



Government of Karnataka
DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Curriculum Structure

III Semester Scheme of Studies- Diploma in Computer Science and Engineering

Sl. No.	Course Category / Teaching Department	Course Code	Course Name	Hours per week			Total contact hrs /week	Credits	CIE Marks		SEE Marks		Total Marks	Min Marks for Passing (including CIE marks)	Assigned Grade	Grade Point	SGPA and CGPA
				L	T	P			Max	Min	Max	Min					
Integrated Courses																	
1	PC/CS	20CS31P	Python Programming	3	1	4	8	6	60	24	40	16	100	40			Both SGPA & CGPA
2	PC/CS	20CS32P	Computer Hardware, Maintenance and Administration	3	1	4	8	6	60	24	40	16	100	40			
3	PC/CS	20CS33P	Computer Networks	3	1	4	8	6	60	24	40	16	100	40			
4	PC/CS	20CS34P	Database System Concepts and PL/SQL	3	1	4	8	6	60	24	40	16	100	40			
Audit Course																	
5	AU/KA	20KA31T	ಸಾಹಿತ್ಯ ಸಿಂಚನ-II/ ಬಳಕೆ ಕನ್ನಡ-II	2	0	0	2	2	50	20	-	-	50	20			
Total				14	4	16	34	26	290	116	160	64	450	180			

***PC: Programme Core:: AU-Audit Course:: KA: Kannada:: L: Lecture:: T: Tutorial:: P: Practice**

3RD SEMESTER



Government of Karnataka
DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Programme	Computer Science and Engineering	Semester	III
Course Code	20CS31P	Type of Course	Programme Core
Course Name	Python Programming	Contact Hours	8 hours/week 104 hours/semester
Teaching Scheme	L:T:P :: 3:1:4	Credits	6
CIE Marks	60	SEE Marks	40

1. Rationale

Computer programming is the core of the computer science and strong fundamentals of programming can give competitive edge in this technology driven world. It not only instils coding skills but also enhances problem solving ability. Python is one of the programming languages which is versatile and feature rich yet simple and easy to learn, has applications in various domains. Python programming sets the basis for further study of web development, data science, IoT, machine learning etc.

2. Course Outcomes: At the end of the Course, the student will be able to:

CO-01	Install the latest version of python distribution and configure it for an appropriate workspace as needed for a given project.
CO-02	Write a program by selecting python constructs needed to solve a given problem and then code, execute, test and debug the program to obtain the desired result.
CO-03	Demonstrate how a program can be optimized by using modular programming approach.
CO-04	Identify and resolve both syntactical and semantic errors in a given code snippet.

3. Course Content

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week (2 hours/batch twice in a week)
1	1,2	1,4	Fundamental Concepts: brief history; features; applications of python; python distributions; versions; python IDEs; Python interpreter; Execution of python programs, debugging python code; Indentation, Comments; best practices for python programming; Character set; tokens; keywords, variables, naming rules for variables, Assignment,	Refer Table 1	1. Setup python environment 2. Executing python: explore different ways to run python program 3. debug python code
2	2,4	1,2,4	Basics I/O operations Input- input (), raw_input() ; output – print (), formatting output. Datatypes		1. Code, execute and debug programs that a) Use i/o statements

			Scalar type: Numeric (int, long, float, complex), Boolean, bytes, None; Type casting Operators Arithmetic, Comparison/Relational, Logical/Boolean, Bitwise; string operators; Expressions and operator precedence		b) Evaluate expressions and displays formatted output c) Evaluate expressions to examine the operator precedence 2. Identify and resolve syntactic and semantic issues in the given code snippet
3	2,4	1,2,4	Control Flow: Conditional blocks If statement: general format; Multiway branching; Sufficient examples;		1. Identify and Code, execute and debug programs using conditional statements. 2. Identify and resolve syntactic and semantic issues in the given code snippet
4	2,4	1,2,4	Control Flow: Loops While loop: general format; examples For loop: general format, examples. Range();nesting loops and conditional statements; Controlling loop execution: Break, continue, pass statements;		1. Code, execute and debug programs using loops. 2. Code, execute and debug programs using loops and conditional statements 3. Identify and resolve syntactic and semantic issues in the given code snippet
5	2,4	1,2,4	Data Collections Concept of mutability Set – features, declaration, initialization, operations, comprehension; Tuple-features; declaration, initialization, basic operations; indexing; slicing; built in functions; Nested tuples;		1. Code, execute and debug programs to perform following ▪ set operations ▪ set comprehension 2. Code, execute and debug programs to perform following ▪ basic operations on tuples ▪ tuple indexing and slicing 3. Identify and resolve syntactic and semantic issues in the given code snippet
6	2,4	1,2,4	List features; declaration, initialization, basic operations; indexing; List iterations; Slicing; built in functions; Nested Lists; Comprehensions; Applications		1. Write code snippet to perform following on List ▪ basic operations on List ▪ indexing and slicing ▪ comprehension

					2. Identify and resolve syntactic and semantic issues in the given code snippet
7	2,4	1,2,4	Dictionary features; declaration, initialization, basic operations; indexing; adding and removing keys, iterating through dictionaries; built in functions; Comprehensions; Applications		1. Code, execute and debug programs to perform basic operations on Dictionary 2. Code, execute and debug programs to perform Dictionary indexing Iterating comprehension 3. Identify and resolve syntactic and semantic issues in the given code snippet
8	2,4	1,2,4	Arrays and Strings Arrays: features; create, initialize, indexing, traversal, manipulation; Strings: create, assign, indexing, built in functions;		1. Code, execute and debug programs to perform string manipulation 2. Code, execute and debug programs to perform array manipulation 3. Identify and resolve syntactic and semantic issues in the given code snippet
9	2,3,4	1,2,4	Functions Need of function; types; define function, calling function, function arguments; return and yield; None keyword; Scope of variables; Recursion; anonymous functions; sufficient examples;		1. Code, execute and debug programs to solve the given problem using built in functions 2. Code, execute and debug programs to solve the given problem by defining a function 3. Code, execute and debug programs to solve the given problem using recursion 4. Define anonymous function and code to solve the given problem 5. Identify and resolve syntactic and semantic issues in the given code snippet
10	2,3,4	1,2,4	Modules and Packages		1. Create Modules and Packages

			Why modules? Module creation; Importing modules; Module Namespace; Packages: basics; path setting; Package __init__.py Files; Commonly used modules: Math, random; Emoji;		2. Code, execute and debug programs using built in modules
11	2,3,4	1,2,4	NumPy Brief about NumPy module; NumPy arithmetic functions; NumPy array manipulation functions; NumPy statistical functions; Pandas Introduction, series, data frame; Create dataframes; formatting data; fundamental data frame operations;		1. Code, execute and debug programs using NumPy module. 2. Code, execute and debug programs using series. 3. Code, execute and debug programs using dataframes. 4. Identify and resolve syntactic and semantic issues in the given code snippet
12	2,3,4	1,2,4	Files Concept; features; file operations; Opening Files; Closing Files; Writing to Files; Reading to Files; File methods; Working with files using data frame.		1. write code snippet to perform following operations on different types of files ▪ read file ▪ write to file. 2. Write code to perform file operations using dataframes on different file types. 3. Identify and resolve syntactic and semantic issues in the given code snippet
13	2,3,4	1,2,4	Error and Exception Handling: Python errors; exceptions: built in, user defined. How to catch exceptions? Raising exceptions;		1. Integrate exception handling into above code 2. Write code snippet to raise exceptions 3. Identify and resolve syntactic and semantic issues in the given code snippet
Total in hours			39	13	52

*PO = Program outcome as listed and defined in year 1 curriculum

Table 1: Suggestive activities for tutorials (the list is only shared as an example and not inclusive of all possible activities for that course. Student and faculty are encouraged to choose activities that are relevant to the topic and the availability of such resources at their institution)

Sl no	Activity
1	1. Compare and contrast excel and python 2. Identify various python IDEs and identify differences between them.
2	1. Identify use cases like reading student name and contact details and display in a required format 2. Compare and contrast input () and raw_input() and identify its appropriate use.

