KG REDDY College of Engineering & Technology

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(Approved by AICTE, New Delhi, Affiliated to JNTUH, Hyderabad)
Chilkur (Village), Moinabad (Mandal), R. R Dist, TS-501504

A+ NAAC

Report

On

Foundational course

"3D PRINTING"

As a part of

Emerging Technology course

Under

Engineering for sustainable development program

26/02/2021 to 19/03/2021

Organized by

3D Printing Club, Mechanical Engineering Department

In association with

H&S Department

at

KG Reddy College of Engineering & Technology

Submitted by

K. Kalpana, Assistant professor, Dept. of Mechanical Engineering

S. Suresh, Assistant professor, Dept of Mechanical Engineering

Head of the Department

Head of the Department
Humanities & Science
K.G. Reddy College of Engg. & Tech,
Chilkur, Moinabad, R.R. Dist. T.S.

Principal

Principal
KG Reddy College of Engineering & Technology
Chilkur (V), Moinabad (M).
R.R.Dist., Telangana.

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1. Course introduction

Course Name: Foundational Course on 3D Printing

Course duration: 4 - weeks

Organizing Department: Institutions Innovation Council

Collaborations:H & S dept., Center for Innovation and Social Transformation

Course offered by – 3D printing club, Mechanical Engineering Department

Venue: T-401, 3D printing Lab,KG Reddy College of Engineering and Technology, Hyderabad

Speaker:K Kalpana, Asst. Prof., Dept. of Mech Engineering, KGRH

S Suresh, Asst. Prof., Dept. of Mech Engineering, KGRH

Engineering for sustainable development:

The Engineering for Sustainable Development is a yearlong co-curricular pro- gram that is designed to introduce freshmen engineering students to the concepts of engineering design, principles of sustainable development and UN's Sustainable Development Goals (SDG's), entrepreneurial thinking, and emerging technologies in multi-disciplinary fields of engineering. The program is designed to help students become ethical and emphatic leaders who will reflect on the impact of engineering work on the environment and sustainability and develop an enhanced sense of social and civil responsibility. As a part of ESD program, a four week foundational course on emerging technologies is conducted. 3D printing is one among the emerging technologies taught as part of ESD. In the first semester 3D printing foundational course and in the second semester 3D printing advanced course is taught for the freshmen students.

2. Objective of the 3D printing foundational Course

- To promote the knowledge and interests in 3D Printing.
- To explain the advantages and dis advantages in 3D Printing.
- To describe the different methods in rapid prototyping.
- Enabling the students to get hands on experience on creality CR-20 and Delta 3D printers

3. Introduction of 3D Printing

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.

Types of 3D Printing Technologies and Processes

1. Vat Photopolymerization
    1. Stereo lithography (SLA)
    2. Digital Light Processing (DLP)
    3. Continuous Liquid Interface Production (CLIP)
2. Material Jetting
3. Binder Jetting
4. Material Extrusion
    1. Fused Deposition Modeling (FDM)
    2. Fused Filament Fabrication (FFF)
5. Powder Bed Fusion
    1. Multi Jet Fusion (MJF)
    2. Selective Laser Sintering (SLS)
    3. Direct Metal Laser Sintering (DMLS)
6. Sheet Lamination
7. Directed Energy Deposition

Rapid Prototyping:

