DEPARTMENT OF COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM (CBCS)
&
LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (LOCF)

BACHELOR OF COMPUTER SCIENCE WITH COGNITIVE SYSTEMS
2021 - 2024 BATCH

Programme Learning Outcomes

After completion of the programme, the student will be able to

PLO1 : Exhibit in-depth knowledge in the discipline of computer science and skills in providing computerized solution

PLO2 : Interpret theoretical connections between mind, intelligence, cognition, computation, creativity, information, language and perception

PLO3 : Apply cognitive, design thinking and critical problem solving skills to establish a productive career in industry, research and academia

PLO4 : Demonstrate with hands-on experience on current technological tools and effective communicative skills to meet the demands of IT / ITeS / ITIS companies

PLO5 : Pursue higher studies / employ themselves either as software professionals or entrepreneurs through their technical competencies

Programme Specific Outcomes

The students at the time of graduation will

PSO1 : Exhibit profound knowledge in cognitive science such as Linguistics, Psychology, Artificial Intelligence and Neuroscience

PSO2 : Apply skills in the areas like Artificial Intelligence and Machine Learning algorithms, Robotic Process Automation, DevOps Tools, Virtualization and Cloud to design and develop applications

Department of Computer Science
Choice Based Credit System & Learning Outcomes Based Curriculum Framework
Bachelor of Computer Science with Cognitive Systems - 2021 - 2024 Batch

Semester	Part	Subject Code	Title of Paper	Category	Instruction Hours / Week	Contact Hours	Tutorial Hours	Duration of Examination	Examination Marks			Credits
									CA	ESE	Total	
I	I	TAM2101/ HIN2101/ FRE2101	Language I	Language	6	86	4	3	50	50	100	3
I	II	ENG2101	English Paper I	English	6	86	4	3	50	50	100	3
I	III	CG21C01	**Core 1 :** Operating Systems	CC	4	56	4	3	50	50	100	4
I	III	CG21CP1	**Programming Lab 1 :** Operating Systems Lab	CC	4	60	-	3	50	50	50*	3
I	III	CG21CP2	**Programming Lab 2:** Problem Solving using Worksheets Lab	CC	2	30	-	3	50	50	50*	2
I	III	TH21A03	**Allied A1:** Numerical and Statistical Techniques	GE	6	86	4	3	50	50	100	5
I	IV	NME21ES/ NME19A1/ NME19B1	Introduction to Entrepreneurship / Advance Tamil / Basic Tamil	AEC	2	28	2	2	50	50	100	2
II	I	TAM2102/ HIN2102/ FRE2102	Language II	Language	6	86	4	3	50	50	100	3
II	II	ENG2102	English Paper II	English	5	71	4	3	50	50	100	3
II	III	CG21C02	**Core 2:** Computer Networks	CC	4	56	4	3	50	50	100	4
II	III	CG21CP3	**Programming Lab 3:** Computer Networks Lab	CC	3	45	-	3	50	50	50*	3
II	III	CG21CP4	**Programming Lab 4:** Web Technologies Lab	CC	3	45	-	3	50	50	50*	2
II	III	TH21A06	**Allied A2:** Discrete Mathematics	GE	6	86	4	3	50	50	100	5
II	IV		Open Course (Self-Study–Online)		Self-Study	-	-	-	-	-	-	-
		NME19A2/ NME19B2	** Advanced Tamil / Basic Tamil	AEC	-	-	-	-	-	-	-	Grade

II	V	21PEPS1	Professional English for Physical Sciences	AEC	3	40	5	2	50	50	100	2
II	VI	NM12GAW	General Awareness	AEC	Self-Study	-	-	OT	100	-	-	Grade
III	III	CG21C03	Core 3: Virtualization and Cloud	CC	4	56	4	3	50	50	100	3
III	III	CG21C04	Core 4: Infrastructure Management	CC	4	56	4	3	50	50	100	3
III	III	CG21C05	Core 5: Python Programming	CC	3	41	4	3	50	50	100	3
III	III	CG21CP5	Programming Lab 5 : Virtualization and Cloud Lab	CC	4	60	-	3	25	25	50	3
III	III	CG21CP6	Programming Lab 6: Infrastructure Management Lab	CC	4	60	-	3	25	25	50	3
III	III	TH21A13	Allied A3 : Optimization Techniques	GE	6	86	4	3	50	50	100	5
III	IV	NM21EVS	Foundation Course II: Environmental Studies	AECC	Self-Study	-	-	-	100	-	100	Grade
III	IV	NM21UHR	Foundation Course III: Universal Human Values and Human Rights	AECC	2	26	4	-	100	-	100	2
III	III	CG20SBP1 / CG20SBCE	SBS I - Python Programming Lab / Coursera - Software Testing Tools	SEC	3	45	-	2	40	60	50*	2
III & IV	IV		Job Oriented Course: Data Analytics Qlik Sense	-	-	-	-	3	-	-	-	Grade

