The University of Zambia

Center for Information and Communication Technology

TECHNICAL & FINANCIAL PROPOSAL DOCUMENT

FOR

A Student Records Management Information System

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Understanding of the Requirements

Our understanding of the objectives of the assignment is as outlined in the Terms of Reference (TORs). The Zambian Open University (ZAOU) has embarked on an exercise to replace the Student Record Management System (SRMS). ZAOU is requesting the University of Zambia Centre for Information and Communication Technologies (CICT) for a technical and financial proposal for developing a Student Records Management Information System (SRMIS) for ZAOU The main tasks of the SRMIS include the following;

#	Main Function	Sub Function Level 1	Sub Function Level 2
1	**Administration**	↓ Admin users should be able to add and remove users from the System. ↓ Admin users should be able to assign and define system user roles. ↓ Define system configuration ↓ Configuration of system parameters ↓ Carry out non- routine system administration tasks	
2	**Course Management**	↓ Admin Users should be able to add Programmes and courses to the System.	↓ Admin Should be able to remove or archive courses not in use.
3	**Admission**	↓ Allow setup for minimum requirements for applicants. ↓ Allow admissions for current and years ahead. ↓ Allow admins to configure admission criteria for undergraduate and Postgraduate.	↓ The system should be able to allow users to run reports on admitted students per school and unsuccessful students per School. ↓ Auto-generation of Acceptance letter.
4	**Registration**	↓ Allow for auto- generation of student numbers. ↓ Users should be able to get a class list per course. ↓ Users Should be able to produce Confirmation of Registration slip ↓ Allow registration per semester ↓ Users should be able to produce Custom reports regarding registered students per semester per program.	↓ - Withdraw student from studies according to the permission given
5	**Examination**	↓ Should allow admin users to Lock and unlock the entering of results ↓ Allow lecturers to enter grades ↓ Allow for exam registration ↓ Exam registration report	↓ Allow for Student Transcript ↓ Auto-generation of degree classification ↓ Automated end comments ↓ Exam reports

			↓ Auto publication of Results per semester ↓ Should allow users to print results slip for ↓ Students.
6	**Student Finance**	↓ Fee set up ↓ Billing of students ↓ Student statement ↓ View daily Bank Transactions ↓ Auto-generation of Receipts and invoices ↓ Cask Book ↓ Import student payment data in CSV ↓ Integration with ↓ Pastel	
7	**Student Portal**	↓ The student Portal should allow students to login and Register for courses online. ↓ Check Examination results ↓ Check account ↓ balances	
8	**Dashboard**	↓ Overview of summary management information on enrolment, registration and School or departmental performance	
9	**Management & General Reports**	↓ Admission Reports ↓ Registration Reports ↓ Examination Reports ↓ Finance Report ↓ Class Registers ↓ School Reports	
10	**Utility and Audit Trail**	↓ Allow users to Change Passwords ↓ The system should provide information on everyone accessing the system and what they are doing including the IP addresses of the ↓ Machine being used Data on all modules accessed, exam record monitoring.	

The system will have a **dashboard** that will comprise an Overview of summary management information on enrolment, registration and School or departmental performance. The **Administration Module** is a critical component of the SRMIS, which will include:

- Admin users should be able to add and remove users from the System.
- Admin users should be able to assign and define system user roles.
- Define system configuration
- Configuration of system parameters
- Carry out non- routine system administration tasks

The system to be developed will be able to accommodate **Admissions Management** module, which will include managing the entire admissions process, from application to acceptance and to tuition payment.

The SRMIS will also in include Registration and Scheduling functionalities including operations such Course registration and scheduling, online registration, and Students online registration for each academic year. Students will be able to sign up via the online application. Under the **Students Finance module, Billing and Payment functionalities** will be included. This will accommodate:

- Providing student billing functionality through the application as well as allowing them to pay their bills via the SRMIS
- The SRMIS will be integrated to the bank system for easy records of paid-up students, management and accounting systems.
- The system will be able to accommodate
- Be able to Fee set up
- Billing of students
- Student statement
- View daily Bank Transactions
- Auto-generation of Receipts and invoices
- Cask Book
- Import student payment data in CSV
- Integration with Pastel

Student Portal

Students will be able to access the portal to track their own performance and grades thereof. The portal should also act as an open channel of communication; which students can use to communicate with their lecturers.