	3. Identify use of operators and develop algorithms to solve the same 4. Compare and contrast different types of operators
3	1. Identify use cases that involve decision making and develop algorithms to solve the same 1. Identify common syntactical errors when using control flow statements
4	1. Identify use cases that involve iteration and develop algorithms to solve the same 2. Compare and contrast different types of loops 2. Identify common syntactical errors when using loops
5	1. Identify use cases and solve them using sets 2. Identify use cases and solve them using tuples 3. Identify common syntactical errors when working with sets and tuples
6	1. Identify use cases and solve them using List 2. Identify common syntactical errors when working with List 3. Reimplement built in list functions
7	1. Identify use cases and solve them using dictionary 2. Reimplement built in dictionary functions 3. Identify common syntactical errors when working with dictionary
8	1. Identify use cases and solve them using arrays 2. Reimplement built in string functions 3. Identify common syntactical errors when working with arrays and strings
9	1. Optimize previously written programs by using modular programming approach
10	1. Identify and present pros and cons of modules and packages 1. Explore and present python built in modules.
11	1. Identify the applications of Pandas 2. Perform data analysis using Pandas module on a dataset such as .
12	1. Identify use cases on files concept and develop algorithms to solve the same 2. Explore regular expressions and present how they can be used for file manipulation
13	3. Compare and contrast error and exception. 4. Rewrite the programs using exceptions if needed

4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill tests reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Activity through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
Total Marks					100

5. Format for CIE written Test

Course Name	Python Programming	Test	I/II/III	Sem	III/IV
Course Code	20CS31P	Duration	80 Min	Marks	30
Note: Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions		Cognitive Levels	Course Outcome	Marks
I	1				

	2			
II	3			
	4			
III	5			
	6			
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.				

6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
Average Marks= (8+6+2+2)/4=4.5							5

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

7. Reference:

Sl. No.	Description
1	Core python programming, Wesley J. Chun Publisher: Prentice Hall PTR
2	Fluent Python by Luciano Ramalho
3	https://www.softcover.io/read/e4cd0fd9/conversational-python
4	https://realpython.com/
5	https://www.python-course.eu/
6	https://www.datacamp.com/
7	https://www.w3schools.com/

8. CIE Skill Test and SEE Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Develop an algorithmic solution for the given problem statement based on the documentation of each of the steps involved, including input, output and logic.	20
2	Write program for the above given problem choosing relevant python constructs.	20
3	Code, execute, test and debug the above program.	30
4	Demonstrate how your program has solved the given problem In the event of, a student fails to get the desired result (with no syntactical and least semantic errors), the examiner shall use viva voce to assess the student's problem-solving and python programming skills	20
5	Portfolio evaluation based on aggregate of all practice sessions	10
Total Marks		100

9. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
1	Python 3.8		20
2	Editor such as iPython, Jupyter, spider, PyCharm , google CoLab		20
3	Computers		20



Government of Karnataka
DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Programme	Computer Science and Engineering	Semester	III
Course Code	20CS32P	Type of Course	Programme Core
Course Name	Computer Hardware, Maintenance and Administration	Contact Hours	8 hours/week 104 hours/semester
Teaching Scheme	L:T:P :: 3:1:4	Credits	6
CIE Marks	60	SEE Marks	40

1. Rationale

Professional computer maintenance ensures computer hardware and software systems run efficiently to increase productivity while lowering the chances of downtime. This course aims to help understand the internal working of computers/laptops and prepare the student for a role as an entry-level IT support technician. This course sets a basis for different facets of information technology like computer hardware, software, trouble shooting and customer service.

2. Course Outcomes: At the end of this course, students will be able to:

CO-01	Assemble a computer as per given technical specifications following all necessary safety protocols and install, configure and setup an administrator for a Windows Operating System.
CO-02	Diagnose a computer using the right diagnostic tools, identify the hardware problem and troubleshoot to resolve the problem following all safety protocols.
CO-03	Diagnose an installed software using the right diagnostic tools, identify the bug/issue, troubleshoot to resolve bugs/issues and ensure all data and applications are backed up before troubleshooting.
CO-04	Explain e-waste protocols to be followed while disposing computer hardware, to ensure compliance with all required state pollution control board regulations.

3. Course Content

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week (2 hours/batch twice in a week)
1	01	1, 4	I/O devices and Interfaces Types of I/O devices and ports on a standard PC for connecting I/O devices. Function of serial port, parallel port, and brief principle of communication through these ports, types of devices that can be connected and interface standards. Explain basic cable types, features and their purposes. Importance of USB and HDMI interfaces- Types and Features. Working of Common	Refer Table 1	1. Hardware Identification: • Computer Case- Types, Features- Front panel, back panel; A look inside the computer case. • Identify the front and rear panel controls and ports on a PC cabinet. • Identify and understand different cables and connectors: Video cables- VGA, HDMI, Mini-HDMI, Display port, DVI; Peripheral cables- Serial; Hard drive cables- SATA, PATA, IDE,

			Input/Output devices- Keyboard, Mouse, display monitor, printer and speaker.		SCSI; Adapters-DVI to HDMI, USB to ethernet, DVI to VGA. • Installation of a local printer. • Shared printer. • Installing wireless and cloud printers.
2	01	1,4	Power supplies Safety Basics: safety protocols; anti-static basic hand tools, Know the danger of static electricity, power variation; Precautions to be taken while mounting and unmounting power supply into/ from the cabinet; DC power source to PC - Need for SMPS, Specifications, Rating of SMPS based on type of motherboard and devices used (AT/ATX, Micro ATX, mini ATX, higher watts PSU for gaming PC), color coding adopted, Types of connectors used- ATX, ATX12V, Molex, SATA, PCIe; Output voltage levels, measuring technique; choosing power supply based on wattage rating; Heat sink; 80 plus rating system; Modular power supply. Symptoms of SMPS failure; Common problems from a faulty SMPS. Trouble shooting Power supplies.		1. Unmount the power supply from PC cabinet. Identify the types of output connectors. 2. Identify output voltages using color coding. 3. Measure voltage levels using multi meter. 4. Mount the power supply into the PC cabinet, connect different components and test PC. 5. Trouble shoot Power supply through SMPS fan. 6. Diagnose power supply faults using PSU Tester.
3	1	1,4	Basic Electronics –Electricity, Electrical quantities- Voltage, current and resistance; Active components: Diodes- PN junction diodes, biasing conditions- forward bias and reverse bias, transistors- BJT, MOSFET; Passive components-Resistors, capacitors, inductors, transformers, sensors, and transducers; Integrated Circuits Digital Electronics- PWM, opto-coupler; checking AC to DC converter.		1. Identify the electrical and electronic components used in a computer and tabulate them as active and passive components. 2. Identify the working and non-working state of basic components and semiconductor devices. 3. Using multi meter- Check Output voltage of basic components and semiconductor devices. 4. Check different voltage levels of opto-coupler, PWM and rectifier.
4	01,03	01,04	Mother board – Example Motherboards; Functional description of mother board; specification and variation. Form factor- what is Motherboard Form factor? Types and features of Motherboard form factors- ATX, Micro-ATX, Mini-ITX,		1. Precautions to be taken before removing the mother board from PC cabinet. 2. Using the CPUID CPU-Z tool, find different features of CPU. 3. Check the Electric flow path and data flow path 4. Windows resource monitor