* 100 Marks Converted into 50 Marks
** Outside Regular Class Hours

CC : Core Course

GE : Generic Elective

AEC : Ability Enhancement Course

OT : Online Test

CA : Continuous Assessment

ESE : End Semester Examination

CG21C01

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	M	S	M	M
CLO3	S	S	S	M	M
CLO4	S	S	M	M	S

CG21CP1

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

CG21CP2

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	M	S	S	S
CLO3	S	S	M	S	S
CLO4	S	M	M	S	S

CG21C02

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S

CG21CP3

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	S	M	S	S
CLO3	S	M	S	S	S
CLO4	S	S	S	M	S

CG21CP4

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

21PEPS1

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	M	S	S	M	S
CLO4	S	S	S	M	S
CLO5	S	M	M	S	S

CG21C03

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	S	M
CLO2	S	S	S	M	S
CLO3	M	S	S	S	S
CLO4	S	M	S	M	S

CG21C04

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	S	M
CLO4	S	M	S	S	S

CG21C05

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	M	M
CLO4	S	S	S	M	S

CG21CP5

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	M
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	M	S	M	S	S

CG21CP6

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	M	S	M	S
CLO3	S	S	M	S	S
CLO4	S	S	S	S	S

CG20SBP1

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	M	S	S	S
CLO2	S	M	S	M	S
CLO3	S	M	M	S	S
CLO4	M	M	S	S	M

Course Number	Course Name	Category	L	T	P	Credit
CG21C01	**Operating Systems**	Theory	56	4	-	4

Preamble

The objective of the course is to provide knowledge on the functionalities of the client and server operating system. It will enable the students to install, configure, deploy, manage and maintain the operating system. It provides comprehensive coverage on Industry 4.0.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the functionalities of client and server operating systems	K1
CLO2	Gain skills to install, configure and deploy the windows server operating system	K2
CLO3	Managing and maintaining windows server operating system	K3
CLO4	Implementing, managing and maintaining Group Policy, Disk Partitioning, File Management, DHCP, DNS and analyze various Industry 4.0 technologies and automation processes in different domains	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	M	S	M	M
CLO3	S	S	S	M	M
CLO4	S	S	M	M	S

S - Strong; M - Medium; L - Low

Operating Systems - CG21C01 (56 Hrs)

Syllabus

Unit I 11 Hrs
Operating System Overview - Hardware Basics - Windows 10: Installing, Configuring and Deploying Windows 10 - System Maintenance: Hardware - Managing Disks and Drives - Automating Tasks and Activities.

Unit II 11 Hrs
Windows Server 2016 - Overview - Working with Windows Servers - Preparing Networking - Navigating Management Options - Managing Servers Remotely - Managing Roles and Features.

Unit III 11 Hrs
Configuring Server Settings: Server Naming - Managing Processor Scheduling - Allocating Virtual Memory - Active Directory - Understanding - Managing - Maintaining - ADFS - FSMO Roles - Backup and Storage.

Unit IV 13 Hrs
Deploying Windows Server 2016 - Preparing - Managing Disk Partitions - Implementing TCP/IP networking - Data storage - Partitioning and Optimizing Drives - RAID - Implementing File Sharing - Managing Permissions and Auditing. Group Policy Management - Group Policy for Administration - Print Services - DHCP: Implementing, Managing and Maintaining - DNS: Implementing, Managing and Maintaining.

Unit V 10 Hrs
Introduction to Industry 4.0 - Need - Reasons for Adopting Industry 4.0 - Definition - Goals and Design Principles - Technologies of Industry 4.0 - Skills required for Industry 4.0 - Advancements in Industry 4.0 - Impact of Industry 4.0 on Society, Business, Government and People - Introduction to 5.0

Text Book

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Bott, Ed, and Craig Stinson	Windows 10 Inside Out (Unit I)	Microsoft Press	2016
2	William R Stanek	Windows Server 2016: The Administrator's Reference (Unit II, III, IV)	Create Space Independent Pub	2016
3	P. Kaliraj, T. Devi	Higher Education for Industry 4.0 and Transformation to Education 5.0 (Unit V)	CRC Press – Taylor and Francis Group	2020

Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Svidergol. B Meloski.V, Wright . B, Martinez . S &Bassett . D	Mastering Windows Server 2016	John Wiley & Sons	2018
2	Orin Thomas	Windows server 2016 Inside out	Pearson Education	2017

Web resources
- https://docs.microsoft.com/en-us/troubleshoot/windows-server

Pedagogy
- Lectures, Group discussions, Demonstrations, Case studies.

