Course Structure

S.No.		Name of the Course	Hr	Credits
I SEMESTER				
1	**Major**	Essentials and Applications of Mathematics,Physics,Chemistry	5	4
2		Advances in Mathematics,Physics,Chemistry	5	4
4	**Language**	English	4	3
5		Telugu/Hindi	4	3
	Multi.Dis	Introduction to Social Work	2	2
6	**Skill Enhancement courses**	Entrepreneurship Development	2	2
7		Communication Skills	2	2
		Total	**24**	**20**
II Semester				
1	**Major**	Python for Data Science	3	3
		Practical	2	1
2		Statistical Methods and Probability Distribution	3	3
		Practical	2	1
3	**Minor**	Problem solving using C	3	3
		Practical	2	1
4	**Language**	English	4	3
5		Telugu/Hindi	4	3
6	**Skill Enhancement courses**	Robotic Process Automation	2	2
7		Excel for Data Analysis	2	2
		Total	**27**	**22**

Community service Project of 180 Hrs with 4 credits

Course Structure

		I SEMESTER		
S.No.		**Name of the Course**	**Hr**	**Credits**
1	**Major**	Essentials and Applications of Mathematical, Physical and chemical sciences	5	4
2		Advances in Physical, Mathematical and Chemical sciences	5	4
4	**Language**	English	4	3
5		Telugu/Hindi	4	3
	Multi.Dis	Introduction to Social Work	2	2
6	**Skill Enhancement courses**	Entrepreneurship Development	2	2
7		Communication Skills	2	2
		Total	**24**	**20**

**Course: 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL,
PHYSICAL AND CHEMICAL SCIENCES**

Hours/Week: 5   **Credits: 4**

Learning objectives:

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

Learning Outcomes:

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

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

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

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

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

Unit 1: ESSENTIALS OF MATHEMATICS

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

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

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

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

UNIT II: **ESSENTIALS OF PHYSICS:**

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions-

Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle-Theories and understanding of universe.

UNIT III: **ESSENTIALS OF CHEMISTRY:**

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

UNIT IV: **APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY:**

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

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

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

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

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

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

Recommended books:

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

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

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

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

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

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

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

8. Physics for Technology and Engineering" by John Bird

9. Chemistry in daily life by Kirpal Singh

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

11. Fundamentals of Computers by V. Raja Raman

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

STUDENT ACTIVITIES

UNIT I: ESSENTIALS OF MATHEMATICS:

1: Complex Number Exploration

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

forms. They will plot the complex numbers on the complex plane and identify

their properties2: Trigonometric Ratios Problem Solving

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

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

3: Vector Operations and Applications

Provide students with a set of vectors in Cartesian form.

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

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

4: Statistical Measures and Data Analysis

Give students a dataset containing numerical values.

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

UNIT II: ESSENTIALS OF PHYSICS:

1. Concept Mapping

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

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

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

2. Laboratory Experiment

Select a laboratory experiment related to one of the topics, such as motion of objects of electric and magnetic fields.
Provide the necessary materials, instructions, and safety guidelines for conducting the experiment.
Students will work in small groups to carry out the experiment, collect data, and analyze the results.
After the experiment, students will write a lab report summarizing their findings, observations, and conclusions.

UNIT III: ESSENTIALS OF CHEMISTRY

1: Chemistry in Daily Life Presentation

Divide students into groups and assign each group a specific aspect of daily life where chemistry plays a significant role, such as food and nutrition, household products, medicine, or environmental issues.

Students will research and create a presentation (e.g., PowerPoint, poster, or video) that showcases the importance of chemistry in their assigned aspect.

2: Periodic Table Exploration

Provide students with a copy of the periodic table.

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

3: Chemical Changes and Classification of Matter

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

4: Biomolecules Investigation

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

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

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

1: Interdisciplinary Case Studies

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

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

2: Design and Innovation Project

Challenge students to design and develop a practical solution or innovation that integrates mathematics, physics, and chemistry principles.

Students can choose a specific problem or area of interest, such as renewable energy,environmental conservation, or materials science.

3: Laboratory Experiments

Assign students laboratory experiments that demonstrate the practical applications of mathematics, physics, and chemistry.