			Nano-ITX, and Pico-ITX. Functional components of Motherboard; CPU and CPU socket-Types of sockets; Overview of microarchitecture of INTEL and AMD CPU.		5. Using the CPUID CPU-Z tool, identify the CPU cache features of your working system.
5	01, 03	01, 04	Chipsets- Function, Types and Features. Buses- System bus architecture Importance of POST; UEFI – why is it required, possible configurations through UEFI. IDE ports; Methods of adding SCSI drives. CMOS battery: Why? Its specifications. Impact of removing the battery from mother board.		1. Identify system faults using POST diagnostics card. 2. Understand basic onboard configuration through UEFI. 3. Test different motherboards to determine support for UEFI 4. Replace the CMOS battery in a computer following the procedures. 5. Understand and modify BIOS settings and observe the consequences of CMOS failure.
6	01, 03	01, 04	Memory– Memory Units (B, KB, MB, GB, TB), memory locations and address space, Access methods, Memory Classification. Main memory Types and Features. Auxiliary memory – Types and features. Memory modules.		1. Identify RAM chips and HDD/SSD, study their features and note their technical specifications. 2. Identify SIMM and DIMM memory modules, their number of pins, specs and type. 3. Identify the interface type of a hard drive and connect it to a PC for data recovery.
7	01, 03	01, 04	RAM Technology- SDRAM, DDR, DDR2, DDR3, DDR4 – Clock speed, Bandwidth, Memory speed rating, PC speed rating; RAM capacity- single- sided and double-sided RAM, Channels; RAM features- Parity/ECC RAM, SODIMM, SPD chip. Mass storage media- Hard drive, Principle of working, reliability, performance, SSD, optical drive; Logical Block Addressing (LBA); Memory capacity- physical and logical addressing; M.2 drives, SATA, NVMe. Causes of Hard drive failure; Signs of failure; Backup and recovery of data;		1. Use CPUID-CPUZ tool to identify capacity, speed, technology, and related features of RAM. 2. Check for RAM and Motherboard compatibility and install additional RAM stick. 3. Find on Windows system properties to check the RAM for correct installation. 4. Query the SPD RAM chip to identify all 5. possible information using CPUID CPUZ.
8	02, 03		Windows Installation – Overview windows 10; general features; Versions; architecture; prerequisites for windows 10 installation: hardware compatibility, BIOS compatibility, driver requirements. Clean install of		1. Windows Installation Inspect prerequisites for windows 10 installation on a given computer. 2. Perform clean installation. 3. Upgrade to windows 10. 4. Create dual boot for a given system, learn and rectify errors

			windows 10; upgrade to windows 10; disk partitioning; troubleshooting installation problems; Multiple boot options; windows service packs. Imaging: create a Windows system image; How to Backup/Restore your Windows partition with the bootable image.		in dual boot. 5. Practice on recovery partition. 6. Practice 10 registry tweaks. 7. Practice disk management utilities.
9	01, 02, 03		File system overview, types, properties, conversion from one filesystem to another, configuration. Configuring system and data recovery: Recover files, recover apps and the registry; recover windows 10. Configure and manage windows updates: auto/manually; testing and troubleshooting updates. Monitor and manage: Performance monitoring; optimize windows services; tune scheduled tasks. Customizing windows desktop.		1. Practice data recovery methods 2. Working with task manager to troubleshoot configuration and other performance related issues. 3. Working with task scheduler. 4. Customizing windows desktop.
10	01, 03	01, 04, 07	Windows Command line; PowerShell; basic commands; writing simple PowerShell scripts. File security.		1. Execute basic commands in Windows using command prompt and PowerShell like listing the drives in a system, creating a new file, removing a file or directory, retrieving the list of processes and services, etc., 2. Use command line to encrypt and decrypt files and folders.
11	02, 03, 04	01, 04	Portable computing- Troubleshooting Laptops- I Difference between laptop and desktop Motherboards; Checking Power connector and adaptor pins, AC adapter of Laptop circuit diagram, Fault finding; troubleshooting voltage transfer section, AC-DC conversion, Generation of stand by voltage, fault finding- No power ON, power switch, Battery charging circuit;		1. Observe the layout of a laptop and compare it with a desktop. 2. Follow/review manufacturer maintenance guide for repair and maintenance. 3. Power Issues: Battery not charging, No power. 4. Troubleshoot computer hardware issues in the following scenarios- -Unexpected shutdowns. -Lockups -POST & Boot -Continuous reboot -No Power -Loud Noises. -Intermittent device failure -Smoke and burning smell 5. -Indicator lights.

12	03, 04,	01, 04	Troubleshooting Laptops- II Dual MOSFET pin details, Two N- channel MOSFET in place of dual MOSFET, one p-channel and one N- channel MOSFET, problems and faultfinding; CPU voltage generation circuits, keyboard interface, problem and fault finding. Touch pad connector, BIOS details, SATA HDD details, Audio section, internal display, LED screen pin details. Malware mitigation: introduction, types, symptoms, malware removal;		1. Perform the same operations in week#7 on a laptop. 2. LCD display trouble-shoot: No display/dim video/flickering video. 3. Wireless troubleshooting: Multiple antennae, check presence of wireless cards. 4. Scan and remove malwares in each computer or mobile device. 5. Perform Antivirus and anti-malware updates.
13	04,	01, 04	E-waste management: What is EEE and E-waste? Different scenarios of E-waste management, StEP initiatives to solve e-waste problems, impact of e-waste on health of children and workers. E-waste management in India: EPR and e-waste, the informal sector in e-waste management, Technologies for e-waste management, Financing e-waste management systems- Key steps, milestones to achieve a robust E-waste system. Case studies.		- Visit https://greene.gov.in and https://kspcb.karnataka.gov.in/ to find the latest regulations and policies taken up by the Government of India. - Visit a nearby e-waste management plant and understand the management process.
Total in hours			39	13	52

*PO = Program outcome as listed and defined in year 1 curriculum

Table 1: Suggestive activities for tutorials (the list is only shared as an example and not inclusive of all possible activities for that course. Student and faculty are encouraged to choose activities that are relevant to the topic and the availability of such resources at their institution)

SL NO	Activity
1	1. Study multipurpose cables used with different models of computers and their applications. 2. Identify the cables and list the devices that can be connected to computer using these cables. 3. Identify commercially available brands of keyboard, mouse and monitor and their distinguishable features.
2	1. Identify preventive measures that help to eliminate or reduce electrostatic discharge. 2. Describe effective ways to reduce the risk of injury or damage while working with respect to powersupply in computer systems. 3. Make your observations on why a technician may choose to use a UPS instead of a surge suppress or to protect a computer. 4. Identify the components that are powered by the PSU. 5. Identify the common causes of PSU/SMPS failure and explain how it can be maintained in a healthy state.