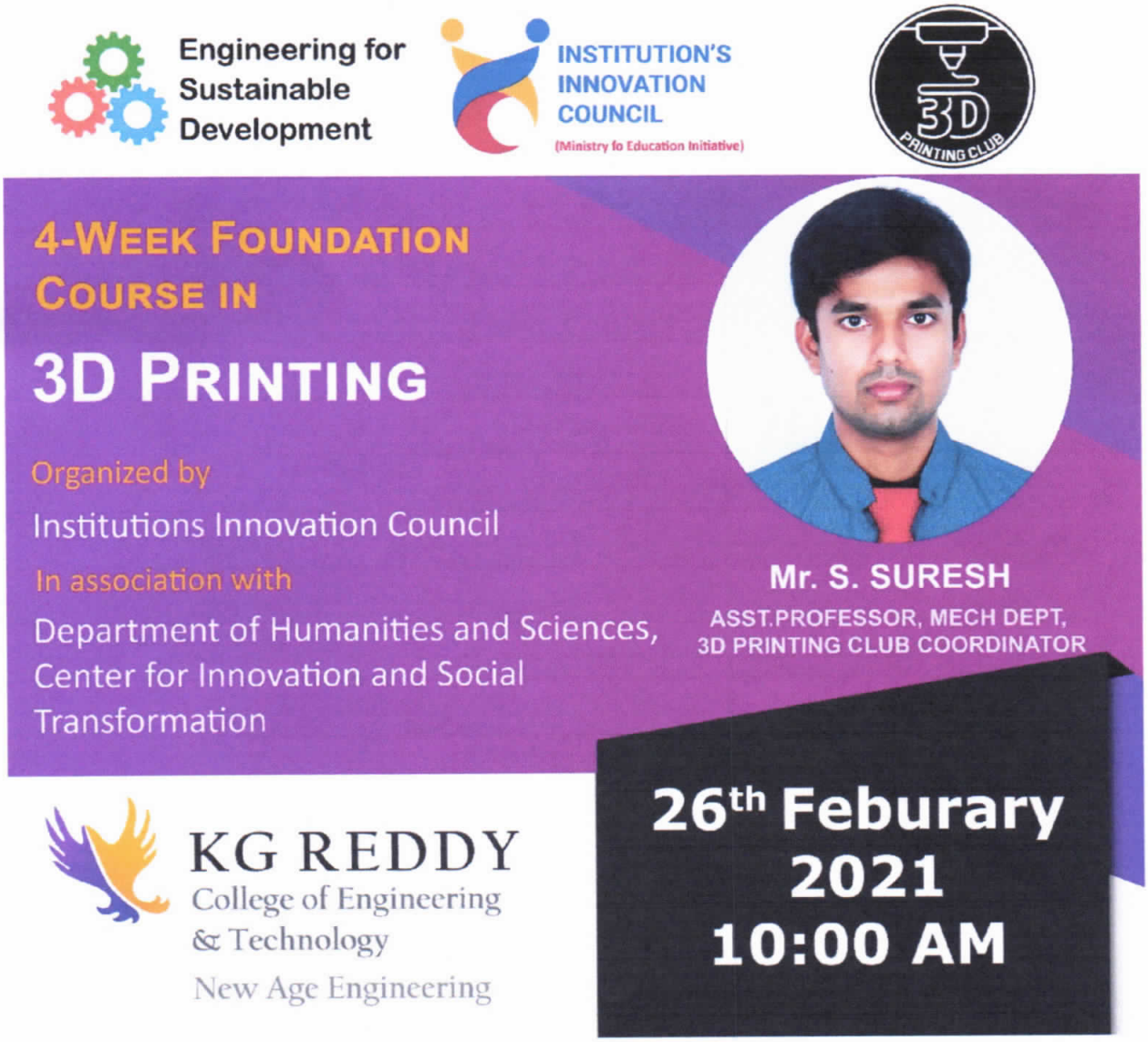
Companies have used 3D printers in their design process to create prototypes since the late seventies. Using 3D printers for these purposes is called **rapid prototyping**. it's fast and relatively cheap. From idea, to 3D model to holding a prototype in your hands is a matter of days

instead of weeks. Iterations are easier and cheaper to make and you don't need expensive molds or tools.

4. fourweeks Content Delivery Description

Week-1:"AdditiveManufacturing Overview & Introduction to 3D Printe (Creality-CR 20)"

Week 1 began with explanation about what sustainability is and how the way engineers design and manufacture the products impact the society. How 3D printing can reduce the carbon footprint in the environment is explained. Then briefly various 3D printing practices have been explained. Then topic moved to the explanation about the Creality (CR-20) and its capabilities and limitations.



Brochure for the 1st week course

1st week content delivery

After the session exit slips are collected from the students, slip having point about interesting thing students found on 1st week, doubt and new thing they learn on that day. At the end of session student found interest in engineering as a new age engineer by finding actual meaning, responsibilities of engineer and how he/she is different difference than other professional.

