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Programme	B. Sc. Computer Science				
Course Code	CSC1MN102				
Course Title	Python Programming				
Type of Course	**Minor**				
Semester	I				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Have an understanding about algorithms and flowchart				
Course Summary	This course explores the versatility of Python language in programming and teaches the application of various data structures using Python.				

Course Outcomes (CO):

CO	**CO Statement**	**Cognitive Level***	**Knowledge**	**Evaluation Tools used**
CO1	Understand the basic concepts of Python programming	U	C	Instructor- created exams / Quiz
CO2	Analyse problem-solving skills using different control structures and loops	An	P	Coding Assignments/ Code reading and review
CO3	Analyse the various data structures and operations on it using Python	An	P	Coding Assignments/ Exams

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CO4	Examine modular programming using functions	An	P	Instructor-created exams / Case studies
CO5	Design Python programs to solve basic computational problems and acquire knowledge of data analysis and visualization using Python	C	M	Instructor- created exams / Quiz Coding

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)

- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	**Introduction to Python**		**12**	20
	1	Features of Python, Different methods to run Python,Python IDE	2	
	2	Comments, Indentation, Identifiers, Keywords, Variables	2	
	3	Standard Data Types	2	
	4	Input Output Functions, Import Functions, range function	1	
	5	Operators and Operands, Precedence of Operators, Associativity	2	
	6	Type Conversion, Multiple Assignment	1	
	7	Expressions and Statements, Evaluation of Expressions	1	
	8	Boolean Expressions	1	
	Control Structures		**12**	20

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II	9	Decision Making- if statement, if…else statement, if…elif…else statement, Nested if statement	5	
	10	Loops - for loop, for loop with else, while loop, while loop with else, Nested Loops	5	
	11	Using indentation in Python to define code blocks	1	
	12	Control Statements- break, continue, pass	1	
III	**Data Structures in Python**		**12**	20
	13	Working with strings and string manipulation	3	
	14	List - creating list, accessing, updating and deleting elements from a list	2	
	15	Basic list operations	1	
	16	Tuple- creating and accessing tuples in python	2	
	17	Basic tuple operations	1	
	18	Dictionary, built in methods to create, access, and modify key-value pairs	2	
	19	Set and basic operations on a set	1	
IV	**Functions**		**9**	15
	20	Built-in functions - mathematical functions, date time functions, random numbers	1	
	21	Writing user defined functions - function definition, function call, flow of execution, parameters and arguments, return statement	6	
	22	Recursion. Introduction to basic Python libraries (e.g., math, random)	2	

	Hands-on Data Structures: **Practical Applications, Case Study and Course Project**	**30**	

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Design programs from the concepts listed below. Select the topics and programs suited for your domain				
V	1	Programs to: • Run instructions in Interactive interpreter and as Python Script • Perform calculations involving integers and floating point numbers using Python arithmetic operators **Data Structures in Python** • String - Create a string , Indexing / Looping / Slicing • Lists - Create a list , Indexing /Looping / Slicing , Adding items / Modifying items / Removing items • Tuples - Create a tuple , Indexing / Looping / Slicing / Adding items to a tuple • Dictionary - Create a dictionary and access values with key / Adding a key- value pair / Adding to an empty dictionary /Modifying values in a dictionary / Removing key-value pair **Function** • Call functions residing in the math module • Define a function for later use • Pass one or more values into a function • Return one or more results from a function		
		Case study: • Create a Todo List Manager where Users should be able to add, remove, and view tasks • Create Student Grade Tracker: Allow users to add students, add grades for subjects, and calculate average grades.		