- The student portal will include functionalities such as student's login and Registration for courses online.
- Check Examination results
- Check account balances

In summary, the Students portal will be able to produce; Admission Reports, Registration Reports, Examination Reports, Finance Report, Class Registers, School Reports

Management & General Reports

The management and General reports will be able to generate many types of reports such as Transcripts.

- Admission Reports
- Registration Reports
- Examination Reports
- Finance Report
- Class Registers
- School Reports

This module will therefore be able to Computation of Grade Point Average (GPA), Generate results reporting sheets, Generate, populate transcripts, and manage all grade related activities.

The other unique feature to the SRMIS system will be the general Student Information Management, which will include features that will allow:

a. Lecturers and Administrators manage all student related information

Integration with other Systems

b. Moodle
c. Pastel
d. Banks

Reporting

e. Report functionality, which allows users to manipulate the information, housed in the solution and generates reports.

All the above-mentioned will be incorporated into the main modules as indicated in the Terms of Reference.

Proposed Deliverables

We are proposing to produce the following tangible deliverables from this assignment based on the scope of work, our understanding of the TORs, and our experience in the development of software systems for business process support. These deliverables will fulfil and even exceed the terms of reference.

Description of Approach

Deliverable No.1	**AN INCEPTION REPORT DETAILING THE WORK PLAN OF THE CONSULTANCY**
This report will outline the key areas to be addressed during the consultancy and will: ☐ Include a detailed work plan including tasks, assignments, and timetable for completion and critical support requirements from the client.	
Approach to producing Deliverable No. 1	We will use two (2) methods to prepare for this output: 1) inception workshop; and 2) team leader preparation of the Report.

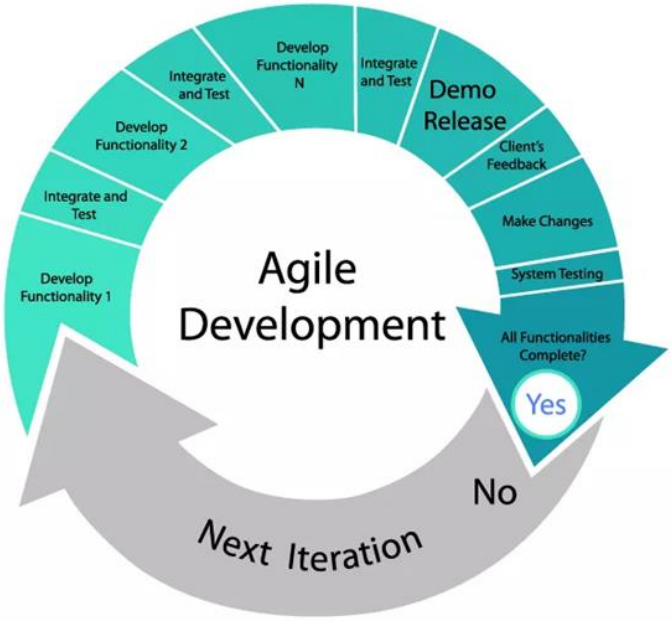
Deliverable No.2	STUDENT'S RECORD MANAGEMENT INFORMATION SYSTEM SPECIFICATION (SRMIS) DOCUMENT

This document will:
- Include an outline of the assumptions and dependencies for the System
- Include an outline of the following System features and requirements:
  - Functional Requirements
  - Nonfunctional Requirements
  - External Interface Requirements (i.e. third party interfacing)
    - System Features	