	6. Explain the factors on which the PSU wattage is decided. 7. Describe the features of different Power supplies available commercially that support a gaming PC.
3	1. Calculate the value of resistors onboard using the color code. 2. Identify the terminals of a BJT and MOSFET.
4	1. Identify the units MHz and GHz with respect to CPU. 2. Compare and contrast the characteristics of different motherboard formfactors. 3. Identify and present the factors to select an appropriate Motherboard based on the purpose- Basic applications, Gaming, Workstations/servers. 4. Study the features and specifications of the processors (Intel: Pentium family, dualcore, quad core, core 2 duo, i3, i5, i7, i9 and AMD processors). 5. Study the CPU benchmarks of the trending processors. 6. Compare features of CPU and GPU.
5	1. Explain bus standards with respect to evolution, speed, and recent trends (ISA, PCI, AGP). 2. Explain how to clear CMOS password. 3. Explain the importance of UEFI and configuration settings for – a. Overclocking of CPU frequencies b. Set RAM timings 4. Setting BIOS passwords Specify boot options.
6	1. Describe the classification of memories. 2. Study different types of memory devices and features that are commercially available.
7	1. Study the characteristics of different types of SSDs. 2. Compare DDR4 and DDR5 memory. 3. Study and identify what happens when the hard drive fails.
8	1. Identify system requirements for Windows 10 installation. 2. Study and list the features of different versions of windows 10. 3. Explore file backup in Windows file history feature.
9	1. Study best practices followed in scheduled backups and scheduled disk maintenance. 2. Study the necessity of TPM in Windows 11.
10	1. Compare relative merits and demerits of the two command shells.
11	1. Relate the components of a laptop to a desktop and compare their features. 2. Identify the upgradable and non- upgradable components in laptops.
12	1. Document the common faults that may occur on the motherboard.
13	1. Study the e-waste rules 2016 and their amendments there-off as prescribed by the Karnataka state pollution control board and explain the process for the polytechnic to follow safe disposal of e-waste. 2. Study the global e-waste key statistics. 3. Sketch the e-waste policies and regulations, you think, must be regulated at each stakeholder's level.

4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill tests reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Activity through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
Total Marks					100

5. Format for CIE written Test

Course Name	Computer Hardware, Maintenance and Administration	Test	I/II/III	Sem	III/IV
Course Code	20CS32P	Duration	80 Min	Marks	30
Note: Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions		Cognitive Levels	Course Outcome	Marks
I	1				
	2				
II	3				
	4				
III	5				
	6				
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.					

6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
Average Marks= (8+6+2+2)/4=4.5							5

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

7. Reference:

Sl. No.	Description
1	https://www.dell.com/support/kbdoc/en-in/000139662/what-does-the-msconfig-utility-do-in-windows-7-on-your-dell-pc#TOC
2	https://www.google.co.in/amp/s/www.ufsexplorer.com/amp/articles/how-to/connect-sata-disks-instruction.php
3	http://www.qiguaninc.com/met/faq/faq35_en.html
4	https://www.ciscopress.com/articles/article.asp?p=2999386&seqNum=3
5	https://www.crucial.in/articles/pc-builders/what-is-computer-hardware
6	https://www.udemy.com
7	https://www.pluralsight.com

8. CIE Skill Test and SEE Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Document technical specifications of the right hardware components to assemble a computer to meet the given requirement and also necessary safety protocols to be followed.	20
2	Demonstrate the configuration and setting up an administrator for a Windows Operating System.	10

3	Identify the hardware problem and trouble shoot using appropriate diagnostic tools in a given computer following all safety protocols.	20
4	Identify the software issues and trouble shoot using appropriate diagnostic tools in a given computer ensuring that all data and applications are backed up.	20
5	Explain the issues identified and how they have been resolved: In the event of student failing to diagnose and troubleshoot the issues either software or hardware, the examiner shall use viva-voce to explain the protocols to be followed in e-waste management.	20
6	Portfolio evaluation of practice sessions	10
Total Marks		100

9. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
1	Computers		10
2	PSU Tester		10
3	Multimeter		10
4	Individual components- SMPS/PSU	400 watts	10
5	SMPS/PSU	800 watts	10
6	Motherboard – ATX		10
7	Motherboard – Micro ITX		10
8	RAM stick – DDR3		10
9	RAM stick – DDR4		10
10	CMOS battery		10
11	Windows 10/11 OS user license for multi users		
12	POST diagnostic card		10



Government of Karnataka
DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Programme	Computer Science and Engineering	Semester	III
Course Code	20CS33P	Type of Course	Programme Core
Course Name	Computer Networks	Contact Hours	8 hours/week 104 hours/semester
Teaching Scheme	L:T:P :: 3:1:4	Credits	6
CIE Marks	60	SEE Marks	40

1. Rationale

The computer networking skills are essential in today's information and communication technology driven world. It enables students with essential skills and knowledge to explore the world of communication and networking for further study and career.

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

CO-01	Select an appropriate communication technology for a given network and ensure optimal performance by addressing issues arising from transmission impairments.
CO-02	Design a network for a given specification by using the right network components, devices, topologies, protocols and software.
CO-03	Design, build, test and troubleshoot a SOHO network for a given premises.
CO-04	Demonstrate the configuration of IP address, routing, subnetting, client-server interaction (TCP, UDP) and DNS for a given WAN network using a network simulator and troubleshoot common network issues

3. Course Content

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week(2 hours/batch twice in a week)
1	01	1, 2	Electromagnetic waves - Generation of electromagnetic waves and their properties Electromagnetic spectrum - classification and its applications Communication Systems - Basic elements of communication systems with block diagram, List commonly used terms in electronic communication systems, Data representation, Data flow, Modulation, Demodulation Analog and Digital Signals, Periodic and Non-Periodic Signals, Sine Wave, Phase, Wavelength, Digital Signals, Bit-rate, Bit-length.	Refer Table 1	1. Build a circuit to Generate and detect of BASK signal and BFSK signal using communication kit.
2	01	1,2	Transmission Impairment – Attenuation, Distortion and Noise,		1. Explore all ISP in your area/locality and select best internet ISP/plan

			Performance - Bandwidth, Throughput, Latency, Jitter (Basic concepts only). Transmission Modes – Parallel and Serial Transmission. Asynchronous and Synchronous Transmission. Satellite communication- Introduction, advantages and disadvantages		based on cost and performance. 2. Test the download/upload speed in your computer/mobile phone also check type, bandwidth and ISP. 3. Explore Bluetooth, Wifi, NFC in your smartphone and note their key technical attributes (Radio spectrum band, range, pathloss, throughput, mode etc)
3	01, 02	1, 2, 3	Perspectives on Networking – End user perspectives on Networking and Internet, Overview of Networking. Categories of networks - LAN, MAN, WAN, Internetworking (Illustrate Network from LAN connected using a HUB to Internetwork). The communication rules (Method, language, Confirmation) – Protocols, the Internet. The Network Standard Organizations, Protocol Stack. OSI Model : OSI Layers and Their Functions, OSI Layering Concepts and Benefits, OSI Encapsulation Terminology.		1. My Protocol Rules Objectives a) Relate computer network protocols to the rules that you use every day for various forms of communication. b) Define the rules that govern how to communicate in a group of students. c) Play the communication game. d) List what would happen if the sender and receiver did not agree on the details of the protocol. 2. Manual and Automatic address assignment (Windows) a) IPv4 address b) Subnet mask c) DNS 3. Manual and Automatic address assignment (Android) a) IPv4 address b) Subnet mask c) DNS
4	01, 02	1, 2, 3	TCP/IP Networking Model - History Leading to TCP/IP, Overview of the TCP/IP Networking Model. TCP/IP Application Layer, HTTP Overview, HTTP Protocol Mechanisms. TCP/IP Transport Layer, TCP Error Recovery Basics, Same-Layer and Adjacent-Layer Interactions. TCP/IP Network Layer, Internet Protocol and the Postal Service, Internet Protocol Addressing Basics, IP Routing Basics. TCP/IP Link Layer (Data Link Plus Physical), TCP/IP Model and Terminology, Data		1. Organize and play games to understand working of TCP/IP like: Create 2 group of students, each playing role of a layers of TCP/IP (intermediate network devices roles can also be considered). Start the communication between two with a sender and receiver. 2. Determine the IP Address Configuration of a

