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

SECTIMENTANA GURLI COLLEGE OF



Sree Narayana Guru College of Engineering & Technology

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





# SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY DEPARTMENT OF MECHANICAL ENGINEERING

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

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

Dr. LEENA A. V.
PRITICIPAL
FIELDWARD COLLEGE OF
ENDERSEG & TECHNOLOGY, PAYYANUR
KANNUR

1	4		DAY 2			
	14-03-2023 (Tuesday)	10:00 AM-11:30 AM	Expert talk by Dr. Abdul Nazar K P, Associate Professor Dept of Mechanical Engineering, GEC Kannur  Title: 3D Printing process steps for 3D printing an object, post- processing operations for 3D printed objects.			
		02:30PM-4:00PM	Expert talk by  Mr. Jacob Thomas  Asst. Professor  Dept of Mechanical Engineering,  SNGCET  Title: 3D Printing approach to build parts and assemblies,  post-processing operations for 3D printed objects.			
1	DAY 3					
	15-03-2023 (Wednesday)	10:00 AM-11:30 AM	Expert talk by Mr. Pradeepkumar V. Instructor ME, GCE Kannur.  Title: 3D Printed Energy Storage Devices for Flexible and Wearable Electronics			
		02:30 PM-4:00 PM	Expert talk by  Dr. Solamon Joseph,  Lecturer ME, GPC Periye, Kasargod.  Title: Challenges and advantages of 3D printing.			

De Lettics A. V.

DE LETTOS ALV.
PALIN CLEAL
BREE NAROWINGURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR.

		Day 4				
	09:30 AM-11:00 AM,	Expert talk by Govardhan Kayarthaya B, Lecturer ME, GPC Periye, Kasargod.				
16-03-2023 (Thursday)		Title: Technology Drivers for 3D printing, Knowledge on 3D printer software				
	02:30PM-4:00PM	Expert talk by Dr. Solamon Joseph, Lecturer ME, GPC Periye, Kasargod.  Title: 3D Printing technology, 3D Printing process steps for 3D printing an object.				
	DAY 5					
17-03-2023 (Friday)	10:00 AM-11:30 AM	Expert talk by Govardhan Kayarthaya B, Lecturer ME, GPC Periye, Kasargod.  Title: post-processing operations for 3D printed objects.				
	01:30 PM-3:00 PM	Expert talk by Mr. Jacob Thomas Asst. Professor Dept of Mechanical Engineering, SNGCET  Title: Opportunity to design and print self-developed design.				

EVELET OF A. V.
PROMOCEPAL
SHEERWAYNING GUNU COLLEGE OF EXCHEERING & TECHNOLOGY, RAYYAHUR KANNUR



#### DEPARTMENT OF MECHANICAL ENGINNERING

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

The Department of Mechanical Engineering (ME) and organized the "Workshop on 3D Printing" from March 13th to March 17th 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** 

PRINCIPAL
SHEEMANAGENE COLLEGE OF
ENCHERING A TECHNOLOGY PAYMINUM
ENCHERING A TECHNOLOGY PAYMI



**Interactive Session** 

The session focusing on 3D Printing at the workshop proved highly successful, equipping students with knowledge and practical skills for utilizing 3D printers in industrial settings. Participants thoroughly covered all fundamental aspects of 3D printing technology. Exceptionally positive feedback was received from the students regarding their learning experience during the workshop. Such initiatives play a pivotal role in preparing students for the contemporary challenges and opportunities they will encounter. Attendees departed the session with renewed inspiration and a steadfast determination to further refine their concepts, with the aim of making a positive impact on the world through their innovative endeavors. The session, featuring informative presentations and insightful discussions, undoubtedly enriched the academic atmosphere at SNGCET.

New N. V.