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Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO5	PSO6	PO 1	PO2	PO3	PO4	PO5	PO6	PO7
CO 1								1	1	1	1	1	1
CO 2								1	2	2	2	1	3
CO 3								1	2	2	2	1	3
CO 4								1	2	2	2	1	3
CO 5								3	3	3	3	3	3

Correlation Levels:

Level	**Correlation**
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments (20%)
- Final Exam (70%)

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Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓			✓
CO 2	✓	✓	✓	✓
CO 3	✓		✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓			✓

Reference Books:

1. Jose, Jeeva. Taming Python By Programming. Khanna Book Publishing, 2017. Print.

2. Downey, Allen. Think Python. Green Tea Press, 2nd ed. 2009

Programme	B. Sc. Computer Science				
Course Code	CSC1MN103				
Course Title	Data analysis using Spreadsheet				
Type of Course	**Minor**				
Semester	I				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	1. Basic mathematics knowledge 2. Basic computer knowledge				
Course Summary	This syllabus aims to cover a broad spectrum of Excel skills, catering to participants with varying levels of expertise.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Demonstrate creation and manipulation of data within Excel workbook including formating of Data	Ap	P	Instructor-created exams / Quiz
CO2	Demonstarte the impotantance of sorting,filtering,cell referencing in Excel for effective data management	Ap	P	Problem-solving assessments
CO3	Analyse basic functions and formulas in Excel .	An	P	Instructor-created exams / Quiz

CO4	Implement the usage of tables and charts to draw meaningful conclusions to support decision-making.	Ap	P	Instructor-created exams / Quiz

CO5	Creating Excel solutions for various real world problems including designing dash board for data analysis	C	P	Modelling Assignments/ / Case studies

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)

- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	**Introduction to Spreadsheets**		**12**	**18**
	1	Overview - Overview of spreadsheet software (Microsoft Excel, Google Sheets) and their application	2	
	2	Excel Interface and Navigation-Ribbon,Row ,Column, Cell Worksheet,Workbook,Cell Address,Data range,Formula, Chart)	2	
	3	Basic navigation techniques within the workbook	2	
	4	Creating and Saving Workbooks - Creating a new workbook and saving it , Different file formats and when to use them	2	
	5	Inserting or deleting rows or columns	2	
	6	Basic Cell Formatting - Formatting text, numbers, and dates,	2	
II	Data Management		**11**	**18**
	7	Find and select -Find,Replace,Go To,Go To Special	2	

	8	Cell Referencing-Relative, Absolute and Mixed	1	
	9	Sorting data-Quick Sorting,Sorting by Multiple Criteria	2	
	10	Filtering data-Quick Filtering, Filtering by Multiple Criteria , Performing Calculations on Filtered Data	2	
	11	AutoFill and Flash Fill	1	
	12	Remove Duplicates	1	
	13	Get External Data - From web,from text and from other sources	2	
III	Excel Functions and formulas		**10**	**18**
	14	Mathematical and Statistical functions(-SUM, AVERAGE, MAX, MIN, ROUND, ABS, SQRT, MOD.,COUNT, COUNTIF, SUMIF, AVERAGEIF, MEDIAN, STDEV, VAR)	2	
	15	Logical Functions(IF, AND, OR, NOT, XOR, IFERROR, IFNA, SWITCH.)	2	
	16	Text Functions (CONCATENATE, LEFT, RIGHT, MID, LEN, SUBSTITUTE, FIND, SEARCH.)	2	
	17	Date & Time Functions-(TODAY, DATE, DAY, MONTH, YEAR, HOUR, MINUTE, SECOND.)	2	
	18	Using formula :Witing a formula ,Cell reference	2	
1V	Data Analysis and Manipulation		**12**	**16**
	19	Introduction to Tables and Data Organization - Creating and formatting tables for effective data management, Sorting and filtering data within tables	3	
	20	Data Analysis Techniques - Advanced functions (VLOOKUP, HLOOKUP, INDEX, MATCH)	3	
	21	PivotTables and PivotCharts - Understanding PivotTables for data analysis, Creating PivotCharts for visual representation	3	
	22	Data Visualization: Creating and customizing various chart types, Effective use of charts for data presentations	3	
V	**Project and Practical Applications**		**30**	

	1	Practical session on real-world applications (Eg: Use advanced functions relevant to field of study, Tabulation of Lab experiments data for better analysis and visualisation)	15	
	2	Course Project: Creating a comprehensive project using Excel features.	15	

References

1. "Microsoft Excel 2019 Step by Step" by Curtis Frye
2. "Excel 2019 Bible" by Michael Alexander and Richard Kusleika
3. "Microsoft Excel 2019 Data Analysis and Business Modeling" by Wayne Winston

Mapping of COs with PSOs and POs :