Approach to producing Deliverable No. 2	The client has provided high level requirements for the consultant to understand what the client wants. To develop good, effective and efficient system there is a need to understand what exactly the client needs by collecting sufficient data from the client and other stakeholders. Therefore, to collect requirements the consultant will use questionnaires, interviews, observation and record inspection. In addition, literature review will be used to obtain secondary data from similar systems which have been implemented in other parts of the world. ***a. Questionnaires*** Questionnaires as fact finding instruments will be developed and administered to stakeholders that will be of interest to the system in order to get information regarding the system currently in use and how the proposed system can be developed to overcome the challenges of the system. ***b. Interviews*** Interviews will be conducted with stakeholders as a form of validating the data which will be collected through questionnaires. The interview script will be developed, validated and administered. ***c. Observations*** This method of data collection will involve visiting stakeholders to appreciate what is involved in the running of the current system. This will also enable the consultant to understand the business rules and process flow better. ***d. Report Inspection*** This method will involve examining and analyzing output documents produced by the current system if any. This activity will help the consultant to understand the business processes of the current system. - After the data has been collected using the four stated methods, the consultant will analyze it in order to determine the requirements.

Deliverable No.3	DESIGN SPECIFICATION DOCUMENT
This document will specify and model how the system will implement the requirements in the **SRMIS** document of deliverable 2. It will include: *Activity diagrams* to describe the flow of different activities and actions in the system. *Use case Diagrams* to model how the system will interact with the end users. *Deployment diagrams* to visualize the relation between the System subsystem modules and hardware. Database design diagrams which will include among other ER diagrams and Data Dictionaries. All other relevant design documents to be outlined in the Inception report	
Approach to producing Deliverable No. 3	The design of the System will be guided by the detailed software requirements specification document. The design document will follow the unified Modelling Language (UML) principles to software design in coming up with Use cases, scenario diagrams, and database design and sequence diagrams, ER diagrams among others.

Deliverable No.4	System Subsystem
This deliverable is the actual solution to meet the needs of the client. It will include the following subsystems among others: - Administration - Course Management - Admission - Registration - Examinations - Student Finance - Student Portal - Dashboard - Management and General Reports - Utility and Audit Trail	

Approach to producing Deliverable **No. 4**	We will use the following methods to prepare this output: ***(1) System development process*** This activity is undertaken using different approaches among the notable ones being prototyping and Agile. In the case of this consultancy, we propose to use a combination of prototyping and Agile Software development methodology (Fig 1) due to the need to integrate third party systems and the need to stay in constant contact with the client so as to accommodate any changes in client requirements. Agile methodology is a type of project management process, mainly used for software development, where demands and solutions evolve through the collaborative effort of self-organizing and cross-functional teams and the customers. It emphasizes collaboration, flexibility, continuous improvement, and high quality results. It aims to be clear and measurable in tracking progress and creating the product. Using the proposed development processes, the consultant is confident of delivering the project on time.  ***(1) Deployment Technologies*** To implement the modules for the System, we propose to develop and deploy, among others: - The admin dashboard, end users/clients and SMS/email notifications will be developed using PHP by using any rapid prototyping frameworks such as Yii, Laravel, and CakePHP and so on. - The backend database will be MySQL as it is open source, secure and cheap hence will not require **ZAOU** University to pay any recurring subscription fees.

- The development team will use software development tools such as GitHub, Trello and so on for collaborative work and management of assigned tasks.

(2) *System deployment and configuration*

- The Server will be virtualized to cut on required hardware costs of purchasing three standalone servers. The system application deployment server will be virtualized with each application deployed in its own virtual machine and system software installed when need arises. The database will also be installed on its own server, which will also be virtualized. After the system is developed and all integrations are done, the system will be deployed at the client's premises or proposed client system deployment centre.
- Data migration of the current system records into the newly developed system. This will require access to the current records
- Backup is needed as a failover system in case of any failure and as a data-archiving server.

(3) System Testing

System testing will be important, as it will help reveal flaws in the software and reveal any flaws in the proposed software development process thereby enabling us to develop an effective and efficient system. Hence, we will use a staged system testing approach to test the proposed system.