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

.4: Mathematical Modeling

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

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

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

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

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

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

ADITYA DEGREE
COLLEGE (A) KAKINADA
Dept. of Artificial
Intelligence B.Sc.,
Artificial Intelligence; I
SEMESTER
Course: 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL,
PHYSICAL AND CHEMICAL SCIENCES

Hours/Week: 5   **Credits: 4**

BLUE PRINT

Unit	MCQ
Unit 1	15
Unit 2	15
Unit 3	15
Unit 4	15
Unit 5	10
Total	**70x1 mark: 70 Marks**

ADITYA DEGREE COLLEGE (A)
KAKINADA
Dept. of Artificial Intelligence
B.Sc., Fisheries; I SEMESTER
Course: 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Hours/Week: 5   **Credits: 4**

QUESTION PAPER TAXONOMY											
Level of Bloom's Taxonomy	Type of Question & m Assigned										
	MCQs		FIB		VSQ		MC		T/F		
	CIA	SEE	CIA	SEE	CIA	SEE	CIA	SEE	CIA	SEE	
Remembering	3 m	10 m									
Understanding	3 m	10 m									
Applying	4 m	10 m									
Analyzing					5 m	10 m					
Evaluating							5 m	10 m	5 m	10 m	
Creating			5 m	10 m							

ADITYA DEGREE COLLEGE (A)
KAKINADA
Dept. of Artificial Intelligence
B.Sc., Artificial Intelligence;
ISEMESTER
Course: 2: ADVANCES IN MATHEMATICAL, PHYSICALAND CHEMICAL SCIENCES

Hours/Week: 5   **Credits: 4**

Course Objective:

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

Learning outcomes:

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

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

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

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

4. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.
5 Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics. Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

UNIT I: ADVANCES IN BASICS MATHEMATICS

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

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

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

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

UNIT II: ADVANCES IN PHYSICS:

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

UNIT III: ADVANCES IN CHEMISTRY:

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

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

Mathematical Modelling applications in physics and chemistry Application of

Renewable energy: Grid Integration and Smart Grids, **Application of nanotechnology**:

Nanomedicine,

Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics,

Application of medical physics: Radiation Therapy, Nuclear medicine

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

UNIT V: Advanced Applications of computer Science

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

Recommended books:

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

2. Calculus by Thomas and Finny, Pearson Publications

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

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

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

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

7. "Biophysics: An Introduction" by Rodney Cotterill

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

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

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

UNIT I: ADVANCES IN BASIC MATHEMATICS

1: Straight Lines Exploration

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

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

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

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

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

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

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

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

UNIT II: ADVANCES IN PHYSICS:

1: Case Studies

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

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

accordingly. Students will collect and analyze data, interpret the results, and draw conclusions based on

their findings.

They will discuss the implications of their experimental results in the context of recent advances in

the field. 3: Group Discussion and Debate

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

memory materials.

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

UNIT III: ADVANCES IN CHEMISTRY:

1. Experimental Design and Simulation

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

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

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

2. Case Studies and Discussion

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

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

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

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

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

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

Provide students with a mathematical modelling experiment related to one of the topics. Forexample, in the context of renewable energy, students can develop a mathematical model to optimize the placement and configuration of solar panels in a solar farm.
Students will work in teams to design and conduct the experiment, collect data, and analyze the results using mathematical models and statistical techniques.
They will discuss the accuracy and limitations of their model, propose improvements, and
interpret the implications of their findings in the context of renewable energy or the specific application area. 2: Case Studies and Group Discussions

Assign students to analyze case studies related to the applications of mathematical modellingin

nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

Students will discuss the mathematical models and computational methods used in the case studies, analyze the outcomes, and evaluate the effectiveness of the modelling approach.

Encourage group discussions on the challenges, ethical considerations, and potentialadvancements in the field.

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

3. Group Project

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

The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize wastemanagement practices.

Students will plan and execute their project, apply mathematical modelling techniques,analyze the results, and present their findings and recommendations.

Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT V: Advanced Applications of computer Science

Students must be able to convert numbers from other number system to binary numbersystems

1. Identify the networking media used for your college network

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

ADITYA DEGREE
COLLEGE (A) KAKINADA
Dept. of AI B.Sc.,
Artificial Intelligence; I
SEMESTER
Course: 2: ADVANCES IN MATHEMATICAL, PHYSICALAND CHEMICAL
SCIENCES
Hours/Week: 5   **Credits: 4**

BLUE PRINT

Unit	MCQ
Unit 1	15
Unit 2	15
Unit 3	15
Unit 4	15
Unit 5	10
Total	**70x1 mark: 70 Marks**

ADITYA DEGREE COLLEGE (A)
KAKINADA
Dept. of AI
B.Sc., Artificial Intelligence;
ISEMESTER
Course: 2: ADVANCES IN MATHEMATICAL, PHYSICALAND CHEMICAL SCIENCES

