



# Bharath Institute of Higher Education and Research

[Declared Under Section 3 of UGC Act, 1956]

Chennai – 600 073

## INTERNAL QUALITY ASSURANCE CELL (IQAC)

### DOCUMENTS SUBMISSION FORM

Date of Submission	19/9/2020
Type of Documents	Value Added <sup>(online)</sup> Course programme Report
Description	Introduction to CNC programming Using G-Code
Enclosures	a) Requisition letter
	b) Circulars
	c) Curriculum
	d) Schedule
	e) Attendance sheet
	f) Feedback form
	g) Certificate
	h) Image
No. of Pages	13
Submitted By	Name : R. Haribaran
	Designation : Asst. Professor
	Department : Mechanical Engineering
	Signature :

### For Office Use Only

Verified By:	K. Sankthivel	Sign:	Date: 19/9/2020
Uploaded By:	K. S. Senthil Kumar	Sign:	Date: 19/9/2020
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IQAC - BIHER



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## Requisition Letter

Date: 12.08.2020

From

The HOD,  
Department of Mechanical Engineering,  
Bharath Institute of Higher Education and Research,  
Selaiyur, Chennai.

To

The Dean Engineering,  
Bharath Institute of Higher Education and Research,  
Selaiyur, Chennai.

Respected Sir,

Sub: Requisition for conducting online Value added course – reg.

School of Mechanical Sciences has planned to conduct Value added course on “Foundation to CNC Programming using GCODE” on 5/9/2020. In this regard we kindly request you to grant permission for the same.

Thanking You

HOD/MECH

Head of the Department  
Department of Mechanical Engineering  
Bharath Institute of Higher Education and Research  
(Declared as Deemed to be University under section 3 of UGC Act. 1956)  
Selaiyur, Chennai-600 073

Dean Engineering

DEAN  
BHARATH INSTITUTE OF HIGHER EDUCATION & RESEARCH  
(Declared as Deemed to be University under section 3 of UGC Act. 1956)  
CHENNAI - 600 073, INDIA.



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Date: 15.08.2020

**Department of Mechanical Engineering**

**Circular**

The of Department of Mechanical Engineering, BIHER glad to conduct online 5 days value added program on “*Foundation to CNC Programming using GCODE*” from 05.09.2020 for 30 hours. Those who are interested to participate do register your name to the program coordinator.

All reregistered students must attend all the classes without fail. The students who are completed the course successfully with good score will get the course completion certificate from the institute/Department.

**Resource person: Mr.S.Thirumavalavan and Mr.V.Srinivasan**

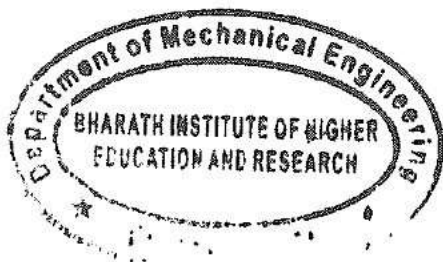
Maximum no. of registration Allowed – 60.

**\*First come first serve basis.**

**Program coordinator**

  
**Mr.R.Hariharan**

  
**Mr.S.Manavalan**





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## Department of Mechanical Engineering

### Foundation to CNC Programming using GCODE

#### OBJECTIVE:

- ✓ i. Identify different axes, machine zero, home position, systems and controls CNC machines.
- ✓ ii. Select, mount and set cutting tools and tool holders on CNC.
- ✓ iii. Prepare part programmers' using ISO format for given simple components with and without use of MACRO, CANNED CYCLE and SUBROUTINE using ISO format.
- ✓ iv. Interface software application for auto part programming. v. Apply maintenance practices for CNC machines.

#### [DAY: 1]

##### MODULE 1 Industrial Safety & Practices

(5Hrs)

**Industrial Safety Practices:** Introduction – Safe guarding methods – Safety in Workshop - Common methods of protection in workshop.

**Engineering Drawing:** Engineering drawing – Limits, fits and Tolerance (Dimensional and Geometrical tolerance), Surface finish representation. Symbolic representation of Wheels, Gears etc Basics on Orthographic views from isometric views of machine parts / components. Dimensionings, Sectioning.