Course Designers
- Dr. S. Karpagavalli

Course Number	Course Name	Category	L	T	P	Credit
CG21CP1	**Operating Systems Lab**	Practical	-	-	60	3

Preamble

The objective of this lab course is to provide the complete knowledge of installation of client / server windows in virtual machine. It will equip the students to perform partitioning management operations, sharing resources and configure network features in the operating system.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understanding the installation of client / server windows in virtual machine and naming the system	K1
CLO2	Illustrate adding roles and features in OS server	K2
CLO3	Demonstrate disk partitioning and replication operations in server	K3
CLO4	Analyze the working of active directory domain service, installation of DNS and DHCP	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

S - Strong; M - Medium; L - Low

Operating Systems Lab - **CG21CP1**   **(60 Hrs)**

 List of Programs

- Install client Windows 10 in virtual machine and naming the system

- Install Windows server 2016 in virtual machine as an administrator

- Managing roles and features of Windows server 2016

- Disk partitioning in MBR and GPT and creating new volume in disk

- Configure and install active directory domain service

- Promote the active directory server to domain controller and replication of Windows server
- Configuring, managing and installation of DNS in Windows server 2016
- Configuring, managing and installation of DHCP in Windows server 2016
- Configuration and deployment of IIS in Windows server 2016
- Mapping network drive for file sharing and printer sharing

Pedagogy

- Demonstration of working environment / Software

Course Designers

- Dr. C. Arunpriya
- Mrs. V. Deepa

Course Number	Course Name	Category	L	T	P	Credit
CG21CP2	**Problem Solving using Worksheets Lab**	Practical	-	-	30	2

Preamble

The objective of the lab course is to provide the necessary skills to work with worksheets to automate tasks using VBA code.

Course Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Knowledge on working with cell, range, worksheet and workbook	K1
CLO2	Explore the simple programs to perform automation tasks	K2
CLO3	Design forms using ActiveX controls	K3
CLO4	Create charts for data and import / export data from different applications	K4

Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	M	S	S	S
CLO3	S	S	M	S	S
CLO4	S	M	M	S	S

S - Strong; M - Medium; L - Low

Problem Solving using Worksheets Lab - CG21CP2 　　　　　　　　**(30 Hrs)**

List of Programs

- Working with cells, range, worksheets and workbooks
- Working with simple macros using control structures
- VBA procedures for data analysis
- Simple macros using string, date functions and user defined functions
- Data visualization through charts and graphs
- Import / export data from different applications
- Creating user forms using Activex controls

- VBA programs to work with files / folders

Pedagogy

- Demonstration of working environment / Tools / Software / Program

Course Designers

- Dr. S. Karpagavalli
- Dr. R. Vishnupriya

Course Number	Course Name	Category	L	T	P	Credit
CG21C02	**Computer Networks**	Theory	56	4	-	4

Preamble

This course is designed to provide knowledge on network, OSI reference model, IP address, routers, switches, various network protocols and network security.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the fundamentals of computer networks and reference models	K1
CLO2	Summarize the purpose of IP address, subnetting and switches	K2
CLO3	Illustrate the working of spanning tree protocol, virtual local area networks and VLAN trucking protocol	K3
CLO4	Analyze the characteristics of network routing, enhanced interior gateway protocol and open shortest path first protocol	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S

S - Strong; M - Medium; L - Low

Computer Networks - CG21C02   **(56 Hrs)**
Syllabus
Unit I   **11 Hrs**
Introducing Computer Networks - Purpose of Networks - Operation Flow of Computer Networks - Topologies of Computer Networks - The OSI Reference Model: Introduction to the OSI Reference Model - Seven Layers - Benefits of the OSI Reference Model - Introduction the TCP/IP Protocol Suite.

Unit II   **11 Hrs**
IP Addressing: The Purpose of IP addresses - The Hierarchy of IP Addresses - Subnetting: Subnetting Basics - IP Address Class and Subnet Mask - Variable Length Subnet - Switches: Purpose of switches - Switch functions - Connecting to Cisco Switch - Configuring Cisco Switch - Managing Cisco Switch Authentication.

