**Centre for Machine Learning and Intelligence**

**Skill Based Elective**

**Fundamentals of 3D Printing Technology&Applications**

**(Applicable for the UG Students admitted from 2023 – 2024 onwards**

**Semester: 3** **Hours of Instruction: 4**

**Subject Code : 23BAISE3** **No of Credits: 2**

**Course Objectives:**

1. To understand the fundamentals of 3D Printing Technologies.
2. To develop the required skills for 3D design and software.
3. To provide hand on experience on 3D printing and design software's.

**Unit 1: Introduction** **- 20Hrs**

Study on Additive Manufacturing - Introduction to 3D Printing Technology –History of 3D Printing Technology-Applications of 3D printing Technology - Study on Different 3D printing technologies - 3D Design - Slicing Software and its parameters - Hardware and software training,Introduction to types of FDM printer,Introduction to FDM Materials, Loading and Unloading of the Filament.

**Unit 2: Implementation** **-40Hrs**

1.Understanding the overview of TinkerCAD Workspace
2. Rotate, Scale, Transform a text character in TinkerCAD
3. Design and group any of the two objects in TinkerCAD
4. Design a Car Wheel in TinkerCAD
5. Design an 3D Boat in TinkerCAD
6. Explore Additional Model Sources from Thingiverse
7.Setting up the build temperature, nozzle temperature, speed, material, layer height using slicing software
8. Setting up infill density, infill pattern, orientation of object, support material wall thickness, converting .stl file to .G-code file etc slicing software.
9. Design a Keychain and print it using PLA material
10. Design a 3D Printed Phone Case in TPU Filament.

**Total Hours: 60**

**Reference Book:**

1. Rafiq Noorani, "***3D Printing: Technology, Applications, and Selection*** ", CRC Press(September 7 2017), ISBN-101498783759.

**Reference Website Link:**

1.https://www.researchgate.net/publication/343001509_Fundamentals_of_3D_Printing_and_Its_Applications_in_Biomedical_Engineering

**Course Outcome:**

1. Get familiar with 3D printing technologies and its principles.
2. Gain hand on experience on with 3D designing and software's.
3. Explore various 3D printing technologies in detail and understand their suitability for different scenarios.
4. Get familiar with post processing techniques to produce high quality models.
5. Acquire knowledge on slicing software and its parameter for preparing 3D models.