A BLUEPRINT FOR TUA-ICTU MODERNIZATION - THREE (3) YEAR PLAN

With organizations and society becoming more and more dependent on technology, there comes a great need to establish an information and communications technology master plan. Our institution, Trinity University of Asia, need to recognize the role of ict in catapulting itself as one of the top university in the asian region. In today's society, ict is no longer just an extra cog in an organization but it is now a very vital cog that needs to be enhanced continuously. Building technology and investing in it must be in the very top of the priorities of every highly aspiring organization. Information and communications technology already evolves from a business enabler to a global game changer. With technology as the game changer, every organization aspiring to stay competitive with industry leaders, stay abreast with its best contemporaries, and remain connected to the society it serves is compelled to go the high road of premium ict services. As H.G Wells said: "*Adapt or perish, now as ever, is nature's inexorable imperative*". This adage is older than the ENIAC, the first computer in 1943, but is the very apt characterization of what is ict all about.

To prepare us to an ict driven future, the following items are included in the proposed blueprint of TUA's future ready information and communications technology:

- System policies and processes upgrades based on ITIL framework
- ICTU Organizational Re-engineering
- Design and development of future proof information systems and content systems
- Modernizing TUA's network infrastructure and Internet speed
- Modernizing TUA's hardware infrastructure
- Implementation of cloud based communication and collaborative tools
- Creation of service opportunity by establishing an IT consulting unit for educational institutions and establishing a training center that will provide advanced IT related topics to professionals and aspiring students
- Installation of a disaster recovery plan (DRP)

The eight (8) items above are considered crucial, critical, and highly important for ICT to help TUA fullfill its vision in becoming one of the top universities in Asia.

SYSTEM POLICIES AND PROCESSES UPGRADES BASED ON ITIL FRAMEWORK

It is not the intention of this paper to replace ISO 9001:2008 for ICT's quality management framework since it is already a tried, tested, and proven system for TUA. In fact ICTU has already revised its quality objectives and proposed it for approval and adoption. See appendix A: Expanded ICTU Quality objectives.

Although another ISO system which is ISO/IEC 20000 is better fitted for ICT processes, ICT will not force itself to adapt to this system. Instead, it will introduce a much more appropriate framework and still adhere to the current quality management system.

ITIL or Information Technology Infrastructure Library is a set of detailed practices for IT service management (ITSM) that focuses on aligning IT services with the needs of the business. ITIL is the framework for the IT service industry.

For TUA-ICT to become future ready, it must adapt the ITIL framework, at least TUA-ICT must adhere to the important ITIL concepts and best practices applicable to TUA as follows:

- The **service life cycle** which consists of:
    - Service Strategy
    - Service Design
    - Service Transition
    - Service Operation
    - Continual Service Improvement

- Embracing the true concept of **service** in ICT environment which is: Service is a means of delivering value to customers by facilitating outcomes the customers want to achieve without the ownership of specific costs and risks.
- Knowing the best definitions of **resources** and **capabilities** in IT service management environment
- The reason why IT exist which is to provide value. And the definition of **value** itself is then composed of **utility** and **warranty**.
- The **4P's** of service design where are people, process, products, and partners
- The **key IT service management roles** which are the internal service providers, shared services, and the external service provider. And various roles such as the two types of customers which are internal customers and external customers; and the roles of user, supplies, and multiple stakeholders.
- The value of **governance** wherein having decision criteria, having levels of decisions. Making sure that we understand organizational decision rights and thresholds and accountability of those decisions. And understanding who can make decisions under what circumstances and so on as part of an overall governance, enterprise governance model. So there's three types that we have. We have what's called enterprise governance, we have corporate governance, and we have IT governance.
- Have a clear definition of **process** which is a set of structured activities designed to accomplish a specific objective. It is what the organization does in terms of those activities. Process is defined the organization as well as products and services.
- The roles of **tools** and **automation** in processes.
- The role of function in the ITIL environment. Wherein a **function** is defined as a unit of organization designed to specific type of work.
- The **four essential roles** in an ITIL environment: Process owner, process manager, process practitioner, and the service owner.
- The authority matrix of the **RACI model**: Responsible, Accountable, Consulted, Informed.
- Key concepts such as risk management, business case, communication, service portfolio, pipeline, catalog, prioritization
- The **five aspects of service design** which are the following: Service solutions for new/changed services, Management information systems and tools, Technology and management architectures, Processes required, Measurement methods and metrics.
- The importance of **knowledge management**
- The **PDCA model**. Plan, Do, Check, Act model.
- The **phases and processes of service strategy** which are: service portfolio management, financial management, business relation management.
- The **phases and processes of service design** which are: service design coordination, service catalog, service level management, availability management, capacity management, it service continuity management, security management, supplier management.
- The **phases and processes of service transition** which are: transition planning and support, service asset and configuration management, definitive media library, change management, change models, change advisory board and emergency change advisory

board, release and deployment management, knowledge management, service knowledge management system.

