KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING

CENG 291: ENGINEERING IN SOCIETY

TOPIC: POOR ROAD CONDITIONS IN EJISU BESEASE

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ACKNOWLEDGEMENT

First of all, I would like to thank the almighty God for keeping me in good health throughout this project and the strength and wisdom to pull this through. I would also like to thank the college of engineering for giving us this opportunity and Dr. Helen Essandoh for her support throughout. Lastly, I would also like to show my appreciation to the people of Ejisu Besease for their assistance and cooperation. May God bless you all.

ABSTRACT

The main objective of this project is to address the bad conditions of roads in Ejisu Besease. My means of obtaining information was through interviews, questionnaires, personal observation and researches. These methods were used in acquiring information about the problem, its causes, effect on the society and the possible ways of solving them. The conditions of our roads right now are as a result of our own actions and some conditions beyond our control. The major ones I can mention are poor and inadequate drainage systems, rainfall, heavy traffic, wind erosion and also the road being an untarred one.

This has a great negative effect on the community. Air pollution, loss of life, vehicles being damaged, slower rate of productivity etc are some of effect on the community.

I suggest that the community members come together with the help of the government to construct the road. Also, proper drainage systems should be constructed with the right materials at the right places. All this being done, the community members must make it their responsibility to maintain them so it can last long.

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1.INTRODUCTION

1.1 Background of the course

Every first-year engineering student in Kwame Nkrumah University of Science and Technology (KNUST) is expected to study the course Engineering in Society (CENG) The main aim of studying this course is to educate the students on how their field of study can also be used to solve the problems in their society. Students undertake this course as early as first semester in second year so that they are able to create a link between their field of study and the problems in their society..

1.2 Aims and objectives

The objective of taking this project is for students to identify the problem in their society and provide feasible solutions to them from their field of study.

1.3 Content of the report

This report contains a detailed information about the problems Ejisu Besease is facing. Poor road conditions, poor waste management systems, inadequate drainage systems and others are some of the problems we face as a community. The most dominating and disturbing one among these and others is the poor road conditions. This report also contains graphs and pictures from my research done. Problem identification, data collection, possible solutions and its effects are all stated and explained in this report.

2. METHODOLOGY

2.1 problem identification

This report is about the poor state of roads in Ejisu Besease. This problem was identified through verbal and online questionnaires, interviews, personal observations and researches. The results from these did not only identify poor road conditions as being the only challenge in the society but the major one affecting the day to day activities of the people here.

2.2 preparation of map

A map of Ejisu Besease was download from google earth.

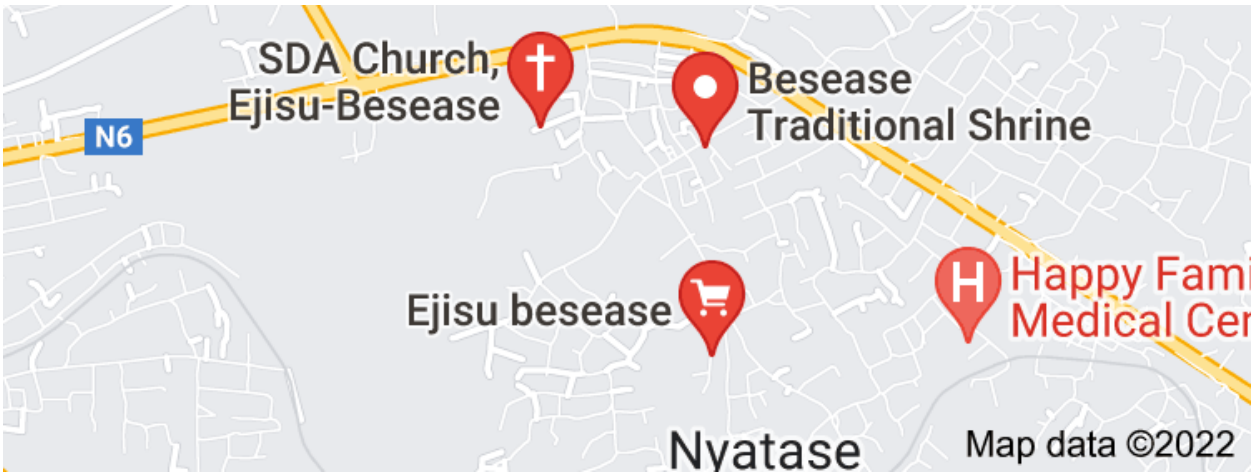

FIGURE 1 SHOWING A MAP OF EJISU BESEASE

2.3 Collection of data

All the information in this report was obtained through questionnaires, interviews, personal observations and researches.

