

Department of Mechanical  
Engineering Organising



# 5 Day Workshop on 3D printing



Exclusively for  
FINAL & PRE FINAL YEAR MECHANICAL  
ENGINEERING STUDENTS



**13-17 March 2023**

**Start 10.00 AM Onwards**

**Venue : Mechanical Seminar Hall**

## Key Features :

- . Self developed design
- . 3D Printing trends
- . Challenges in 3D printing
- . Post processing operations



DR. LEENA A. V.  
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KANNUR



Est. 2003

**Sree Narayana Guru College  
of Engineering & Technology**

CHALAKKODE P.O., KOROM, PAYYANUR, KANNUR-670 307





**5 Day Workshop on 3D Printing, March 13-17, 2023**

<b>DAY 1</b>		
<b>Date</b>	<b>Time</b>	
<b>13-03-2023 (Monday)</b>	10:00 AM-10:10 AM	<b>Introduction</b> <b>by</b> <b>Coordinator</b> Dr. Sudhin Chandran, Dept. of ME, SNGCET
	10:10 AM-10:15 AM	<b>Departmental address by</b> Mr. Jacob Thomas HoD, Dept. of ME, SNGCET
	10:30 AM-12:00 AM	<b>Expert talk by</b> Dr. Abdul Nazar K P, Associate Professor Dept of Mechanical Engineering, GEC Kannur  <b>Title: State of the art of 3D printing application.</b>
	02:30 PM-4:00 PM	<b>Expert talk by</b> Mr. Jacob Thomas Asst. Professor Dept of Mechanical Engineering, SNGCET  <b>Title: 3D Printing technology steps, 3D Printing application fields, 3D Printing equipment, 3D Printing approach to build parts and assemblies.</b>

  
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**DAY 2**

<b>14-03-2023</b> <b>(Tuesday)</b>	10:00 AM-11:30 AM	<b>Expert talk by</b> Dr. Abdul Nazar K P, Associate Professor Dept of Mechanical Engineering, GEC Kannur  <b>Title: 3D Printing process steps for 3D printing an object, post-processing operations for 3D printed objects.</b>
	02:30 PM-4:00 PM	<b>Expert talk by</b> Mr. Jacob Thomas Asst. Professor Dept of Mechanical Engineering, SNGCET  <b>Title: 3D Printing approach to build parts and assemblies, post-processing operations for 3D printed objects.</b>

**DAY 3**

<b>15-03-2023</b> <b>(Wednesday)</b>	10:00 AM-11:30 AM	<b>Expert talk by</b> Mr. Pradeepkumar V. Instructor ME, GCE Kannur.  <b>Title: 3D Printed Energy Storage Devices for Flexible and Wearable Electronics</b>
	02:30 PM-4:00 PM	<b>Expert talk by</b> Dr. Solamon Joseph, Lecturer ME, GPC Periyar, Kasargod.  <b>Title: Challenges and advantages of 3D printing.</b>



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**Day 4**

<b>16-03-2023 (Thursday)</b>	<b>09:30 AM-11:00 AM,</b>	<b>Expert talk by</b> Govardhan Kayarthaya B, Lecturer ME, GPC Periye, Kasargod.  <b>Title: Technology Drivers for 3D printing, Knowledge on 3D printer software</b>
	<b>02:30PM-4:00PM</b>	<b>Expert talk by</b> Dr. Solamon Joseph, Lecturer ME, GPC Periye, Kasargod.  <b>Title: 3D Printing technology, 3D Printing process steps for 3D printing an object.</b>

**DAY 5**

<b>17-03-2023 (Friday)</b>	<b>10:00 AM-11:30 AM</b>	<b>Expert talk by</b> Govardhan Kayarthaya B, Lecturer ME, GPC Periye, Kasargod.  <b>Title: post-processing operations for 3D printed objects.</b>
	<b>01:30 PM-3:00 PM</b>	<b>Expert talk by</b> Mr. Jacob Thomas Asst. Professor Dept of Mechanical Engineering, SNGCET  <b>Title: Opportunity to design and print self-developed design.</b>