- The **phases and processes of service operation** which are: event management, incident management, problem management, request fulfillment, access management.
- The **phases and processes of continual service improvement** which are; the seven step improvement process:
    - Identify the strategy for improvement
    - Define what you will measure
    - Gather the data
    - Process the data
    - Analyze the information/data
    - Present/use the information
    - Implement improvement
- The service management functions which are the:
    - **Service Desk**: This is the single point of contact between the users and our IT service provider, around operational types of issues.Funnel calls so that IT can manage requests, manage incidents in an organized fashion and in an efficient manner. Therefore the primary aim here of this service desk is to restore normal service to the users as quickly as possible. So, it could mean basically incident service requests and so on.
    - **Technical management**: Includes mainframe, servers, networks, storage, database directory services. The infrastructure type of resources. Technical management are the keeper of the technical knowledge and skills.
    - **IT operations management:** IT operations management essentially has two big pieces. One is called IT operations control and one is called facilities management.
    - **Application management:** Application Management's responsible for managing applications throughout their life cycle, as a function, and the activities necessary for managing these apps can be performed a lot of different technical groups, so, they're the keeper of the technical knowledge and the expertise related to those applications that are used for the business.

The summary of ITIL framework as discussed above will guide the ICT to create the appropriate processes, policies, and compliant ITIL concepts. Since ICT's direction is towards ITIL compliance, the following activities are laid out to get there:

		Month1		Month2				Month3				Month4			
Activities	Status	week 3	week 4	week 1	week 2	week 3	week 4	week 1	week 2	week 3	week 4	week 1	week 2	week 3	week 4
Policy Creation															
Internet Usage Policy and Process	For Approval														
Email Usage Policy and Process	For Approval														
Research and Instructional Equipment Usage Policy and Process	For Creation														

Telephone Usage Policy and Process	For Creation														
G Suite Usage Policy and Process	For Creation														
Network and Security Policy and Process	For Creation														
Service Desk Policy and Process	For Creation														
Digital Media Usage Policy and Process	For Creation														
Production Support Policy and Process	For Creation														
Content Management Policy and Process	For Creation														
Data Privacy Policy and Process	For Creation														
Application Account Management Policy and Process	For Creation														
TUAPORTAL guidelines and Process	For Creation														
Content Standardizatio n Policy and Process	For Creation														
Database Management Policy and Process	For Creation														
Incident Management / Service Desk															
Incident Record definition	For Creation														
Incident Prioritization guideline	For Creation														
Initial Analysis of an Incident guideline	For Creation														

Incident Escalation guideline	For Creation														
Closure of an Incident guideline	For Creation														
Incident Report guideline	For Creation														
Problem Management															
Problem Record definition	For Creation														
Problem Priority guidelibe	For Creation														
Closure of a Problem guideline	For Creation														
Problem Report guideline	For Creation														
Change Management															
Request for Change (RFC) definition	For Creation														
Change Record definition	For Creation														
Change Classification guideline	For Creation														
CAB Agenda guideline	For Creation														
Forward Schedule of Changes (FSC) guideline	For Creation														
Post Implementation Review (PIR) guideline	For Creation														
Release Management															
Release Policy	For Creation														
Release Plan	For Creation														

Configuration Management															
CMS CMDB definition	For Creation														
Configuration Item (CI) Record guideline	For Creation														
CMDB Audit Protocol guideline	For Creation														
Design Coordination															
Service Design Package (SDP) definition	For Creation														
Service Level Management															
SLA OLA definition	For Creation														
Service Level Requirements (SLR) guideline	For Creation														
Service Specification Sheet guideline	For Creation														
Service Catalogue guideline	For Creation														
Service Level Report guideline	For Creation														
Protocol SLA Review guideline	For Creation														
Service Quality Plan (SQP) guideline	For Creation														
Capacity Management															
Capacity Plan definition	For Creation														
Capacity Forecast guideline	For Creation														
Capacity Report guideline	For Creation														

Availability Management															
Availability Improvement Plan guideline	For Creation														
Availability Report guideline	For Creation														
IT Service Continuity Management															
ITSCM Risk Analysis guideline	For Creation														
IT Service Continuity Plan guideline	For Creation														
ITSCM Report guideline	For Creation														
Emergency Plan guideline	For Creation														
Protocol Disaster Practice guideline	For Creation														
Supplier Management															
Underpinning Contract guideline	For Creation														
Financial Management															
Financial Analysis guideline	For Creation														
Service Portfolio Management															
Service Portfolio definition	For Creation														
Service Review															
Service Review Report guideline	For Creation														
Definition of CSI Initiatives															
CSI Register (Service Improvement	For Creation														

Plan - SIP) guideline															

To accomplish these tasks, it is recommended to recruit a project based technical writer. The technical writer will be under the supervision of the ICTU director and will be dedicated to create a document containing the items listed above. The technical writer is expected to work for six months with a recommended monthly salary of Php 12,000 a month or a total of **Php 72,000.00**. This position can also be opened to an internal employee who has a technical writing and IT background.