- **QUESTIONNAIRES**
  A list of 40 questions were printed and distributed to the people in the community, with which about 90% of people answered. Also, an online questionnaire was design and sent to about 20 people we couldn't reach. The feedback was quite good even though we expected something more.

- **Personal observations**
  I also gathered some information by personally observing the community for some time. I observed that most people in the community do not have proper drainage systems in their homes and they therefore channel their home used water to the road and this destroys the quality of the road over time.

- **Research**
  I also obtained information through the internet, pdfs, books and contributions from other people in my field of studies.

- **Interviews**
  During the vacation I had the opportunity to do internship at Architectural and Engineering Service Limited (A. E.S.L) in Sunyani. This gave me the chance to interview a few people there and this really helped in my project.

2.4 Analysis of data

Problems facing Ejisu Besease	**Frequency**
Poor waste management systems	10
Crime rates	8
Water problems	10
Poor state of roads	30

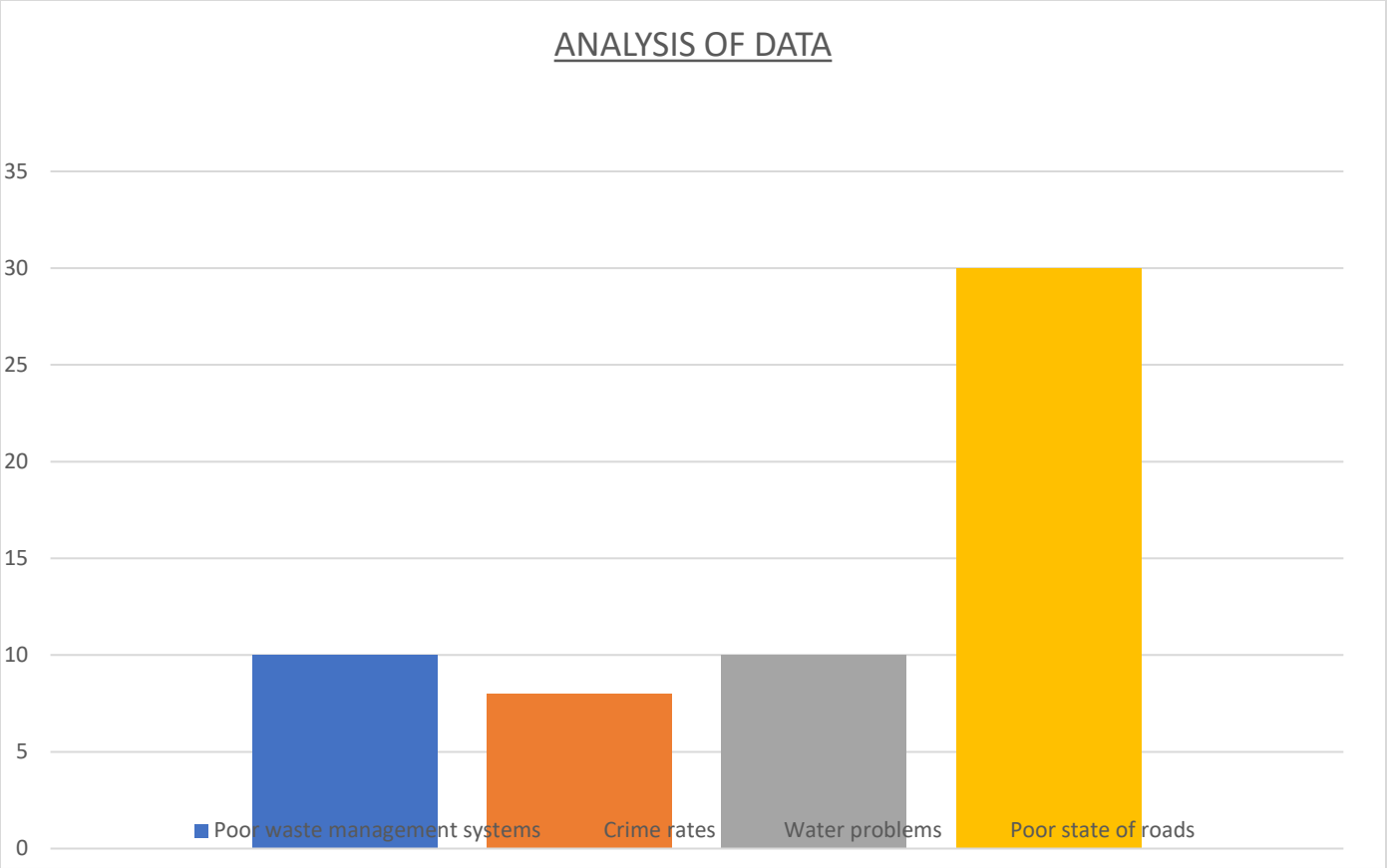

FIGURE 2 A GRAPH DISPLAY OF THE PROBLEMS IN THE COMMUNITY

2.4 Difficulties encountered

A number of people in the community are uneducated so extra time had to be taken out of my personal time to read the questions to them and note their answers down. A majority of them also had no interest because they saw it as a waste of their time. I had to spend time with people like these and convince them. Also because of the work of some people an online questionnaire had to be designed and send to them to receive their feedback.

3. RESULTS AND DISCUSSION

3.1 Description of my community

Ejisu Besease is a community which can found in the Ejisu Juaben municipality. It has four (4) urban settlement namely; Ejisu, Juaben, Besease, Bonwire. Ejisu Besease has a relative humidity which is fairly moderate and quite high during the rainy seasons and early mornings. It has a latitude of $1^0\,15^1$ N and $1^0\,45^1$ N and longitude of $6^0\,15^1$ W and $7^0\,00^1$ W. its normal temperature normally ranges from 20℃ to 30℃. The community has both new and old buildings. The new buildings in the community are built in an order but the old ones are not quite in order. There are a few number of aged people and majority of the rest being youth. The number of working people in the community is also quite convincing. A great number of the youth are also schooling. Most of the roads in the community are untarred ones. The only tarred ones are the Accra-Kumasi road and some few others. The community can boost of a well-known car dealership and auto- repair shop (Korea man), hotels, private and government schools, traditional shrine and others.

