gain knowledge in operations manager reporting along with disaster recovery. (PO5, PO7)

LAB LIST

1. Windows 10
    a. Explain the Deployment Overview of Windows 10
2. System Center Configuration Manager (SCCM)
    a. Installation of SCCM Server
    b. Deployment of SCCM Agents
    c. Explain the OS and Software Deployment using SCCM
    d. Generate Reports for SCCM
3. System Center Operations Manager (SCOM)
    a. Installation of SCOM Server
    b. Deployment of SCOM Agents
    c. Explain the Deployment and Customization of Management Packs in SCOM
    d. Create Alerts and Notifications using SCOM
    e. Generate Reports for SCOM

COURSE 8: OBJECT ORIENTED PROGRAMMING USING JAVA

Theory	Credits: 4	5 hrs/week

Course Objectives:

The Objective of the course is to assist the student in understanding the concepts of Object Oriented Programming using Java language.

Course Outcomes: At the end of this course the student is able to

CO1: Overview of java programming, history and its features.**(PO5,PO7)**

CO2: Understand fundamentals of programming such as variables, conditional and iterative execution, statements, etc.**(PO5,PO6,PO7)**

CO3: Understand the principles of arrays, inheritance, packages and multi-threading.**(PO5,PO6,PO7)**

CO4: Understand the Fundamental features of Managing Errors, Exceptions and Applet Programming.**(PO5,PO6,PO7)**

CO5: Understand the Files concept in java.**(PO5,PO6,PO7)**

UNIT -I

JAVA Evolution: History – Features, Overview of Java Language: Introduction - Simple Java program - Structure - Java tokens - Statements - Java virtual Machine.
Constants - Variables - Data types - Operators and expressions.

UNIT -II

Decision making and Branching: Simple If Statement, the IF…Else statement, The Else... If ladder, The Switch Statement, The? : Operator, Decision making and looping: The While statement, The do Statement - The for Statement - Jumps in loops - labeled loops - Classes, Objects and Methods.

UNIT -III

Arrays, Strings and Vectors – Interfaces- Multiple Inheritance – Packages: Putting classes together –Threaded Programming.

UNIT –IV

Managing Errors and Exceptions – I/O Exceptions – Applet Programming – Graphics programming: The Graphics class- Lines and rectangles-Circles and ellipses-Drawing arcs - Line graphs -Drawing Bar charts.

UNIT -V

Files: Introduction – concept of streams – Stream classes – Using stream – I/O classes – File class – creation of files – Reading / Writing characters/ Bytes.

Text Books:

	Author	Title	Publisher
1	E. Balaguruswamy,	Programming with JAVA - A Primer, 2015	McGraw Hill Professional

Reference Text Books:

	Author	Title	Publisher

1	Sachin Malhotra	Programming in Java	OXFORD University Press
2	John R. Hubbard	Programming with Java, Second Edition	Schaum"s outline Series, TATA McGraw-Hill Company.
3	Deitel &Deitel.	Java TM: How to Program 2007	PHI
4	D.S Mallik	Java Programming: From Problem Analysis to Program Design	
5	P. Radha Krishna	Object Oriented Programming Through Java, 2008	Universities Press

Course Delivery method: Face-to-face / Blended

Course has focus on: Skill Development.

Websites of Interest:
https://www.tutorialspoint.com/java/index.htm

COURSE 9: VIRTUALIZATION AND CLOUD COMPUTING

| Theory | Credits: 3 | 3 hrs/week |

Course Prerequisites (if any): Basic knowledge in computers and internet.

Course Description: This course focuses towards Distributed Systems, Cloud Concepts, Virtualization and Datacentres

Course Objectives:
1. Understanding of Distributed Systems.
2. Enhance the knowledge on Cloud Computing.
3. To Configure and Manage Virtual Machines.
4. To Know about Data Center.

Course Outcomes: At the end of this course, students should be able to

CO1: **Understand** Distributed Systems concepts and its applications. (PO5,PO6, PO7)

CO2: **Learn** about Cloud Computing. (PO5, P07)

CO3: **Learn** to Configure and Manage Virtual Machines. (PO5, P07)

CO4: **Know** about Virtual Machines. (PO5, P07)

CO5: **Understand** Data Center. (PO5,PO6, PO7)

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	**Distributed Systems:** Overview of Computing Paradigm, Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing, Evolution of Cloud Computing	8
II	**Data Center** :Data Center Overview, Data Center Evolution, Modern Business Requirements for Data Center, Making Agile Data Center	10
III	**Virtualization :**Define Virtualization, Need of Virtualization, Virtualization Technologies, Uses of Virtualization,Virtualization Pitfalls	10
IV	**Cloud:** Cloud Fundamentals, Benefits of Cloud Computing, Type of Clouds, Cloud Computing Services, Cloud Computing Architecture, Virtualization and Cloud Computing.	10
V	**Hybrid Cloud:** Hybrid Cloud Fundamentals, Benefits of a Hybrid Cloud, Key Considerations for Hybrid Cloud, Components of Hybrid Cloud.	7

	Text Books		
	Author	**Title**	**Publisher**
	Jean Dollimore formerly of Queen Mary, Tim Kindberg	Distributed Systems Concepts and Design [PDF]	5th Edition Cambridge University, University of London (2012)
	VenkataJosyula , Malcolm Orr , Greg Page	Cloud Computing: Automating the Virtualized Data Center[PDF]	1st Edition By Josyula(2012)
	Brian J.S. Chee, Curtis Franklin Jr.	Cloud Computing: Technologies and Strategies of the Ubiquitous Data Center[PDF]	1st Edition By Brian J,S, Chee, Curtis Franklin Jr(2019)

Course Delivery method : Face-to-face / Blended

Course has focus on : Skill Development

Co-curricular Activities: Programming Contests, Assignments & Quiz

Websites of Interest:

Distributed Systems
- https://www.itu.int/dms_pub/itu-t/oth/23/01/T23010000090001PDFE.pdf
- https://www.tutorialspoint.com/Distributed-Systems
- https://blog.stackpath.com/distributed-system/
- https://www.tutorialspoint.com/software_architecture_design/pdf/distributed_architecture.pdf
- https://archive.mu.ac.in/myweb_test/MCA%20study%20material/M.C.A.(Sem%20-%20V)%20Distributed%20Computing.pdf

Data Center
- https://acadpubl.eu/jsi/2017-114-7-ICPCIT-2017/articles/12/8.pdf
- https://www.actualtechmedia.com/wp-content/uploads/2016/05/Building-a-Modern-Data-Center-ebook.pdf
- https://www.youtube.com/playlist?list=PLJuCep43JwAVl17HMPNZRwmlEn2

mzhha Virtualization
- https://www.vmware.com/pdf/virtualization.pdf
- https://ssl.www8.hp.com/de/de/pdf/virtuallisation_tcm_144_1147500.pdf
- https://www.youtube.com/playlist?list=PLndqfxA_9SWFsFpP1Db_E8DmzY3

K5Wkq Cloud
- https://www.guru99.com/cloud-computing-for-beginners.html
- https://www.youtube.com/playlist?list=PLDns5jVqEmIoNrmSY0aRHwK5LqGM

9u3LL Hybrid Cloud
- https://www.omg.org/cloud/deliverables/CSCC-Practical-Guide-to-Hybrid-Cloud- Computing.pdf
- https://www.youtube.com/playlist?list=PLOspHqNVtKABPTyvxoNW0e4XSgCNdZ40F

COURSE 9: VIRTUALIZATION AND CLOUD COMPUTING

<u>Practical</u>   Credits: 1   <u>2 hrs/week</u>

Course Prerequisites (if any): Basic knowledge in computers and internet.

Course Description: This course focuses towards Distributed Systems, Cloud Concepts, Virtualization and Datacentres

Course Objectives:

1. Enhance the knowledge on Cloud Computing.

2. To Configure and Manage AWS.

Course Outcomes: At the end of this course, students should be able to

   CO1: Understand Distributed Systems concepts and its applications. (PO5,PO6, PO7)

   CO2: Learn about Cloud Computing. (PO5, P07)

   CO3: Learn to Configure and Manage Virtual Machines. (PO5, P07)

   CO4: Know about Virtual Machines. (PO5, P07)

   CO5: Understand Data Center. (PO5,PO6, PO7)

Practical Exercises:

1. Installing and Using Workstation Player
      a. Install Workstation Player on a Windows Host
      b. Start Workstation Player
      c. Use the Workstation Player Window
2. Changing Workstation Player Preference Settings
      a. Configuring Close Behavior Preference Settings
      b. Configuring Software Updates Settings
      c. Configuring Workstation Player Color Theme Settings
3. Creating Virtual Machines in Workstation Player
      a. Preparing to Create a Virtual Machine
      b. Create a Virtual Machine
4. Installing and Upgrading VMware Tools
      a. Installing VMware Tools
      b. Upgrading VMware Tools
      c. Configure Software Update Preferences
      d. Configure VMware Tools Updates for a Specific Virtual Machine
5. Starting and Stopping Virtual Machines in Workstation Player a. Start a Virtual Machine in Workstation Player
      b. Power Off a Virtual Machine in Workstation Player
      c. Use Ctrl+Alt+Delete to Shut Down a Guest
      d. Suspend and Resume a Virtual Machine in Workstation Player
      e. Reset a Virtual Machine in Workstation Player
6. Changing the Virtual Machine Display
      a. Configure Display Settings for a Virtual Machine
      b. Use Full Screen Mode in Workstation Player
7. Configuring and Managing Virtual Machines
      a. Change the Name of a Virtual Machine
      b. Change the Working Directory for a Virtual Machine

c. Change the Virtual Machine Directory for a Virtual Machine

d. Change the Memory Allocation for a Virtual Machine

e. Moving Virtual Machines

f. Delete a Virtual Machine

8. Configuring and Managing Devices

a. Configuring DVD, CD-ROM, and Floppy Drives

b. Configuring and Maintaining Virtual Hard Disks

c. Configuring Keyboard Features

d. Modify Hardware Settings for a Virtual Machine

9. Configuring Network Connections

a. Understanding Common Networking Configurations

b. Configuring Bridged Networking

c. Configuring Network Address Translation

d. Configuring Host-Only Networking

e. Changing a Networking Configuration

10. Configuring Virtual Machine Option Settings

a. Configuring General Option Settings for a Virtual Machine

b. Configuring Power Options for a Virtual Machine

c. Configuring VMware Tools Options for a Virtual Machine

11. Configuring Virtual Machine Hardware Settings

a. Adding & Removing Hardware to a Virtual Machine

b. Adjusting Virtual Machine Memory

c. Configuring Virtual Machine Processor Settings

d. Configuring and Maintaining Virtual Hard Disks

e. Configuring Virtual Network Adapter Settings

f. Configuring Display Settings

Lab Requirements:

ϒ Download: VMware Workstation Player

ϒ User Guide: Using VMware Workstation Player for Windows

COURSE 10: PROCESS MANAGEMENT

Theory   Credits: 3   3 hrs/week

Course Prerequisites (if any): Basic knowledge in computers and internet.

