National Agriculture Higher Education Project
Centre of Excellence : Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGV's (DFSRDA)

Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (M.S.) INDIA

Two Week Online Course Programme

on

"RAPID PROTOTYPING AND REVERSE ENGINEERING BY 3D SCANNER AND 3D PRINTER IN AGRICULTURE"

07th to 18th June 2021

Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (MS) INDIA

About University

The Marathwada Krishi Vidyapeeth (Presently renamed as Vasantrao Naik Marathwada Krishi Vidyapeeth) established in 1972 on Land Grant pattern at Parbhani to fulfill the regional aspirations of fields, undertake research and facilitate technology transfer in marathwada region of Maharashtra.

Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV) Parbhani, is one of the prestigious agricultural universities in India. Since its inception, it has gained recognition as an innovative organization in the term of education and research in agriculture. It takes care of research and facilitates agriculture technology transfer in marathwada region of Maharashtra .

About Project

The Centre of excellence for Digital Farming solutions for Enhancing Productivity by Robots, Drones and AGV's (DFSRDA) Under Center for Advanced Agricultural Science and Technology (CAAST) is being implemented in Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra under world bank Sponsored National Agricultural Higher Education Project (NAHEP) of Indian Council of Agricultural Research (ICAR), New Delhi, Government of India, Since 2019. The main objective of this center is to train PG/PhD students and faculties about advances in science and technology. The project is proposed on 50:50 cost sharing basis between the World Bank and the Government of India, implemented at VNMKV, Parbhani. Overall, the project aims to establish an advanced basic engineering hardware and software setup such as Mechatronics, CAD/CAM/CAE, 3-D Printers and Instrumentation Laboratories for Agribots, Agri-drones and Agri-AGVs., so that a holistic model can be developed to raise the standard of current agricultural education system that provides more jobs and is entrepreneurship oriented and on par with the global agriculture education standards.

As a part of this project, Centre of excellence for Digital Farming solutions for Enhancing Productivity by Robots, Drones and AGV's (DFSRDA), VNMKV, Parbhani is organizing Two Week Online Course Programme on "Rapid Prototyping and Reverse Engineering By 3D Scanner and 3D Printer in Agriculture"

Course Background

3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the object is created. Each of these layers can be seen as a thinly sliced cross-section of the object. 3D printing is the opposite of subtractive manufacturing which is cutting out / hollowing out a piece of metal or plastic with for instance a milling machine. 3D printing enables you to produce complex shapes using less material than traditional manufacturing methods.

The technologies referred to as Solid Freeform Fabrication are what we recognize today as rapid prototyping, 3D printing or additive manufacturing. Rapid prototyping is also commonly applied in software engineering to try out new business models and application architectures such as Aerospace, Automotive, Product development, and Healthcare. Aerospace design and industrial teams rely on prototyping in order to create new AM methodologies in the industry. Using SLA they can quickly make multiple versions of their projects in a few days and begin testing quicker. Rapid Prototyping allows designers/developers to provide an accurate idea of how the finished product will turn out before putting too much time and money into the prototype. 3D printing being used for Rapid Prototyping allows for Industrial 3D printing to takes place. With this, you could have large-scale molds to spare parts being pumped out quickly within a short period of time. The very first 3D rapid prototyping system relying on Fused Deposition Modeling (FDM) was made in April 1992 by Stratasys but the patent did not issue until June 9, 1992.

Reverse engineering also known as backwards engineering or back engineering is a process or method through the application of which one attempts to understand through deductive reasoning how a device, process, system, or piece of software accomplishes a task with very little insight into exactly how it does so. Software for reverse engineering can help to improve the understanding of the underlying source code for the maintenance and improvement of the software, relevant information can be extracted to make a decision for software development and graphical representations of the code can provide alternate views regarding the source code, which can help to detect and fix a software bug or vulnerability. Frequently, as some software develops, its design information and improvements are often lost over time,

but that lost information can usually be recovered with reverse engineering. The process can also help to cut down the time required to understand the source code, thus reducing the overall cost of the software development. Reverse engineering can also help to detect and to eliminate a malicious code written to the software with better code detectors. Reversing a source code can be used to find alternate uses of the source code, such as detecting the unauthorized replication of the source code where it was not intended to be used, or revealing how a competitor's product was built

There are other uses to reverse engineering

- Interfacing
- Military or commercial espionage
- Product security analysis.
- Competitive technical intelligence.
- Saving money
- Repurposing
- Design

A 3D printer F170 is the world's most reliable range of industrial-grade. Designed for the way you work, It is built on 30 years of research and development by a team of engineers, designers, educators and manufacturers. That means 100% accuracy, engineering grade outputs and repeatable results. Every time. The F170 works with a range of materials – so you can produce complex parts with flexibility and accuracy. And it includes advanced features like Fast Draft mode for truly rapid prototyping, and soluble support to prevent design compromise and hands-on removal. All designed to shorten your product development cycle and keep you ahead of the competition

3D Laser Scanning is a non-contact, non-destructive technology that digitally captures the shape of physical objects using a line of laser light. 3D laser scanners create “point clouds” of data from the surface of an object. In other words, 3D laser scanning is a way to capture a physical object's exact size and shape into the computer world as a digital 3-dimensional representation.