Week – 2: "Additive Manufacturing applications & Delta 3D printer Assembly"

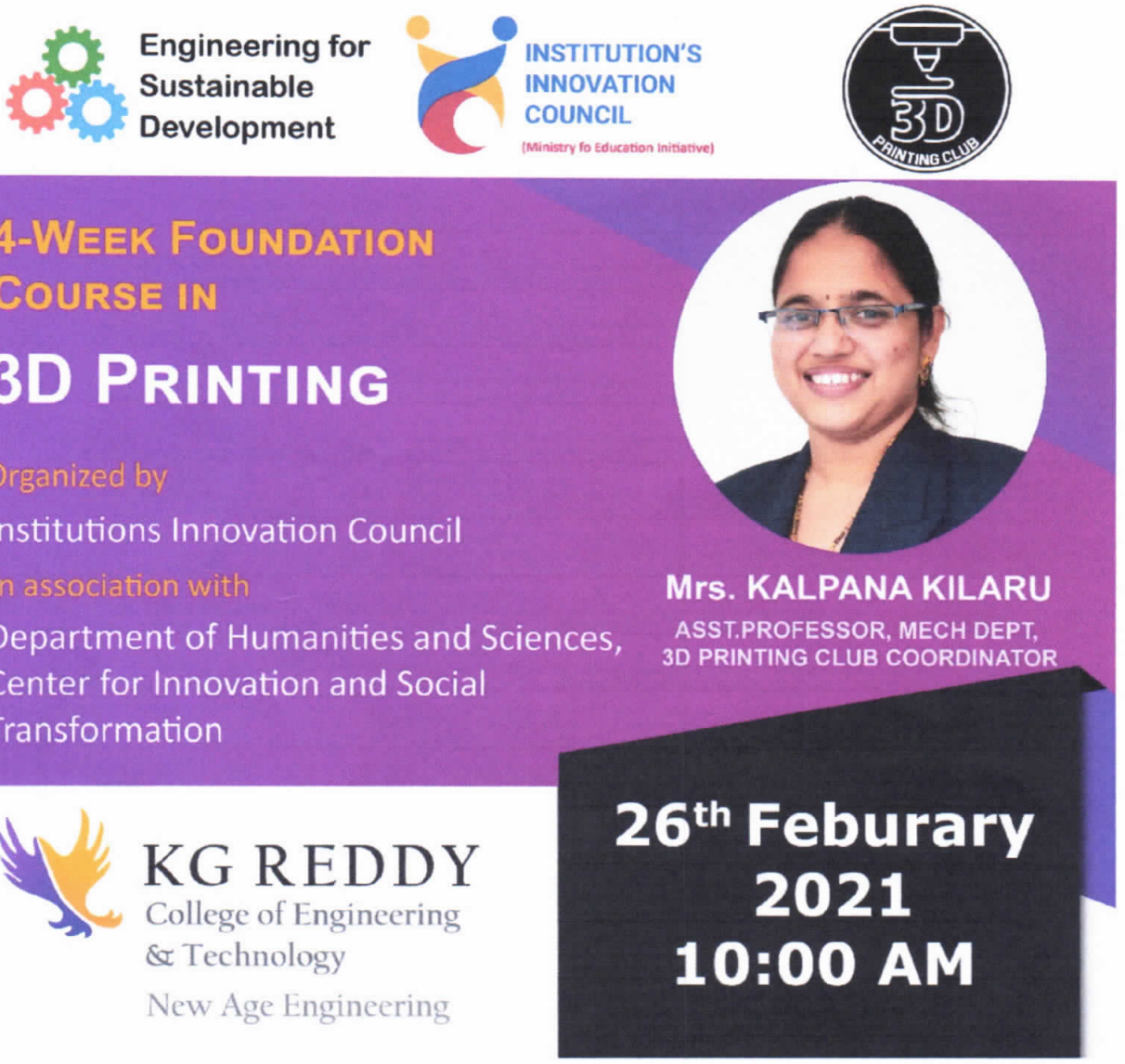
After understanding what is 3D printing, then students were enlightened with the applications of 3D printing in medical, defense, aerospace and various other industries. In the first week, they got to see only CR-20 printer which has limitation with the height and also it was already assembled. To print object of height more than 25 cm, they were introduced with delta 3D printer. It is essential to know how to assemble the printers because when a printer is purchased, it does not come fully assembled. So students were given training as to how to assemble the Delta 3D printer.