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# SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY

## DEPARTMENT OF MECHANICAL ENGINEERING

### Report of the Session on WORKSHOP ON 3D PRINTING

The Department of Mechanical Engineering (ME) and organized the "Workshop on 3D Printing" from March 13<sup>th</sup> to March 17<sup>th</sup> 2023, at 10 AM in Mechanical department's seminar hall. The aim of the workshop is to make students aware about concept & importance of 3D printing Technology. The workshop was also attended by the staffs of SNGCET. The session commenced with a welcoming address from the event coordinator, Dr. Sudhin Chandran, Assistant Professor of ME, expressing appreciation to participants and faculties for their whole-hearted support.

The workshop started with welcoming guest by respected Head of the Department Mr. Jacob Thomas. The workshop was divided in two sessions, in first session Dr. Abdul Nazar K P has presented and explained to students about back ground of how 3D printing technology evolved. He also explained about the various types of 3D printing technology available in market and how they differ in printing object. In the Second session, Mr. Jacob Thomas demonstrated on 3D printer which they have brought by 3D printing a small component in printer. While demonstration was going on simultaneously sir has also explained about type of raw material required for 3D printing. Sir also explained that depending upon the raw material how the product quality varies and also cost of the component.



Session on 3 D Printing Technology

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# SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

## 5 DAY WORKSHOP ON 3D PRINTING

### DAY 1 ATTENDENCE LIST

S.NO	NAME	SEMESTER	SIGN
1	ADARSH.P.K	S8	
2	ADWAIDH BALAN	S8	
3	ANURAG A	S8	
4	ASWANTH.C	S8	
5	ATHUL.B	S8	
6	BIPIN.K	S8	
7	FARHAN.C	S8	
8	JASIN.P	S8	
9	MOHAMMED AAFIL ISMAYIL.M.K	S8	
10	MRIDUL.C	S8	
11	NITHIN.A	S8	
12	SANDESH K DINESH	S8	
13	ARJUN SHYLESH	S6	
14	ASHISH K	S6	
15	ASHWIN JOHN	S6	
16	ASWIN BABU M V	S6	
17	MOHAMMED SHAD ABDUL SATHAR	S6	
18	SOURAG K	S6	
19	ARJUN SHYLESH	S6	
20	ASHISH K	S6	

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# SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

## 5 DAY WORKSHOP ON 3D PRINTING

### DAY 2 ATTENDANCE LIST

S.NO	NAME	SEM	SIGN
1	ADARSH.P.K	S8	
2	ADWAI DH BALAN	S8	
3	ANURAG A	S8	
4	ASWANTH.C	S8	
5	ATHUL.B	S8	
6	BIPIN.K	S8	
7	FARHAN.C	S8	
8	JASIN.P	S8	
9	MOHAMMED AAFIL ISMAYIL.M.K	S8	
10	MRIDUL.C	S8	
11	NITHIN.A	S8	
12	SANDESH K DINESH	S8	
13	ARJUN SHYLESH	S6	
14	ASHISH K	S6	
15	ASHWIN JOHN	S6	
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20	ASHISH K	S6	

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DEPARTMENT OF MECHANICAL ENGINEERING

## 5 DAY WORKSHOP ON 3D PRINTING

### DAY 3 ATTENDENCE LIST

S.NO	NAME	SEM	SIGN
1	ADARSH.P.K	S8	
2	ADWAIDH BALAN	S8	
3	ANURAG A	S8	
4	ASWANTH.C	S8	
5	ATHUL.B	S8	
6	BIPIN.K	S8	
7	FARHAN.C	S8	
8	JASIN.P	S8	
9	MOHAMMED AAFIL ISMAYIL.M.K	S8	
10	MRIDUL.C	S8	
11	NITHIN.A	S8	
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20	ASHISH K	S6	

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KADAPPA



# SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

## 5 DAY WORKSHOP ON 3D PRINTING

### DAY 4 ATTENDENCE LIST

S.NO	NAME	SEM	SIGN
1	ADARSH.P.K	S8	
2	ADWAIDH BALAN	S8	
3	ANURAG A	S8	
4	ASWANTH.C	S8	
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SREE NARAYANA GURU COLLEGE OF  
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(ESTD - 1983)



# SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

## 5 DAY WORKSHOP ON 3D PRINTING

### DAY 5 ATTENDANCE LIST

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## **Sree Narayana Guru College of Engineering & Technology**

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### **CERTIFICATE OF PARTICIPATION**

This is to certify that **Nithin.A** of **Sree Narayana Guru College of Engineering and Technology** has attended the Five day workshop on **3D Printing** organized by the **Department of Mechanical Engineering, Sree Narayana Guru College of Engineering and Technology** from 13/03/2023 to 17/03/2023

**Dr. Sudhin Chandran**  
*Co-ordinator*

**Mr. Jacob Thomas**  
*Head of the Department*



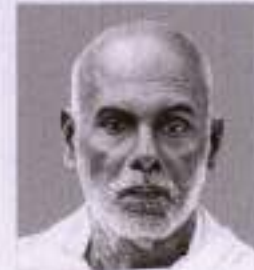
**Dr. Leena A V**  
*Principal*



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### CERTIFICATE OF PARTICIPATION

This is to certify that **Sandesh K Dinesh** of **Sree Narayana Guru College of Engineering and Technology** has attended the Five day workshop on **3D Printing** organized by the **Department of Mechanical Engineering, Sree Narayana Guru College of Engineering and Technology** from 13/03/2023 to 17/03/2023

**Dr. Sudhin Chandran**  
*Co-ordinator*

**Mr. Jacob Thomas**  
*Head of the Department*



**Dr. Leena A V**  
**Principal**  
SREE NARAYANA GURU COLLEGE OF  
ENGINEERING & TECHNOLOGY, PAYYANUR

**Dr. Leena A V**  
*Principal*



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### CERTIFICATE OF PARTICIPATION

This is to certify that **Sourag K** of **Sree Narayana Guru College of Engineering and Technology** has attended the Five day workshop on **3D Printing** organized by the **Department of Mechanical Engineering, Sree Narayana Guru College of Engineering and Technology** from 13/03/2023 to 17/03/2023

**Dr. Sudhin Chandran**  
*Co-ordinator*

**Mr. Jacob Thomas**  
*Head of the Department*



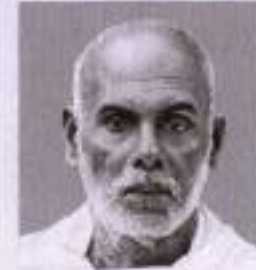
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### CERTIFICATE OF PARTICIPATION

This is to certify that **Adwaidh Balan** of **Sree Narayana Guru College of Engineering and Technology** has attended the Five day workshop on **3D Printing** organized by the **Department of Mechanical Engineering, Sree Narayana Guru College of Engineering and Technology** from 13/03/2023 to 17/03/2023

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*Co-ordinator*

**Mr. Jacob Thomas**  
*Head of the Department*



**Dr. Leena A V**  
*Principal*



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### **CERTIFICATE OF PARTICIPATION**

This is to certify that **Adarsh.P.K** of **Sree Narayana Guru College of Engineering and Technology** has attended the Five day workshop on **3D Printing** organized by the **Department of Mechanical Engineering, Sree Narayana Guru College of Engineering and Technology** from 13/03/2023 to 17/03/2023

**Dr. Sudhin Chandran**  
*Co-ordinator*

**Mr. Jacob Thomas**  
*Head of the Department*



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**Dr. Leena A V**  
*Principal*



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### **CERTIFICATE OF PARTICIPATION**

This is to certify that **Mridul.C** of **Sree Narayana Guru College of Engineering and Technology** has attended the Five day workshop on **3D Printing** organized by the **Department of Mechanical Engineering, Sree Narayana Guru College of Engineering and Technology** from 13/03/2023 to 17/03/2023