**Shop Theory:** Work holding devices, setting & dialling of work piece, tool holding devices, application of coolant.

#### [DAY: 2]

##### MODULE II Metrology & Inspection

(5 Hrs)

**Marking tools:** Introduction to marking tools, Divider, Scriber, Surface Gauge, V-Block, Parallel Block, Surface Plate, Angle Plate & Punches **Measuring Tools:** Introduction to measuring instruments, construction, application of steel rule, try square, vernier calliper, vernier height gauge, micrometre, bore gauge, radius gauge, bevel protractor, callipers & gauges. **Conventional Lathe Machine:** Lathe: Specification - Types - Mechanisms - Operations - Calculations - Capstan and turret lathe – Tooling with examples - Copy turning lathe

[DAY: 3]

**MODULE III Basics Of N.C Machine Tools**

**(15Hrs)**

Conventional Numerical Control: Basic components of NC system, the NC procedure, NC coordinate systems, NC motion control system, applications of numerical control, advantages and disadvantages of NC, computer controls in NC, problems with conventional NC, NC controller technology, computer numerical control, functions of CNC, advantages of CNC. Tooling: Cutting Tool materials and its applications, carbide index able inserts, tooling systems for CNC Lathe, selection of tools for various work piece materials, selection of cutting parameters.

[DAY: 4] **G-Code at a Glance**

Manufacturers all around the world use CNC programming to control a machine's tools to produce parts. At the heart of this automated manufacturing process is a set of instructions that tells a CNC machine where – and how – to move. These instructions are called G-Code. Individual pieces of code, that make up this machine-based language start with the letter G.

[DAY: 5] **G-Code Blocks**

The G-code standard was published back in the days when machines had small amounts of memory. Because of this memory limitation, G-code is an extremely compact and concise language that might almost seem archaic at first glance. Take, for example, this line of code:

G01 X1 Y1 F20 T01 M03 S500

**In this single line, we're giving the machine a series of instructions:**

- G01 – Perform a linear feed move
- X1/Y1 – Move to these X and Y coordinates
- F20 – Move at a feed rate of 20
- T01 – Use Tool 1 to get the job done
- M03 – Turn the spindle on
- S500 – Set a spindle speed of 500

[DAY: 6]

**MODULE IV G-Code Programs**

**(5Hrs)**

The goal of every G-code program is to produce parts in the safest and most efficient way possible. To achieve this, you'll typically find G-code blocks arranged in a particular order like this:

1. Start the CNC program.
2. Load the required tool.
3. Turn the spindle on.
4. Turn the coolant on.
5. Move to a position above a part.
6. Start the machining process.

7. Turn the coolant off.
8. Turn the spindle off.
9. Move away from the part to a safe location.
10. End the CNC program.

- **Modals and Address Codes**
- **G-Codes & M-Codes Explained**

**[DAY: 7]**

**Practical Session for CNC Programming using GCODE**





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Department of Mechanical Engineering

One Week online Value added Program on "Foundation to CNC Programming using GCODE"  
5<sup>th</sup> Sep to 12<sup>th</sup> Sep 2020

Date	Morning Session (9 AM – 12 PM)	Afternoon Session (1:30 PM – 3:30 PM)
05 – 09 – 2020	<b>Program Inauguration</b> <b>Mr.S.Thirumavalavan</b> <i>Industrial Safety Practices: Introduction – Safe guarding methods – Safety in Workshop - Common methods of protection in workshop.</i>	<b>Mr.V.Srinivasan</b> <i>Engineering Drawing &amp; Shop Theory:</i> <i>Engineering drawing – Limits, fits and Tolerance (Dimensional and Geometrical tolerance), Surface finish representation. Symbolic representation of Wheels, Gears etc Basics on Orthographic views</i>
06 – 09 – 2020	<b>Mr.V.Srinivasan</b> <i>Marking tools: Introduction to marking tools, Divider, Scriber, Surface Gauge, V-Block, Parallel Block, Surface Plate, Angle Plate &amp; Punches</i> <b>Measuring Tools:</b>	<b>Mr.S.Thirumavalavan</b> <i>Lathe Machine: Lathe: Specification - Types - Mechanisms - Operations - Calculations - Capstan and turret lathe – Tooling with examples - Copy turning lathe</i>
07 – 09 – 2020	<b>Mr.S.Thirumavalavan</b> <i>Conventional Numerical Control: Basic components of NC system, the NC procedure, NC coordinate systems, NC motion control system, applications of numerical control, advantages and disadvantages of NC, computer controls in NC.</i>	<b>Mr.V.Srinivasan</b> <i>Tooling: Cutting Tool materials and its applications, carbide index able inserts, tooling systems for CNC Lathe, selection of tools for various work piece materials, selection of cutting parameters.</i>
08 – 09 – 2020	<b>Mr.V.Srinivasan</b> <i>Manufacturers all around the world use CNC programming to control a machine's tools to produce parts. At the heart of this automated manufacturing process is a set of instructions that tells a CNC machine where – and how – to move.</i>	<b>Mr.S.Thirumavalavan</b> <i>G-Code at a Glance</i> <i>Individual pieces of code, that make up this machine-based language start with the letter G.</i> <b>Video Session</b>
09 – 11 – 2020	<b>Mr.S.Thirumavalavan</b> <i>The G-code standard was published back in the days when machines had small amounts of memory. Because of this memory limitation, G-code is an extremely compact and concise language that might almost seem archaic at first glance. Take, for example, this line of code:</i> <i>G01 X1 Y1 F20 T01 M03 S500</i>	<b>Mr.V.Srinivasan</b> ➤ <i>Machine a series of instructions</i>
10 – 09 – 2020	<b>Mr.V.Srinivasan</b> <i>G-Code Programs: The goal of every G-code program is to produce parts in the safest and most efficient way possible. To achieve this, you'll typically find G-code blocks arranged in a particular order</i>	<b>Mr.S.Thirumavalavan</b> ➤ <i>Programming session</i>
12 – 09 – 2020	<b>Mr.S.Thirumavalavan</b> ➤ <i>Practical Session for CNC Programming using GCODE</i>	<i>Quiz/ Feedback / valedictory Session</i>