3D laser scanners measure fine details and capture free-form shapes to quickly generate highly accurate point clouds. 3D laser scanning is ideally suited to the measurement and inspection of contoured surfaces and complex geometries which require massive amounts of data for their accurate description and where doing this is impractical with the use of traditional measurement methods or a touch probe.

With 3D Scanner Scanning, you can now achieve the very best in scanning results also using your own software, integrating 3D Scanner into almost any system. Either adapt your current software to support 3D Scanner, or develop your own software to spec. Whether you want to scan for medical purposes, industrial quality control, or reverse engineering, Eva can be easily assimilated into your specialized solution. 3D Scanner can also be used to develop for built-in scanning solutions.

Objectives

1. Basics of rapid prototyping and reverse engineering
2. Working principal of 3D printing
3. Working principal of 3D Scanning
4. CrabCAD software modules for 3D printing
5. Artec studio Software modules for 3D scanning

Contents

- Introduction to Additive Manufacturing Process and 3D Printing
- Types of Additive Manufacturing technology
- Materials associated in 3D Printing process
- Workflow for FDM 3DP Technology
- Industry accepted Files, formats and software for 3DP
- File format errors and remedies
- Basic Introduction to GrabCAD Print
- Design Methodologies for Additive Manufacturing
- Industries where 3DP useful
- Advance feature in GrabCAD Print
- Preparation and Scanning techniques with Artec Eva lite.
- Analyzing the scan data and correcting the raw scan data for post processing
- Creating point cloud/polygonal model for 3D printing manually
- Creating polygon models with Auto-pilot mode
- Post Processing- Fixing the holes
- Application based Simplification of polygon models
- Precise-Alignment of 3D polygon model
- Dimensional measurements in Artec Studio
- CAD- scan comparison in Artec Studio

Target Audience

PG, Ph.D. Students, Faculties, Scientists of Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani and other Universities, in the area of Agronomy, Horticulture, Extension education, Economics and Agriculture Engineering. etc. Departments are eligible to register and are requested to take advantage of the online training course during this COVID-19 lock down period.

About Selection

1) The Whatsapp Group of the selected candidates will be formed at least one day before the start of the E-cource and the communications regarding the E-cource will be posted in the group.
2) Alternatively Candidates can keep accessing the CAAST-VNMKV website (https://nahep.vnmkv.org.in) regarding the selection, preferable on the day before the start of the seminar.
3) Lead lectures through online platform will be conducted along with online interaction. The link, ID and password for joining the online session will be communicated through Whatsapp group of the selected candidates 30 minutes before the start of the session.
4) Certificates will be issued to those participants only who will complete all online session and assignments.

Training Outcomes

Methodology for conduct of Training

Pre and Post Evaluation: Pre and Post certificate course evaluation will be carried out to evaluate the impact of the certificate course

Conduct of the Certificate Course:

Project Report: The candidates are required to complete the case study based project report and submit it online.

Evaluation : There will be evaluation of the candidates at the end of each week, and a final evaluation towards the end of the course. The evaluation will be in the form of MCQs, descriptive questions, and power point presentations, as the case may be.

Feedback : Candidates need to provide the feedback towards the end of certificate course.

Registration

Duration of E-cource:
t07th to 18 th June, 2021 (Two Weeks)

Registration Fee (Non Refundable):
Cource Fee:
Rs. 250/- for VNMKV Students,
Rs. 500/- for VNMKV Faculty,
Rs. 500/- for Students other than VNMKV &
Rs. 1000/- for Faculty other than VNMKV.
International Participant 50 USD
Account Detailes :
Account Name : Comptroller, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani
Account Number : **38639565001**
Bank Branch : **State Bank of India, Branch: MKV, Parbhani (MS) India.**
IFSC Code : **SBIN0020317**
MICR Code : **431002203**

Important Dates:
Interested participants can register on below mentioned link, for the online registration is,
https://bit.ly/2ROg6Sk

or use QR code provided here.

Last date of registration : June 04, 2021
Confirmation of admission to the candidates:
May 05, 2021
Course Language: English

Two Week Online Course Programme
on
"RAPID PROTOTYPING AND REVERSE ENGINEERING BY 3D SCANNER AND 3D PRINTER IN AGRICULTURE"

07th to 18th June, 2021 Time : 01.00 Hrs

Patrons

Dr. A. S. Dhawan
Vice-Chancellor
VNMKV, Parbhani

Dr. R. C. Agrawal
National Director
NAHEP, ICAR, New Delhi

Chief Convenors

Dr. D. N. Gokhale
DI & Dean F/A
VNMKV, Parbhani

Dr. Prabhat Kumar
National Co-ordinator
NAHEP, ICAR, New Delhi

Convenor

Dr. G.U. Shinde
Principal Investigator
NAHEP-CAAST-DFSRDA
VNMKV, Parbhani

Organizing Secretary

Er. Khemchand Kapgate
RA, NAHEP,
VNMKV, Parbhani
M. 9403418469

Co-Organizing Secretary

Dr. H. N. Rokade
SRF (SSPN), NAHEP,
VNMKV, Parbhani
M. 9421864320

Training Coordinator

Mr. Raheem Khan
JRF (SSPN), NAHEP,
VNMKV, Parbhani

Er. Tanzeemkhan Pathan
JE (Mech.), NAHEP,
VNMKV, Parbhani