Course Description: This course focuses towards Software Engineering, Agile and Scrum,DevOps Tools and Design Thinking

Course Objectives:

1. Understanding the concept of Software Engineering.

2. To Know about Agile and Scrum.

3. To implement DevOps Tools.

4. Understanding the concept of Design Thinking.

Course Outcomes: At the end of this course, students should be able to

CO1: Understand about Software Engineering. (PO5,PO6, PO7)

CO2: Learn about Agile. (PO5, P07)

CO3: Learn about Scrum (PO5, P07)

CO4: Know about DevOps. (PO5, P07)

CO5: Understand Design Thinking is about. (PO5,PO6, PO7)

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	**Software and Software Engineering** The Nature of Software, The Unique Nature of WebApps, Software Engineering- Software Process, Software Process Model: A Generic Process Model, Process Assessment and Improvement, Perspective Process Models, Specialized Process Model, The Unified Process.	8
II	**Agile**	10

	What Is Agile, Understanding Agile Value, Agile Manifesto, Principles of Agile, Agile Methodologies, Advantages and Disadvantages of Agile - Agile anti-patterns, Scaled Agile Framework.		
III	**Scrum** Definition of Scrum, Uses of Scrum, Scrum Theory, Scrum Values, The Scrum Team, Scrum Events.	8
IV	**DevOps** Introduction to DevOps, methodologies, principles, strategies, Automation, Performance Measurement through KPIS and Metrics, Agile and DevOps, Agile Infrastructure, Velocity, Lean Startup UPS.	10
V	**Design Thinking** Introduction to Design Thinking – Lean thinking, Actionable Strategy, The Problem with Complexity, Vision and Strategy, Defining Actionable Strategy Act to Learn.	9

Text Books			
	Author	**Title**	**Publisher**
1	Roger S Pressman,	"Software Engineering A Practioners Approach"	7th Edition 2010
2	KalloriVikraman,	"Introduction to Devops"	1st Edition, 2016.
3	Stephen Haunts	Essential of Scrum" Addison-Wesley Professional	1st Edition, 2012
4	Jonny Schneider	"Understanding Design Thinking, Lean, and Agile"	O'Reilly Media 2017.
5	Jeff Gothelf	"Lean vs. Agile vs. Design Thinking"	Sense and Respond Press,2017

Course Delivery method : Face-to-face / Blended
Course has focus on : Skill Development
Websites of Interest:
https://www.javatpoint.com/devops
https://www.tutorialspoint.com/scrum/scrum_overview.htm
https://www.javatpoint.com/agile
https://www.tutorialspoint.com/design_thinking/design_thinking_introduction.htm

Co-curricular Activities: Programming Contests, Assignments & Quiz

COURSE 10: PROCESS MANAGEMENT

Practical   Credits: 1   2 hrs/week

Course Prerequisites (if any): Basic knowledge in computers and internet.
Course Description: This course focuses towards Software Engineering, Agile and Scrum,DevOps Tools and Design Thinking
Course Objectives:
1. To implement DevOps Tools.

Course Outcomes: At the end of this course, students should be able to
  CO1: Understand about Software Engineering. (PO5,PO6, PO7)

  CO2: Learn about Agile and Scrum. (PO5, P07)

  CO3: Learn to Manage DevOps Tools. (PO5, P07)

  CO4: Know about Lean UX and Agile Anti-Patterns. (PO5, P07)

  CO5: Understand Design Thinking is about. (PO5,PO6, PO7)

Exercises

1. Introduction to DevOps – Tools and settings
2. Revision Controls System
3. Configuration Management
4. Build Automation -Introduction with Maven
5. Nexus Artifacts/Proxy Tool
6. Jenkins Framework
7. LAMP Setup
8. Working with Docker
9. System Monitoring

COURSE 11: INTRODUCTION TO DIGITAL TECHNOLOGY

Theory   Credits: 3   3 hrs/week

Course Objectives

• To understand the fundamental concepts of digital technology and   to introduce the concepts of cloud , big data, digital marketing

• To introduce the principles of Artificial Intelligence, Block chain technology

• To recognize the use of Digital technology in various Industries

• To understand the principles of Automatix, Automation Anywhere

• To understand and create Bots

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1:Know about Digital primer(PO6,PO7)

CO2: Understand Digital for Industries (PO6,PO7)

CO3: Learn Automatix – Art of RPA-Introduction (PO6,PO7)

CO4: Know about Automation Anywhere (PO6,PO7)

CO5:Know about Bots (PO6,PO7)

II. Syllabus: **(Total Theory Hours: 45)**

Unit I
Digital Primer - Why is Digital Different?- Digital Metaphors On Cloud 9-A Small Intro to Big Data-Social Media & Digital Marketing-Artificial Intelligence- Unchain the Block chain-Internet of Everything-Immersive Technology.

Unit II
Digital for Industries-Manufacturing and Hi-tech-Banking and Financial Services-Insurance and Healthcare-Retail-Travel & Hospitality-Communications, Media & Information Services and Government.

Unit III
Automatix – Art of RPA-Introduction - Setting the Context-RPA Prelude-RPA Demystified-RPA vs BPM RPA Implementations-RPA in Industries-RPA Tools-Automatix
Unit IV
      Automation Anywhere-Getting Started with AA Enterprise-Exploring AA Enterprise-AA Enterprise – Architecture.

Unit V
Knowing the Bots-More About TaskBots- AA Enterprise - Assess your Learning, All About Recorders, Designers, MetaBots, Cognitive RPA

III References/ Text Book/ e-books/websites

- Getting started with RPA using Automation Anywhere: Automate your day-to-day Business Processes using Automation Anywhere (English Edition) by Vaibhav Srivastava
- Robotic Process Automation Projects: Build Real-world RPA Solutions Using UiPath and Automation Anywhere by Arun Kumar Asokan and Nandan Mullakara

Reference Materials on the Web/web-links:

Faculty & Student Resources:

- Automation Anywhere: <u>Getting Started with Robotic Process Automation (RPA)</u>
- Automation Anywhere: <u>Citizen Developer Basics</u>
- Automation Anywhere: <u>Tips And Tricks (Beginner)</u>
- <u>YouTube: Automation Anywhere Full Course</u> - Simplilearn
- Automation Anywhere Community Edition (<u>Download Link</u>)

IV. Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work andshallencourage self/independent and group learning)

A. Measurable
1. Assignments (in writing and doing forms on the aspects of syllabus content and outside thesyllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals orgroups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

B. General
1. Group Discussion
2. Try to solve MCQ‟s available online.

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SEMESTER-IV
COURSE 11: INTRODUCTION TO DIGITAL TECHNOLOGY

</div>

Practical   Credits: 1   2 hrs/week

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Understand the fundamental concepts of digital technology

CO2: Familiarize the principles of Artificial Intelligence, Block chain technology

CO3: Recognize the use of Digital technology in various

Industries CO4: Understand the principles of Automatix,

Automation AnywhereCO5: Create bots and understand its

various types

II: Practical (Laboratory) Syllabus: (30 Periods):

Automatix (RPA), Automation Anywhere

1. Creating bots for automatic software installation
2. Creating bots for automatic software patch installation
3. Creating bots for file transfer
4. Creating bots for automatic file backup

III. Reference Materials on the Web/web-links:

- YouTube: Automation Anywhere Full Course - Simplilearn

COURSE 12: SOFTWARE ENGINEERING AND TESTING

Theory   Credits: 3   3 hrs/week

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1:Understand the Selenium Basics concepts(PO6,PO7)

CO2: Know about Selenium WebDriver (PO6,PO7)

CO3:Understand Selenium Framework (PO6,PO7)

CO4: Learn how TestNG works(PO6,PO7)

CO5: Learn Advanced concepts in Selenium (PO6,PO7)

II. Syllabus:

III.   Unit I :Selenium Basics 8hrs
Software Testing, Automation Testing, Introduction to Selenium and its Components,
Selenium IDE Features, Selenium Download and Installation, Locator Types

Unit II:Selenium WebDriver 10hrs
Selenium WebDriver Installation with Eclipse, Handling Dropdowns, Explicit and Implicit
Wait, Handling Alerts/Pop-ups, Handling Web Tables, Frames, Dynamic Elements, Robot
API, AutoIT

Unit III :Selenium Framework
Test Automation Framework: Introduction, Benefits of Automation Framework, Types of
Automation framework

Unit IV: TestNG
Introduction to TestNG, TestNG Framework, TestNG installation, TestNG Annotations and
Listeners, TestNG Example, TestNG Process Execution: Batch, Controlled Batch & Parallel

Unit V :Advance Selenium
Selenium Grid: Introduction, Usage of Selenium Grid, Grid1.0 vs Grid2.0, Selenium Grid
architecture, How to setup Selenium Grid using command line, designing test scripts that can
run on the Grid, Using DesiredCapabilities Object, Using RemoteWebDriver Object,
Running a sample Test Case on the Grid

III   References/ Text Book/ e-books/websites

- Test Automation using Selenium WebDriver with Java: Step by Step Guide by
  Navneesh Garg
- Absolute Beginner Java 4 Selenium Webdriver: Come Learn How to Program for
  Automation Testing by Rex Allen Jones II

    Reference Materials on the Web/web-links:

https://www.softwaretestingmaterial.com/types-test-automation-frameworks/
https://www.guru99.com/introduction-to-selenium-grid.html#6

\Faculty & Student Resources:

- [YouTube: Selenium Video Tutorials](#)
- [YouTube: Selenium Full Course](#) – Simplilearn
- [YouTube: Selenium Full Course](#) – Edureka!
- [Sample Selenium Assignments/Exercises 1](#)
- [Sample Selenium Assignments/Exercises 2](#)
- [Sample Selenium Assignments/Exercises 3](#)

IV. Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work andshallencourage self/independent and group learning)

C. Measurable
1. Assignments (in writing and doing forms on the aspects of syllabus content and outside thesyllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals orgroups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

D. General
1. Group Discussion
2. Try to solve MCQ‴s available online.

COURSE 12: SOFTWARE ENGINEERING AND TESTING

Practical   Credits: 1   2 hrs/week

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Learn how to use Chrome Driver(PO6,PO7)
CO2: Know about how to create browser instance (PO6,PO7)
CO3: Understand how to search and print contents in the list(PO6,PO7)
CO4: Learn how use quit() method.(PO6,PO7)
CO5: Learn about generic method(PO6,PO7)

II: Practical (Laboratory) Syllabus: (30 Periods): At least 8 Practicals.