Unit III   **11 Hrs**
Spanning Tree Protocol - Introducing the Spanning Tree Protocol - STP Operation Flow - Introducing Cisco Options for STP - Introducing Rapid Spanning Tree Protocol - Ether Channel - Monitoring STP - Virtual Local Area Networks - Introducing Virtual Local Area Networks- Benefits of VLANs - Managing VLANs - VLAN Trunking - VLAN Trunking Protocol.

Unit IV   **11 Hrs**
Network Routing - Introducing Network Routes - Routing Protocols - Routed Protocols - Routing Decision Protocols - Routing Decision Criteria - Routing Methods - Routing Information Protocol - Introducing Routing Information Protocol - Enhanced Interior Gateway Routing Protocol - IGRP - The Foundation of EIGRP - EIGRP Benefits - Characteristics of EIGRP - EIGRP Operation - Open Shortest Path First Protocol - Introducing Open Shortest Path First - OSPF Routing Hierarchy.

Unit V   **12 Hrs**
Network Security Basics: Network Zoning - Recognizing Security Risks - Introducing Security Risk Mitigation Methods - IP Access Lists - Purpose of Access Lists - Types of ACLs - Managing ACLs-Creating ACLs - Network Address Translation (NAT) - Purpose of NAT - Operational Flow of NAT.

Text Book

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Silviu Angelescu	CCNA Certification All-in - One For Dummies	For Dummies	1st Edition

Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Behrouz A. Forouzan	Data Communications and Networking	Tata McGraw Hill	5th Edition, 2017
2	Kurose James F. Ross Keith W.	Computer Networking - A Top-Down Approach	Pearson Education	6th Edition, 2017
3	William Stallings	Data and Computer Communications	Pearson Education	10th Edition, 2017

Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies

Course Designers

- Dr. S. Karpagavalli
- Dr. C. Arunpriya

Course Number	Course Name	Category	L	T	P	Credit
CG21CP3	**Computer Networks Lab**	Practical	-	-	45	3

Preamble

This course imparts a detailed knowledge on designing the structure and topology of different types of networks and on configuring different routing protocols.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Design and setup different topology of network	K1
CLO2	Understand the concept of IP address, switches and routers	K2
CLO3	Apply VLAN and VLAN trunk protocol to connect different networks	K3
CLO4	Implement and configure different types of routing protocols in any one topology	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	S	M	S	S
CLO3	S	M	S	S	S
CLO4	S	S	S	M	S

S - Strong; M - Medium; L - Low

Computer Networks Lab - **CG21CP3**   **(45 Hrs)**

List of Programs

- Topology of network
- Working with IP address, switches and routers
- Static routing protocol
- Routing information protocol
- Virtual local area network
- VLAN trunking protocol
- Spanning tree protocol
- Enhanced interior gateway routing protocol
- Open shortest path first protocol

- Dynamic host configuration protocol
- Telnet
- Point to point with password authentication protocol

Pedagogy

- Demonstration of working environment / Tools / Software / Programs

Course Designers

- Dr. S. Karpagavalli
- Dr. C. Arunpriya

Course Number	Course Name	Category	L	T	P	Credit
CG21CP4	**Web Technologies Lab**	Practical	-	-	45	2

Preamble

This lab course introduces HTML5 tags, Cascading Style Sheets for web programming. It helps to explore client side scripting language and working with content management systems.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the purpose of HTML5 tags	K1
CLO2	Apply CSS for effective design of web pages	K2
CLO3	Demonstrate the power of scripting language in web development	K3
CLO4	Design and develop dynamic web pages, websites and blogs	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

S - Strong; M - Medium; L - Low

Web Technologies Lab - CG21CP4   (45 Hrs)

List of Programs

- Formatting Tag, List Tags
- Image and Anchor Tag, BG Color, Font
- Table Tags
- Frames and Frame sets
- Cascading Style Sheets - Internal, External, Inline
- Radio buttons, Check boxes and List boxes
- Validation using script
- Calculation using script

- Data binding using script
- Content management system
- Design and development of simple web site / blog

Pedagogy

- Demonstration of working environment / Tools / Software / Program

Course Designers

- Dr. S. Karpagavalli
- Dr. R. Kavitha

Course Number	Course Name	Category	L	T	P	Credit
21PEPS1	**Professional English for Physical Sciences**	Theory	40	5	-	2