Guidance given to the students to assemble the Delta 3D printer

Students assembling the Delta printer

Week – 3: "Introduction to Design Software & Slicing Software"

Different 3D modelling software's like CATIA, Solid works, Fusion 360 were briefly explained theoretically as a part of the foundational course but they will be given training in Solid works in the advanced course which will be conducted in the subsequent semester. They got introduced to Thingiverse website where many number of 3D models were available for public to download and also students were given instructions to download and install the ultimaker CURA software in their laptops. Once the 3D model is taken from the Thingiverse website, it is uploaded in to the CURA software for slicing. Students were given clear explanation about how to slice the 3D model.



Week – 4: "Hands on sessions on Prototype Printing"

In the last 3 weeks all the aspects of the 3D printing were covered. In the final week students selected the sprocket key object from the Thingiverse and sliced the object and printed it all by themselves without needing the instructors help.

Students working on the sprocket keychain design from thingiverse

Students slicing the 3D model of the sprocket keychain

3D printed sprocket key chain before processing

3D printed sprocket after processing

6. Scope of the course

This foundational course in 3D printing introduced the 3D printer and its working to the first year students. They also got the handson experience with CR-20 printer. They became familiar with the slicing software Ultimaker Cura. As a part of foundational course 3D models of the objects were downloaded from thingiverse forum where enthusiastic designers post their design files for the public to use. In the advanced course of 3D printing, design knowledge will be imparted to the students.

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KGRCET/MECH/DDC/CIRCULAR/2020-21/SEM-I/ Date: 20/02/2021

Department of Mechanical Engineering

Circular

It is here by informed that Mechanical Department – 3D Printing Club is organizing A **"Foundational course on 3D Printing"** on 26th –Feb-2021 to I year Students. So, all the students are instructed to attend the session without fail and utilize the opportunity.

Mech,HoD

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Copy to

- All MECH Faculty members
- Head of the Departments
- Students

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INSTITUTION'S INNOVATION COUNCIL

Engineering for Sustainable Development

Department of Humanities and Sciecnes

Workshop on Emerging Technologies (3D Printing)

Attendance Sheet **Date: 05-03-2021**

S.No	Roll Number	Name of the Student	Signature
1	20QM1A0306	Pusthakala Harika	P. Harika
2	20QM1A0540	K. Mounika	
3	20QM1A6652	Nathwani Janavi	Janavi
4	20QM1A6719	Kamma Nitya sri	
5	20QM1A6723	K. Deepika	Deepika
6	20QM1A6730	Mutyala Srinidhi	M. Srinidhi
7	20QM1A6737	Sindam Chaithanya	Chaithanya.
8	20QM1A0549	K. Shiva	
9	20QM1A6621	Gudise Vivek Mudiraj	G. VK
10	20QM1A0595	Tanneerukondaiah	
11	20QM1A0574	R.K.Sahil Singh	Sahil
12	20QM1A0596	Tehmeena Begum	Tehmeena
13	20QM1A0577	Raman Suvekha	
14	20QM1A0112	Mohd Jaffar Farooqi	
15	20QM1A0549	K Shiva	Shiva
16	20QM1A0532	E Vamshi	
17	20QM1A0508	A Supriya	
18	20QM1A0521	Chandani kumari	
19	20QM1A05A3	Geetha Shivani	V. Geetha Shivani

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INSTITUTION'S INNOVATION COUNCIL

Engineering for Sustainable Development

Department of Humanities and Sciecnes

Workshop on Emerging Technologies (3D Printing)

Attendance Sheet **Date:12-03-2021**

S.No	Roll Number	Name of the Student	Signature
1	20QM1A0306	Pusthakala Harika	P. Harika
2	20QM1A0540	K. Mounika	
3	20QM1A6652	Nathwani Janavi	Janavi
4	20QM1A6719	Kamma Nitya sri	
5	20QM1A6723	K. Deepika	Deepika
6	20QM1A6730	Mutyala Srinidhi	M. Srinidhi
7	20QM1A6737	Sindam Chaithanya	Chaithanya
8	20QM1A0549	K. Shiva	
9	20QM1A6621	Gudise Vivek Mudiraj	G. VK
10	20QM1A0595	Tanneerukondaiah	
11	20QM1A0574	R.K.Sahil Singh	
12	20QM1A0596	Tehmeena Begum	Tehmeena
13	20QM1A0577	Raman Suvekha	
14	20QM1A0112	Mohd Jaffar Farooqi	
15	20QM1A0549	K Shiva	
16	20QM1A0532	E Vamshi	
17	20QM1A0508	A Supriya	
18	20QM1A0521	Chandani kumari	
19	20QM1A05A3	Geetha Shivani	V. Geetha Shivani