1. Write a script to open google.com and verify that title is Google and verify that it is redirected to google.co.in

2. Write a script to open google.co.in using chrome browser (ChromeDriver)

3. Write a script to open google.co.in using internet explorer (InternetExplorerDriver)

4. Write a script to create browser instance based on browser name

5. Write a script to search for specified option in the listbox

6. Write a script to print the content of list in sorted order.

7. Write a script to print all the options. For duplicates add entry only once. Use HashSet.

8. Write a script to close all the browsers without using quit() method.

9. Write generic method in selenium to handle all locators and return web element for any locator.

10. Write generic method in selenium to handle all locators containing dynamic wait and return web element for any locator.

III. Lab References:
https://www.guru99.com/selenium-tutorial.html
https://www.javatpoint.com/selenium-tutorial
Web-links: https://youtu.be/Tu61E5mHv18

COURSE 13: CLIENT RELATIONSHIP MANAGEMENT

Theory   Credits: 3   3 hrs/week

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Understanding the interface of ServiceNow (PO6,PO7)

CO2: To Know how to Customization of UI(PO6,PO7)

CO3: Understanding Data and Relationships (PO6,PO7)

CO4: Understanding the Tasks and Workflows,UI and Data Policies (PO6,PO7)

CO5: Learn User Administration, Security and Scripting (PO6,PO7)

II. Syllabus:

Unit I
The Interface - Versions, Frames, Important application menus and modules, Content Frame, UI Settings and Personalization
Lists and Forms – List V2 versus List V3, Lists and Tables, Forms

Unit II
UI Customization – Branding your Instance, Custom Themes, UI-Impacting System Properties, Configuring Service Portal UI, Creating a Custom Homepage, Styling Pages and Widgets, Setting up the War Room page, Styling the CMS

Unit III
Understanding Data and Relationships – One to many relationships in ServiceNow, manyto many relationships in ServiceNow, Enforcing one to one relationships, Defining Custom Relationships, Database table inheritance

Unit IV
Tasks and Workflows – Important Task fields, Journals, and the activity formatter, Extending the task table, Workflows.
UI and Data Policies – UI Policies, Reverse if false, Scripting in UI policies, UI Policy Order, Data Policies

Unit V
User Administration and Security – Users, Groups and Roles, Emails and Notifications, User Preferences, ACLs – Security Rules

Introduction to Scripting – Client-side versus Server-side APIs, Where scripting is supported, Integrated development environment

III   References/ Text Book/ e-books/websites

- Learning ServiceNow: administration and development on the Now platform, for powerful IT automation by Tom Woodfuff
- ServiceNow Basics: User Training – (PDF shared separately)

   Reference Materials on the Web/web-links:

Faculty & Student Resources:
- **Creating Account in ServiceNow** – Registration Page
   o   With an Account you will have access to:

- Watch <u>bite-sized videos</u> instantly
- Experience a <u>live, in-depth demo</u>
- Get hands-on with a <u>free developer instance</u>
- **ServiceNow Trainings**
  - [ServiceNow Essentials](#)
  - [ServiceNow User Interface](#)
  - [ServiceNow Fundamentals Simulator](#)
  - [ServiceNow System Administrator Training](#)

IV. Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work andshallencourage self/independent and group learning)

E. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside thesyllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals orgroups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

F. General

1. Group Discussion
2. Try to solve MCQ"s available online.

COURSE 13: CLIENT RELATIONSHIP MANAGEMENT

Practical   Credits: 1   2 hrs/week

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1:Know how basic navigation in Service Now (PO6)

CO2: Learn Searching in Service Now is done(PO6)

CO3: Learn how to Manage Records in Lists(PO6)

CO4: Understand Lists(PO6)

CO5: Learn to Manage Records in Forms (PO6)

II: Practical (Laboratory) Syllabus: (30 Periods):

1. Basic Navigation
   a. Navigation and the User Interface
   b. Navigating Applications
   c. Introduction to Searching
2. Managing Records in Lists
   a. Using Lists
   b. Finding Information in Lists
   c. Using Filters and Breadcrumbs
   d. Editing Lists
   e. Creating Personal Lists
3. Managing Records in Forms
   a. Forms

III. Lab References:

Refer Service Now Basics: User Training PDF for Step-by-Step Procedures for the above Lab Exercises

COURSE 14: IT INFRASTRUCTURE LIBRARY

Theory   Credits: 4   5 hrs/week

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Understanding the concept of ITIL 4(PO6,PO7)
CO2: To Know the Key Concepts of Service Management (PO6,PO7)
CO3: To know about Dimension Model of IT Service
Management(PO6,PO7)CO4: Understanding the concept of ITIL Service
Value System(PO6,PO7) CO5: To implement ITIL Management
Practices(PO6,PO7)

II. Syllabus:

Unit I : Introduction to ITIL 4

IT Service Management in the modern world, About ITIL v4, The structure and benefits of the ITIL v4 Framework

Unit II: Key Concepts of Service Management

Value and Value Co-Creation, Stakeholders, Products and Services, Service Relationships and Value

Unit III
ITIL 4: Dimension Model of IT Service Management

Organization & People; Information & Technology; Partners & Suppliers; Value Streams & Processes, External factors

Unit IV: ITIL Service Value System

Service Value System (SVS) Overview; Opportunity, demand, and Value; Guiding Principles; Governance; Service Value Chain (SVC); Continual Improvement; Practices

Unit V : ITIL Management Practices

General Management Practices; Service Management Practices; Technical Management Practices

III   References/ Text Book/ e-books/websites

ITIL For Beginners: The Complete Beginner's Guide to ITIL by Clyde Bank Technology

Reference Materials on the Web/web-links:

Faculty & Student Resources:

- ITIL Foundation v4 Edition - PDF
- ITIL For Beginners: The Complete Beginner"s Guide to ITIL - PDF
- ITIL for Dummies - PDF

IV. Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work andshallencourage self/independent and group learning)

G. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside thesyllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals orgroups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

H. General

1. Group Discussion
2. Try to solve MCQ''s available online.

I. Course Outcomes: Students at the successful completion of the course will be able to: CO1: Overview of Corporate & BPS Industry (PO6)
CO2: Understand what is Grooming for Corporates (PO1, PO6)CO3: Learn Elementary Level English Communication (PO1, PO6) CO4: Learn Intermediate Level English Communication (PO1, PO6) CO5: Learn Advanced Level English Communication (PO1, PO6)

II. **Syllabus:**

Unit I: Overview of Corporate & Business Process System Industry
Corporate: Ice-breaker Session, History of Corporate, What is Corporate?

BPS Industry: What is BPS? History of BPS, Benefits of BPS, BPS Industry in World,BPS Industry in India, TCS BPS
        Difference between Campus and Corporate
•   Change Management (Understand the difference between campus and corporate life and prepare themselves for the same)
•   Awareness to Corporate Culture, Impact of your attitude and behaviour, Language Proficiency, Good relationship, Respect others, Self Confidence, zeal forcontinuous learning & Nonverbal communication.
Unit II: Grooming for Corporate

Corporate Etiquettes: Dressing and Grooming Skills, Workplace Etiquette, Business Etiquette, Email Etiquette, Telephone Etiquette, Meeting Etiquette & Presentation Skills

Professional Competencies: Analytical Thinking, Listening Skills, Time Management, TeamSkills, Assertiveness, Stress Management, Participating in Group Discussion, Interview Facing, Ownership and Attention to detail.

 Unit III: Elementary Level English Communication
Grammar, Phonetics, One on One basic conversation
skill practice

Unit IV: Intermediate Level English Communication

Reading Comprehension, Listening Comprehension, Improving Vocabulary,
        Improving Writing Skills and Comprehension while interacting face
        toface

Unit V : Advanced Level English Communication

Narration of short stories, Interview Skills, Group Discussion, Social ConversationSkills, Presentation skills & One Act Plays.

III   References/ Text Book/ e-books/websites

1. Ramachandra K.K, Karthick K.K From Campus to
    Corporate,Pearson ISBN 978-93-325-5467-2 2016.
2. English in Use – I Orient Blackswan
3. English in Use – II Orient Blackswan
Reference Materials on the Web/web-links:

Speak— https://www.speechactive.com (it can record our speech to check our pronunciation) (for vowels and consonants)

Reading— https://www.freeonlinetest.in (for practice to reading)
Correction of the sentences and sentence fillers—
https://meritnotes.com

Faculty & Student Resources:

•   Practical Assessments (Evaluation Rubric to assess the skills learnt) – 80% Allocation
•   Written Examination – 20% Allocation

IV. Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work
and shall encourage self/independent and group learning)

A.   Measurable
1.   Assignments (in writing and doing forms on the aspects of syllabus content and
         outside the syllabus content. Shall be individual and challenging)
2.   Student seminars (on topics of the syllabus and related aspects (individual activity))
3.   Quiz (on topics where the content can be compiled by smaller aspects
          and data (Individuals or groups as teams))
4.   Study projects (by very small groups of students on selected local real-time
          problems pertaining to syllabus or related areas. The individual participation
          and contribution of students shall be ensured (team activity)
B.   General
1.   Group Discussion
2.   Try to solve MCQ's available online.