Hours/Week: 5

QUESTION PAPER TAXONOMY										
Level of Bloom's Taxonomy	Type of Question & m Assigned									
	MCQs		FIB		VSQ		MC		T/F	
	CIA	SEE	CIA	SEE	CIA	SEE	CIA	SEE	CIA	SEE
Remembering	3 m	10 m								
Understanding	3 m	10 m								
Applying	4 m	10 m								
Analyzing					5 m	10 m				
Evaluating							5 m	10 m	5 m	10 m
Creating			5 m	10 m						

ADITYA DEGREE COLLEGE (A)
Autonomous and NAAC Accredited with A++ Grade (3.66/4 CGPA)
KAKINADA
Dept. of Artificial Intelligence

B.Sc., AI
Course Structure

		II Semester		
			Hr	**Credits**
1	**Major**	Python for Data Science	3	3
		Python for Data Science Practical	2	1
2		Statistical Methods and Probability Distribution	3	3
		Practical	2	1
3	**Minor**	Problem Solving using C	3	3
		Practical	2	1
4	**Language**	English	4	3
5		Telugu/Hindi	4	3
6	**Skill Enhancement courses**	Robotic Process Automation	2	2
7		Excel for Data Analysis	2	2
		Total	**27**	**22**

ADITYA DEGREE COLLEGE (A)
KAKINADA
Dept. of Artificial Intelligence
B.Sc., AI; II SEMESTER
Course No.: 3 Python for Data Science
credits :3

Course Objective:

The objective of this course is to study main elements of python programming and perform data analysis using data structures and tools in python.

Course Outcomes:

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	To Understand Features and basic concepts of python.	PO5, PO7
CO2$_2$	To learn control structures in python and apply them to real world problems.	PO5, PO7
CO3$_3$	To implement functions and modules in python.	PO5, PO7
CO4$_4$	To understand data structures in python. oops concepts	PO5, PO7
CO5$_5$	To construct data and perform data analysis.	PO5, PO7

UNIT-1: Basics of Python

Features of python, literal constants-numbers, variables, identifiers, data types, input operation, comments, operators, operations on strings, other data types, type conversion.

Selection or conditional branching statements**-**if, if else , nested if, if elif else,   loops or iterative statements-while, for, nested loops, break, continue, pass, else statement with loops.

UNIT-2: Functions and Modules
Functions-Definition and call, return statements, anonymous function- LAMBDA, recursive functions. **Modules-**Using existing modules, making own modules, packages in python, Names of standard library modules.

UNIT-3: Data Structures

List-Accessing lists, updating lists, nested lists, basic list operations, list methods, loops in lists.

Tuples-Creation, Accessing, updating, deletion in tuples and basic tuple operations.
Sets-creation, set operations.

Dictionaries - creation, accessing, adding and modifying items, deleting items.

UNIT-4: Object Oriented Programming concepts

Oops concept- Introduction, Classes and Objects, Class method Inheritance Introduction Inheriting classes in python Types of Inheritance, Error and Exception Handling.

UNIT-5: Data Analysis

Data preparation using pandas and series: pandas data frame basics**,** Creating your own data , Series, Data frames, Making changes to series and data frames
Plotting: Matplotlib Introduction, Univariate plots-Histograms

Text Books:
1. **Python Programming Using Problem Solving Approach** –Reema Thareja , Oxford University Press, ©2017
2. **Pandas for Everyone (Python data Analysis)-**Daniel Y.Chen, Pearson Addison Wesley Data and Analytics series,©2018.

Recommended Co – Curricular Activities:

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

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

B. General
5. Group Discussion
6. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work.

II Semester

Practical	Credits: 1	2 hrs/week

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO_1	Implement a given problem as a python program.	PO5, PO7
CO_2	To write loops and decision statements in Python	PO5, PO7
CO_3	To implement functions and modules in Python.	PO5, PO7
CO_4	To implement different data structures in python	PO5, PO7
CO_5	To implement data analysis using pandas and graphs	PO5, PO7

Experiments List

1. Write a program to read and print values of variables of different data types.
2. Write a program to find the roots of quadratic equations.
3. Write a program to find the largest of 3 numbers.
4. Write a program to check whether a given number is prime or not.
5. Write a program to generate Fibonacci series.
6. Write a program to find whether a given number is Armstrong or not.
7. Write a program using functions to swap two numbers.
8. Write a program to find factorial of a number using recursion.
9. Write a program to find square root of a given number using math module.
10. Write a program to generate 10 random numbers between 1 to 100 using random module.
11. Create a list and perform different operations on it.
12. Create a tuple and perform different operations on it.
13. Create a set and perform different operations on it.
14. Create a dictionary and perform different operations on it.
15. Import pandas and create a data frame and perform operations on it.
16. Generate histogram using Matplotlib.
17. Generate scatter plot using Matplotlib.
18. Generate box plot using Matplotlib.