			Encapsulation Terminology. Names of TCP/IP Messages.		Computer (Windows) and Test the Network Interface TCP/IP Stack (Ping).
5	02, 03	1, 2, 4,	Hardware and Software components of Network - Common network devices - Computers, Access points, Hub, Switch, Router, repeaters, NIC, Modem. LAN Cables – Co-axial, twisted pair, optical fibre, LAN connectors- co-axial cable, and twisted pair cable, optical fibre, Connectors, Firewall, Firm wares, ISPs.		1. Demonstrate working of common network devices. 2. Demonstrate different network cables and connectors. 3. Install and configure NIC. 4. Crimping of RJ45: Straight and Cross. a) Punching Cat 6 cable to I/O Box. Use punching tool. b) Check connectivity using LAN tester
6	01, 02	1, 2, 3, 4,	Overview of network topologies - Basic topologies- bus, ring, star, mesh and hybrid. Network Simulator: Network simulator like Packet Tracer, Installation, User Interface. Deploy devices and cables GUI and CLI Configuration. Configure end Devices		1. Install Network simulator like Cisco packet tracer. 2. Create simple network in simulator. 3. Create and Demonstrate all possible network topologies using simulator.
7	02, 03	1, 2, 3, 4,	An Overview of LANs - Typical SOHO LANs, Typical Enterprise LANs, The Variety of Ethernet Physical Layer Standards, Consistent Behaviour over All Links Using the Ethernet Data Link Layer. Building Physical Ethernet Networks with UTP - Transmitting Data Using Twisted Pairs, Breaking Down a UTP Ethernet Link, UTP Cabling Pinouts for 10BASE-T and 100BASE-T, Straight-Through Cable Pinout, Crossover Cable Pinout, Choosing the Right Cable Pinouts, UTP Cabling Pinouts for 1000BASE-T, Sending Data in Ethernet Networks.		1. Build a physical Ethernet LAN Network and demonstrate file sharing, printer sharing. 2. Install and configure wireless access point over the LAN. 3. Use pathping command to find actual path between source to destination with information about network latency/delay & network loss.
8	02, 03	1, 2, 3, 4,	Ethernet Data Link Protocols – The Rise of Ethernet, The Ethernet MAC address and Ethernet Addressing, Identifying Network Layer Protocols with the Ethernet Type Field, Error Detection with FCS. Encapsulation, Ethernet Frame. Hierarchical Network Design – Physical and logical addresses, Benefits of a Hierarchical Design, Access, Distribution, and Core layers Sending Ethernet Frames with Switches and Hubs, Sending in Modern Ethernet LANs Using Full-Duplex, Using Half-Duplex with LAN Hubs. Ethernet access layer devices – Hub, Switch, The MAC address table,		1. Determine the MAC Address of a Host(PC and Phone). 2. View Wireless and Wired NIC Information and make a table explaining each. 3. Configure and install a ethernet switch/Hub (Use simulator if hardware devices are not available) 4. Create/model a simple Ethernet network using 3 hosts and a switch, Observe traffic behavior on the network and Observer

			Ethernet Broadcast and Broadcast domain, ARP.		data flow of ARP broadcasts and pings.
9	02, 03, 04	1, 2, 3, 4,	Routing: The Need for Routing - Criteria for Dividing the Local Network - Now We Need Routing Overview of Network Layer Functions - Network Layer Routing (Forwarding) Logic, Host Forwarding Logic: Send the Packet to the Default Router, Routing Data Across the Network, Delivering Data to the End Destination, How Network Layer Routing Uses LANs and WANs, IP Addressing and How Addressing Helps IP Routing, Routing Protocols. IPv4 Addressing - Rules for IP Addresses, Rules for Grouping IP Addresses, Class A, B, and C IP Networks, The Actual Class A, B, and C IP Networks, IP Subnetting, How to create subnets, Subnet mask, CIDR, variable length subnet mask.		1. Build a simple peer-to-peer network and verify physical connectivity and Assign various IPv4 addresses to hosts and observe the effects on network communication 2. Configure IP addresses of a network (real or simulated) and ping across to test and troubleshoot. 3. Subnetting of a network (either using real network or in Simulator). 4. Connect to web server using simulator, Observe how packets are sent across the Internet using IP addresses.
10	02, 03, 04	1, 2, 3, 4, 7	IPv4 Routing - IPv4 Host Routing, Router, Forwarding Decisions and the IP Routing Table, The default gateway, A Summary of Router Forwarding Logic, A Detailed Routing Example. Routing Protocols - IPv4 Routing Protocols – static and dynamic. Other Network Layer Features - Using Names and the Domain Name System, The Address Resolution Protocol, ICMP Echo and the ping Command. DHCP – Static address assignment, Dynamic address assignment, DHCP servers.		1. Implement simple static routing. 2. Troubleshooting of IP Addressing- a) Change a routing table entry b) Wrong address c) incorrect subnet mask 3. Configure and test DHCP on a wireless router (real or simulated)
11	02, 03, 04	1, 2, 3, 4,	Pv4 and IPv6 Address Management - Network Boundaries -Gateways to Other Networks, Routers as Gateways. Network Address Translation - Introduction, NAT operation. IPv4 Issues - Need of IPv6, Ipv4 vs IPv6, IPv4 and IPv6 Coexistence. IPv6 features - IPv6 Address Representation. Concept of Virtual LAN's(VLAN's)		1. Packet Tracer - Examine NAT on a Wireless Router 2. Identify IPv6 Addresses a) Identify the different types of IPv6 addresses. b) Examine a host IPv6 network interface and address. c) Practice IPv6 address abbreviation. 3. Setup, configure and test VPN in your smartphone.
12	02, 03, 04	1, 2, 3, 4,	The Client Server relationship – Client Server interaction. URI, URN, URL TCP/IP Layer 4 Protocols: TCP and UDP - Transmission Control Protocol, Multiplexing Using TCP Port Numbers, Popular TCP/IP Applications, Connection Establishment and Termination, User Datagram Protocol.		1. Create a client – server model in simulator and observe the client interaction between the server and PC using packet tracer. 2. Observe DNS Name Resolution

			Port Numbers – TCP and UDP. Socket pairs, the netstat command. Application Layer Services - Common Network Application Services, Domain Name System, Domain Name Translation, DNS Servers, HTTP, Web Clients and Servers, FTP, Virtual Terminals, Remote Access with Telnet or SSH, Telnet, Security Issues with Telnet, SSH, Email- Email protocols, Simple Mail Transfer Protocol (SMTP), Post Office Protocol (POP3), Internet Message Access Protocol (IMAP4).		a) Observe the conversion of a URL to an IP address. b) Observe DNS lookup using the nslookup command. 3. Use simulator to demonstrate Telnet and SSH
13	02, 03, 04	1, 2, 3, 4,	Troubleshoot Common Network Problems - The Troubleshooting Process, Network Troubleshooting Overview, Gather Information - Nature of problem, Equipment, Configuration and Topology, Previous Troubleshooting. Structured Troubleshooting Methods - Bottom-Up, Top-Down, Divide-and-Conquer, Follow-the-Path, Substitution, Comparison, Educated Guess. Guidelines for Selecting a Troubleshooting Method Troubleshoot Wireless Issues - Causes of Wireless Issues, Authentication and Association Errors.		1. Demonstrate troubleshooting Commands with a scenario- ipconfig, ping , netstat, tracert, nslookup. 2. Interpret the output of commonly used network command line utilities and Determine which network utility can provide the necessary information to perform troubleshooting activities in a bottom-up troubleshooting strategy 3. Physical Layer Problems - Common Layer 1 Problems, how to use the five senses to troubleshoot, Wireless Router LEDs, Cabling Problems 4. Common Internet Connectivity Issues - DHCP Server Configuration Errors, Check Internet Configuration, Check Firewall Settings.
Total in hours			39	13	52