Preamble

1. To develop the language skills of students by offering adequate practice in professional contexts.
2. To enhance the lexical, grammatical and socio-linguistic and communicative competence of first year students
3. To focus on developing students' knowledge of domain specific registers and the required language skills.
4. To develop strategic competence that will help in efficient communication
5. To sharpen students' critical thinking skills and make students culturally aware of the target situation.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Recognise their own ability to improve their own competence in using the language	K1
CLO2	Use language for speaking with confidence in an intelligible and acceptable manner	K2
CLO3	Read independently unfamiliar texts with comprehension and understand the importance of reading for life	K3
CLO4	Understand the importance of writing in academic life	K3
CLO5	Write simple sentences without committing error of spelling or grammar	K3

Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	M	S	S	M	S
CLO4	S	S	S	M	S
CLO5	S	M	M	S	S

S - Strong; M - Medium; L - Low

Unit I - Communication   **8 Hrs**

Listening	**:**	Listening to audio text and answering question - Listening to instructions
Speaking	**:**	Pair work and small group work
Reading	**:**	Comprehension passages - Differentiate between facts and opinion
Writing	**:**	Developing a story with pictures
Vocabulary	**:**	Register specific - Incorporated into the LSRW tasks

Unit II - Description   **8 Hrs**

Listening	**:**	Listening to process description - Drawing a flow chart
Speaking	**:**	Role play (formal context)
Reading	**:**	Skimming / Scanning- Reading passages on products, equipment and gadgets
Writing	**:**	Process description - Compare and contrast paragraph - Sentence definition and Extended definition - Free writing.
Vocabulary	**:**	Register specific - Incorporated into the LSRW tasks

Unit III - Negotiation Strategies   **8 Hrs**

Listening	**:**	Listening to interviews of specialists / Inventors in fields (Subject specific)
Speaking	**:**	Brainstorming (Mind mapping) - Small group discussions (Subject- Specific)
Reading	**:**	Longer Reading text.
Writing	**:**	Essay Writing (250 words)
Vocabulary	**:**	Register specific - Incorporated into the LSRW tasks

Unit IV - Presentation Skills   **8 Hrs**

Listening	**:**	Listening to lectures
Speaking	**:**	Short talks
Reading	**:**	Reading Comprehension passages
Writing	**:**	Writing Recommendations - Interpreting Visuals inputs
Vocabulary	**:**	Register specific - Incorporated into the LSRW tasks

Unit V - Critical Thinking Skills   **8 Hrs**

Listening	**:**	Listening comprehension- Listening for information.
Speaking	**:**	Making presentations (with PPT- practice)
Reading	**:**	Comprehension passages - Note making. Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills)
Writing	**:**	Problem and Solution essay - Creative writing - Summary writing
Vocabulary	**:**	Register specific - Incorporated into the LSRW tasks

Text Book

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Tamil Nadu State Council for Higher Education (TANSCHE)	English for Physical Sciences Semester 1	-	-

Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Sreedharan, Josh	The Four Skills for Communication	Foundation books	2016
2	Pillai, G Radhakrishna, K Rajeevan, P Bhaskaran Nair	Spoken English for you	Emerald	1998
3	Pillai, G Radhakrishna, K Rajeevan, P Bhaskaran Nair	Written English for you	Emerald	1998

Course Number	Course Name	Category	L	T	P	Credit
CG21C03	**Virtualization and Cloud**	Theory	56	4	-	3

Preamble

This course provides an insight on virtualization, cloud services anddata centers. It also emphasizes on various cloud service providers, cloud deployment models and hypervisors.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the fundamentals of cloud, essentials of virtualization and datacenters	K1
CLO2	Understand the cloud services, service models and virtualization types	K2
CLO3	Applycloud services and virtualization for effective use of resources	K3
CLO4	Analyze different cloud services, security threats, virtualization and data centers for various business categories	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	S	M
CLO2	S	S	S	M	S
CLO3	M	S	S	S	S
CLO4	S	M	S	M	S

S- Strong; M-Medium; L-Low.

Virtualization and Cloud - CG21C03 (56 Hrs)
Syllabus

Unit I 11 Hrs
Computing Paradigms - Cloud Computing Fundamentals: Motivation for Cloud Computing- **DefiningCloud Computing** - Principles of Cloud computing- Cloud Ecosystem - Requirements for Cloud Services - Cloud Application - **Benefits and Drawbacks. Cloud Computing Architecture and Management: Introduction** - Cloud Architecture - Anatomy of the Cloud - Network Connectivity in Cloud Computing - **Applications on the Cloud - Managing the Cloud** - Migrating Application to Cloud.