COURSE 15: CAMPUS TO CORPORATE

Practical	Credits: 1	2 hrs/week

I. Course Outcomes: Students at the successful completion of the course will be able to: CO1: Overview of Corporate & BPS Industry (PO6)
CO2: Understand what is Grooming for Corporates (PO1, PO6) CO3: Learn Elementary Level English Communication (PO1, PO6) CO4: Learn Intermediate Level English Communication (PO1, PO6) CO5: Learn Advanced Level English Communication (PO1, PO6)

Unit I: Overview of Corporate & Business Process System Industry (2 Hours)
Corporate: Ice-breaker Session, Nonverbal communication.

Unit II: Grooming for Corporate (4 Hours)
Corporate Etiquettes: Dressing and Grooming Skills, Workplace Etiquette, Business Etiquette, Email Etiquette, Telephone Etiquette, Meeting Etiquette & Presentation Skills

Unit III: Elementary Level English Communication (4 Hours)
 Phonetics, One on One basic conversation skill practice

Unit IV: Intermediate Level English Communication (5 Hours)
 Reading Comprehension, Listening Comprehension, Comprehension while interacting face to face.

Unit V : Advanced Level English Communication (10 Hours)
 Narration of short stories, Interview Skills, Group Discussion, Social Conversation Skills, Presentation skills & One Act Play

COURSE 16: MERN FULL STACK DEVELOPMENT

Theory	Credits: 3	3 hrs/week

Course Objective:

You will build a unique full-stack project, Capstone project, and even learn how to deploy your project so it's live and accessible on the Internet.

Course Outcomes:

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Understand the detail of ecma script	PO5, PO7
CO2	Understand the concept of mongodb	PO5,PO7
CO3	Understand the concept of express js	PO5,PO7
CO4	Understand the concept of react js	PO5,PO6
CO5	Understand the concept of node js	PO5,PO7

Unit-1: JavaScript with ECMAScript   8hrs

Introduction to JavaScript Framework

History of JavaScript, What is ES6 (ECMAScript 6/JavaScript 6), ES6 Module System, A Word on Bable, Block Scope, Let & Const, Template Literals, Arrow Functions, Spread and Rest Operators, Object Literal Improvements, De-structuring,Classes, Inheritance, Static Properties and Methods, Promises, Iterators and Iterables, Generators, Modules, New Features in ES6, JavaScript let, JavaScript const, JavaScript Arrow Functions, JavaScript Classes, Default parameter values, Array.find(), Array.findIndex(),Exponentiation (**) (ECMA Script 2016)

Unit-2: Introduction to MONGODB

MongoDB Basics: Introduction, Advantages, History, Features,No SQL Databases, Advantages over RDBMS,Environment Setup, Install MongoDB, MongoDB Shell, MongoDB Data Model, MongoDB Datatypes,Database,Create Database,Drop Database.

Collection: Create Collection,Drop Collection,

CRUD Documents:Insert Documents,Update Documents, Delete Documents, Query Documents,

Methods: Limit (), Sort (), Skip ()

Unit-III: Introduction toExpress js 10hrs

Introduction of ExpressJs: What is ExpressJS ,How Express.js works,Installation of Express.js,Basic Example

• **Templating Engines:**

   Introduction,pug Templating Engine,Working with Tags in pug,Working with id and classes in pug,Attributes and Nesting Tags in pug ,Using if & unless in pug ,Using for & each in pug ,Using case & mixins in pug ,Include and Extend in pug,EJS Templating engine ,Express Handlebars

• **Working with Express.js:** Introduction ,Introduction to Express.js,Connect Module ,Express.js Installation ,app.js,Steps for creating Express.js Application,application, request, response object properties & methods

•   **Request/Response   in   Express.js:**Request-params,body,files,route,header,get ,Response-render,locals,status,json,redirect

• **Using middleware:**Types of middleware,Application level middleware,Express-json,session,logger,compress,Router level middleware,Built-in middleware,Third party

middleware,Express 4.0 Router

Unit – IV: React Js

Introduction of React.JS: About React, Features, Advantages, Limitations

Environment Setup:, Create of Root Folder, Install Global Packages, Add Dependencies and Plugins, Create the Files, Set Compiler, Server and Loaders, html, JSX and Main.js, Running the Server

 JSX:, What is JSX?, Using JSX, Nested Elements, Attributes, JavaScript Expressions, Styling, Components,Naming Convention Components, Stateless, State full

 Props: Props Overview, Using Props, Default Props, State and Props

 Props Validation:, Validating Props , Component Life Cycle, Lifecycle Methods
Forms:, Simple, Complex **Events:**, Simple, Child **Refs:**, What is Refs?, Using Refs
Keys:, What are Keys?,Using Keys **Router:**,Install a React Router,Add a Router•
Create Components **Flux Concept:**, What is Flux?,Flux Elements, Flux Props **Using Flux and REDUX:**, Install REDUX, Creating Components, Working with States, Composing Components, Actions, Event Handlers, Reducers, Store, Root Component
, Other Components, Unit Testing – Tools, React, REDUX

Unit – V:Node js 9hrs

Learning Node.js: Getting Started with Node.js, Understanding Node.js, Installing Node.js, Working with Node Packages, Concurrency and event loop fundamentals,Creating a Node.js Application, Using Events, Listeners, Timers, and Callbacks in Nodes.js: Node.js Event Model, Adding Work to the Event Queue, Implementing Callbacks.

Handling Data I/O in Node.js: Working with JSON, Using the Buffer Module to Buffer Data, Using the Stream Module to Stream Data, Compressing and Decompressing Data with Zlib.

Understanding HTTP Services in Node.js: Processing URLs, Processing Query Strings and Form Parameters, Understanding Request, Response, and Server Objects. Implement HTTP Clients and Servers in Node.Js,Building REST services using Node JS REST services, Installing Express JS, Express Node project structure, Building REST services with Express framework, Routes, filters, template engines – Jade, ejs.

Web Resources:
https://www.w3schools.com/, https://jspiders.com/mern-stack/course

SEMESTER-VII

COURSE 16: MERN FULL STACK DEVELOPMENT

Practical   Credits: 1   2 hrs/week

Course Objective:

    ☐ To familiarize with html,css (PO5)
    ☐ To understand js,nodejs and express js (PO5)
    ☐ To learn the usage of mongo db and react js (PO5)

1. Write a program to build a Chat module using HTML CSS and JavaScript
2. Write a program to create a simple calculator Application using React JS

3. Write a program to create a voting application using React JS
4. Create a Simple Login form using React JS
5. Installing the Node.js and its dependencies

6. Creating a Node.js application

7. Implementing http services in Node.js

8. Implementing socket services in Node.js

9. Building MongoDB environment and managing collection

10. Manipulating MongoDB documents from Node.js

11. Develop and demonstrate Invoking data using Jscript from Mongo DB.

12. Generating HTML views with Jade using Expressjs

13. Add Functionalities toTo-do App

COURSE 17: DATA MINING AND WAREHOUSING

Theory	Credits: 3	3 hrs/week

Course Objectives:

The objective of Data mining and Data Warehousing is to introduce the Basic concepts Data warehouse Architecture OLAP Technologies, Principles, methods Implementation techniques, Applications and Query Languages of Data mining. The major methods focused were Data pre-processing Techniques, Association Rule mining, Classification and prediction and Cluster Analysis Techniques.

Course Outcome:

1. To Understand the Data mining primitives, Architecture.(PO5,PO7)
2. Learn the OLAP operations.(PO5,PO7)
3. Understand the Mining association rules on large databases.(PO5,PO7)
4. Learn the concepts of Classification and prediction. (PO5,PO7)
5. To understand Cluster analysis.(PO5,PO7)

UNIT-I:

Introduction: Fundamentals of Data mining, Data mining functionalities, Classification of data mining systems, Data mining applications, Data Warehouse and OLAP technology: What is Data Warehouse, Data warehouse architecture

UNIT-II:

Data pre-processing: Data cleaning, Data integration and Transformation, Data reduction, Discretization and Concept hierarchy generation, Data Mining Query Languages.

UNIT-III

Association Rule Mining: Market basket analysis, Efficient and scalable frequent itemset mining methods (Apriori and FP-Growth), Mining various kinds of association rules.

UNIT-IV

Classification and Prediction: Introduction to classification, Classification by Decision tree induction, Bayesian classification, Prediction: Linear regression, Non-Linear regression.

UNIT-V:

Cluster analysis: Types of data in cluster analysis, Categorization of clustering methods, Partioning methods, Outlier analysis, DB Scan method

TEXT BOOKS:

1. Data Mining Concepts and Techniques, Jiawei Han University of Illinois at Urbana–Champaign, Micheline Kamber Jian Pei Simon Fraser University.

2. Introduction To Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Education.

COURSE 17: DATA MINING AND WAREHOUSING

Practical   Credits: 1   2 hrs/week

Experiment – 1:

Demonstration of preprocessing on dataset student.arff.

Experiment – 2:

Demonstration of preprocessing on dataset labor.arff

Experiment – 3:

Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm.

Experiment – 4:

Demonstration of Association rule process on dataset test.arff using apriori algorithm.

Experiment – 5:

Demonstration of classification rule process on dataset student.arff using j48 algorithm.

Experiment – 6:

Demonstration of classification rule process on dataset employee.arff using j48 algorithm.

Experiment – 7:

Demonstration of classification rule process on dataset employee.arff using id3 algorithm.

Experiment – 8:

Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm

Experiment – 9:

Demonstration of clustering rule process on dataset iris.arff using simple k-means.

Experiment – 10:

Demonstration of clustering rule process on dataset student.arff using simple k-means.

COURSE 18: INTRODUCTION TO KOTLIN

Theory   Credits: 3   3 hrs/week

Course Objectives:

 The objective of the course is to introduce the concept of Kotlin by developing Android Applications.