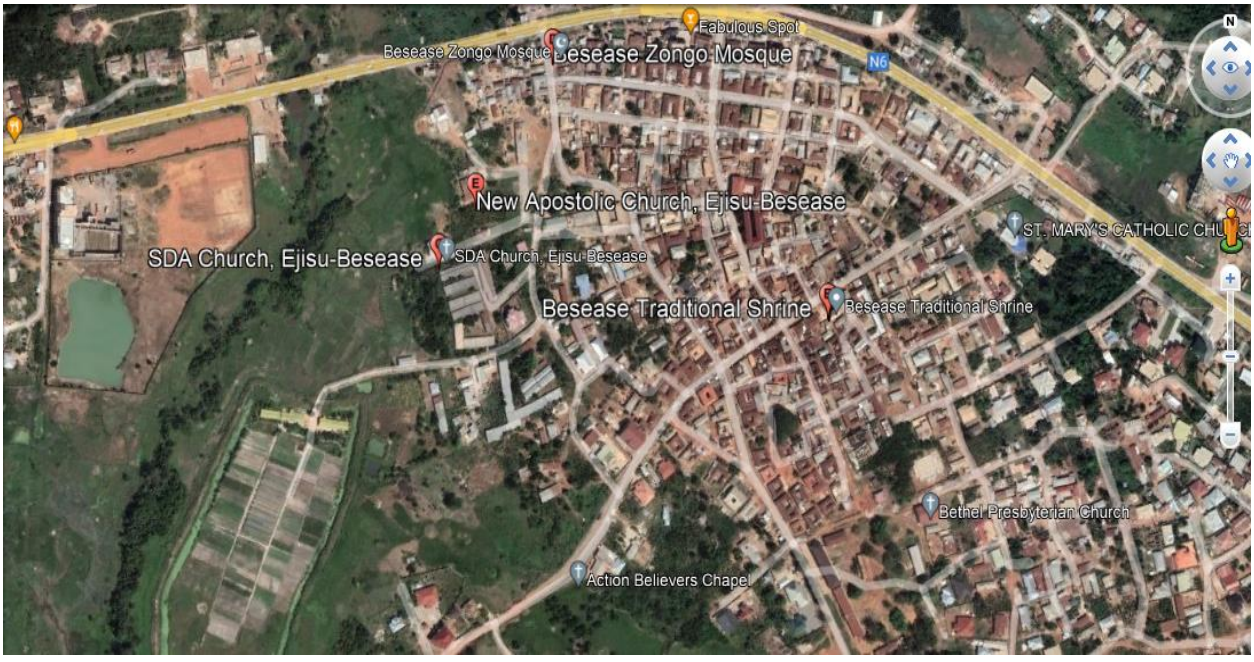

FIGURE 3 A DETAILED MAP OF EJISU BESEASE

3.2 Nature of the problem

As far as I can remember, the poor state of roads in the community has been a major challenge Ejisu Besease is facing as a community. Almost all the roads in the community are untarred. Assistance from the government has been seeked through our members of parliament but to no avail. The community members come together and decide to do something on their own but they stop half way through the work because their resources are not enough. These untarred roads are in bad conditions themselves and therefore become an eye saw the during rainy season. This causes potholes and gully erosions which makes the road difficult to access by both humans and vehicles

FIGURE 4 SHOWING THE STATE OF ROADS

FIGURE 5 SHOWING THE STATE OF ROAD

FIGURE 6 SHOWING THE ROAD CONDITIONS IN THE COMMUNITY

3.3 causes of poor roads

Poor road conditions can lead to more than a bumpy ride. Roads can deteriorate to the level where they become dangerous. this include potholes, uneven road surfaces, broken concrete and road cracks. Below are some of the causes of bad road conditions.

- **Inadequate drainage systems:** unfortunately, the number of drainage systems in the community is not something to write home about. Drainage system is an important component of road construction and they cannot be ignored. They are needed to minimize the effect of rainfall or water on the road. Water is one of the major causes of road deterioration especially on untarred roads. Rainfall whether heavy or light has an effect on the road we use. Unfortunately, most roads in Ejisu Besease are untarred ones with no drainage systems. which are easily affected by rainfall. Since the soil is also a laterite soil, when it rains and the water finds no access route (drainage systems) it remains on the land which washes away the top soil and the soil particles joining the rocks together. Continues exposure to this exposes the rocky part of the soil. This later causes gully erosion. Also, when it rains the water seeps deep into the soil which weakens the base layer of the land therefore any small pressure applied to it causes cracks in the soil

- **Loads of heavy-duty trucks:** Roads are constructed with the intention of making driving easy for both heavy and light vehicles. However heavy-duty trucks sometimes tend to cause damage to the roads. The roads in our community both tarred and untarred are subjected to heavy-duty trucks. Since the untarred roads in my community are already prone to erosion, the smallest pressure applied to it causes it to deteriorate more and since the base of the land has already been weakened by water, when these heavy-duty trucks like the; zoomlion trucks, trucks carry sand and others, uses the

road it causes it to damage more. These heavy-duty trucks also cause damage to our tarred roads. These heavy-duty trucks use the tarred road frequently and it has a high equivalent single axle load (ESALS) with high Esal and nothing done to the substructure oh the road, the road is prone to damage. Example of these damages are the existence of the potholes on the road. The heavy-duty trucks also affect the structural capacity of the road.