Unit II   **12 Hrs**
Cloud Deployment Models: Introduction - Private Cloud - Public Cloud - Community Cloud - Hybrid Cloud. **Cloud Service Models: Introduction - Infrastructure as a Service - Platform as a Service** - Software as a Service - Other Cloud Service Models.

Unit III   **11 Hrs**
Virtualization: Introduction - Virtualization Opportunities - Approaches to Virtualization - Hypervisors - Virtualization to Cloud Computing. **Security in Cloud Computing: Introduction**-Security Aspects- **Platform-Related Security** - Audit and Compliance.

Unit IV   **11 Hrs**
Cloud Service Providers: Introduction - EMC - Google - Sales force - Amazon Web Services: S3 **- EBS** - EC2 -**Dynamo DB -** Microsoft **- IBM**

Unit V   **11 Hrs**
Data Centers: Overview of data centers -**Data center goals** - Data center facilities -Role of data centers in the enterprise - **Role of data centers in the service provider environment** - Application architecture models - Data center architecture -**Data center services**.

Text Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	K. Chandrasekaran	Essentials of Cloud Computing (Unit I, II, III & IV)	CRC Press	2015
2	Mauricio Arregoces, Maurizio Portolani	Data Center Fundamentals (Unit V)	Cisco press	2003

Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Ray Rafaels	Cloud Computing	Create Space Independent Publishing Platform	2nd Edition, 2018
2	Curtis Franklin Jr. and Brian Chee	Securing the Cloud: Security Strategies for the Ubiquitous Data Center	Auerbach Publications	2019
3	Dinseh G. Dutt	Cloud Native Data Center Networking: Architecture, Protocols, and Tools	O'Reilly Media	2019

Note:
- Blended mode topics are highlighted. Links will be provided.

Pedagogy

- Lectures, Group discussions, Demonstrations

Course Designers

- Dr. S. Karpagavalli
- Dr. C. Arunpriya

Course Number	Course Name	Category	L	T	P	Credit
CG21C04	**Infrastructure Management**	**Theory**	56	4	-	3

Preamble

This course provides fundamental knowledge on system center configuration manager, system center operation manager, a single tool to manage all client environments.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CO Statement	Knowledge Level
CLO1	Recall the primary configuration management featuresof SCCM and SCOM	K1
CLO2	Understand the components of SCCM and SCOM to create, manage, deploy and monitor applications	K2
CLO3	Apply configuration manager and operation manager to manage and monitor enterprise infrastructure	K3
CLO4	Analyze enterprise infrastructure management applicationsusing SCCM and SCOM	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	S	M
CLO4	S	M	S	S	S

S- Strong; M-Medium; L-Low

Infrastructure Management - CG21C04 (56 Hrs)

Unit I 11 Hrs

Implementing Windows 10: User interface - **Switching between desktop mode and tablet mode - Using virtual desktops - Using snap – Cortana** - Windows startup enhancements - Microsoft Edge – Security - Windows 10 upgrade process. Windows 10 deployment options: **Pre-deployments steps - Manual in-place upgrade- Traditional deployments- Windows update approach- OS upgrade via windows server update services.**

Unit II 12 Hrs

Configuration Management Basics: Ten Reasons to Use Configuration Manager - The Evolution of Systems Management - Systems Management Defined - Microsoft's Strategy for Service Management - Overview of Microsoft System Center - The Value Proposition of Configuration

Manager. **Looking Inside Configuration Manager: Design Concepts - Active Directory Integration - A WMI Primer - WMI in ConfigMgr - Components and Communications - Inside the ConfigMgr Database - Viewing Detailed Process Activity- SQL Replication Crash Course - Configuration Manager Database Replication - File-Based Replication.**

Unit III   **11 Hrs**
Installing System Center 2012 Configuration Manager: Configuring Pre-Installation Requirements - Performing Site Installations - Site Properties - Uninstalling Sites - Troubleshooting Site Installation The Configuration Manager Console: Console Highlights - Touring the Console - ConfigMgr Workspaces - Console Deployment - Role-Based Administration - Connecting to a Site - The In-Console Alert Experience - Configuration Manager Service Manager - Security Considerations - Troubleshooting Console Issues.