Course Out Comes:

CO1: Learn how to work with Kotlin basics. (PO5,PO7)
CO2: Exploring different types of Functions.(PO5,PO7)
CO3: Student will know about object oriented programming concepts. (PO5,PO7)
CO4: Know about Extension Functions(PO5,PO7)
CO5: Utilizations of Functions in App Development(PO5,PO6,PO7)

Unit-I : Kotlin Basics
1.1 Introduction to Android
1.2 Kotlin Benefits
1.3 Installation of JDK and IntelliJ IDEA
1.4 Types of Variables
1.5 Types of Operators
1.6 Data Types
1.7 Conditions
1.8 Lists and arrays

Unit-II : Functions
2.1 Creating functions
2.2 Default values and compact functions
2.3 Single-expression functions

Unit-III : Object Oriented programming
3.1 Classes
3.2 Objects
3.3 Properties
3.4 Methods
3.5 Inheritance

Unit-IV: Extensions and Generic Functions
4.1 Pairs and Triples
4.2 Comprehend collections
4.3 Constants
4.4 Extension functions

Unit-V: Functional Manipulation
5.1 Annotations
5.2 Labeled Breaks
5.3 Single abstract method (SAM) interfaces
5.4 Lambdas and higher-order functions

Reference Sites:

1. https://codelabs.developers.google.com/kotlin-bootcamp/
2. https://github.com/google-developer-training/android-kotlin-fundamentals-starter-apps
3. https://github.com/google-developer-training/android-kotlin-fundamentals-apps

Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. **Measurable**
   1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
   2. Student seminars (on topics of the syllabus and related aspects (individual activity))
   3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
   4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

B. **General**
   1. Group Discussion
   2. Try to solve MCQ"s available online.

COURSE 18: INTRODUCTION TO KOTLIN

Practical   Credits: 1   2 hrs/week

Course Objectives:

The objective of the course is to introduce the concept of Kotlin by developing Android Applications.

Course Out Comes:

CO1: Learn how to work with Kotlin basics. (PO5,PO7)
CO2: Exploring different types of Functions.(PO5,PO7)
CO3: Student will know about object oriented programming concepts. (PO5,PO7)
CO4: Know about Extension Functions(PO5,PO7)
CO5: Utilizations of Functions in App Development(PO5,PO6,PO7)

1. Write a Kotlin program on Operators?

2. Write a Kotlin program on Conditions?

3. Write a Kotlin program on List and Arrays?

4. Write a Kotlin program on Functions?

5. Create an App with Hello World.

6. Create an App on Toast Messages.

7. Create an App **"AboutMe"** using different layouts.

8. Create an App DiceRoller and add basic interactivity.

Reference Sites:

1. https://codelabs.developers.google.com/android-kotlin-fundamentals/

COURSE 21: PROGRAMMING USING R

Theory   Credits: 3   3 hrs/week

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to	PROGRAM OUTCOME NO
CO1	Demonstration of constructing vectors, data frames, Matrices and perform operations.	PO7
CO2	Perform operations in R using Switch case, while and recursion.	PO5
CO3	Perform importing data into R from csv files	PO5
CO4	Demonstration of different graphs and plots by creating a dataset in R.	PO5
CO5	Demonstration of K means clustering in R	PO5

Requirements:

R Studio IDE

Exercises

Experiment – 1:

Create a vector in R and perform operations on it (arithmetic operations, combining vectors, retrieving elements of vector, assign names to vector elements).

Experiment – 2:

Create integer, complex, logical, character data type objects in R and print their values and their class using print and class functions.

Experiment – 3:

Create a matrix of values in R and extract data from matrix. (Ex. Second row third elements etc) find transpose of matrix and combine two matrices using Rbind and Cbind functions.

Experiment – 4:

Create a list in R and perform operations on it like list slicing, sum and mean functions, head and tail functions and finally delete list using rm() function.

Experiment – 5:

Create data frame in R and perform operations on it.

Experiment – 6:

Import data into R from text and excel files using read.table () and read.csv () functions.

Experiment – 7:

Print name of your current working directory and set working directory to your directory in R.

Experiment – 8:

Write code in R to find out whether number is prime or not.

Experiment – 9:

Print numbers from 1 to 100 using while loop and for loop in R.

Experiment – 10:

Create a factor in R by specifying levels. And print it then modify some values in it.
Experiment – 11:

Find factorial of a number using recursion in R.
Experiment – 12:

Perform arithmetic operations in R using switch case.
Experiment – 13:

Create a dataset and draw different types of graphs using plot, boxplot, histogram, stripchart, line functions.
Experiment – 14:

Demonstrate K means clustering for any dataset of your choice.

Faculty & Student Resources:

- Software Download
  - R Studio IDE by going to http://cran.r-project.org/ (Depending on the operating system)
- Free Online Courses for R Programming
  - R Programming Language introduction-Udemy
  - R Programming- Coursera

COURSE 21: PROGRAMMING USING R

Practical	Credits: 1	2 hrs/week

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to	PROGRAM OUTCOME NO
CO1	Demonstration of constructing vectors, data frames, Matrices and perform operations.	PO7
CO2	Perform operations in R using Switch case, while and recursion.	PO5
CO3	Perform importing data into R from csv files	PO5
CO4	Demonstration of different graphs and plots by creating a dataset in R.	PO5
CO5	Demonstration of K means clustering in R	PO5

Requirements:

R Studio IDE

Exercises

Experiment – 1: Create a vector in R and perform operations on it (arithmetic operations, combining vectors, retrieving elements of vector, assign names to vector elements).

Experiment – 2:

Create integer, complex, logical, character data type objects in R and print their values and

their class using print and class functions.

Experiment – 3:

Create a matrix of values in R and extract data from matrix. (Ex. Second row third elements etc) find transpose of matrix and combine two matrices using Rbind and Cbind functions.

Experiment – 4:

Create a list in R and perform operations on it like list slicing, sum and mean functions, head and tail functions and finally delete list using rm() function.

Experiment – 5:

Create data frame in R and perform operations on it.

Experiment – 6:

Import data into R from text and excel files using read.table () and read.csv () functions.

Experiment – 7:

Print name of your current working directory and set working directory to your directory in R.

Experiment – 8:

Write code in R to find out whether number is prime or not.

Experiment – 9:

Print numbers from 1 to 100 using while loop and for loop in R.

Experiment – 10:

Create a factor in R by specifying levels. And print it then modify some values in it.

Experiment – 11:

Find factorial of a number using recursion in R.

Experiment – 12:

Perform arithmetic operations in R using switch case.

Experiment – 13:

Create a dataset and draw different types of graphs using plot, boxplot, histogram, stripchart, line functions.

Experiment – 14:

Demonstrate K means clustering for any dataset of your choice.

Faculty & Student Resources:

- Software Download
  - R Studio IDE by going to http://cran.r-project.org/ (Depending on the operating system)
- Free Online Courses for R Programming
  - R Programming Language introduction-Udemy
  - R Programming- Coursera

COURSE 22: BIG DATA and HADOOP

Theory	Credits: 3	3 hrs/week

Course Objectives:

The Objective of this course is to provide theoretical and practical training that enables students to recognize need of Big Data and application of Bigdata using Hadoop.

The course provides basic methods to big data technology and tools, including MapReduce using Hadoop, using Hive to access Hadoop.

Course Outcome:

1. Recognize and understand use and applications of Bigdata, Hadoop.(PO5,PO7)

2. Learn how to apply MapReduce.(PO5,PO7)

3. Understand Hadoop ecosystem components.(PO5,PO7)

4. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.(PO5,PO7)

5. Able to use Hive as an interface to access data in Hadoop.(PO5,PO7)

UNIT-I:

Introduction to Big Data: What is Big Data? Structuring Big Data -Types of Big Data, Elements of Big Data- Volume, Velocity, Variety, Veracity, Big Data Applications.

UNIT-II:

Introduction to Hadoop: What is Hadoop? Comparing SQL databases and Hadoop, Understanding Map Reduce-Scaling Word Count Program Manually, Scaling Word Count Program in Map Reduce.

UNIT-III

Hadoop Eco System: HDFS-HDFS Architecture, Concept of Blocks in HDFS-Name Node, Data Node, Secondary Name Node, Job Tracker, Task Tracker.

UNIT-IV

Working with files in HDFS: Basic File Commands, Reading & Writing to HDFS Programmatically, Anatomy of Map Reduce Program-Hadoop Data Types, Mapper, Reducer, Partitioner, Combiner, Word Counting With Pre-Defined Mapper and Reducer, Reading & Writing-Input Format, Output Format.

UNIT-V:

Introducing Hive, Hive Services, Hive Variables, Hive Queries, Data types, Hive Built in functions, Hive - DDL, DML, and Data Retrieval Queries.

TEXT BOOKS:

1. BIG DATA (covers hadoop2, map reduce, Hive, Yarn, Pig, R and Data Visualization) Black Book , DreamTech Press.

2. Hadoop in Action by Chuck Lam, DreamTech Press.

REFERENCE BOOKS

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions",   Wiley, ISBN: 9788126551071, 2015.

2. Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.

3. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012.

4. Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.

5. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014.

6. Jy Liebowitz, "Big Data and Business analytics",CRC press, 2013

Student Activity:

1. Collect Real Time Data and Justify How it has become Big Data

2. Reduce the Dimensionality of a Big Data Using Your Own Map Reducer

COURSE 22: BIG DATA and HADOOP

Practical   Credits: 1   2 hrs/week

Experiment – 1:

Perform setting up and Installing Hadoop in its three operating modes:

□ Standalone, □ Pseudo distributed, □ Fully distributed.

Experiment – 2:

Implement the file management tasks in Hadoop.

