Semester - III			
Part III Skill Based Elective Introduction to Python Programming			
Course Code :21UMAS31	**Hrs/week :2**	**Hrs/Sem :30**	**Credits : 2**

Objectives:

- To acquire Programming skills and Object Oriented Skills in Python
- To develop the ability to write database applications in Python

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	apply decision and repetitions structures in programme design	5	Ap
CO-2	demonstrate the use of Python	5	Ap
CO-3	write python programs to solve problems	8	Cr
CO-4	distinguish various Python Objects	8	An
CO-5	use string function in Python	7	Ev
CO-6	understand the fundamental concepts to write a Python Program	1	Un
CO-7	demonstrate how to read and write files Programs in Python	4	Ap
CO-8	use compound data using Python lists and tuples	5	Ev

Semester - III			
Part III Skill Based Elective Introduction to Python Programming			
Course Code :21UMAS31	**Hrs/week :2**	**Hrs/Sem :30**	**Credits : 2**

Unit I

Introduction to Python – Operations – Variables and Assignment – Numbers and Strings – Errors and Exceptions – Python Basics

(Chapter II Sec 2.1 – 2.16 , Chapter III Sec 3.1 – 3.6)

Unit II

Python Objects – Internal Types – Standard Type Operators – Standard Type Built-in Functions

(Chapter IV, Sec 4.1 – 4.5)

Unit III

Introduction to Numbers – Integers – Complex Numbers – Built-in and Factory Functions – Other Numeric Types

(Chapter V, Sec 5.1 – 5.7)

Unit IV

Strings – Strings and Operators – Built-in Functions – String Built-in Methods –Lists – List Type built-in Methods – Tuples – Tuple Operators and Built-in Functions

(Chapter VI, Sec 6.2 – 6.6, 6.11 -6.17)

Unit V

Conditionals and Loops – if, else if – Conditional Expressions – while, for, break, pass Statements

(Chapter VIII, Sec 8.1 – 8.10)

Text Book

Wesley J.Chun, *Core Python Programming*, Pearson Education, Second Edition, 2012.

Web Resources : 1.https://www.tutorialspoint.com/python/index.htm
2.https://youtu.be/kqtD5dpn9C8
3. https://youtu.be/_uQrJ0TkZlc

Reference Books:

1. Charles Dierbach, *Introduction to Computer Science Using Python*, Wiley, 2015
2. Jeeve Jose & P. SojanLal, *Introduction to Computing and Problem Solving with Python,* Khanna Publishers, New Delhi, 2016.

Semester - IV			
Part III Skill Based Elective Documentation using LaTeX			
Course Code :21UMAS41	**Hrs/week :2**	**Hrs/ Semester:30**	**Credits :2**

Objectives:

- To give deep knowledge of the LaTeX for Mathematical documentation
- To train the students to use LaTeX skills in documenting and preparing for publications.

Course Outcome:

Co No	Upon completion of this course, students will be able to	PSO s addressed	CL
Co-1	know the difference between MS Word and LaTeX	3	Un
Co-2	understand the uses of LaTeX	2	Un
Co-3	apply LaTeX in their typing work	1	Un
Co-4	handle math symbols and tables	3	An
Co-5	create documents and make small presentations.	3	Ap
Co-6	become proficient in the use of software applications as used in an office environment.	3 and 8	Ap
Co-7	manipulate with the real life needs in preparing documents	3	Ap
Co-8	prepare projects in updating with the new updates and versions	8	Cr

Semester - IV			
Part III Skill Based Elective Documentation using LaTeX			
Course Code :21UMAS41	**Hrs/week : 2**	**Hrs/ Semester: 30**	**Credits : 2**

Unit I

Typing text : Words, sentences, and paragraphs - Symbols not on the keyboard - Comments and footnotes - Changing font characteristics - Lines, paragraphs, and pages – Spaces – Boxes. **(Chapter 5, Sec 5.1 - 5.9, pages: 61 - 115)**

Unit II

Text environments: Some general rules for displayed text environments - List environments - Styleand size environments -Proclamations (theorem-like structures) - Proof environments - Tabular environments - Tabbing environments - Miscellaneous displayed text environments **(Chapter 6, Sec 6.1 to 6.8, pages 117 - 149)**

Unit III

Typing math: Math environments - Spacing rules - Equations - Basic constructs - Arithmetic operations - Delimiters - Operators - Math accents -Stretchable horizontal lines - Formula Gallery **(Chapter 7, Sec 7.1 to 7.9, pages 151 - 186)**

Unit IV

More math**:** Spacing of symbols Building new symbols - Math alphabets and symbols - Vertical spacing - Tagging and grouping - Generalized fractions - Boxed formulas **(Chapter 8, Sec 8.1 to 8.6, pages 187 - 206)**

Unit V

LaTeX documents: The structure of a document - The preamble - Abstract -Sectioning - Cross-referencing - Bibliographies. **(Chapter 10, Sec 10.1 to 10.6, pages 245 - 270)**

Text Book:

George Gratzer, *More Math into LaTeX*, 4th Edition, Springer, 2007.

https://www.javatpoint.com/latex

https://www.overleaf.com/learn/latex/Tutorials

Books for Reference:

Helmut Kopka and Patrick W. Daly, A guide to LaTeX, Fourth Edition, Addison-Wesley.