Program Coordinator:

Mr.R.Hariharan

Mr.S.Manavalan

Assistant Professor,

E-Mail: hariharan.mech@bharathuniv.ac.in  
manavalan.mech@bharathuniv.ac.in



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05-09-2020

## Foundation to CNC Programming using GCODE

### Attendance sheet

S.No	Reg.No	Name	Department
1.	U13ME002	ABHIJIT PAUL	Mechanical Engineering
2.	U13ME003	ABHISHEK KUMAR	Mechanical Engineering
3.	U13ME004	ABHISHEK KUMAR	Mechanical Engineering
4.	U13ME068	DHIRAJ DEB	Mechanical Engineering
5.	U13ME069	DILIP SINGH	Mechanical Engineering
6.	U13ME188	SATHISHKUMAR S	Mechanical Engineering
7.	U13ME189	SATHYA S	Mechanical Engineering
8.	U13ME190	SATYAJIT KUMAR	Mechanical Engineering
9.	U13ME191	SAURABH SINGH	Mechanical Engineering
10.	U13ME192	SEKAR P	Mechanical Engineering
11.	U13ME508	GRICXWIN S EDWIN	Mechanical Engineering
12.	U13ME509	VIGNESHWAREN.G	Mechanical Engineering
13.	U14ME316	SHAIK.YASEEN	Mechanical Engineering
14.	U14ME317	SHAJK FAYAZ	Mechanical Engineering
15.	U14ME319	SHASHIKANT KUMAR	Mechanical Engineering
16.	U14ME320	SHAURYA PRASAD	Mechanical Engineering



17.	U14ME321	SHAYAN DUYPURKAYASTHA	Mechanical Engineering
18.	U14ME286	RISHY KESH.D	Mechanical Engineering
19.	U14ME287	ROHIT SHARMA	Mechanical Engineering
20.	U14ME288	ROHITH KUMAR.A	Mechanical Engineering
21.	U14ME289	ROUSHAN BHARTI	Mechanical Engineering
22.	U14ME290	SACHIN KUMAR	Mechanical Engineering
23.	U14ME291	SAI KIRN CH	Mechanical Engineering
24.	U14ME292	SAI RAM PRASAD.B	Mechanical Engineering
25.	U14ME293	SAI SREEKAR.M	Mechanical Engineering
26.	U15ME057	ESAKKI P	Mechanical Engineering
27.	U15ME058	ESWAR K	Mechanical Engineering
28.	U15ME059	FEHATH BASHA S	Mechanical Engineering
29.	U15ME060	GAMBALI SANTHAN	Mechanical Engineering
30.	U15ME061	GANESH KUMAR E	Mechanical Engineering
31.	U15ME011	AKIRI VENKATESH	Mechanical Engineering
32.	U15ME012	AKTHAR A	Mechanical Engineering
33.	U15ME013	AKULA ANJI BABU	Mechanical Engineering
34.	U15ME014	ALLAPURAM AKHIL BALANARA YANA REDDY	Mechanical Engineering
35.	U15ME015	ALTAF HUSAIN	Mechanical Engineering
36.	U15MT001	AJITH	Mechatronics
37.	U15MT002	BALAJI	Mechatronics
38.	U15MT003	INAYAT ULLA RABBANI	Mechatronics