Development testing: Rigorous testing will be done at the development stage by the development team, majority of the tests being Unit tests to fix bugs. Developer testing is necessary in order to reduce on bugs that:

a. May arise during actual testing hence reducing the amount of time required to do tests and the amount of time required to deliver the project.

b. **Integration testing (System Integration Tests SITs):** This will also be done by developers to make sure that the system units are properly integrated and the system as a whole is properly integrated with third party systems such as web hosting systems.

c. **System Testing:** Testing the system as a whole. This will be done by appointed consultant testers. The testing will involve among other tests;
   - Usability testing: Make sure the system is easy to operate and understand.
   - Documentation testing: Make sure that the system guides explain the features as they will work in real life.
   - Functionality testing: Make sure everything behaves as expected and described in the documentation.

	- Interoperability testing: Make sure the system works well with third party systems (different OS, browser, plugins, etc.)? - Performance testing: Make sure that the system does not break itself by trying to use too many resources. - Scalability testing: Make sure the system is not affected by user count, user location, or server load. - Stress testing: Understanding the maximum strain the system can take before it breaks d. **User acceptance testing (UATs):** This will involve client and consultant appointed testers that will make sure that the system is able to do as the consultant claims it can do. This stage will be cardinal because the client and the consultant will work together to ensure that the consultant delivers a product the contracting authority needs. e. **Post Deployment Testing:** This will involve redoing some of the tests that were done just to make sure the system behaves accordingly.

Deliverable No.5	**USER TRAINING**
The deliverable will be the training of users who are the ultimate users of the system. Training will include: - Understanding would be system users by performing a needs analysis to understand the technical competences. - Perform a Comprehensive Hands on training for all expected users based on user categories. - Training of trainers which will involve training users that will act as trainers especially to the System - Get End user feedback after the training.	
Approach to producing Deliverable No. 5	The following methods will be used to prepare this output: - **Questionnaires and observations** on the use of a computer and software at the client's site by would be system users will be used to understand how comfortable the stakeholders are when interacting with System - **Daily (and upon client request) training workshops** will be held at the client site (proposed client site) for a defined period where users will be trained on the use of the developed system using developed training guides and hands on training on a demonstration platform.

	- **Training of trainers will be done at the client site** (or proposed site) as well which will involve training users that will act as end users of the system - **Questionnaires** will be used to get an understanding of how comfortable the users are in using the system after training.

Deliverable No.6	**USER MANUALS**
The deliverable will be comprehensive user manuals module by module	
Approach to producing Deliverable No. 6	We will use software user manual generation techniques and user manual creation software to create simple but comprehensive manuals.

Deliverable No.7	**SYSTEM DOCUMENTATION**
The deliverable will be comprehensive documentation for the entire system which will make it easy for the clients support team to support the system after handover. This will include: - Module by module documentation - System troubleshooting steps documentation - System configuration documentation	
Approach to producing Deliverable No. 7	We will use the appropriate documentation tools to write comprehensive documentation. This will be done throughout the project duration by the developers responsible for a particular module.

Work plan

- Based on the work plan schedule the first activity to be undertaken will be contract signing and this will be followed by the Requirements Analysis. These two activities will be done in the first one week.
- The second activity will involve System Requirements Gathering, which should be complete in the first week (same week on the schedule as contract signing) depending on the amount of requirements. The deliverables at this stage will be a detailed system specifications document.
- The Software Custom Design will follow requirement gathering. This activity will also be complete in the first week, in which a system design document will be written.
- Next to Design is the Customized Development, which is estimated to last for three weeks. At this stage proposed system submodules will be developed. Then Software testing will follow. Customized deployment and configuration, which will involve procurement of system servers by client and configuration then deployment of developed software, will follow. After deployment post production sign testing and sign off will take place.
- The next activity after development will be Deployment, which is expected to take approximately one week.
- The next activity will be User Training, which is expected to last for three weeks as well, and will be developed concurrently, as the training is underway.
- Software documentation and Project Management will run throughout the duration of the project. After all the activities are done and client is satisfied, the Software will be handed over to the client giving the client at least the agreed support duration which should involve system monitoring and troubleshooting. Depending on how quick the contract is signed, the project is estimated to take 8 weeks (2 month) to complete, as some of the activities will only take weeks to complete as opposed to several weeks as indicated on the work schedule. The proposed work plan is flexible to changes in terms of timelines based on what the client wants.