David R. Wilkins, Getting started with LaTeX, Second Edition.

Practicals: Typing Text and Tables: Chapter 4.1 - Inserting Figures: Chapter 5.1 - Mathematical Equations: Chapter 6.3- Inserting References: Chapter 7.6 - Preparing an article for mathematical journal

Semester - III			
Part III Allied	**Statistics I**		
Course Code :21UMMA31	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

Objectives:

- To help the students to understand the uses of statistics in various competitive fields.
- To apply the statistical tools in their day to day problems.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	understand the difference between the central moments and general moments	1	Un
CO-2	compute the central moments and general moments	3	Ev
CO-3	apply concepts and theorems in solving problems	8	Cr, Ap
CO-4	find correlation between two variables	3	Ap
CO-5	evaluate particular regression lines	3 and 7	Ap
CO-6	understand the difference between the discrete random variables and the continuous random variables and solve the problems	8	Un, Ap
CO-7	fit Binomial, Poisson and Normal distribution.	8	Ap
CO-8	compare moment generating function and cumulant generating function	2 and 7	Ev

Semester - III			
Part III Allied	**Statistics I**		
Course Code : 21UMMA31	**Hrs/week :6**	**Hrs/Sem: 90**	**Credits : 4**

Unit I

Moments - Skewness and kurtosis - Curve fitting - Method of least squares - fitting lines - parabolic, exponential & logarithmic curves **(Text book 1 Chapter 4,5)**

Unit II

Correlation &regression - scatter diagram - Karl Pearson's coefficient of correlation - properties - lines of regression coefficient & properties - rank correlation

(Text book 1 Chapter 6 §sections 6.1,6.2 6.3)

Unit III

Random variables, distribution function, two dimensional random variables, moment generating function, cumulants and characteristic function

(Text book 2 chapter5&7 §sections 5.2 to 5.5 and 7.1 to 7.3)

Unit IV

Discrete probability distribution - Geometric, Binomial & Poisson distribution & their moment generating functions, characteristic function, properties & simple application. **(Text book 2§Chapter8§Section8.4,8.5,8.7 (Omitting Negative Binomials)**

Unit V

Continuous probability distributions - Gamma distributions, Normal distributions - their properties - simple problems - importance of normal distribution

(Text book 2§ Chapter 9 §sec 9.2, 9.5,9.6 and 9.7)

Text Books

1. S.Arumugam and A.Issac, *Statistics*, New Gamma publishing House. Palayamkottai

2. Gupta S.C., Kapoor V.K., *Fundamentals of mathematical Statistics* Eleventh edition, Sultan Chand & Sons, Educational Publishers, New Delhi.

Reference books

1 H.C.Saxena, *Elementary Statistics*, S.Chand& Company Ltd., New Delhi

2. J.N.Kapurand Saxena, *Mathematical Statistics*,S.Chand& Company Ltd., New Delhi.

Semester – IV			
Part III Allied	**Statistics II**		
Course Code : 21UMMA41	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

Objectives:

- To cater needs of statistics in professional and academic courses
- To understand the application of statistics in various fields.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	understand the difference between the weighted index numbers and unweighted	1 and 2	Un
CO-2	compute the upper and lower control limits for different chart	3	Ev
CO-3	find approximate solutions to problems	4 and 8	Cr & Un
CO-4	apply concepts and theorems in solving problems.	4	Ap
CO-5	demonstrate problem solving skills	3	An
CO-6	know type I and type II error	1	Cr
CO-7	classify the different test static	5	Un & Ap
CO-8	apply the correct test static	4	Ap

Semester – IV			
Part III Allied	**Statistics II**		
Course Code : 21UMMA41	**Hrs/week :6**	**Hrs/Sem :90**	**Credits :4**

Unit I

Characteristics of index numbers, Laspeyers and Paasche's – Bowley's - Marshall and Erdgeworth's index numbers - Tests - Unit test - Commodity reversal test, Time reversal test, Circular test.**§Text book 2 chapter 9**

Unit II

Statistical Quality Control - Definition, Advantages, Process control - Control chart, Mean chart, Range chart, p - chart, np – chart.

§Text book1 volume2 chapter 7 (page 1052 - 1074)

Unit III

Testing of hypothesis - Null and Alternate Hypothesis. Type I and Type II errors - Critical region, level of significance - Test of significance for large samples - Testing a single proportion - Difference of proportions - testing a single mean - Difference of means. **§Text book1 volume2 chapter 3 (page 881 -908)**

Unit IV

Tests based on t - distribution - Single mean - Difference of means - Tests based on F distribution - Variance ratio test - Test based on chi square distribution - Independence - Goodness of fit.

§Text book1 volume2 chapters 3&4 (page 910 -920, 939-990, 1006-1009)

Unit V

Analysis of Variance - One way and two way classified data - Basis of experimental design - simple problems. **§Text book2 chapter17**

Text Books

1. Gupta S.P., *Statistical Method*, forty fourth edition Sultanch and & sons publishers-New Delhi.
2. Arumugam S. and Issac A., *Statistics*, New Gamma publishing House. Palayamkottai.

Reference Book

1. Gupta S.C., Kapoor V.K., *Fundamentals of Mathematical Statistics* , Eleventh edition, Sultan Chand & Sons, Educational Publishers, New Delhi.