#### DEPARTMENT OF MECHANICAL ENGINEERING

#### 5 DAY WORKSHOP ON 3D PRINTING

#### DAY 1 ATTENDENCE LIST

S.NO	NAME	SEMESTER	SIGN
1	ADARSH.P.K	S8	del
2	ADWAIDH BALAN	S8	Adubates
3	ANURAG A	S8	RAM
) 4	ASWANTH.C	S8	A STATE OF THE PARTY OF THE PAR
5	ATHUL,B	S8	AYL
6	BIPIN.K	S8	Bo
7	FARHAN.C	S8	Taran
8	JASIN.P	S8	Marine
9	MOHAMMED AAFIL ISMAYIL,M.K	S8	Nataral
10	MRIDUL.C	S8	STALW
11	NITHIN A	S8	Neth
12	SANDESH K DINESH	S8 .	Sand-
13	ARJUN SHYLESH	S6	Que
14	ASHISH K	S6	risto.
15	ASHWIN JOHN	S6	Arkur oh
16	ASWIN BABU M V	S6	Solution
17	MOHAMMED SHAD ABDUL SATHAR	S6	John
18	SOURAG K	S6	Addy.
19	ARJUN SHYLESH	S6	And
20	ASHISH K	S6	Ashir

PELL CLEAT



#### DEPARTMENT OF MECHANICAL ENGINEERING

#### 5 DAY WORKSHOP ON 3D PRINTING

### DAY 2 ATTENDENCE LIST

S.NO	NAME	SEM	SIGN
1	ADARSH.P.K	S8	doll
2	ADWAIDH BALAN	S8	AdiBallan
3	ANURAG A	S8	Rapiu
4	ASWANTH.C	S8	XM
5	ATHUL.B	S8	AM
6	BIPIN.K	S8	Bigi
7	FARHAN.C	S8	Toway
8	JASIN.P	S8	Total
9	MOHAMMED AAFIL ISMAYIL.M.K	S8	Nulsamar.
10	MRIDUL.C	S8	war.
11	NITHIN.A	S8	N:#
12	SANDESH K DINESH	S8	Camel
13	ARJUN SHYLESH	S6	Au
14	ASHISH K	S6	de
15	ASHWIN JOHN	S6	Artisaloh
16	ASWIN BABU M V	S6	Shund
17	MOHAMMED SHAD ABDUL SATHAR	S6	has
18	SOURAG K	S6	Sail
19	ARJUN SHYLESH	S6 /	A
20	ASHISH K	S6Xu	Artusti

Dr. LEENA A. V.
PELNCIPAL

SIENAMANA CONTROLLER



#### DEPARTMENT OF MECHANICAL ENGINEERING

#### 5 DAY WORKSHOP ON 3D PRINTING

#### DAY 3 ATTENDENCE LIST

S.NO	NAME	SEM	SIGN
1	ADARSH.P.K	S8	JAh
2	ADWAIDH BALAN	S8	Adulana
3	ANURAG A	S8	Sante
4	ASWANTH.C	S8	No.
5	ATHULB	S8	AL
6	BIPIN.K	S8	ABIN:
7	FARHAN.C	S8	Faran
8	JASIN.P	S8	adm
9	MOHAMMED AAFIL ISMAYIL,M.K	S8	Stemmedy
10	MRIDUL.C	S8	entry
11	NITHIN.A	S8	NH
12	SANDESH K DINESH	S8	Sand
13	ARJUN SHYLESH	S6	Aus
14	ASHISH K	S6	126
15	ASHWIN JOHN	S6	Artuntition
16	ASWIN BABU M V	S6	Shows.
17	MOHAMMED SHAD ABDUL SATHAR	S6	Wel
18	SOURAG K	S6	de
19	ARJUN SHYLESH	S6 /	Ani
20	ASHISH K	S6 Xu	Abusti

Dr. LEENA A. V.
PRINCIPAL
DES NACONAGAN COMESE OF
ENDMERSON A TOMOLOGY PROCESS.



#### DEPARTMENT OF MECHANICAL ENGINEERING

#### 5 DAY WORKSHOP ON 3D PRINTING

#### DAY 4 ATTENDENCE LIST

S.NO	NAME	SEM	SIGN
1	ADARSH.P.K	S8	dutta
2	ADWAIDH BALAN	S8	Adulata
3	ANURAG A	S8	BANK
4	ASWANTH.C	S8	And I
5	ATHUL.B	S8	Atl
6	BIPIN.K	S8	Bis
7	FARHAN,C	S8	(Failar
8	JASIN.P	S8	indus-
9	MOHAMMED AAFIL ISMAYIL.M.K	S8	Muhammadh
10	MRIDUL.C	S8	stoled.
11	NITHIN.A	S8	Nith
12	SANDESH K DINESH	S8	Grand
13	ARJUN SHYLESH	S6	(Am
14	ASHISH K	\$6	126
15	ASHWIN JOHN	S6	Adusth
16	ASWIN BABU M V	S6	Almost.
17	MOHAMMED SHAD ABDUL SATHAR	S6	
18	SOURAG K	S6	alus
19	ARJUN SHYLESH	S6	Agr
20	ASHISH K	Nother.	- Adult