N°	Deliverables [1] (D..)	WEEKS								
		1	2	3	4	5	6	7	8	TOTAL
D1	Requirements Analysis									1

D2	Software Requirement Specification document(SRS)									1
D3	Custom Design Specification Document									1
D4	Customized Development									3
D5	Deployment									3
D6	User Training									1
D7	Software Documentation									
Total										

CONSULTANCY EXPERIENCE BY PROJECTS OF SIMILAR MAGNITUDE

The following table is a summary of previous work that the Unit has carried out for other organization:

Experience in similar conditions

1.	**Number of contract: 1**	
	Name of contract: Development of the disability management information system	
	Country: Zambia	
2.	Name of Procuring Entity: ZAPD/ILO	
3.	Procuring Entity address:	
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: It was dealing with system integrations, had card reader and card printers integration and was to be deployed in all provinces	
5.	Contract role (check one) ☐ Prime Supplier	

6.	Amount of the total contract/subcontract/partner share (in specified currencies at completion, or at date of award for current contracts) ZMW 459,206.13
7.	Equivalent amount US$ Total contract: $ 41,746.01
8.	Date of award/completion: 7th August 2018
9.	Contract was completed one months ahead of original schedule (if behind, provide explanation).
10.	Contract was completed US$ 41,746.01 equivalent original contract amount (if over, provide explanation).
11.	Special contractual/technical requirements.
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such Information System.

1.	**Number of contract: 2**	
	Name of contract: A System Augmenting Agricultural Activities in Marginalized Rural Areas of South Africa and Zambia by using Cloud Computing and Sensor Networks.	
	Country: South Africa and Zambia	
2.	Name of Procuring Entity: Join funding from the National Science and Technology Council (NSTC) Zambia and National Research Foundation (NRF) South Africa	
3.	Procuring Entity address: Haile Sellasie Avenue, Curriculum Development Centre Building, Longacres Lusaka	
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: The system included components of registrations which is needed in the systems	
5.	Contract role (check one) ☐ Prime Supplier	
6.	Amount of the total contract/subcontract/partner share (in specified currencies at completion, or at date of award for current contracts) ZMW 140,000.00 from Zambia **Plus** ZAR300,000 from the South African Government	
7.	Equivalent amount US$ Total contract: $ 25,000	
8.	Date of award/completion: January 2015	
9.	Contract was completed one month ahead of original schedule (if behind, provide explanation).	

10.	Contract was completed US$ 10,000 equivalent original contract amount (if over, provide explanation).
11.	Special contractual/technical requirements.
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such Information System.

1.	Number of contract: 3	
	Name of contract: SARIMA Researcher Database.	
	Country: Zambia	
2.	Name of Procuring Entity: Southern African Development Community (SADC).	
3.	Procuring Entity address: SADC House Plot No. 54385 Central Business District Gaborone Botswana	
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: System had information management components and good reporting components which are relevant to this project	
5.	Contract role (check one) ☐ Prime Supplier	
6.	Amount of the total contract/subcontract/partner share (in specified currencies at completion, or at date of award for current contracts) ZMW 83,000.00	
7.	Equivalent amount US$ Total contract: $ 6,000	
8.	Date of award/completion: February 2016	
9.	Contract was completed one month ahead of original schedule (if behind, provide explanation).	
10.	Contract was completed US$ 6,000 equivalent original contract amount (if over, provide explanation).	
11.	Special contractual/technical requirements.	
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such Information System.	

1.	**Number of contract: 4**	
	Name of contract: Contract for the review, Design, Development and maintenance of the Rural Electrification Project Information Database(REPID)	

	Country: Zambia
2.	Name of Procuring Entity: Rural Electrification Authority
3.	Procuring Entity address: Plot no. 5033 Longolongo Road, Lusaka
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: Had system integration components such as integrations with accounting systems, nationwide deployment.
5.	Contract role (check one) ☐ Prime Supplier
6.	Amount of the total contract/subcontract/partner share (in specified currencies at completion, or at date of award for current contracts) ZMW 90,000.00
7.	Equivalent amount US$ Total contract: $ 8181.82
8.	Date of award/completion: 25th September 2014
9.	Contract was completed one month ahead of original schedule (if behind, provide explanation).
10.	Contract was completed US$ 8181.82 equivalent original contract amount (if over, provide explanation).
11.	Special contractual/technical requirements.
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such Information System.

