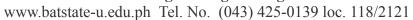


Republic of the Philippines **BATANGAS STATE UNIVERSITY**

The National Engineering University

BATSTATEU ALANGILAN, Alangilan, Batangas City College of Engineering





TOPIC PROPOSAL FORM BACHELOR OF SCIENCE IN MECHATRONICS ENGINEERING

Project Title:	Design and Development of a PLA Filament Extruder System for Excess	
C N 1	and Reject 3d Print Materials	
Group Number:	MEXE 24-011	
Project Adviser:		N. CC A1:
Co-Adviser		Name of Co-Adviser
SDGs Addressed:	SDG 9 - Industry, Innov	vation and Infrastructure
Date Submitted:	October 2, 2024	
Project Duration:	6 months (Starting December 2024 to May 2025)	
Rationale:	volume of excess and reject mater process, particularly in the form of filament. PLA or polylactic acid in filaments and is known for biodegrace hand, the environmental impact remand reject models due to to failed print [1] According to a study by Hachim additive manufacturing or 3d printing. Their design of a filament extruder in the filament and almost have the same and the produced. They have successfully in filament and almost have the same. They have concluded that the magnitude is within their satisfactory in [2]. Based on the research made by filament requires the proper setting of the two is not properly in line, it and can result in the plastic not fully temperature will differ as the comp. Their extruder were able to produce be used in 3d printing. Ultimately, this project could have sand individuals using 3D printing te	in et. al. (2021), a big challenge into ags is the availability of the material. From recycled thermoplastic materials aracteristics of the filament that is made a filament that is close to a real properties with minimal difference. echanical property of the filament range. Nassar et. al. (2019), high quality of temperature and extrusion. If either the quality of the filament may differ a melting, bubbles forming etc The position of the filament may change commercial quality filament that can significant implications for industries chnology by promoting a sustainable erial usage, while also reducing the recommercial quality filament that can be considered as a sustainable erial usage, while also reducing the recommercial quality filament that can be considered as a sustainable erial usage, while also reducing the recommercial quality filament that can be considered as a sustainable erial usage, while also reducing the recommercial quality filament that can be considered as a sustainable erial usage, while also reducing the recommercial quality filament that can be considered as a sustainable erial usage, while also reducing the recommercial quality filament that can be considered as a sustainable erial usage, while also reducing the recommercial quality filament that can be considered as a sustainable erial usage.

	References:		
	[1] Taoufik Hachimi, Nassima Naboulsi, Fatima Majid, Rajae Rhanim, Ibrahim Mrani, Hassan Rhahim, "Design and Manufacturing of a 3d Printer Filament Extruder", 2021 ScienceDirect [Online], Available: https://www.sciencedirect.com/science/article/pii/S2452321621001967		
	Design and Manufacturing of a 3D printer filaments extruder - ScienceDirect		
	[2] Nassar, Mona A., El Farahati, Mohammed A., Ibrahim, Saber, Hassan, Youssef R., "Design of 3d Filamnet Extrtuder For Fused Deposition Modelling(FDM) Additive Manufacturing", 2019 ResearhGate [Online], Available : https://www.researchgate.net/publication/369992070_Design_of_3D_filament_extruder_for_Fused_Deposition_Modeling_FDM_additive_manufacturing		
	Design of 3D filament extruder for Fused Deposition Modeling (FDM) additive manufacturing		
Pre-Requisite(s):	ECE 415 - Microprocessor and Microcontroller Systems and Design MexE 408 – CAD/CAM and CNC ENGG 412 – Materials Science and Engineering ICE 405 - Sensors Engineering		
Research Questions:	 What will be the key difference of aftermarket filament compared to the reused filament? How can the design of a PLA melting system optimize the quality of recycled filament for subsequent 3D printing use? What are the cost implications of implementing a PLA melting system for personal and small-scale 3D printing operations? What challenges exist in maintaining printing quality of the PLA when its melted and re-extruded for 3d printing? 		
Research Objectives:	 To determine the design requirements for the PLA melting system. To design the PLA filament extruder system compliant to the design requirement. To develop and assemble the prototype of PLA filament extruder system. To test the filament produced by the system in 3d printing and compare it to the aftermarket filament. 		
Resources Needed:	Heating element, Extruder, Frame, Electronic Component, Sensor Technology, 3d Modelling Software,		
Are the existing facilities at the College sufficient to carry out this project work? (Yes)			
Does the student need special training to use any College lab equipment? (Yes/No) If yes, how will this be provided?			
Proposed Budget (PHP): 20,000 to 30,000			
Item	Estimated Cost Range (PHP) Example Components		
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Frame Material	3,000 - 5,000	Aluminum Frame, plywood, Stainless Steel
Electric Motors	1,500 - 3,000	Nema 17, 23, 34 Stepper Motor
Heating Element	100 - 300	Heating Aluminum Blockh
Cooling Block	250 - 750	Heat Sinks
Nozzle	150 - 500	Brass Nozzle
Fabricated Metal Components	2,500 - 5,000	Auger,
Power Supply	500 - 1,000	Switching Power Supply e.g.(5v, 12v, 24v)
Sensors	500 - 1,000	Temperature sensor (e.g., LM35) & laser sensor
Cooling Fans	100 - 500	DC Cooling Fan
Microcontroller	1,000 - 2,000	Arduino Mega or similar
Miscellaneous	1,000	Wires, connectors, soldering supplies
Total	10,500 - 20,000	

Is there any external financial assistance to support	ort this project? (Yes/ No)
Ray Ivan C. Almonte -	
Floriane A. Munoz - from community	Date Submitted:
Gian Carl C. Tolentino -	October 2, 2024
Patrick James G. Verroya -	