On top of the ITIL documentation checklist is the creation of necessary policies and processes specific for each ICT work specialization. The policies and processes will bring a clear direction and harmonious order for ICT inter-related services and TUA's processes.

As shown in the gantt chart, the technical writer is given four months to accomplish all the drafts for all required documentation. It is not shown in the gantt chart that on the fifth month the draft will be reviewed and finalized and on the sixth month all the policies and processes will be finalized and eventually integrated to TUA.

This item can be started in August 2017 and be accomplished after six months, which is January 2018.

Please see attached documents found in Appendix B for policies ready for approval:.

ICTU ORGANIZATIONAL RE-ENGINEERING:

Besides the adaption into the ITIL framework and the creation of comprehensive policies and processes, ICTU is also going to include five (5) value added services to help further propel TUA to its grand vision of becoming one of the top universities here in Asia. The five services are:

- Implementation of institutional collaborative and communication system via G Suite
- Establishment of a digital engagement sub-unit to collaborate with the Marketing department
- Taking over the responsibility of the LCD and theatre services
- ICTU as a training center
- ICTU as a consulting unit of ict services for other educational institutions

These five services needs to be followed by upgrade of skills, knowledge, attitude, resources, and systems. In order to support these services and all the other goals of ICTU, ICTU should formally consider the following realities to succeed in its own mission and ultimately support TUA's grand vision:

- Restructuring of ICTU's organizational landscape
- Retooling ICTU's personnel with up-to-date and relevant knowledge and skills-set
- Inclusion of necessary new roles
- Outsourcing of projects, especially those activities that consumes significant amount of time.

As shown below in figure 1.1, the current ICTU's organizational structure is very limited in scope and was built to support the day-to-day operations of the university. Today's information technology environment is a fast phase, highly responsive, and highly customer-focused. With the ever changing user demands and with the continuous evolution of information and communication technology, the current ICTU setup is inadequate to support the said environment.