1.	**Number of contract: 5**	
	Name of contract: Clinic Management System	
	Country: Zambia	
2.	Name of Procuring Entity: University of Zambia Medical Services department(Clinic)	
3.	Procuring Entity address: UNZA Great East Road Campus	
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: The system was made of several submodules which needed to be integrated	
5.	Contract role (check one) ☐ Prime Supplier	

6.	Amount of the total contract/subcontract/partner share (in specified currencies at completion, or at date of award for current contracts) ZMW 300,000.00
7.	Equivalent amount US$ Total contract: $ 23,000.00
8.	Date of award/completion: January 2014
9.	Contract was completed within the original schedule (if behind, provide explanation).
10.	Contract was completed US$ 23,000.00 equivalent original contract amount (if over, provide explanation).
11.	Special contractual/technical requirements.
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such Information System.

1.	**Number of contract: 6**	
	Name of contract: Bus Terminus and Market Management System (BTMMS)	
	Country: Zambia	
2.	Name of Procuring Entity: National Pension Scheme Authority (NAPSA)	
3.	Procuring Entity address: Lusaka	
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: The system was made of several submodules which needed to be integrated	
5.	Contract role (check one) ☐ Prime Supplier	

1.	**Number of contract: 7**	
	Name of contract: Development of Seasonal Rainfall Forecasting Using Artificial Intelligence Project	
	Country: Zambia	
2.	Name of Procuring Entity:	
3.	Procuring Entity address: Lusaka	
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: The system was made of several submodules which needed to be integrated	

5.	Contract role (check one) ☐ Prime Supplier

1.	**Number of contract: 8**	
	Name of contract: Registry of Environmental Information (REI) Project	
	Country: Zambia	
2.	Name of Procuring Entity:	
3.	Procuring Entity address: Lusaka	
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: The system was made of several submodules which needed to be integrated	
5.	Contract role (check one) ☐ Prime Supplier	

1.	**Number of contract: 9**	
	Name of contract: Development of a WebEnabled MIS to Support Implementation of the ESAPP Project	
	Country: Zambia	
2.	Name of Procuring Entity: Ministry of Agriculture and IFAD	
3.	Procuring Entity address: Lusaka	
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: The system was made of several submodules which needed to be integrated	
5.	Contract role (check one) ☐ Prime Supplier	

1.	**Number of contract: 10**	
	Name of contract: Integrated Management Information System Project	
	Country: Zambia	
2.	Name of Procuring Entity: The Higher Education Authority (HEA)	
3.	Procuring Entity address: Lusaka	
4.	Nature of Information Systems and special features relevant to the contract for which the Bidding Documents are issued: The system was made of several submodules which needed to be integrated	
5.	Contract role (check one) ☐ Prime Supplier	

FINANCIAL PROPOSAL

Financial proposal is broken down into parts; price and mode of payment as follows:

Price and Other Costs

The Student Record Management Information System (SRMIS) is an already existing system, which is fully tested and functional. The system was developed for the University of Zambia but can easily be customized to meet the needs of other learning Institutions. Because of this, the pricing model we are proposing is that of an outright purchase with customization and support.

This means Zambia Open University will pay one off amount to purchase the whole system including source code. Additionally, ZAOU will pay for customization, integration and training of users. The following table is a summary break down of cost:

Cost Summary Table

Component No.	Component Description	Price (ZMW)
1	System Purchase	350,000.00
2	Customization	100,000.00
3	Training and operational cost	50,000.00
5	Support for 6 Months	0.00

Subtotals		**500,000.00**
Total Professional fees		**500,000.00**

Mode of Payment

The proposed mode of payment is staggered in three installments as follows:

Item No	Description	ZMW
1	After Inception Report is submitted to client	**250,000.00**
2	Second Payment, after completion of System Deployment	**100,000.00**
3	Third Payment, after completion of User Training and Handing over of Manuals	**150,000.00**
	Total	**500,000.00**