ADITYA DEGREE COLLEGE (A)
KAKINADA
Dept. of Artificial Intelligence
B.Sc., AI; II SEMESTER
Course No.: 3 Python for Data Science
credits :3

BLUE PRINT

Unit	Essays	Shorts
Unit 1	2	2
Unit 2	2	2
Unit 3	2	1
Unit 4	2	1
Unit 5	2	2
Total	**10** **Out of 10, 5 questions should be answered** **5x10=50 Marks**	**8** **Out of 8, 5 questions should be answered** **5x4=20 Marks**

ADITYA DEGREE COLLEGE (A)
KAKINADA
Dept. of Artificial Intelligence
B.Sc., AI; II SEMESTER
Course No.: 3 Python for Data Science
credits :3

SEMESTER END EXAMINATION MODEL QUESTION PAPER

Time: 3 Hours   Maximum: 70 marks

SECTION - A

Answer any Five Questions   5 x 4 = 20
  1. Explain about Variables in Python
  2. Discuss about Type Conversion in Python
  3. Explain about recursive function
  4. What are the basic list operation in Python
  5. Discuss about Tuples in Python
  6. What is an object in python
  7. Explain about Data Frames
  8. Discuss about plotting

SECTION - B

Answer all Questions   5 x 10 = 50

  9 a) Discuss about Operations in Python
            (OR)
       b) Explain about Conditional Statements

  10 a) What is Lambda Functions in Python
            (OR)
         b) Discuss about python packages

  11 a) Explain about Nested list in Python with some examples
            (OR)
          b) Defines set. Explain about set operations in Python

  12 a) Discuss about oops concept in python
            (OR)
        b) Explain about Exception handling in python

  13 a) Write the steps for data preparation
            (OR)
       b) Define Matplotlib. Discuss about parts of Matplotlib figure

ADITYA DEGREE COLLEGE (A)
KAKINADA
Dept. of Artificial Intelligence
B.Sc., AI; II SEMESTER
Course No.: 3 Python for Data Science
Semester End Examination - Practical
credits :1

Time: 3 Hrs   **Max.Marks: 50**

  I. Major Experiment   1x20 : 20 Marks
  II. Minor Experiment   1x10 : 10 Marks
  III. Identification of spotters   5x2 : 10 Marks
  IV. Viva   5 Marks
  V. Record   5 Marks

ADITYA DEGREE COLLEGE (A)
KAKINADA
Dept. of Artificial Intelligence
B.Sc., AI; II SEMESTER
Course No.: 4 -Statistical Methods and Probability
Distributions

Course Objective: The purpose is to familiarise the students about the basic concepts required for artificial intelligence and Machine learning.

Course Outcomes: After successfully completing this course, the students will acquire:

CO1: know about correlation and regression techniques, the two very powerful tools in statistics, CO2: study concept of coefficient of determination and inference on partial and multiple correlation and regression coefficients.

CO3: knowledge of important discrete distributions such as Binomial, Poisson, Geometric, Negative Binomial and Hyper geometric and their interrelations if any,

CO4:knowledge of important continuous distributions such as Uniform, Normal, Exponential and Gamma and relations with some other distributions,

CO5: basic knowledge of complete enumeration and sample, sampling frame, sampling distribution, sampling and non-sampling errors, principal steps in sample surveys, limitations of sampling etc.,

Unit I Correlation Analysis

Meaning Measures of Correlation- Scatter diagram, Karl Pearson's and Spearman's rank correlation. Calculation of the correlation coefficient for bi-variate frequency distribution Multiple and Partial correlation(3 variables only)

Unit II Curve fitting and Regression Analysis:

Principle of least squares, fitting of straight line, second degree polynomial or parabola, power and exponential curves**. Regression:** Introduction, Linear Regression- Regression coefficients and its properties, Angle between two lines of regression. Standard error of estimate (residual variance), Explained and Unexplained variation, coefficient of determination. Multiple Linear Regression(3 variables only) and Logistic Regression.

Unit III Discrete Probability Distributions:

Uniform, Bernoulli, Binomial, Poisson, Geometric, Negative Binomial and Hyper-geometric distributions along with their characteristic properties, applications and limiting/approximation cases.

Unit IV *C***ontinuous probability distributions**

Normal, Exponential, Uniform, Beta, Gamma, distributions along with their characteristic properties, applications and limiting/approximation cases.