*PO = Program outcome as listed and defined in year 1 curriculum

Table 1: Suggestive activities for tutorials (the list is only shared as an example and not inclusive of all possible activities for that course. Student and faculty are encouraged to choose activities that are relevant to the topic and the availability of such resources at their institution)

Sl. No	Activity
1	Prepare a report on advanced communication systems and suggest best way to connect remote villages of India.
2	Prepare a report on Communication satellites of Indian Space Research Organization.
3	Prepare a presentation on 5 networking protocols being used in your smart phone.
4	My Protocol Rules Objectives a) Relate computer network protocols to the rules that you use every day for various forms of communication. b) Define the rules that govern how you send and interpret text messages.

	c) Explain what would happen if the sender and receiver did not agree on the details of the protocol.
5	My Local Network a) Record all the different network-attached devices in your home or classroom. b) Investigate how each device connects to the network to send and receive information. c) Create a diagram showing the topology of your network. d) Label each device with its function within the network.
6	Detailed study of Packet tracer and present the same.
7	Trace a Route a) Determine network connectivity to a destination host b) Trace a route to a remote server using tracert
8	Presentation on wireless Ethernet protocols
9	1. Calculate whether destination address is local or remote using IP address. 2. Calculate whether destination address is local or remote using mask. 3. Use logical AND to determine network address
10	Identify IPv6 Addresses a) Identify the different types of IPv6 addresses. b) Examine a host IPv6 network interface and address. c) Practice IPv6 address abbreviation.
11	Prepare a report on ICANN List the popular port numbers with their use.
12	Prepare e report on popular application layer protocols and present the same.
13	Identify and correct any misconfiguration of a wireless device (Scenario : A small business owner learns that a wireless user is unable to access the network. All the PCs are configured with static IP addressing. Identify and resolve the issue)

4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2Written Test	9	80	30	
3	CIE-3Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill tests reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Activity through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
Total Marks					100

5. Format for CIE written Test

Course Name	Computer Network	Test	I/II/III	Sem	III/IV
Course Code	20CS33P	Duration	80 Min	Marks	30
Note: Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions		Cognitive Levels	Course Outcome	Marks
I	1				
	2				
II	3				

	4			
III	5			
	6			
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.				

6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
Average Marks=(8+6+2+2)/4=4.5							5

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

7. Reference:

Sl. No.	Description
1	www.netcad.com
2	Computer Networks - Behrouz A. Forouzan
3	www.howtonetwork.com
4	vlab.co.in

8. CIE Skill Test and SEE Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Identify the network devices, cables, Connectors, software and other tools required as per the given specification and write their technical details.	20
2	Design/Create/Configure the given network as per the specification given.	25
3	Configure and troubleshoot the network (devices, address, port, software, tools, protocol).	25
4	Demonstrate the solution. In the event of, a student fails to get the desired result, the examiner shall use viva voce to assess the student's understanding of computer networks.	20
5	Portfolio evaluation based on aggregate of all practice sessions.	10
Total Marks		100

9. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
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1	Computer		20
2	Lan cable		20
3	Crimping tool		20
4	Networking Switch, Modem		2
5	Network simulator like packet tracer		20
6	Communication trainer kit		10



Government of Karnataka

DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Programme	Computer Science and Engineering	Semester	III
Course Code	20CS34P	Type of Course	Programme Core
Course Name	Database System Concepts and PL/SQL	Contact Hours	8 hours/week 104 hours/semester
Teaching Scheme	L:T:P :: 3:1:4	Credits	6
CIE Marks	60	SEE Marks	40

1. Rationale

Data, factual information, is the main driving force that is changing the face of our world. Database is an organized collection of related data which is stored and accessed electronically using a computer. Database management has evolved from a specialized computer application to a central component of virtually all enterprises, and, as a result, knowledge about database systems has become an essential part of an education in computer science. SQL is a powerful language for both querying and updating data in relational databases. Study of SQL empowers students to implement and work with relational data model.

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

CO-01	Identify the elements of ER model for a given requirement, draw ER diagram and validate with the given requirement.
CO-02	Translate the given ER diagram to a relational model and verify against integrity constraints. Also refine and normalize the relational database design against first three normal forms.
CO-03	Use appropriate SQL statements to create a database and other DB objects using a DBMS software.
CO-04	Perform insert, delete and/or update operations on the database and query the database to retrieve the required information using appropriate SQL statements and clauses.

3. Course Content

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week (2 hours/batch twice in a week)
1	1	1,4	Introduction Overview of DB: why a database? Purpose of database; Classification; Application; DBMS: features, providers; Functional components of DBMS; Types of DBMS architecture; View of data in DBMS; Database users; Role and responsibilities of DBA; Case study: Example of any database application, recruitment database	Refer Table 1	1. Install and setup DBMS software such as MySQL, PostgreSQL 2. Learn the interface and explore the features of installed DBMS
2	1	1,3,4	Database design Data model; types; importance of data modeling; Overview of database design; phases		1. Identify and ER-model elements and draw ER

			of database design; database development life cycle; Conceptual design: ER-Model: entity: types; attribute: types; relationships: types, constraints, Symbols and Notations; Case study: conceptual design for a set of specifications i. Restaurant ii. Retail shop iii. Recruitment iv. College v. Library		diagram for the given specifications using tools.
3	2	1,3	Relational model: Overview; characteristics; Constraints: types; Operations; Advantages and Disadvantages; applications; Design anomalies; Features of good DB design;		1. Map ER Model to relational model 2. Identify various constraints
4	2	1,3	Functional dependency: overview, rules, types; Normalization: normalization process; importance of normalization; 1NF, 2NF, 3NF Sufficient examples to understand the concept		1. Normalize the above design
5	3	1,4	database languages: types, commands/tasks in each type; Integrity constraints; MySQL/PostgreSQL: overview; features; datatypes; Standardization guidelines;		1. Validate the above design against integrity constraints
6	3	1,3,4	Defining Data: DDL CREATE, ALTER, DROP different DB objects; Temporary tables: types, create and use; external tables; Managing constraints		1. Use MySQL/PostgreSQL DDL statements to create database and other DB objects for above design
7	3,4	1,3,4	Insert, delete and update data Modifying data: UPDATE and DELETE Update anomalies; impact of constraints Querying of available data: SELECT; Aliases; sorting data: ORDER BY		1. Perform single table and multi table insertion 2. Perform delete and update operations 3. Querying single table 4. Sort the result set of a query
8	4	1,4	filtering data: WHERE, AND, OR, row limiting clause, IN, BETWEEN, LIKE; Joining table: INNER JOIN, LEFT JOIN,		1. Querying single table 2. Filtering data 3. query multiple tables with joins
9	4	1,4	Grouping data: Aggregate functions, GROUP BY, HAVING; Set operators: UNION, INTERSECT, MINUS;		1. Queries that use set operators 2. Report aggregated data using group functions
10	4	1,4	Subqueries: Comparator operators; subqueries: Single Row Subqueries; Multiple Row Subqueries; correlated subqueries; EXISTS, NOT EXISTS, ANY, ALL, SOME;		1. Write sub queries to retrieve information from the created database
11	4	1,4	Views: create, drop and update; realization of views based on single and multiple tables;		1. Create view and query

