# "CONSTRUCTION OF A LOW COST 3D PRINTER USING ARDUINO".

## DEPARTMENT OF MECHANICAL ENGINEERING SONARGAON UNIVERSITY

147/1, Green Road, Tejgaon, Dhaka-1215 Course Title: Project and Thesis Course code: ME 400 Submitted By:

Rajin Ahmed

ID: BME 1602009368

M Rafiqul islam
ID: BME 1602009346



Md Mukter Hossan ID: BME 1602009402

Sajib Chandra das

ID: BME 1602009367

**Under the Supervision of** 

Md. Mainol Hasan

Lecturer
Department of Mechanical Engineering,
Sonargaon University, Dhaka, Bangladesh.

### **Submitted to**

# DEPARTMENT OF MECHANICAL ENGINEERING SONARGAON UNIVERSITY (SU)

In partial fulfillment of the requirements for the award of the degree

Of

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

**FEBUARY, 2020** 

#### **DECLARATION**

We hereby, declare that the work presented in this project is the outcome of the investigation and research work performed by us under the supervision of **Md. MainolHasan**, Lecturer & Asst. Course Coordinator Department of Mechanical Engineering, Sonargaon University (SU). We also declare that no part of this project and thereof has been or is being submitted elsewhere for the award of any degree.

\_\_\_\_\_

Md. MainolHasan Lecturer Department of Mechanical Engineering, Sonargoan University, Dhaka, Bangladesh.

#### **APPROVAL**

This is to certify that the project on "CONSTRUCTION OF A LOW COST 3D PRINTER USING ARDUINO" by (Rajinahmed-Student ID: BME 1602009368, Rafiqul Islam-StudentID: BME 1602009346, Mukterhossan-Student ID: BME 1602009402, Sajib Chandra das- Student ID: BME 1602009367) has been carried out under our supervisor. The project has been carried out in partial fulfillment of the requirement for the degree of Bachelor of Science (BSc) in Mechanical Engineering of the year 2020 and has been approved as to its style and contents.

-----

Md. MainolHasan

Department of Mechanical Enginering,

Lecturer Sonargaon University, Dhaka, Bangladesh.

#### **ACKNOWLEDGEMENT**

The author wants to express gratefulness, regard, gratitude and sincere thanks to supervisor Md. MainolHasanDepartment of Mechanical Engineering, Sonargaon University (SU), for his guidance and valuable counsel in execution and completion of the study without which it would be impossible to carry out the work. Also thanks to MD. MostofaHossain, Associate Professor and Head of the Department of Mechanical Engineering, (SU) for giving permission to use laboratory facilities of the department. Author grateful to the teachers who helped us directly or indirectly which was very necessary to complete the thesis work.

Finally, we are also grateful to the vice chancellor of Sonargaon University (SU) for his overall support to finish the project works.

#### **ABSTRACT**

3D printing is a form of additive manufacturing technology where a three dimensional object is created by laying down successive layers of material. It is also known as rapid prototyping, is a mechanized method whereby 3D objects are quickly made on a reasonably sized machine connected to a computer containing blueprints for the object. The 3D printing concept of custom manufacturing is exciting to nearly everyone. This revolutionary method for creating 3D models with the use of inkjet technology saves time and cost by eliminating the need to design; print and glue together separate model parts. Now, you can create a complete model in a single process using 3D printing. The basic principles include materials cartridges, flexibility of output, and translation of code into a visible pattern. 3D Printers are machines that produce physical 3D models from digital data by printing layer by layer. It can make physical models of objects either designed with a CAD program or scanned with a 3D Scanner. It is used in a variety of industries including jewellery, footwear, industrial design, architecture, engineering and construction, automotive, aerospace, dental and medical industries, education and consumer products.

## **CONTENT**

CHAPTER – 1
1.1 Introduction
1.2 Scope of the Project
CHAPTER – 2
2.1 Background
CHAPTER –3
METHODOLOGY:
3.1 Nema 17 Stepper Motor6
3.2 Arduino Mega 2560
3.3 Ramps 1.4hield
3.4 Stepper Motor Drivers with Heat Sink9
3.5 Extruder Full Set with Fan
3.6 Smooth Rod
3.7 Trapezoidal Lead Screw
3.8 Flexible Coupling Coupler
3.9 Linear Ball Bearing
3.10 Timing Belt
3.11 Teeth Pulley
3.13 Radial Ball Bearing
3.14 End Stop Switch
3.15 Aluminum Channel

3.16 Glass	J
3.17 Plywood	)
3.18 Zip Tie	l
3.19 DC Power Supply 12V, 20amp	2
3.20 Filament	í
3.21 Working Principle of 3D Printer24	4
3.22 Final Products	j
CHAPTER – 4 Discussion and Conclusion:	
4.1 Comparison of 3D Printer in Market27	,
4.2 Advantage of Low Cost 3D Printer 28	3
4.3 Limitations of Low Cost 3D Printer29	)
4.4 Conclusion3	0
4.5 Reference	31

### **LIST OF FIGURES:**

3.1 Nema 17 Stepper Motor	6
3.2 Arduino Mega 2560.	7
3.3 Ramps 1.4hield	8
3.4 Stepper Motor Drivers with Heat Sink	9
3.5 Extruder Full Set with Fan	10
3.6 Smooth Rod	11
3.7 Trapezoidal Lead Screw	12
3.8 Flexible Coupling Coupler	13
3.9 Linear Ball Bearing	13
3.10 Timing Belt	14
3.11 Teeth Pulley	15
3.12 PCB Heat Bed	16
3.13 Radial Ball Bearing.	17
3.14 End Stop Switch.	18
3.15 Aluminum Channel	19
3.16 Glass	20
3.17 Plywood.	20
3.18 Zip Tie	21
3.19 DC Power Supply 12V, 20amp	22
3.20 Filament	23
3.21 Low Cost 3D Printer (Aruino Based)	24
3.22	Cup
	25

3.22 Spur Gear	26
3.22 Square Halo Box	26
4.1.1 Our Project (Arduino Based)	27
4.1.2 AnycubicPrusa i3	27