Unit IV   **11 Hrs**
Creating and Managing Applications : ConfigMgr Applications Overview - **About Creating Applications - Creating Deployment Types - Creating Detection Methods - Managing and Creating Global Conditions Configuration Manager Queries:** Introducing the Queries Node - Creating Queries - ConfigMgr Query Builder - Criterion Types, Operators, and Values - Writing Advanced Queries - Relationships, Operations, and Joins - **Using Query Results - Status Message Queries.**

Unit V   **11 Hrs**
Software Update Management: New in 2012 - Incorporated tools - Preparing for software updates with ConfigMgr - Software update building blocks - **The software updates process in action. Backup, Recovery, and Maintenance : Performing Site and SQL Server Backups - SQL Replication - Site Maintenance - Database Maintenance - Making the Status Message System to Work -** Monitoring Configuration Manager with Operations Manager - Services and Descriptions.

Text Book

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Kerrie Meyler, Byron Holt Marcus Oh Jason Sandys Greg Ramsey	System Center 2012 Configuration Manager Unleashed	Pearson Education	2013

Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Santos Martinez , Peter Daalmans , Brett Bennett	Mastering System Center 2012 R2 Configuration Manager	Sybex	1st Edition, 2017

2	Samir Hammoudi, ChuluunsurenDamdinsuren , Brian Mason &Greg Ramsey	Microsoft System Center Configuration Manager Cookbook	Packt Publishing	2nd Edition 2016

Web Resources
- **https://www.prajwaldesai.com/sccm-console-deployment/**
- **https://www.anoopcnair.com/sccm-admin-web-console-softwarecentral-review/**

Note
- Blended mode topics are highlighted. Links will be provided.

Pedagogy
- Lectures, Group discussions, Demonstrations, Case studies

Course Designers
- Dr. S. Karpagavalli
- Ms. P. Parvathi

Course Number	Course Name	Category	L	T	P	Credit
CG21C05	Python Programming	Theory	41	4	-	3

Preamble

The course provides an introduction to python programming constructs such as variables, expressions, function, iterations, lists, tuples, dictionaries and regular expressions. It enables to understand the database connectivity and visualization concepts in python programming.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CO Statement	Knowledge Level
CLO1	Recall the basic python programming constructs	K1
CLO2	Understand the purpose of functions, string, list, dictionary, tuples files and data retrieval in python	K2
CLO3	Apply the python supported data structures to solve real world problems	K3
CLO4	Analyze the problems and solve using python data types, structures and data handling methods	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	M	M
CLO4	S	S	S	M	S

S- Strong; M-Medium; L-Low

Python Programming - CG21C05 (41 Hrs)
Syllabus
Unit I 9 Hrs
Understanding programming - Conversing with Python - The building blocks of programs **- Variables,expressions,andstatements-Valuesandtypes–Variables-Variable names and keywords -Statements - Operators and operands - Expressions - Order of operations** - Modulus operator - String operations **- Conditional execution-Boolean expressions - Logical operators -** Conditional execution - Alternative execution - Chained conditionals - Nested conditionals.

Unit II   **8 Hrs**

Functions - Function calls - Built-in functions - **Type conversion functions** - Math functions - Random numbers - Adding new functions - Definitions and uses - Flow of execution - **Parameters and arguments - Iteration - Updating variables - The while statement - Infinite loops - Finishing iterations with continue** - Definite loops using for - Loop patterns - Counting and summing loops - Maximum and minimum loops - **Strings - A string is a sequence - Getting the length of a string using len** - Looping and counting - The in operator - **String comparison - String methods - Parsing strings.**

Unit III   **8 Hrs**

Files - Persistence - Opening files - Text files and lines - Reading files - Searching through a file - Letting the user choose the file name - Using try, except, and open - Writing files - **Lists - A list is a sequence - Lists are mutable - Traversing a list** - List operations - List slices - List methods - Deleting elements - **Lists and functions - Lists and strings** - Parsing lines - Objects and values - Aliasing - List arguments - Dictionaries - **Dictionary as a set of counters** - **Dictionaries and files** - Looping and dictionaries - Advanced text parsing.

Unit IV   **8 Hrs**

Tuples - Tuples are immutable - Comparing tuples - Tuple assignment - Dictionaries and tuples - Multiple assignment with dictionaries - The most common words - Using tuples as keys in dictionaries – Regular expressions - Character matching in regular expressions - **Extracting data using regular expressions - Combining searching and extracting** - Escape character.