DELECTA A.V.
PRINCIPAL
THE HARAWING DELEGE OF
ENGINEERING STREET CONTROLLEGE OF



#### DEPARTMENT OF MECHANICAL ENGINEERING

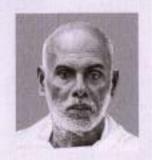
#### 5 DAY WORKSHOP ON 3D PRINTING

#### DAY 5 ATTENDENCE LIST

S.NO	NAME	SEM	SIGN
1	ADARSH.P.K	S8	dalah
2	ADWAIDH BALAN	S8	Adulada
3	ANURAG A	S8	RANH
4	ASWANTH.C	S8	X
5	ATHUL.B	S8	AHL
6	BIPIN.K	S8	AZ POP
7	FARHAN.C	S8	Fartar
8	JASIN.P	S8	- way
9	MOHAMMED AAFIL ISMAYIL.M.K	S8	Huhamma.
10	MRIDUL.C	S8	erthal
11	NITHIN A	S8	NA
12	SANDESH K DINESH	S8	Could
13	ARJUN SHYLESH	S6	Aur
14	ASHISH K	S6	N/D/b
15	ASHWIN JOHN	S6	Amonth
16	ASWIN BABU M V	S6	Shink.
17	MOHAMMED SHAD ABDUL SATHAR	S6	
18	SOURAG K	S6	alug-
19	ARJUN SHYLESH	\$6	An-
20	ASHISH K	86	DANTE



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



### 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

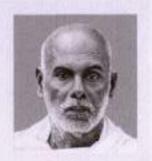
Co-ordinator

Mr. Jacob Thomas Head of the Department PAYYANUR LEGAL STATE OF THE STA

Dr. Leena A V Principal



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



### 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

Jahra .

Dr. Sudhin Chandran
Co-ordinator

Some I

Mr. Jacob Thomas Head of the Department

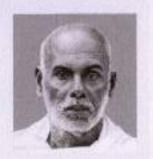


Dr. Leena A V
Principal

BREE NATIONNIA GURLU COLLEGE



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



### 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

Salas

Dr. Sudhin Chandran
Co-ordinator

Mr. Jacob Thomas

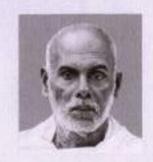
Head of the Department

Dr. Leena A V

PWYVANDE



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



### 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

Jahon .

Dr. Sudhin Chandran
Co-ordinator

Mr. Jacob Thomas

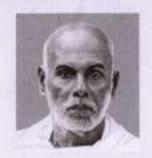
Head of the Department

PRYYANTE DE LE STATE DE LE STA

PRINCIPAL Dr. Leena A V



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



### 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

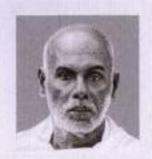
Dr. Sudhin Chandran

Co-ordinator

Mr. Jacob Thomas Head of the Department PREDIC PAL PREDIC PAL MARAYNIA GURU DOLL SI Principal



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



### 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

Jahos .

Dr. Sudhin Chandran
Co-ordinator

Mr. Jacob Thomas

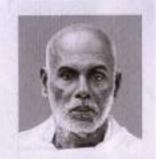
Head of the Department

PATYANDH LIGHT COLLEGE HARANNIN GUNU COLLEGE

Dr. Leena A V Principal



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



### 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

Johan .

Dr. Sudhin Chandran
Co-ordinator

Mr. Jacob Thomas

Head of the Department

Dr. Leena A V
Principal



## **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?				
<ol><li>How would you rate the trainer's communication and presentation skills</li></ol>		B		
3. Were the interactive elements engaging and beneficial	4			
<ol> <li>Did you receive enough opportunity for questions and clarification during the session</li> </ol>		B		
5. Did this class meet your expectation		d		
<ol> <li>Were the hands-on activities beneficial in understanding concepts</li> </ol>	V			
<ol><li>Did the workshop offer practical strategies or tools that you can readily apply</li></ol>		2		
<ol><li>Were the technical aspects during the workshop satisfactory</li></ol>	9			
<ol><li>Rate the level of interaction between the facilitator and participants</li></ol>				
<ol> <li>Did the workshop covers emerging trend or advancements in the field</li> </ol>	I			