**Dr. Sudhin Chandran**  
*Co-ordinator*

**Mr. Jacob Thomas**  
*Head of the Department*



**Dr. Leena A V**  
*Principal*



## **Sree Narayana Guru College of Engineering & Technology**

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### **CERTIFICATE OF PARTICIPATION**

This is to certify that **Mohammed Shad Abdul Sathar** of **Sree Narayana Guru College of Engineering and Technology** has attended the Five day workshop on **3D Printing** organized by the **Department of Mechanical Engineering, Sree Narayana Guru College of Engineering and Technology** from 13/03/2023 to 17/03/2023

**Dr. Sudhin Chandran**  
*Co-ordinator*

**Mr. Jacob Thomas**  
*Head of the Department*



**Dr. Leena A. V.**  
*Principal*

**Dr. Leena A V**  
*Principal*



# SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY

## 5 DAY WORKSHOP ON 3D PRINTING

### FEEDBACK FORM

Submitted by the Department of Mechanical Engineering

	Excellent	Good	Fair	Poor
1. Overall how would you rate the training class?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. How would you rate the trainer's communication and presentation skills	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Were the interactive elements engaging and beneficial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Did you receive enough opportunity for questions and clarification during the session	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Did this class meet your expectation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were the hands-on activities beneficial in understanding concepts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Did the workshop offer practical strategies or tools that you can readily apply	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were the technical aspects during the workshop satisfactory	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Rate the level of interaction between the facilitator and participants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Did the workshop covers emerging trend or advancements in the field	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*Leena*

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## 5 DAY WORKSHOP ON 3D PRINTING

### FEEDBACK FORM

Submitted by the Department of Mechanical Engineering

	Excellent	Good	Fair	Poor
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2. How would you rate the trainer's communication and presentation skills	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Were the interactive elements engaging and beneficial	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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10. Did the workshop covers emerging trend or advancements in the field	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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ENGINEERING & TECHNOLOGY, PONDICHERRY



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## 5 DAY WORKSHOP ON 3D PRINTING

### FEEDBACK FORM

Submitted by the Department of Mechanical Engineering

	Excellent	Good	Fair	Poor
1. Overall how would you rate the training class?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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**SREE NARAYANA GURU COLLEGE OF ENGINEERING &  
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DEPARTMENT OF MECHANICAL ENGINEERING**

**SYLLABUS FOR 3D PRINTING**

<b>Professional Skills(Trade Practical)</b>	<b>Professional Knowledge(Trade Theory)</b>
<ol style="list-style-type: none"> <li>1. Importance of trade training, List of tools &amp; Machinery used in the trade.</li> <li>2. First Aid Method and basic training.</li> <li>3. Safe disposal of waste materials like cotton waste, metal chips/burrs etc.</li> <li>4. Hazard identification and avoidance.</li> <li>5. Safety signs for Danger, Warning, caution &amp; personal safety message.</li> <li>6. Preventive measures for electrical accidents &amp; steps to be taken in such accidents.</li> <li>7. Use of Fire extinguishers.</li> <li>8. Practice and understand precautions to be followed while working in fitting jobs.</li> <li>9. Demonstrate the functions of 3D printing and Scanning.</li> <li>10. Demonstrate the functions of 3D printing and Scanning. Perform Computer operation:               <ol style="list-style-type: none"> <li>i) create new folder, ii) add subfolders, create application files, iv) change appearance of windows, v) search for files, vi) sort files, vii) copy files, viii) create shortcut folder, ix) create shortcut icon in desktop and taskbar x) Move files to and from removable disk/ flash drive. xi) Install a printer from driver software in operating system.</li> </ol> </li> <li>11. Create, save and print a document, worksheet and pdf (portable document format) files.</li> <li>12. Draw perpendicular, inclined (given angle) and parallel lines. Draw triangles with given sides and angles.</li> <li>13. Draw inscribed and circumscribed circles of triangle, pentagon and hexagon.</li> <li>14. Draw orthographic projection of cut section/ frustums of solids- prism, cylinders, cones, pyramids.</li> </ol>	<p>All necessary guidance to be provided to the new comers to become familiar with the working of Industrial Training Institute system including stores procedures.</p> <p>Soft Skills, its importance and Job area after completion of training.</p> <p>Importance of safety and general precautions observed in the industry/shop floor.</p> <p>Introduction of First aid. Operation of electrical mains and electrical safety. Introduction of PPEs. Response to emergencies e.g.; power failure, fire, and system failure.</p> <p><b>Importance of housekeeping &amp; good shop floor practices.</b> Introduction to 5S concept &amp; its application.</p> <p><b>Occupational Safety &amp; Health:</b> Health, Safety and Environment guidelines, legislations &amp; regulations as applicable.</p> <p>Introduction to 3D Printing and Scanning. Basic computer. Introduction to computer, Windows operating system, file management system. Computer hardware and software specification.</p> <p><b>Engineering Drawing:</b> Nomenclature, description and use of drawing instruments &amp; various equipments used in drawing office. Their care and maintenance.</p> <p>Units of dimensioning, System of dimensioning, Method of dimensioning &amp; common features. Methods of obtaining orthographic view. Position of the object, selection of the views, three views of drawing. Planes and their normal projections. Orthographic projection. First angle and third</p>