- **Poor construction of road:** Most of the roads constructed these days are not constructed well. This can be attributed to the improper measurement of ratio of materials, the use of inferior materials and greed on the side of the constructor and other reasons. This is the reason most of our roads do not last long and after a small period of time the road starts to deteriorate with any minimal loads applied to it.

3.4 Effects of poor roads on the community

In the course of daily our daily, roads are indispensable. Therefore, whether a road is in good or terrible shape has an impact on the community. Here are some few negative effects poor road conditions has on the community:

- **Air pollution:** As vehicles travel along these untarred roads, dust is produced, making it difficult for nearby residents to breathe. These folks will eventually experience health issues in the future as a result of this. Usage of these untarred roads accounts for significant amount of air pollution, causing serious pollution problems.

- **Destruction of vehicles:** Deterioration of vehicles is a result of continuous usage of these roads. This is due to the fact that potholes that hit the cars causes some of its part to be destroyed. Its effectiveness is decreased when these parts are repeatedly impacted by potholes. A study done in 2020 by the national Transportation Research Group explained that a large sum of money is required to fix damages cause to vehicles annually.

- **Loss of life:** One of the major effects of bad roads being common in our community is the occurrence of road accidents. In my community we have witnessed quite a number of these road accidents. These accidents mostly occur by drivers trying to avoid these potholes and gullies found on the road. These accidents caused whether severe or minor cause the life of people. According to World Health Organization (WHO) about 1.3 million persons are killed and additional 30 to 50 million are injured annually in road traffic accidents.

- **Slows down productivity:** A community with poor road infrastructure has its growth retarded. No entrepreneur will like to set up a business in a community with poor road infrastructure. As said earlier that my community can boost of a hotel and a well-known car dealership shop, bearly will they attract quest and customers because of our road conditions, this slows down productivity in the community, retarding community growth.

3.5 Civil engineering and its branches

Civil engineering is one of the oldest of the engineering fields. It provides mathematical knowledge in geometry, calculus and physical science. Civil engineers design and supervise the construction of infrastructure such as roads,

buildings, tunnels, airport, dams, bridges and water supply and sewage systems. Civil engineering is made up of several branches including; structural, water resources, environmental, construction, transportation and geotechnical engineering.

- **Structural engineering:** It is a type of civil engineering that deals with analyzing and designing of physical infrastructures like bridges, dams etc. a structural engineer ensures that structures built can safely bear and resist forces and load.

- **Construction engineering:** This civil engineering branch deals with the planning, constructing and maintenance of infrastructures. Construction engineers execute designs from all the other branches of civil engineering.

- **Transportation engineering:** Under this branch of engineering, the engineers design and implement structures the deals with transportation in order to provide a safe and convenient mode of transportation. There are six divisions under this branch: air transportation, highway, waterway, aerospace, coastal and ocean and urban transportation.

- **Geotechnical engineering:** This type of civil engineering deals with the investigation of the soil. The engineers at play here studies the behavior of the earth materials and how it affects the structure to be constructed on it.

- **Environmental engineering**: It deals with protecting the public from destructive environmental effects and also protecting the environments from the impact of human activities and climate change.

- **Water resource engineering**: It deals with the management and distribution of water essential to everyday life

- **Coastal engineering:** This branch of engineering is concern with the management and protection of the coastal areas from flooding erosion and other environmental factors.

- **Tunnel engineering:** Engineers in this field ensures the designing, planning and constructing of safe tunnels. They also ensure the maintenance of these tunnels after they have been constructed.

- **Surveying:** it deals with the examining of lands. Engineers under this field uses different instruments and equipment such as inclinometers and drones to map.

- **Earthquake engineering**: It involves planning and designing structures that can withstand any earthquake situation.

3.6 How civil engineering can be used to solve the problem

- **Construction of drainage systems:** A well-constructed road still requires a drainage system to be kept in good shape. Any road whether tarred or untarred will readily concentrate runoff. So, there is a need to construct road to allow frequent and safe discharge of water. The absence of drainage systems on both tarred and untarred roads leads to erosion and further deterioration of the road. This problem can be solved with the proper construction of drainage systems along both sides of the road. With the presence of these drainage systems water does not stay on the road after downpour but rather flows through these drainage systems. This reduces the rate at which the binding agents of the asphalts weakens and also cracks generating.