Experiment – 3:

Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

Experiment – 4:

Create a database with name "CustInfo".
Create a customer"s table with the following fields

Customer Id   int

Customer Name   String

Customer Age   int

Address   String

Perform the following operations on customers table:

1. Describe the customers table
2. Load data of ten customers
3. Alter table name customers to customer details
4. Display the details of all customers
5. Add column name gender to table

Experiment – 5:

Create a database with name "college".
Create a student table with the following fields

Student Id   int

Student Name   String

Student Age   int

Course Name   String

Fee   double

City   String

State	String
Pin code	int

Perform the following operations on student table:

1. Describe the student table
2. Load data of six students
3. Alter table name to "StudentDetails"
4. Add column name **year of joining** to table
5. Display the details of all students

Experiment – 6:

Create a database with name "company".
Create an employee table with the following fields

Employee Id	int
Employee Name	String
Designation	String
Gender	String
Salary	double
Address	String
City	String
State	String
Pin code	int

Perform the following operations on employee table:

1. Describe the employee table
2. Load data of eight employees
3. Alter table name to "EmpDet"
4. Add column name **department** to table
5. Alter the column name address to comaddr
6. Display the details of all employees
7. Add the salary of all employees

Experiment – 7:

(A)　Create a database with name "retail".
　　　Create a categories table with the following fields

Category Id	int
Category Name	String

　　　Perform the following operations on student table:
　　　　1. Describe the categories table
　　　　2. Load data of five categories

3. Alter table name to "CategoryDetails"
4. Display the details of all categories

(B) Create a products table with the following fields

Category Id	int
Product Id	int
Product Name	String
Product Description	String
Product Price	String
Product Image	String

Perform the following operations on student table:
1. Describe the products table
2. Load data of eight products
3. Alter table name to "ProductDetails"
4. Display the details of all products
5. Display the details of products present in second category with category description

Experiment – 8:

Use the database "college".

Create a book information table with the following fields

Book Id	int
Book ISBN Number	String
Book Title	String
Author of Book	String
Year of Publication	String
Publisher of Book	String
Edition of Book	String
Book Image	String
Price of Book	int

Perform the following operations on student table:

1. Describe the book information table

2. Load data of ten books

3. Alter table name to "BookInfo"

4. Display the details of all books

5. Display the details of books of specific publisher

Experiment – 9:

Create a database with name "online".

(A) Create an items table with the following fields

Item Id	int
Item Name	String
Item Description	String
Item Price	String
Item Image	String
Quantity	int

Perform the following operations on student table:

1. Describe the items table
2. Load data of ten items
3. Alter table name to "ItemDetails"
4. Display the details of all items

(B)   Create an orders table with the following fields

Order Id	int
Order Name	String
Order Date	String
Amount	double
Shipping Address	String
Shipping Date	String

Perform the following operations on student table:

1. Describe the orders table
2. Load data of five orders
3. Alter table name to "OrderDetails"
4. Display the details of all orders

Experiment – 10:

Create a database with name "university".
Create a staff table with the following fields

Staff Id	int
Staff Name	String
Designation	String
Department Name	String
Date of Joining	String
Gender	String

Basic Salary	double
Communication Address	String
City	String
State	String
Pin code	int
Mobile Number	String

Perform the following operations on employee table:

1. Describe the staff table
2. Load data of ten staff members
3. Alter table name to "StaffDetails"
4. Add column name **Qualification** to table
5. Get the data of staff members working in Computer Science in department

COURSE 23: IOT Applications Development

<u>Theory</u>   Credits: 3   3 hrs/week

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Understand architecture and applications of IoT systems.(PO5,PO7)
CO2: Gain knowledge of various development boards used for
IoT.(PO5,PO7)CO3: Understand various Wireless Technologies used in
IoT.(PO5,PO7)
 CO4: Learn how to use various sensors and actuators for design of IoT.(PO7)

CO5: Learn how to connect various things to Internet and develop simple IOT
Devices.(PO7)

II. Syllabus:

UNIT-I

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.

Applications of IoT**:** Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

UNIT-II

Sensors Networks : Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.

UNIT-III

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet And Modbus.IP Based Protocols for IoT IPv6, 6LowPAN, LoRA, RPL, REST, AMPQ, CoAP, MQTT. Edge connectivity and protocols.

UNIT-IV

Arduino Simulation Environment: Arduino Uno Architecture, Setting up the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino, Interfacing LED, push button and buzzer with Arduino, Interfacing Arduino with LCD.

Sensor & Actuators with Arduino: Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensors with Arduino, Interfacing of Actuators with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino.

UNIT-V

Developing IOT‟s: Implementation of IoT with Arduino, Connecting and using various IoT Cloud Based Platforms such as Blynk, Thingspeak, AWS IoT, Google Cloud IoT Core etc. Cloud Computing, Fog Computing, Privacy and Security Issues in IoT.

III   Text Book/ References

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1st Edition, VPT, 2014
3. Daniel Minoli, ― "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
4. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
5. Open source software / learning websites
   a. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html
   b. Contiki (Open source IoT operating system)
   c. Ardudroid (open source IoT project)
   d. IoT Toolkit (smart object API gateway service reference implementation)

Reference Materials on the Web/web-links:

1. https://github.com/connectIOT/iottoolkit
2. https://github.com/connectIOT/iottoolkithttps://www.arduino.cc/
3. https://onlinecourses.nptel.ac.in/noc17_cs22/course
4. https://blynk.io (Mobile app)

IV   Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups a steams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

General

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others.

COURSE 23: IOT Applications Development

Practical   Credits: 1   2 hrs/week

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Acquire the skills to design a small IoT device.(PO5)
CO2: Connect various sensors, actuators, etc to Arduino board.(PO5)
CO3: Connect the things to Internet.(PO5)
CO4: Design a small mobile app to control the sensors.(PO5,PO7)
CO5: Deploy a simple IoT device.(PO5,PO7)

II: Practical (Laboratory) Syllabus: (30 Periods)

    a. Understanding Arduino UNO Board and Components
    b. Installing and work with Arduino IDE
    c. Blinking LED sketch with Arduino
    d. Simulation of 4-Way Traffic Light with Arduino
    e. Using Pulse Width Modulation
    f. LED Fade Sketch and Button Sketch
    g. Analog Input Sketch (Bar Graph with LEDs and Potentiometre)
    h. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)
    i. Working with Adafruit Libraries in Arduino
    j. Spinning a DC Motor and Motor Speed Control Sketch
    k. Working with Shields
    l. Design APP using Blink App or Things peak API and connect it LED bulb.
    m. Design APP Using Blynk App and Connect to Temperature, magnetic Sensors.

III. Lab References:

1.   Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti,Universities Press, 2015, ISBN: 9788173719547
2. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1stEdition, VPT, 2014
3. Daniel Minoli, ― "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications

  Reference Materials on the Web/web-links:
    1. https://github.com/connectIOT/iottoolkithttps://www.arduino.cc/
    2. https://onlinecourses.nptel.ac.in/noc17_cs22/course
    3. https://blynk.io (Mobile app)

1st B.Sc. Computer Science and Cognitive Systems (Single major)

SEMESTER-1, CORE-2

ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

BLUE PRINT

Duration:3Hrs   **Total Marks:70M**

Answer all the questions.

Part	Roman no.		Weightage
A	I	Multiple choice questions	10M
B	II	Fill in the blanks	10M
C	III	True or False questions	10M
D	IV	Match the following	20M
E	V	Very short answer type questions	20M

Computer Networks

Semester : II

Time : 3hrs   Max. Marks:70

SECTION – A (5 X 5 = 25 Marks)
Answer any FIVE from the following Eight questions.
1. What are the key functions of the data link layer?
2. Differentiate between error detection and error correction.
3. What is CSMA/CD, and where is it used?
4. What are the functions of ARP and RARP?
5. What is the difference between UDP and TCP?
6. How does congestion control differ from congestion avoidance?
7. What is the purpose of SMTP in email communication?
8. What are the security features provided by SSH?

SECTION – B (5 X 10 = 50M)
Answer ALL questions, ONE question from each unit.
UNIT - I
9. A) Discuss different channel access methods and their advantages.
OR
B) Explain how error correction methods like Hamming Code work.
UNIT - II
10. A) Explain the working of Carrier Sense Multiple Access (CSMA) techniques.
OR
B) Describe the structure and working of a wireless LAN, including IEEE 802.11 standards.
UNIT - III
11. A) Discuss different routing algorithms (RIP, OSPF, BGP) and their applications.
OR
B) Explain how IPv6 differs from IPv4 and its advantages.
UNIT - IV
12. A) Describe congestion control techniques such as leaky bucket and token bucket.
OR
B) How do congestion control mechanisms work in TCP?
UNIT - V
13. A) Discuss how HTTP and HTTPS work in web communication.
OR
B) How does PGP provide security for emails?

Python Programming

Answer any FIVE of the following questions (5 × 4 = 20 Marks)

1. Define an algorithm. Explain the importance of control flow in algorithmic problem-solving.

2. Describe the Python data types int, float, boolean, string, and list with examples.

3. Write a Python program to swap the values of two variables using tuple assignment.

4. Explain the difference between if, if-else, and if-elif-else statements with examples.

5. Discuss the concept of list comprehension in Python with an example.

6. Explain the concept of exceptions in Python. Write a program to handle division by zero.

7. Describe the process of writing data into a file in Python with an example.

8. Compare selection sort and insertion sort algorithms with examples.

Answer ALL questions, selecting ONE from each UNIT (5 × 10 = 50 Marks)

9. (a) Write an algorithm to find the minimum value in a list. Illustrate it using pseudo code and a flowchart.
OR
(b) Explain the Towers of Hanoi problem. Write a recursive algorithm for solving it.

10. (a) Describe the precedence of operators in Python with examples. Write a program to demonstrate it.
OR
(b) Define functions in Python. Write a program that exchanges the values of two variables using a function.

11. (a) Explain the concept of iteration in Python. Write a program to perform linear search in a list.
OR
(b) Define fruitful functions in Python. Write a program to calculate the square root of a number using such a function.

12. (a) What are dictionaries in Python? Discuss their operations and methods with examples.
OR
(b) Write Python programs for selection sort and merge sort. Compare their performance.