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15. Draw 2D objects using: line, polyline, ray, polygon, circle, rectangle, arc, ellipse commands.

16. Modify 2D objects using Move, Copy, Array, Insert Block, Make Block, Scale, Rotate, Hatch Commands.

17. Perform computer application in 2D drawing space using commands from ribbon, menu bar, toolbars and by typing in command prompt.

18. Modify 2D objects using Move, Copy, Array, Insert Block, Make Block, Scale, Rotate, Hatch Commands.

19. Draw 3D solid figures by Sketching features & applied features.

20. Handle imported geometries using Feature Works – Recognise features to native file formats.

21. Create a 3D transition figure

- Using loft feature.
- Using sweep feature.
- Using library features.

i) Create 3D model by annotating Holes and Threads, ii) Create Centrelines, symbols and leaders, iii) Perform seamless Simulation within CAD Apply loads & boundary conditions, Material should come from part definition, contacts etc and perform base simulation.

iv) Plot various results- Stress, Strain, Deformation, Displacement, Factor of Safety plot, Design Insight plot, probe facility, Isoclippping, Section clipping.

v) Create automatic reports vi) Understand 2D simplification.

22. Learn Data Translation – Built in translation facility to export design to DWG, DXF, ProE, IPT(Inventor), Mechanical Desktop, Unigraphics, ParaSolid, CADKEY, IGES, STEP, .PAR (SolidEdge), SAT(ACIS), VDA-FS, VRML, STL, TIFF, JPG, Adobe, Rhino, IDF & HSF.(20 hrs)

angle projection. Principal of orthographic projection. Projection of solids like prism, cones, pyramids and their frustums.

**Introduction to 2D User interface.** Drawing of Line, polyline, ray, polygon, circle, rectangle, arc, ellipse using different options. Trim, Offset, Fillet, Chamfer, Arc and Circle under modify commands. Move, Copy, Array, Insert Block, Make Block, Scale, Rotate, Hatch Commands. Creating templates, Inserting drawings, Layers, Modify Layers. Format dimension style, creating new dimension style, Modifying styles in dimensioning. Writing text on dimension line and on leader. Edit text dimension. Knowledge of shortcut keyboard command. Customization of keyboard command. Customization of drafting settings, changing orthographic snap to isometric snap. Procedure to create viewport in layout space in zooming scale.

### **3D Modeling and Design Software:**

Introduction to 3D Modeling and Software. User interface - Menu Bar – Command manager – Feature manager – Design Tree – settings on the Default options – suggested settings – key board short cuts. Feature manager Design Tree Selection of plane Control of sketches through parameter and property manager. Featured tools in Command Manager Feature Toolbar. Extrude Boss/Base Revolve Boss/Base Swept Boss/Base Lofted Boss/Base Boundary Boss/Base Extruded cut Hole Wizard Revolved Cut Boundary Cut Fillet, chamfer, mirror Linear pattern and circular pattern Understanding part GD&T with DimXpert Manager



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