39.	U15MT004	INAYATHULLA	Mechatronics
40.	U15MT005	KARTHIGAYAN	Mechatronics
41.	U15AM012	MANIKANDAN	Automobile Engineering
42.	U15AM013	MARIA SUBITCHAM VINITH	Automobile Engineering
43.	U15AM014	MATHAN KUMAR	Automobile Engineering
44.	U15AM015	MOHAMED ASHIF	Automobile Engineering
45.	U15AM017	MUTUM NAOBA SINGH	Automobile Engineering
46.	U15AM018	NELLUBALLI CHAITANYA	Automobile Engineering
47.	U15AM019	PERIMIREDDY NAVEEN KUMAR	Automobile Engineering
48.	U15AM020	PIHE	Automobile Engineering
49.	U15AM021	PREM	Automobile Engineering
50.	U15AM022	RAJU	Automobile Engineering
51.	U15AM705	SHANMUKA KIRAN	Automobile Engineering
52.	U15AM706	REMILAN	Automobile Engineering



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## FEEDBACK FORM

❖ As part of a continuing improvement process, our college appreciates suggestions and inputs regarding the institution. We request you to sincerely answer these questions under assurance of complete confidentiality. Your interest in making our institution better is greatly appreciated.

Name of Department : Mechanical Engineering  
Date : 05.09.2020  
Event / Speaker Name : foundations to cnc using G'Code

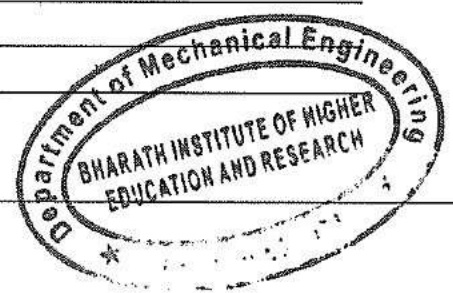
• Please rate the session on the scale indicated. Your comments are most appreciated.

S.NO	Parameters	Below Average	Average	Good	Excellent	Outstanding
1.	<b>The Topic</b>					
	The choice of topic was relevant to me					✓
2.	<b>The Lecturer / Speaker</b>					
	Self-confidence				✓	
	Communication skills				✓	
	Doubts/ queries were answered satisfactorily				✓	
3.	<b>The Content (Topic)</b>					
	Refers to latest developments in the field				✓	
	Career oriented				✓	✓
	Innovative learning, if any				✓	✓

• Overall, how would you rate this Guest Lecture / Workshop / Seminar / Event/Value added course?

1. Below Average	2. Average	3. Good	4. Excellent	5. Outstanding
				✓

• Comments (If any): Spce/ont





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## FEEDBACK FORM

- ❖ As part of a continuing improvement process, our college appreciates suggestions and inputs regarding the institution. We request you to sincerely answer these questions under assurance of complete confidentiality. Your interest in making our institution better is greatly appreciated.

Name of Department : Mechanical Engineering

Date : 05.09.2020

Event / Speaker Name : Foundation to cnc programming using a code

- Please rate the session on the scale indicated. Your comments are most appreciated.

S.NO	Parameters	Below Average	Average	Good	Excellent	Outstanding
1.	<b>The Topic</b>					✓
	The choice of topic was relevant to me					✓
2.	<b>The Lecturer / Speaker</b>					✓
	Self-confidence					✓
	Communication skills					✓
	Doubts/ queries were answered satisfactorily					✓
3.	<b>The Content (Topic)</b>					✓
	Refers to latest developments in the field					✓
	Career oriented					✓
	Innovative learning, if any					✓

- Overall, how would you rate this Guest Lecture / Workshop / Seminar / Event/Value added course?

1. Below Average	2. Average	3. Good	4. Excellent	5. Outstanding
				✓

- Comments (If any): Very Excellent Presentation.



# Certificate



**Bharath Institute of Higher Education and  
Research**



DEPARTMENT OF MECHANICAL ENGINEERING

*Certificate of Participation*

This is to certify that

*Griexwin S Edwin*

has attended the value-added program on "Foundation to CNC Programming using GCODE"  
organized by the Department of Mechanical Engineering, Bharath Institute of Higher Education  
and Research, Chennai on September (5-12), 2020.

Mr. R. Harsharan

Mr. S. Manavalan

Coordinators



Mr. S. Thirumavalavan

Mr. V. Shrivasan

Resource Persons