- **Maintenance of road:** Road maintenance is one way of ensuring that our roads stays in good condition for a longer period of time. These large potholes on our roads started as smaller ones but due to our poor maintenance culture, they have now turned into larger ones causing us harm.

- **Construction of roads with the right materials:** Roads constitute a great factor in our lives. With this, they must be constructed well with the right materials and proportion so that they can be well maintained. The construction of roads is so much important that during its construction the structure and the composition must be taken into consideration. The work of a transportation engineer is required to design, plan and construct a road to ensure safe transportation of people, goods and services. Every procedure taken to construct roads is important and must be treated as such

Construction steps

- **Planning:** This is where the transportation engineer takes a look at the current and future state of the road and studies it.

- **Setting out:** once the details of the construction project is ready the transportation engineer starts transferring them to the ground.

- **Earthwork:** before any construction works begins, the area on which the road is to be constructed is cleared of any vegetation and unwanted materials. If the existing area is not suitable for the road construction, other materials are mixed with it.

- **Subbase and base course:** The most important step in road construction is the preparation of its subbase. This is why it is important that the materials used for this layer is of high quality.

- **Surface course:** This is done when the subbase and course have been graded and the drainage systems has been constructed. It can either be rigid or flexible.

- **Road marking:** The construction of roads is not done once the asphalt layer is applied. Road markings are done using thermoplastic paints.

After all these being done the engineer checks whether the road is good for use.

FIGURE 7 SHOWING PICTURES OF ROAD CONSTRUCTION

FIGURE 8 SHOWING A PICTURE OF ROAD CONSTION AND ITS MARKING

4.RECOMMENDATIONS AND CONCLUSION

4.1 conclusion

Poor road conditions were found to be the main problematic issue in Ejisu Besease after intensive studying and evaluation, some of the causes included the use of improper and less inferior materials for road construction, poor drainage systems and the untarred nature of the roads itself.

This has led to the damage of vehicles, loss of lives and properties and caused respiratory disease to others.

Constructing of roads with drainage systems will come a long with providing solution to this problem.

4.2 Recommendations

Government together with the community members should raise funds towards the construction of roads. This can be done by individuals and organization donating any amount of money or any other material that could aid in the constructing of our roads. Also, the community members after this will have to make it their responsibility to maintain the road so that it can last long

5.REFERRENCES

- http://www.thecivileng.com/Branches.php

- Branches of civil engineering; http://www.thecivilengg.com/Branches.php
- Construction steps; hhttp://www.designingbuildings.co.uk
- Pictures of road construction; hhttp://www.designingbuildings.co.uk
- Hhttp://www.asrjetsjournal.org
- Hhttp://www.roadman.tech
- Google map

- Google earth

6. APPENDICES

6.1 Questionnaire

1. Gender

a. Male b. Female

2. What age range do you fall into?

a.12-19 b. 20-30 c. 31-50 d. 50 upwards

3. Do you live in Ejisu Besease?

a. Yes b. No

4. How long have you lived in Ejisu Besease?

a. Weeks b. Months c. Years

5. What is your occupation?

a. worker b. Student c. others

6. what is the major problem causing hinderance to community development?

a. waste management b. poor road conditions c. inadequate water drainage systems

7. Has the community members shown any concern about these problems?

a. yes b. no

8. what do you think can be done to help solve the problem?