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 1							1	1	3	3	1	1	1
CO 2							2	1	3	3	3	1	1
CO 3							1	1	3	3	3	1	1
CO 4							1	1	3	3	3	1	1
CO 5							1	2	3	3	3	1	2

Correlation Levels:

Level	Correlation
-	Nil
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Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments (20%)
- Final Exam (70%)

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1		✓		✓
CO 2	✓	✓		✓
CO 3		✓		✓
CO 4	✓			✓
CO 5	✓		✓	✓

Programme	B. Sc. Computer Science				
Course Code	CSC1FM105				
Course Title	Data Analysis and Visualisation Through Spread sheets				
Type of Course	**MDC**				
Semester	I				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	● Basic understanding of computers ● Familiarity with basic mathematical operations				
Course Summary	This course provides a comprehensive introduction to Spreadsheets, focusing on understanding formulas, functions, data organization, analysis techniques, and data visualization. Participants will gain skills in spreadsheet management, data cleansing, analysis, and visualization using Excel's various tools and features.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Clarify proficiency in managing spreadsheets, including creating, formatting, and manipulating data within Excel workbooks.	U	P	Instructor-created exams / Quiz
CO2	Discuss the importance of data organization and cleansing in Excel with import, export, filter, sort, validate, and remove duplicates from datasets.	U	P	Instructor-created exams/ Home Assignments
CO3	Apply advanced data analysis skills like pivot tables, what-if analysis, and goal seek	Ap	P	Instructor-created exams
CO4	Adapt proficiency in data visualization techniques using Excel. They will be able to create a variety of charts, design pivot charts, dashboards for effective data analysis	Ap	P	Instructor-created exams

CO5	Practice skills in advanced features of Excel like macros, protect data sheets and workbooks,incoparate add-ins for extended functionalities and manage printing options	Ap	P	Instructor-created exams

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs (36+9)	Marks (50)
I	**Introduction to Excel & Understanding Formulas, Functions**		**9**	**15**
	1	Features of Spreadsheet	1	
	2	Parts of Excel Window, Tool bars, Work sheet and Work book, Insertion and Deletion of cells, columns, rows	2	
	3	Formatting in Excel (Merge, Warp, Font Formatting, Number Formatting, Borders and Shading, Colouring)	2	
	4	Range, Autofill, Autosum, Relative, Absolute and Mixed Referencing in Excel, Linking data between worksheets	2	
	5	Formulas and Functions in Excel: Use of Formula Bar, Functions: SUM,ROUND, CEIL, FLOOR,IF, AND, OR,AVERAGE, MIN, MAX ,COUNT, COUNTIF, SUMIF, VLOOKUP,HLOOKUP	2	
II	**Cleansing and Organising Data in Excel**		**9**	**10**
	6	Importance of Data Cleansing and Organisation	1	
	7	Data Import and Export	2	
	8	Filtering and Sorting	2	
	9	Data Validation and remove Duplicates	1	
	10	Group, Ungroup, Subtotal	2	
	11	Conditional Formatting – Highlight Cell Rules, Top/Bottom Rules	1	
III	**Advanced Techniques for Data Analysis**		**8**	**10**

	12	Features of Pivot table	1	
	13	Pivot Table creation	2	
	14	What-if Analysis	2	
	15	Goal Seek	2	
	16	Watch Window	1	
IV	**Data Visualisation Techniques**		**10**	**15**
	17	Creating Charts, Different types of charts	2	
	18	Formatting Chart Objects, Changing the Chart Type, Showing and Hiding the Legend, Showing and Hiding the Data Table	2	
	19	Pivot Chart	2	
	20	Dashboards	1	
	21	Form Controls	3	
V	**Open Ended Module: More about Excel**		**9**	
	1. Recording and Running Macros 2. Protecting Data Sheets and Workbooks 3. Split, Freeze and Hide options 4. Add-ins 5. Printing options in Excel			

References

1. "Excel 2019 Bible" by Michael Alexander and Richard Kusleika
2. "Excel Formulas & Functions For Dummies" by Ken Bluttman and Peter Aitken

3. “Excel with Microsoft Excel: Comprehensive & Easy Guide to Learn Advanced MS Excel” by Naveen Mishra

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Final Exam