13. (a) Discuss file handling in Python. Write a program to count the number of words in a file.
OR
(b) Explain the concept of modules and packages in Python. Write a program that imports and uses a custom module.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

MODEL PAPER

Time : 3 hours   **Max : 60 Marks**

Section –A (5x4=20marks)
Answer any FIVE of the following questions

1. Explain the Naming conventions followed in Java
2. Explain how to read input using java.util.scanner class.
3. Illustrate recursive functions.
4. Define a constructor. Write a sample program to demonstrate constructors.
5. Define polymorphism and explain types of polymorphism.
6. Illustrate the use of "final" keyword.
7. Explain thread groups.
8. Explain Daemon threads.
9. Illustrate retrieval of data from database.
10. Explain <Applet > tag.

Section –B (5x8=40marks)
Answer ALL of the following questions

11. a. Define a constant. Explain various types of constants supported in Java.

    (Or)

    b. Illustrate various branching statements supported in Java.

12. a. Explain static methods and static blocks.

    (Or)

    b. Define inheritance. Explain different type of inheritance with examples.

13. a. Explain method overloading and method overriding with example programs.

    (Or)

    b. Explain various keywords used for handling exceptions in Java.

14. a. Create a file using FileWriter and use FileReader class to read its contents.

    (Or)

    b. Define a thread. Explain its life cycle.

15. a. Define an applet. Explain its life cycle.

    (Or)

b. Explain the stages in JDBC program.

VIRTUALIZATION AND CLOUD COMPUTING

SECTION - A

I Answer any FIVE of the following. All questions carry equal marks.   5 × 4 = 20

1. Define Distributed Computing and mention its key characteristics.

2. Differentiate between Grid Computing and Cluster Computing.
3. What are the modern business requirements for a data centre?
4. Briefly explain the concept of an agile data center.

5. What is Virtualization, and why is it needed?

7. Define Cloud Computing and state its fundamental principles.
8. List the key components of a Hybrid Cloud.

SECTION B

II Answer ALL of the following questions. All questions carry equal marks. 5 × 10 = 50
9. A) Describe the evolution of Cloud Computing in detail.
(OR)
B) Compare and contrast the various computing paradigms: Grid, Cluster, Utility, and Cloud Computing.

10. A) Explain the evolution of data centres and how they have adapted to modern requirements.

(OR)

   B) Discuss the steps involved in making a data centre agile, with relevant examples.

11. A) Discuss the different uses of Virtualization in modern computing environments.

(OR)

   B) Analyse the common pitfalls of Virtualization and how to avoid them.

12. A) Explain the architecture of Cloud Computing with a neat diagram.

(OR)

   B) Discuss the relationship between Virtualization and Cloud Computing, highlighting their interdependence.

13. A) Explain the key considerations while adopting a Hybrid Cloud model.

(OR)

   B) Discuss the components of a Hybrid Cloud and their roles in ensuring efficiency and flexibility.

Process Management

Answer any FIVE of the following questions (5 × 4 = 20 Marks)

1. What are the unique characteristics of WebApps? How do they differ from traditional software?
2. Define the Agile Manifesto. List and explain any two principles of Agile.
3. What are Scrum Values? How do they contribute to the success of a Scrum Team?
4. Explain the concept of DevOps automation. Provide examples of tools used in DevOps automation.
5. What is Lean Thinking in Design Thinking? How does it help in solving complex problems?
6. Discuss the Scaled Agile Framework (SAFe) and its benefits in large-scale Agile adoption.
7. What are the KPIs and metrics used for performance measurement in DevOps?
8. Explain the role of "Vision and Strategy" in Design Thinking with an example.

Answer ALL questions, selecting ONE from each UNIT (5 × 10 = 50 Marks)

9. (a) Describe the nature of software and its relevance to Software Engineering. Explain the Generic Process Model in detail.

   OR

   (b) Discuss Specialized Process Models. How does the Unified Process differ from a Generic Process Model?

10. (a) What is Agile? Discuss its advantages and disadvantages with suitable examples.

    OR

    (b) Explain Agile anti-patterns. How can they be mitigated in an Agile environment?

11. (a) Define Scrum Theory. How are Scrum Events structured, and what purposes do they serve?

    OR

    (b) What is the role of a Scrum Team? Explain the various roles within a Scrum Team.

12. (a) Discuss the methodologies and principles of DevOps. How does it complement Agile?

    OR

    (b) Explain the concept of Velocity and its importance in Agile Infrastructure and DevOps.

13. (a) What is Design Thinking? Explain its actionable strategy approach with an example.

OR

(b) Discuss the problems associated with complexity in Design Thinking and how it can be addressed.

Introduction to Digital Technology

Section –A (20 Marks)

Answer any *Five* questions. All questions carry equal marks.   5 X 4 = 20M 1.

1. Explain about Digital Marketing
2. what are the Applications of Interne?.
3. Explain about electronic media
4. What are the difference between Demystified-RPA vs BPM RPA?
5. Define Automation Anywhere
6. e- tourism
7. Define MetaBots
8. Explain Cognitive RPA

Section –B (50 Marks)

Answer all Questions. All questions carry equal marks.   5 X 10 = 50M

9. a) Explain the Block chain technology.

Or

b) define AI. Explain features of AI

10. a) Explain about digital Industries in Banking and hospital

Or

b) Discuss about e- governance

11. a) Explain Robotics Process Automation

Or

b) What are Tools of RPA? Explain it.

12. a) Explain the Architecture of AA.

Or

b) Discuss about AA Enterprises.

13. a) Discuss about TaskBots.

Or

b) Discuss about Recorders, Designers,

SOFTWARE ENGINEERING AND TESTING

Model Question Paper

SECTION – A

I. Answer any FIVE of the following questions. All questions carry equal marks. 5 × 4 = 20

1. What is Selenium, and what are its main components?

2. List and explain any two locator types in Selenium.

3. What is the difference between Explicit and Implicit wait in Selenium WebDriver?

4. How can you handle alerts or pop-ups using Selenium WebDriver?

5. What are the benefits of using a Test Automation Framework?

6. What is TestNG, and why is it used in automation testing?

7. What is Selenium Grid, and how is it used in test execution?

8. Differentiate between Grid 1.0 and Grid 2.0.

SECTION - B

II. Answer ALL the following questions. Each questions carry equal marks.   5 × 10 = 50

9. A) Discuss the process of downloading and installing Selenium. Include steps to configure it with an IDE.

(OR)

B) Explain the key features of Selenium IDE and its importance in automation testing.

10. A) Write a detailed explanation on how to handle dynamic elements and web tables using Selenium WebDriver.

(OR)

B) Discuss the use of Robot API and AutoIT in handling advanced test scenarios. Provide examples.

11. A) Explain the concept of a Test Automation Framework. Discuss its types with relevant examples.

(OR)

B) Describe in detail the benefits and challenges of using an Automation Framework in software testing.

12. A) Discuss the installation and process execution in TestNG, including batch, controlled batch, and parallel execution.

(OR)

B) Explain TestNG annotations and listeners in detail with an example use case.

13. A) Explain how to set up Selenium Grid using the command line. Discuss its architecture and usage.

(OR)

B) Write a sample test script demonstrating the use of DesiredCapabilities and RemoteWebDriver with Selenium Grid.

Client Relationship Management

Answer any FIVE of the following questions (5 × 4 = 20 Marks)

1. What is the difference between List V2 and List V3 in ServiceNow? Provide examples to explain your answer.
2. Explain the concept of UI customization in ServiceNow. How can you create a custom homepage?
3. Define and explain one-to-many and many-to-many relationships in ServiceNow with examples.
4. What are UI Policies in ServiceNow? Explain the role of "Reverse if false" in UI Policies.
5. Describe the role of Users, Groups, and Roles in User Administration in ServiceNow.
6. Discuss the differences between client-side and server-side APIs in ServiceNow scripting.
7. Explain the importance of database table inheritance in ServiceNow.
8. What are the key features of the War Room page? How can it be styled in ServiceNow?

Answer ALL questions, selecting ONE from each UNIT (5 × 10 = 50 Marks)

9. (a) Explain the structure and components of the ServiceNow interface. How can UI settings be personalized?

OR

(b) Discuss the key differences between Lists and Tables in ServiceNow. How are forms utilized in managing data?

10. (a) Describe the process of branding an instance in ServiceNow. What are UI-impacting system properties?

OR

(b) Explain how to configure the Service Portal UI and style pages and widgets in ServiceNow.

11. (a) What are custom relationships in ServiceNow? How can one-to-one relationships be enforced?

OR

(b) Discuss database table inheritance in ServiceNow. How does it impact data organization and relationships?

12. (a) Explain the structure of workflows in ServiceNow. What are important task fields and their significance?

OR

(b) Discuss the role of data policies in ServiceNow. How do they differ from UI Policies?

13. (a) What are ACLs in ServiceNow? How do they ensure security in the system?

OR

(b) Explain the Integrated Development Environment (IDE) in ServiceNow. Where is scripting supported?

IT Infrastructure Library

Section –A (20 Marks)

Answer any *Five* questions. All questions carry equal marks.   5 X 4 = 20M

1. Explain about ITIL v4
2. what is Value co-creation
3. illustrate eExternal factors
4. Explain Governance in the SVS
5. Discuss about dashboards
6. what is continual improvement model
7. Explain Change control
8. illustrate Service Relationships

Section –B (50 Marks)

Answer all Questions. All questions carry equal marks.   5 X 10 = 50M

9. a) Explain the structure and benefits of the ITIL v4 Framework

Or

b)   Importance of IT Service Management in the modern world

10.a) Discuss on Products and services in   ITIL

Or

b) Explain costs, and risks of an organization to provide services to cutomers.

11.a) discuss about The four dimensions of service management

Or

b)   Discuss about Value streams for service management

12.a)   Explain The ITIL service value system with neat diagram.

Or

b) Explain Service value chain model

13.a)   Discuss about General management practices

Or

b) Explain Technical management

Campus to Corporate

Model Question Paper

<u>SECTION A</u>

I. Answer any five of the following. All questions carry equal marks.   5 × 4 = 20

1. What is the difference between Campus and Corporate life?

2. Define BPS and explain its benefits.

3. What are the key aspects of Corporate Etiquette?

4. Explain the importance of Time Management in the corporate world.

5. What is phonetics? How does it help in English communication?

6. Describe the role of Listening Comprehension in improving communication skills.

7. What are the essential elements of a Group Discussion?

8. How does non-verbal communication impact corporate interactions?

<u>SECTION B</u>

II. Answer all questions. All questions carry equal marks.   5 × 10 = 50

9. A) Discuss the history of Corporate and BPS Industry, highlighting their significance in India and the world.

<div align="center">OR</div>

B) Explain Change Management and how students can transition smoothly from campus to corporate life.