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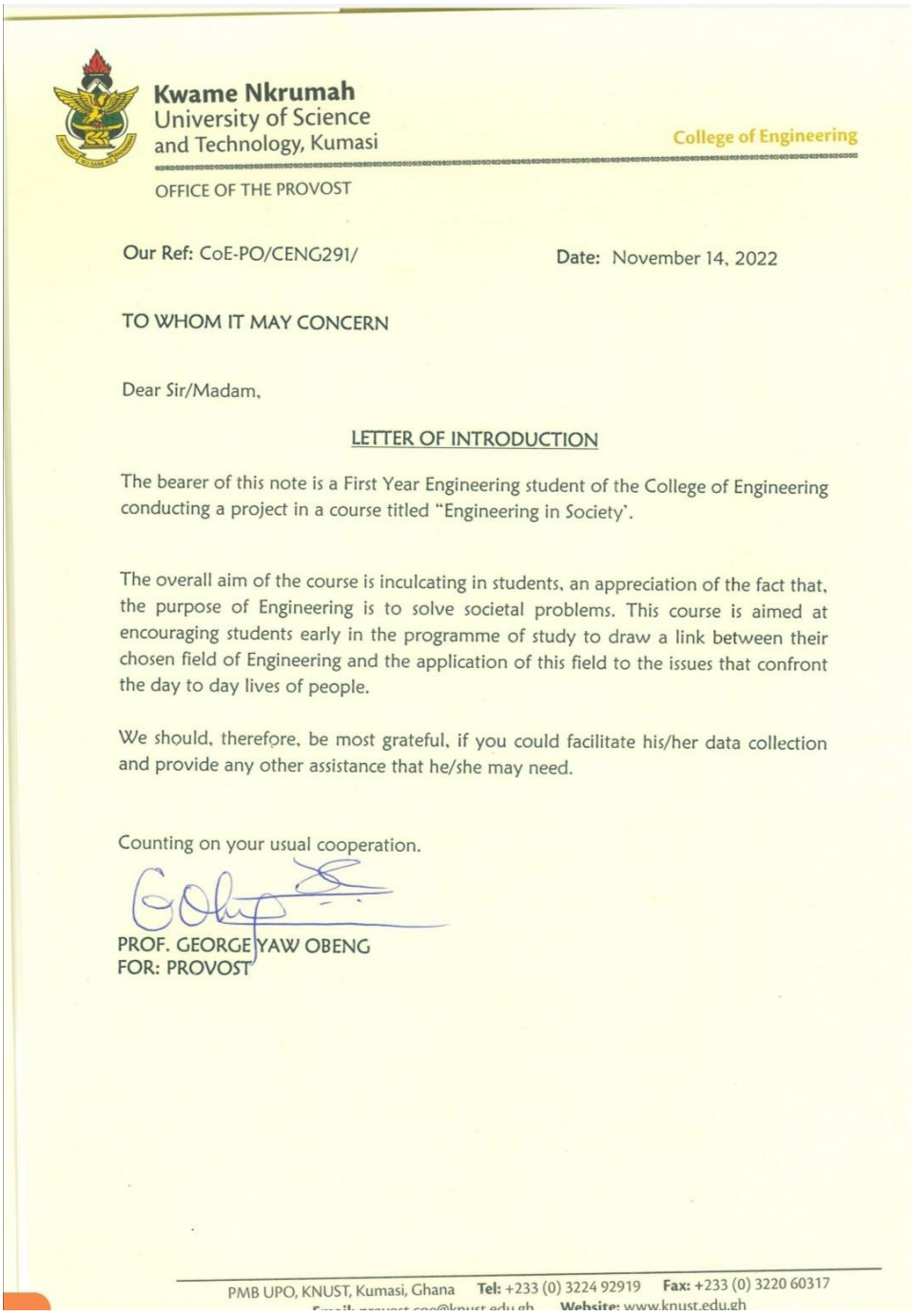

Kwame Nkrumah
University of Science
and Technology, Kumasi

College of Engineering

OFFICE OF THE PROVOST

Our Ref: CoE-PO/CENG291/ **Date:** November 14, 2022

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

LETTER OF INTRODUCTION

The bearer of this note is a First Year Engineering student of the College of Engineering conducting a project in a course titled "Engineering in Society'.

The overall aim of the course is inculcating in students, an appreciation of the fact that, the purpose of Engineering is to solve societal problems. This course is aimed at encouraging students early in the programme of study to draw a link between their chosen field of Engineering and the application of this field to the issues that confront the day to day lives of people.

We should, therefore, be most grateful, if you could facilitate his/her data collection and provide any other assistance that he/she may need.

Counting on your usual cooperation.

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FIGURE 9 LETTER OF INTRODUCTIONS