			DCL: Controlling user access: Differentiating system privileges from object privileges; Granting privileges on tables		2. Create users and assign privileges for DB operations
12	4	1,4	PL/SQL: variables, datatypes; control statements (decision making); Stored procedures and Functions Concept; syntax and structure of store procedure; syntax and structure of functions; calling a function; Examples;		1. Create and execute store procedures 2. Create and execute functions
13	4	1,4	Managing and controlling transactions: Introduction of transaction, ACID properties; states of transaction; Transaction control; Overview of transaction management, using transaction control commands: COMMIT, ROLLBACK, SAVE POINT, SET TRANSACTION; sufficient examples;		1. Create and execute transactions 2. Call previously created store procedure or function in transaction
Total in hours			39	13	52

***PO = Program outcome as listed and defined in year 1 curriculum**

Table 1: Suggestive activities for tutorials (the list is only shared as an example and not inclusive of all possible activities for that course. Student and faculty are encouraged to choose activities that are relevant to the topic and the availability of such resources at their institution)

1	1. Identify the drawbacks of file system and how DB enables us to overcome them. Identify distinguishable features of each of DBMS available in the market.
2	1. Transform given n-ary relationship to binary relationship 2. Document the steps to create ER diagram. 3. Identify the components of ER model in the given requirements.
3	1. Document the steps to create logical design 2. Discuss and document Codd's 12 rules
4	1. Explore and document other normal forms
5	1. study and present the working of SQL optimizer 2. Learn and report optimization techniques
6	1. Learn and demonstrate use of DISTINCT, ALL, IS NULL; 2. Learn and present RIGHT JOIN;
7	1. Identify the advantages of Cascading Referential Integrity Constraints
8	1. Identify need of subqueries
9	1. identify the advantages and disadvantages of store procedure and functions,
10	1. presentation on the latest developments in research and industry related to this course
11	1. Learn and present need of scalar subqueries
12	1. Learn iterative statements in PL/SQL
13	1. Does Relational model support storage of unstructured data, if no, what are the alternatives to store unstructured data.

4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	

5	CIE-5 Skill Test-Practice	12	180	100	Average of two skill tests reduced to 20
6	CIE-6 Portfolio continuous evaluation of Activity through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
Total Marks					100

5. Format for CIE written Test

Course Name	Database System Concepts and PL/SQL	Test	I/II/III	Sem	III/IV
Course Code	20CS34P	Duration	80 Min	Marks	30

Note: Answer any one full question from each section. Each full question carries 10 marks.

Section	Assessment Questions	Cognitive Levels	Course Outcome	Marks
I	1			
	2			
II	3			
	4			
III	5			
	6			

Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.

6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
Average Marks= (8+6+2+2)/4=4.5							5

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

7. Reference:

Sl. No.	Description
1	Database System Concepts by Abraham Silberschatz, Henry F. Korth, S . Sudarshan
2	https://binaryterms.com/
3	https://beginnersbook.com/
4	https://www.oracletutorial.com/

8. CIE Skill Test Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Draw ER diagram for the given specifications.	30

2	Translate ER diagram to relational model, verify against integrity constraints and refine and normalize DB design	40
3	Explain above DB design In the event of student failing to verify integrity constraints and apply normalization the examiner shall use viva voce to assess the student understanding of normal forms and integrity constraints	20
4	Portfolio evaluation of practice sessions	10
Total Marks		100

Note: For CIE skill test 2, SEE scheme of evaluation shall be used.

9. SEE Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Draw ER diagram for the given specifications.	10
2	Translate ER diagram to relational model, verify against integrity constraints and refine and normalize DB design	20
3	Use appropriate SQL statements to create the database and other DB objects using a DBMS software for the above design	10
4	Perform insert, delete and/or update operations on the database and query the database to retrieve the required information using appropriate SQL statements and clauses.	30
5	Demonstrate the working of above queries. In the event of not working of above queries (with no syntactical errors), the examiner shall use viva voce to assess the student understanding of ER model, Relational model concepts and SQL.	20
6	Portfolio evaluation of practice sessions	10
Total Marks		100

10. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
1	Computers		20
2	MySQL workbench/ or equivalent software; Lucid chart, draw.io		

ಮೂರನೇ ಸೆಮಿಸ್ಟರ್

ಕನ್ನಡ ಬಲ್ಲ ಡಿಪ್ಲೋಮಾ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

(ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ, ಸಂಸ್ಕೃತಿ ಮತ್ತು ಪರಂಪರೆ ಕುರಿತು)

Course Code	20KA31T	Semester : III	Course Group - AU
Course Title	ಸಾಹಿತ್ಯ ಸಿಂಚನ - 2	Category : Audit	Lecture Course
No. of Credits	2	Type of Course	CIE Marks : 50
Total Contact Hours	02 Hrs Per Week 26 Hrs Per Semester	Prerequisites Teaching Scheme (L:T:P)= 2:0:0	SEE Marks : Nil

ಸಾಹಿತ್ಯ ಸಿಂಚನ - 2 ಪಠ್ಯಕ್ರಮ - 20KA31T

26 ಗಂಟೆಗಳು

ಪಠ್ಯಕ್ರಮದ ಪರಿವಿಡಿ	ಬೋಧನಾ ಅವಧಿ
1. ಹೊಸಗನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಪ್ರಭಾವಗಳು ಮತ್ತು ಪ್ರೇರಣೆಗಳು	01 ಗಂಟೆ
2. ಹೊಸಗನ್ನಡ ಕಾವ್ಯದ ಪ್ರಕಾರಗಳು -	02 ಗಂಟೆ
ನವೋದಯ ಸಾಹಿತ್ಯ - ಲಕ್ಷಣಗಳು ಮತ್ತು ಪ್ರೇರಣೆ, ಪ್ರಮುಖ ಕವಿಗಳು ಮತ್ತು ಸಾಹಿತ್ಯದ ಕೊಡುಗೆಗಳು.	03 ಗಂಟೆ
ನವ್ಯ ಸಾಹಿತ್ಯ - ಲಕ್ಷಣಗಳು ಮತ್ತು ಪ್ರೇರಣೆ, ಪ್ರಮುಖ ಕವಿಗಳು ಮತ್ತು ಸಾಹಿತ್ಯದ ಕೊಡುಗೆಗಳು.	03 ಗಂಟೆ
ಬಂಡಾಯ ಮತ್ತು ಪ್ರಗತಿಪರ ಸಾಹಿತ್ಯ - ಲಕ್ಷಣಗಳು ಮತ್ತು ಪ್ರೇರಣೆ, ಪ್ರಮುಖ ಕವಿಗಳು ಮತ್ತು ಸಾಹಿತ್ಯದ ಕೊಡುಗೆಗಳು.	03 ಗಂಟೆ
ದಲಿತ ಸಾಹಿತ್ಯ, ಮಹಿಳಾ ಸಾಹಿತ್ಯ, ವಿಜ್ಞಾನ ಸಾಹಿತ್ಯ ಮತ್ತು ಇತ್ತೀಚಿನ ಪ್ರಚಲಿತ ಕನ್ನಡ ಸಾಹಿತ್ಯ - ಲಕ್ಷಣಗಳು ಮತ್ತು ಪ್ರೇರಣೆ, ಪ್ರಮುಖ ಕವಿಗಳು ಮತ್ತು ಸಾಹಿತ್ಯದ ಕೊಡುಗೆಗಳು.	03 ಗಂಟೆ
3. ವೈಚಾರಿಕತೆ ಕುರಿತಾದ ಲೇಖನ - ಜಿ ಎಸ್. ಶಿವರುದ್ರಪ್ಪ	01 ಗಂಟೆ
4. ಕಥೆ - ನೇಮಿಚಂದ್ರ	01 ಗಂಟೆ
5. ಪ್ರವಾಸ ಕಥನ - ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯರವರ (ಕುಪ್ಪಳಿ ಡೈರಿ ಪುಸ್ತಕದಿಂದ)	01 ಗಂಟೆ
6. ಪರಿಸರ, ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ ಕುರಿತಾದ ಲೇಖನಗಳು	01 ಗಂಟೆ
7. ಪ್ರಬಂಧ - ಗೊರೂರು ರಾಮಸ್ವಾಮಿ ಅಯ್ಯಂಗಾರ	01 ಗಂಟೆ
8. ಪ್ರಚಲಿತ ವಿದ್ಯಮಾನಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ಲೇಖನ - "ಪೇರು ಮಾರುಕಟ್ಟೆ ಮತ್ತು ಹಣಕಾಸು ನಿರ್ವಹಣೆ" ಕುರಿತಂತೆ	01 ಗಂಟೆ
9. ಕರ್ನಾಟಕ ಏಕೀಕರಣ ಚಳುವಳಿ - ಪ್ರೊ. ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ	01 ಗಂಟೆ
10. ಕನ್ನಡ ಸಿನಿಮಾರಂಗ ಬೆಳೆದು ಬಂದ ದಾರಿ ಮತ್ತು ನಾಡು-ನುಡಿ ಹಾಗೂ ನಾಡಿನ ಸಂಸ್ಕೃತಿಯ ಮೇಲೆ ಬೀರಿದ ಪ್ರಭಾವಗಳು	01 ಗಂಟೆ
11. ಕನ್ನಡದ ಸಾಮಾಜಿಕ ಉಪಭಾಷೆಗಳು (ಭಾಷಾ ಪ್ರಭೇದಗಳು)	01 ಗಂಟೆ
12. ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಒಂದು ಅವಲೋಕನ	02 ಗಂಟೆ
ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ 26 ಗಂಟೆಗಳು	26 ಗಂಟೆ