10. A) What are the different types of corporate etiquettes? Discuss their importance in   professional life.

<div align="center">OR</div>

B) Explain the role of professional competencies such as assertiveness, stress management,   and team skills in the corporate sector.

11. A) Discuss the importance of Grammar and Phonetics in developing effective communication skills.

<div align="center">OR</div>

B) Explain the significance of one-on-one basic conversation skill practice in professional life.

12. A) How can reading and listening comprehension help in improving overall communication? Explain with examples.

<div align="center">OR</div>

B) Discuss the role of vocabulary enhancement and writing skills in professional communication.

13. A) Explain how Group Discussions and Interview Skills play a crucial role in corporate success.

<div align="center">OR</div>

B) Discuss the importance of presentation skills and social conversation skills in the workplace.

MERN FULL STACK DEVELOPMENT

Answer any FIVE of the following questions (5 × 4 = 20 Marks)

1. Explain the differences between let and const in ES6. Provide examples for each.
2. What are the key advantages of MongoDB over traditional RDBMS?
3. Write a short note on the Pug templating engine in Express.js, highlighting its key features.
4. What are React.js props? Explain with an example how props are used in a React component.
5. Discuss the concept of the Node.js Event Loop. Why is it important for handling asynchronous operations?
6. Explain the use of the Array.find() and Array.findIndex() methods introduced in ES6. Provide examples.
7. Describe the steps for creating a database and a collection in MongoDB.
8. What are lifecycle methods in React.js? Mention their significance in component behavior.

Answer ALL questions, selecting ONE from each UNIT (5 × 10 = 50 Marks)

9. (a) Discuss the major features of ECMAScript 6 (ES6). Write a program to demonstrate the use of template literals and destructuring.
OR
(b) Explain JavaScript classes and inheritance in ES6 with examples. How do static properties and methods differ from instance properties and methods?

10. (a) Describe CRUD operations in MongoDB. Write examples for inserting, updating, deleting, and querying documents in a MongoDB collection.
OR
(b) Explain MongoDB's limit(), sort(), and skip() methods. How are these methods useful when working with data?

11. (a) What is Express.js? Write the steps for creating an Express.js application and explain the use of middleware in Express.js.
OR
(b) Discuss request and response objects in Express.js. Explain their key properties and methods with examples.

12. (a) What is JSX in React.js? Write a React component that demonstrates the use of JSX, props, and state.
OR
(b) Explain Flux and Redux in the context of React.js. How are they used to manage application state?

13. (a) Describe the process of creating a RESTful service using Node.js and Express.js. Provide a code example for setting up a simple REST API.
OR
(b) Explain how Node.js handles data I/O. Discuss the use of JSON, the Buffer module, and the Stream module with examples.

Data Mining and Warehousing
Section –A (20 Marks)

Answer any Five questions. All questions carry equal marks.   5 X 4 = 20M

1. Discuss about Data Ware housing.
2. Write short notes on Data Cube Aggregation
3. Explain various kinds of association rules.
4. what is Linear regression
5. What are the Data mining applications
6. illustrate Frequent item set
7. Define Outlier analysis
8. what is   k-Means

Section –B (50 Marks)

Answer all Questions. All questions carry equal marks.   5 X 10 = 50M

9. a)Define data. Explain classification mining techniques?

Or

b) Discuss about OLAP technology.

10. a) Explain Data cleaning and integration methods in data mining.

Or

b) Explain about   Data Mining Query Languages.

11. a)   ExplainFP growth Algorithm with an Example.

Or

b) Explain Apriori Algorithm .

12. a) How to construct Decision tree ? Explain it

Or

b) Discuss about Bayesian classification with an example.

13. a) discuss about cluster analysis

Or

b)   Explain Density-Based Methods

INTRODUCTION TO KOTLIN

Question Paper

SECTION A

I. Answer any five of the following. All questions carry equal marks.   **5 × 4 = 20**

1. What are the benefits of using Kotlin for Android development?

2. Explain the different types of operators in Kotlin.
3. What is a single-expression function in Kotlin? Provide an example.
4. How do default values in functions work in Kotlin?
5. Define a class and explain its components in Kotlin.
6. What is inheritance in Kotlin? Provide a brief explanation.
7. What are pairs and triples in Kotlin? Provide an example of their usage.
8. Explain the concept of labeled breaks in Kotlin.

SECTION B

II. Answer all questions. All questions carry equal marks.   **5 × 10 = 50**

9. A) Discuss the steps for installing JDK and IntelliJ IDEA for Kotlin development.
(OR)
  B) Explain lists and arrays in Kotlin with examples. How are they different?

10. A) Write a Kotlin program to demonstrate creating and calling functions with default values.
(OR)
  B)Explain single-expression functions in detail with multiple examples.

11. A) Describe the difference between classes and objects in Kotlin with examples.
(OR)
  B) Write a Kotlin program to demonstrate inheritance, including properties and methods.

12. A) Explain the concept of comprehending collections in Kotlin. Write a program to demonstrate its usage.
(OR)
  B) Write a Kotlin program to create and use extension functions. Explain its advantages.

13. A) Discuss lambdas and higher-order functions in Kotlin. Write a program to demonstrate both.
(OR)
  B) Explain SAM (Single Abstract Method) interfaces in Kotlin with an example.

PHP Programming

Answer any FIVE of the following questions (5 × 4 = 20 Marks)

1. Explain the difference between include and require in PHP. Provide examples.

2. Write a PHP script to demonstrate the use of associative arrays.

3. What are PHP sessions? Explain how they differ from cookies with examples.

4. Describe the use of the isset() and empty() functions in PHP. Provide code snippets.

5. What is the significance of error handling in PHP? Write a script to demonstrate the use of try, catch, and finally.

6. Explain the role of the $_POST and $_GET superglobals in form handling.

7. Write a PHP program to connect to a MySQL database and retrieve data using a SELECT query.

8. What is the purpose of the header() function in PHP? Provide an example to demonstrate its usage.

Answer ALL questions, selecting ONE from each UNIT (5 × 10 = 50 Marks)

9. (a) Discuss the core features of PHP. Write a program to demonstrate variable declaration, data types, and basic operations in PHP.
OR
(b) Explain control structures in PHP. Write a program to demonstrate the use of if-else, switch, and loops (for, while, do-while).

10. (a) What are the different types of arrays in PHP? Write a PHP script to demonstrate the creation and traversal of multidimensional arrays.
OR
(b) Define and explain user-defined functions in PHP. Write a program to create a function that calculates the factorial of a number.

11. (a) Explain file handling in PHP. Write a PHP script to create, read, and write to a file.
OR
(b) Discuss the process of handling form data in PHP. Write a program to validate and process a user login form.

12. (a) What is object-oriented programming (OOP) in PHP? Write a program to demonstrate the use of classes, objects, inheritance, and constructors.
OR
(b) Explain the concept of interfaces and traits in PHP. Write a program that demonstrates their usage.

13. (a) Write a PHP program to perform CRUD operations (Create, Read, Update, Delete) on a MySQL database.
OR
(b) Discuss the importance of security in PHP applications. Explain SQL injection and write a secure PHP script to prevent it using prepared statements.

Big Data and HADOOP

Answer any FIVE of the following questions (5 × 4 = 20 Marks)

1. Define Big Data and explain its key elements: Volume, Velocity, Variety, and Veracity.
2. Discuss the types of Big Data with examples.
3. Compare SQL databases and Hadoop. Highlight the major differences.
4. Explain the concept of Name Node, Data Node, and Secondary Name Node in HDFS.
5. Write the basic commands for reading and writing files in HDFS.
6. Describe the purpose of the Mapper and Reducer in a MapReduce program.
7. What are Hive variables? Explain their significance in Hive queries.
8. Write a note on Hive's built-in functions and their use in data retrieval.

Answer ALL questions, selecting ONE from each UNIT (5 × 10 = 50 Marks)

9. (a) What is Big Data? Discuss the applications of Big Data in different fields. Provide real-world examples.

OR

(b) Explain the structuring of Big Data. How do different types of Big Data impact its processing and analysis?

10. (a) What is Hadoop? Discuss its key features and advantages over traditional SQL databases.

OR

(b) Explain the MapReduce programming model with an example of a word count program.

11. (a) Describe the architecture of HDFS. Explain the concept of blocks in HDFS and their role in data storage.

OR

(b) Write short notes on the following components of the Hadoop ecosystem:
- Job Tracker
- Task Tracker

12. (a) Discuss the anatomy of a MapReduce program, including the roles of Mapper, Reducer, Partitioner, and Combiner.

OR

(b) Explain the Input and Output formats in Hadoop. Write a simple program to count words using predefined Mapper and Reducer.

13. (a) Introduce Hive and its services. Discuss the advantages of using Hive for data analysis.

OR

(b) Write Hive DDL and DML queries to create a table, insert data, and retrieve data from the table. Include examples of using Hive built-in functions.

IOT Applications Development

Section –A (20 Marks)

Answer any *Five* questions. All questions carry equal marks.   5 X 4 = 20M

1. What are the Things in IoT.
2. Discuss on IoT frameworks
3. Illustrate about RaspberriPi Development Kit
4. Write about RPL
5. WPAN
6. Arduino Libraries
7. How to setting to the IDE
8. Cloud Computing

Section –B (50 Marks)

Answer all Questions. All questions carry equal marks.   5 X 10 = 50M

9. a) Explain n IoT Architectures

Or

  b)   Explain the Applications of IoT

10. a) Explain Arduino IDE and Board .

Or

  b) Explain Sensors Systems with example.

11. a) Describe IEEE 802.15.4

Or

  b)   Explain IP Based Protocols.

12. a) Arduino Uno Architecture

Or

 b) Explain Interfacing od Actuators interfacing with Arduino

13. a) various IoT Cloud Based Platforms

Or

  b) Privacy and Security Issues in IoT.