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Workshop on Emerging Technologies (3D Printing)

Attendance Sheet **Date:19-03-2021**

S.No	Roll Number	Name of the Student	Signature
1	20QM1A0306	Pusthakala Harika	P. Harika
2	20QM1A0540	K. Mounika	
3	20QM1A6652	Nathwani Janavi	Janavi
4	20QM1A6719	Kamma Nitya sri	
5	20QM1A6723	K. Deepika	K. Deepika.
6	20QM1A6730	Mutyala Srinidhi	M. Srinidhi
7	20QM1A6737	Sindam Chaithanya	S. Chaithanya
8	20QM1A0549	K. Shiva	
9	20QM1A6621	Gudise Vivek Mudiraj	G. VK
10	20QM1A0595	Tanneerukondaiah	
11	20QM1A0574	R.K.Sahil Singh	
12	20QM1A0596	Tehmeena Begum	Tehmeena
13	20QM1A0577	Raman Suvekha	Suvekha
14	20QM1A0112	Mohd Jaffar Farooqi	
15	20QM1A0549	K Shiva	
16	20QM1A0532	E Vamshi	
17	20QM1A0508	A Supriya	A. Supriya
18	20QM1A0521	Chandani kumari	Chandani Kumari
19	20QM1A05A3	Geetha Shivani	V. Geetha Shivani

26/2/22 ESD: 3D Printing (Foundational Course)

1	E. Vamshi	CSE	20QM1A0532	Added
2	K. Shiva	CSE	20QM1A0549	
3	A. Supriya	CSE	20QM1A0508	A. Supriya Added
4	K. Manvika	CSE	20QM1A0540	
5	Chandani Kumari	CSE	20QM1A0521	Chandani Kumari
6	Tehmeena begum	CSE	20QM1A0596	Tehmeena Added
7	Suvekha	CSE	20QM1A0577	Suvekha
8	Geetha Shivani	CSE	20QM1A0583	V. Geetha Added
9.	Harika. p	Mech	20QM1A0306	Harika
10.	Deepika. k	CSD	20QM1A6723	Deepika
11.	chaithanya. s	CSD	20QM1A6737	Chaithanya
12.	Srinidhi. a	CSD	20QM1A6780	Srinidhi Added
13.	Mohd. Iffat Fatima Quil		20QM1A0512	
14.	NATHWANI JANAVI	CSM	20QM1A6652	Janavi
	R.K. Sahil Singh	CSE	20QM1A0574	
16)	G. VIVEK	CSM	20QM1A6621	G. VK

Absentees

1) K. Nithya Sri (20QM1A6719)

2) T. Kondaiah (20QM1A0595)

4 People extra added

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3D PRINTING CLUB

Department of Mechanical Engineering

Certificate of participation

This is to certify that Mr/Mrs N. Jaanvi has successfully completed the Foundational Course in 3D Printing.

Mrs. K Kalpana	Mr S Suresh	Mr. Mahesh R Reddy	Dr R S Jahagirdhar
Club Co-ordinator	**Club Co-ordinator**	**HOD**	**Principal**

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Department of Mechanical Engineering

Certificate of participation

This is to certify that Mr/Mrs K. Shiva has successfully completed the Foundational Course in 3D Printing.

Mrs. K Kalpana	Mr S Suresh	Mr. Mahesh R Reddy	Dr R S Jahagirdhar
Club Co-ordinator	**Club Co-ordinator**	**HOD**	**Principal**

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Certificate of participation

This is to certify that Mr/Mrs A. Supriya has successfully completed the Foundational Course in 3D Printing.

Mrs. K Kalpana	Mr S Suresh	Mr. Mahesh R Reddy	Dr R S Jahagirdhar
Club Co-ordinator	**Club Co-ordinator**	**HOD**	**Principal**

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