**ಕನ್ನಡ ಬಾರದ / ಕನ್ನಡೇತರ ಡಿಪ್ಲೋಮಾ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಕನ್ನಡ ಕಲಿಸಲು
ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ**

Course Code	20KA31T	Semester : III	Course Group - AU
Course Title	ಬಳಕೆ ಕನ್ನಡ - 2	Category : Audit	Lecture Course
No. of Credits	2	Type of Course	CIE Marks : 50
Total Contact Hours	2 Hrs Per Week 26Hrs Per Semester	Prerequisites Teaching Scheme (L:T:P)= 2:0:0	SEE Marks : Nil

ಬಳಕೆ ಕನ್ನಡ - 2 ಪಠ್ಯಕ್ರಮ - 20KA31T

Table of Contents (ಪರಿವಿಡಿ)

26 ಗಂಟೆಗಳು

Part – 1	Teaching Hour
Necessity of learning a local language (Continuation). Tips to learn the language with easy methods (Continuation). Easy learning of a Kannada Language: A few tips (Continuation). Hints for correct and polite conversation (Continuation). Instructions to Teachers for Listening and Speaking Activities (Continuation). Instructions to Teachers for Reading and Writing Activities (Continuation).	01 Hour
Part – II	
Key to Transcription for Correct Pronunciation of Kannada Language (Continuation). Instructions to Teachers to teach Kannada Language (Continuation).	02 Hour
Part – III Lessons to teach Kannada Language (Speaking, Listening, Reading and Writing Activities with Explanation)	
Lesson – 1 Personal Pronouns, Possessive Forms, Interrogative words – Part II	02 Hour
Lesson – 2 Permission, Commands, encouraging and Urging words (Imperative words and sentences) – Part II	02 Hour
Lesson – 3 Comparative, Relationship, Identification and Negation Words – Part II	02 Hour
Lesson – 4 Different types of forms of Tense (Use and Usage of Tense in Kannada) – Part II	02 Hour
Lesson – 5 Kannada Helping Verbs in Conversation (Use and Usage of Verbs) – Part II	02 Hour
Lesson – 6 Formation of Past, Future and Present Tense Sentences with Changing Verb Forms	02 Hour
Lesson – 7 Karnataka State and General Information about the State	02 Hour
Lesson – 8 Kannada Language and Literature	02 Hour
Lesson – 9 Do's and Don'ts in Learning a Language	02 Hour
PART - IV Reading and writing Practice of Kannada Language	
Lesson – 10 Kannada Language Script Part – I	02 Hour
Lesson – 11 Kannada Language Script Part – II (Continuation)	02 Hour
Lesson – 12 Kannada Vocabulary List : ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು - Kannada Words in Conversation (Continuation).	01 Hour
Total Teaching Hours	26 Hour

**ಸಾಹಿತ್ಯ ಸಿಂಚನ ಭಾಗ - II ಮತ್ತು ಬಳಕೆ ಕನ್ನಡ ಭಾಗ - II ಈ ಎರಡು ಪಠ್ಯಕ್ರಮಗಳಿಗೆ
CIE - ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ ಮಾರ್ಗಸೂಚಿಗಳು :**

(Course Assessment and Evaluation Chart - CIE only)

Sl. No	Assessment	Type	Time frame in semester	Duration In minutes	Max marks	Conversion
1.	CIE- Assessment - 1	Written Test - 1	At the end of 3 rd week	80	30	Average of three written tests : 1, 2 & 3 for 30 Marks
2.	CIE- Assessment - 2	Written Test - 2	At the end of 7 th week	80	30	
3	CIE- Assessment - 3	Written Test - 3	At the end of 13 th week	80	30	
4.	CIE- Assessment - 4	MCQ/Quiz	At the end of 5 th week	60	20	Average of three Assessment tests : 4, 5 & 6 for 20 Marks
5	CIE- Assessment - 5	Open Book Test	At the end of 9 th week	60	20	
6	CIE- Assessment - 6	Work book Consolidation & Activities	At the end of 11 th week	60 (Work book Submission)	20	
Total CIE – Continuous Internal Evaluation Assessment Marks						50
Total Marks						50

- ಸೂಚನೆ :** 1.CIE - ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ 1, 2 ಮತ್ತು 3 ರ ಕಿರು ಪರೀಕ್ಷೆಗಳನ್ನು ಮತ್ತು ಮೌಲ್ಯಮಾಪನದ 4, 5 ಮತ್ತು 6 ರ ಪರೀಕ್ಷೆಗಳನ್ನು ಪ್ರತ್ಯೇಕ ಬ್ಲಾಡ್ ಪುಸ್ತಕದಲ್ಲಿ ವಿದ್ಯಾರ್ಥಿಗಳು ಬರೆಯಬೇಕು.
- 2.ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದಲ್ಲಿ ವಿದ್ಯಾರ್ಥಿಗಳು, ತರಗತಿ ಕನ್ನಡ ಭಾಷಾ ಶಿಕ್ಷಕರಿಂದ ಮತ್ತು ವಿಭಾಗಾಧಿಕಾರಿಗಳಿಂದ ದೃಢೀಕರಣಗೊಂಡ ಕಾರ್ಯಪಠ್ಯಪುಸ್ತಕವನ್ನು (Work Book) ಮೌಲ್ಯಮಾಪನ ಭಾಗ- CIE- Assessment – 6 ರ ಪರೀಕ್ಷೆಯ ನಂತರ ಆಯಾ ವಿಭಾಗಕ್ಕೆ ಸಲ್ಲಿಸಬೇಕು.