Unit V   **8 Hrs**

Using Databases and SQL - Creating a database table - Programming with multiple tables - **Constraints in database tables** - Retrieve and/or insert a record- Storing the friend relationship - Visualizing data - Building aOpenStreetMap from geocoded data.

Text Book

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Dr. Charles R. Severance	Python for Everybody Exploring Data Using Python 3	Shroff Publishers	2017

Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Wesley J. Chun	Core Python Programming	Pearson Education Publication	2012
2	Tim Hall and J-P Stacey	Python 3 for Absolute Beginners	Apress	2009

3	Zed Shaw	Learn Python the Hard Way	Addition Wesley	2017

Note
- Blended mode topics are highlighted. Links will be provided.

Pedagogy
- Lectures, Demonstrations

Course Designer
- Mrs. D. Suganthi

Course Number	Course Name	Category	L	T	P	Credit
CG21CP5	**Virtualization and Cloud Lab**	**Practical**	-	-	60	3

Preamble

This course provides technical skills on virtualization, creating virtual machines and environment. It also enables the students to explore cloud services.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understanding implementation of virtual machines	K1
CLO2	Demonstrate the key technologies required for setting up IT virtualization and cloud computing infrastructure and private cloud platform using virtualization	K2
CLO3	Apply the key components of Amazon Web Services in problem solving	K3
CLO4	Demonstrate cloud services and cloud programming	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	M
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	M	S	M	S	S

S- Strong; M-Medium; L-Low

Virtualization and Cloud Lab - **CG21CP5**   **(60 Hrs)**

List of Programs
- Working with hypervisors
- Creating Virtual Machines
- Cloning Virtual Machines
- Network Virtualization
- SAAS Services
- Creating Private Cloud
- Creating account in AWS
- Exploring AWS services like EC2, S3, Buckets
- Exploring Salesforce

Pedagogy
- Demonstration of working environment / Tools / Software / Program

Course Designer
- Dr. S. Karpagavalli
- Dr. C. Arunpriya

Course Number	Course Name	Category	L	T	P	Credit
CG21CP6	**Infrastructure Management Lab**	**Practical**	-	-	60	3

Preamble

The course provides a strong foundation in Configuration and deploying windows operating systems, application, provide endpoint security, and to manage policies and configurations for client machines.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the concepts of workspace in SCCM and SCOM	K2
CLO2	Apply various administration roles and advanced queries using SCCM and SCOM	K3
CLO3	Apply the components protection, monitoring, reporting and administration in SCCM and SCOM	K3
CLO4	Demonstrate the creation of customized dashboard and adding widgets to the dashboard	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	M	S	M	S
CLO3	S	S	M	S	S
CLO4	S	S	S	S	S

S- Strong; M-Medium; L-Low

Infrastructure Management Lab - CG21CP6   **(60 Hrs)**

List of Programs

Working with SCOM- Different workspaces and functions of System Center 2012 R2

- Operations Manager
- Monitoring
- Authoring
- Reporting and administration
- Different components of the datacenter infrastructure will be monitored and analyzed using Operations Manager
- SCOM: Create a Custom Dashboard View
- SCOM: Add Widgets to the Dashboard
- SCDPM: Backup System Center Infrastructure

Pedagogy

- Demonstration of working environment / Tools / Software / Program

Course Designers

- Dr. S. Karpagavalli
- Ms. P. Parvathi

Course Number	Course Name	Category	L	T	P	Credit
CG20SBP1	SBS I :Python Programming Lab	Practical	-	-	45	2

Preamble

This course provides hands on experience of python programming and to solve problems using python API's.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CO Statement	Knowledge Level
CLO1	Understand python programming structure	K1
CLO2	Classify different functions in python programming	K2
CLO3	Apply filesfor data processing	K3
CLO4	Illustrate pattern matching and extra action using regular expression and database connectivity	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	M	S	S	S
CLO2	S	M	S	M	S
CLO3	S	M	M	S	S
CLO4	M	M	S	S	M

S- Strong; M-Medium; L-Low

Python Programming Lab- CG21SBP1 (45 Hrs)

List of Programs

- Exercises to write, test, and debug simple python programs
- Exercises using variables and expressions
- Exercises to explore assignments, conditional and loop statements
- Exercises using functions and iterations
- Exercises using data structures like lists, dictionaries and tuples
- Exercises to do pattern matching using regular expressions
- Exercises using classes and objects
- Exercises toread and write data in files
- Exercises to store, retrieve and access data from data source

Pedagogy
- Demonstration of working environment / Tools / Software / Program

Course Designer
- Mrs. D. Suganthi

.