Dr. LEENA A. V. PELYCIPAL SEENARIO DI DOLLEGI OF



## **5 DAY WORKSHOP ON 3D PRINTING**

## FEEDBACK FORM

## Submitted by the Department of Mechanical Engineering

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

Dr. LEEHA A. V. PRINCIPAL BENAVA GENOLULOF

Arwag A



# 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?		I		
<ol><li>How would you rate the trainer's communication and presentation skills</li></ol>				
3. Were the interactive elements engaging and beneficial				
<ol> <li>Did you receive enough opportunity for questions and clarification during the session</li> </ol>				
5. Did this class meet your expectation				
<ol> <li>Were the hands-on activities beneficial in understanding concepts</li> </ol>	O C			
<ol><li>Did the workshop offer practical strategies or tools that you can readily apply</li></ol>	Ø			
<ol><li>Were the technical aspects during the workshop satisfactory</li></ol>			Ø	
<ol><li>Rate the level of interaction between the facilitator and participants</li></ol>			Ø	
10. Did the workshop covers emerging trend or advancements in the field	, $\Box$			
~	11.00			

Do LEBNA A V.
PRINCIPAL
DISENSE NATIONAL CONTROL OF THE PARTY OF THE P



14. Draw

cones, pyramids.

orthographic projection

section/ frustums of solids- prism, cylinders,

#### SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY DEPARTMENT OF MECHANICAL ENGINEERING

#### SYLLABUS FOR 3D PRINTING

Professional Skills(Trade Practical)	Professional Knowledge(Trade Theory)
<ol> <li>Importance of trade training, List of tools &amp; Machinery used in the trade.</li> <li>First Aid Method and basictraining.</li> <li>Safe disposal of waste materials like cotton waste, metal chips/burrs etc.</li> <li>Hazard identification and avoidance.</li> <li>Safety signs for Danger, Warning, caution &amp; personal safety message.</li> <li>Preventive measures forelectrical accidents &amp; steps to be taken in such accidents.</li> <li>Use of Fire extinguishers.</li> </ol>	All necessary guidance to be provided to the new comers to become familiar with the working of Industrial Training Institute system including storesprocedures.  Soft Skills, its importance and Job area after completion of training.  Importance of safety and general precautions observed in the industry/shop floor.  Introduction of First aid Operation of electrical mainsand electrical safety. Introduction of PPEs. Response to emergencies e.g.; power
Practice and understand precautions to be followed while working in fitting jobs.      Demonstrate the functions of 3D printing and Scanning.	failure, fire, and system failure.  Importance of housekeeping & good shop floor practices. Introduction to 5S concept & its application.
Scanning.  10. Demonstrate the functions of 3D printing and Scanning. Perform Computer operation: i)create new folder, ii) add subfolders, create application files, iv) change appearance of windows, v) search for files, vii) 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.	Occupational Safety & Health: Health, Safety and Environment guidelines, legislations & regulations as applicable.  Introduction to 3D Printing and Scanning, Basic computer: Introduction to computer, Windows operating system, file management system.
Create, save and print a document, worksheet and pdf (portable document format) files.     Draw perpendicular, inclined (given angle) and parallel lines. Draw triangles with given sides and angles.     Draw inscribed and circumscribed circles of triangle, pentagon andhexagon.	Engineering Drawing: Nomenclature, description and use of drawing instruments & various equipments used in drawing office. Their care and maintenance.  Units of dimensioning, System of dimensioning, Method of dimensioning & common features. Methods of obtaining orthographic view. Position

cut

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

- Draw 2D objects using: line, polyline, ray, polygon, circle, rectangle, arc, ellipse commands.
- Modify 2D objects using Move, Copy, Array, Insert Block, Make Block, Scale, Rotate, Hatch Commands.
- Perform computer application in 2D drawing space using commands from ribbon, menu bar, toolbars and by typing in command prompt.
- Modify 2D objects using Move, Copy, Array, Insert Block, Make Block, Scale, Rotate, Hatch Commands.
- Draw 3D solid figures by Sketching features & applied features.
- 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, Isoclipping, Section clipping.
   v) Create automatic reports vi) Understand 2D simplification.
- 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 Design Software: and 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 Understanding pattern part GD&T DimXpert Manager

Leve