Unit V   Basic concepts:

population and sample, census and sample survey, sampling frame, sampling distribution, standard error, sampling design, sampling and non-sampling errors, sample surveys, principles of sample survey, principal steps in sample survey, limitations of sampling, Sample survey versus complete enumeration survey. Types of sampling - Simple random sampling, stratified sampling, systematic sampling, and cluster sampling (only concept)

Text Book(Unit I to IV):   Fundamentals of Mathematical Statistics, 12th Edition, 10th September 2020, S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi.

Text Book(Unit V)   **:** Fundamentals of Applied Statistics, 4th Edition, 1stJanuary 2014,(ISBN-10 : 8180547051)S. C. Gupta and

V. K. Kapoor, Sultan Chand & Sons, New Delhi.

Recommended References books:

1.   Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .

2.   Probability and Statistics,Volume I, D.Biswas, New central book Agency (P) Ltd,   New Delhi.

3.   An outline of Statistical theory, Volume Two,3rd Edition,2010(with corrections) A.M.Goon,M.K. Gupta, B.Dasgupta ,The World Press Pvt.Ltd., Kolakota.

4.   Sanjay Arora and BansiLal:. New Mathematical Statistics, SatyaPrakashan ,   New Delhi.

Websites of Interest: **http://onlinestatbook.com/rvls/index.html**

Co-Curricular Activities in the class:

1. Pictionary

2. Case Studies on topics in field of statistics

3. Snap test and Open Book test

4. Architectural – To be build the procedures

5. Extempore – Random concept to students

6. Interactive Sessions

7. Teaching through real world examples

SEMESTER-II

COURSE 4: STATISTICAL METHODS AND PROBABILITY DISTRIBUTION

Practical	Credits: 1	2 hrs/week

Course Objective:

This course enables students to gain hands-on practical experience of SPSS for analysing data.

CO.NO	Upon successful completion of this course, students should have the knowledge and skills to:	POS
CO1	Apply the various statistical methods for real life problems	PO2
CO2	Analyze the uni-variate and bivariate data using statistical techniques.	PO2

List of Practicals using SPSS

1. Diagrams & Graphs- Bar, Pie , Histogram, frequency polygon, and Ogive curves
2. Computation of measures of central tendency- Arithmetic Mean, Geometric mean and Harmonic Mean – Grouped Data.
3. Computation of measures of central tendency- Median, Mode and Partition Values - Grouped Data.
4. Computation of measures of Dispersion – Quartile Deviation, Mean Deviation, Standard Deviation, Variance and Coefficient of Variation – Grouped Data.
5. Computation of non-central, central moments, β_1 and β_2 and Sheppard's corrections for grouped data.
6. Computation of Karl Pearson's coefficients, Bowley's coefficients of Skewness and coefficients of Skewness based on moments – Grouped Data
7. Computation of correlation coefficient and regression lines for (i) ungrouped data (ii) grouped bivariate data
8. Construction regression line equations for (i) ungrouped data (ii) grouped bi-variate data.

Note: Training shall be in SPSS and derive the results. The SPSS output shall be exported to MS word for writing inference.

Reference Manual: Practical Manual -Prepared by the Department Faculty Members

Websites of Interest: http://www.statsci.org/datasets.html

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Credits:3

BLUE PRINT

Unit	Essays	Shorts
Unit 1	2	2
Unit 2	2	2
Unit 3	2	1
Unit 4	2	1
Unit 5	2	2
Total	**10** **Out of 10, 5 questions should be answered** **5x10=50 Marks**	**8** **Out of 8, 5 questions should be answered** **5x4=20 Marks**

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SEMESTER END EXAMINATION MODEL QUESTION PAPER

SECTION -A

Answer any 5 questions. Each question carries 4 marks.   (5 x 4 =20)

(Total 8 questions, questions 1-5 from units 1-5 & questions 6-8 from any of the units)

1. Unit –I

2. Unit-II

3. Unit-III

4. Unit-IV

5. Unit-V

6. From any Unit

7. From any Unit

8. From any Unit

SECTION- B

Answer all questions. Each question carries 10 marks.   (5 x 10 =50)

(Each question (both A or B) from each Unit.

9. From Unit I

    Or

From Unit   I

10. From Unit II

Or

From Unit II

11. From Unit III

Or

Unit III

12. Unit IV

Or

Unit IV

13. Unit V

Or

Unit V

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Dept. of
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Course No.: 4 – Statistical
Methods and Probability
Distributions – Practical**

Credits:1

Time: 3 Hrs   **Max.Marks:
50**

VI.	Major Experiment Marks	1x20 : 20
VII.	Minor Experiment Marks	1x10 : 10
VIII.	Identification of spotters Marks	5x2 : 10
IX.	Viva	5 Marks
X.	Record	5 Marks