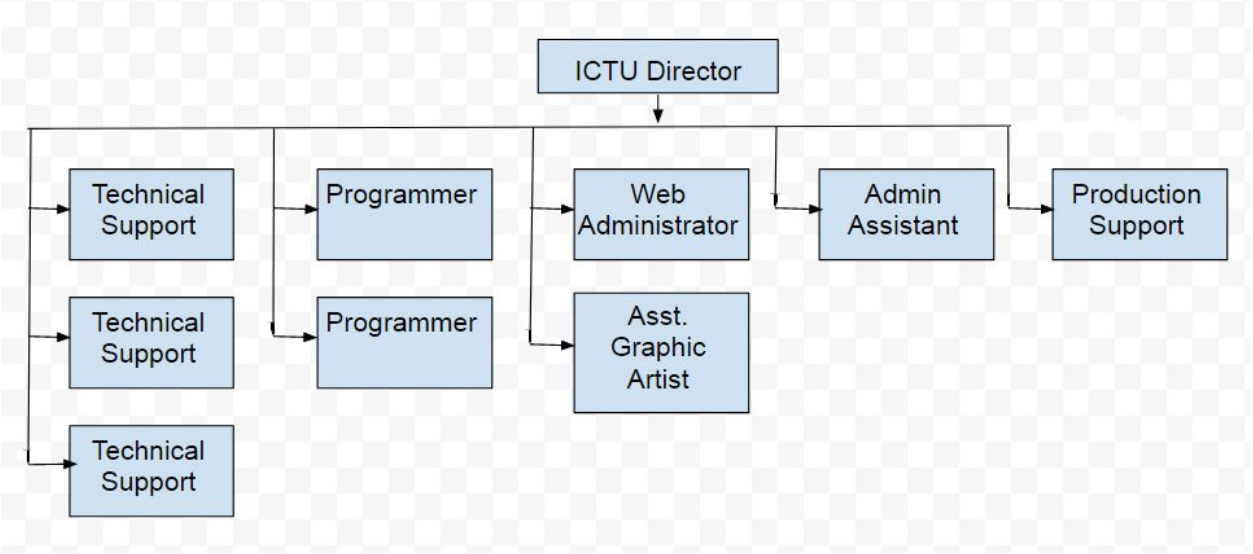


Figure 1.1

In the current setup shown in figure 1.1, all of the personnel handles a specialized and specific task designed to focus on operational activities. In todays' modern organizational setup, the clear and present challenge for any functional units in many types of organization is to have a proactive and forward looking approach and at the same time rendering a quality and efficient day-to-day services. With a given flat organizational structure for TUA-ICT, promoting forward-looking approaches and providing daily quality services is getting very difficult as technology progresses coupled with the ever changing customer demands. As the day-to-day experience of ICT is getting more difficult and handling and coping with the advancement of technology, ICT's predicament is near breaking-point.

For ICTU to address the issue of inadequacy in terms of being a forward-looking organization, it has to transform its organizational structure. The new organizational structure must address the challenge of becoming a world-class unit adhering to international standards such as ITIL, as presented in the previous part of this document. This new organizational structure can enable ICTU to provide top class services for the reason that the new organizational structure promotes a highly defined role, clear accountability, nimbleness of skills, industry grade standards, business focused processes, and customer centered services..

The organizational structure should be upgraded because ict has a mandate to make services available all the time, secure these services all the time, and suit these services according to customer's demands all the time. ICT also intends to contribute to society in general, especially to other educational institutions by offering what it will accomplish in the development of its own top class services. Each role in the new organizational structure should help fulfill this mandate.

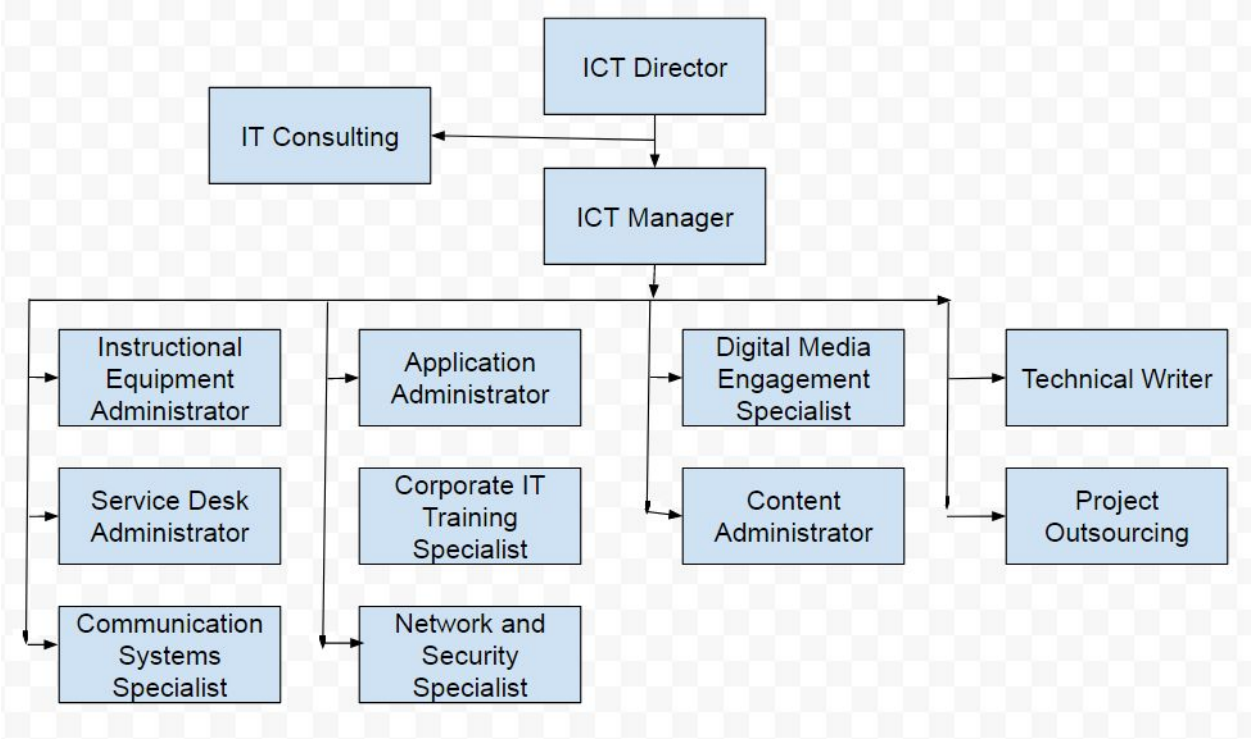


Figure 1.2

As shown in figure 1.2, almost all of the roles are upgraded. This upgrade of roles requires further retooling through research and training. Training activities will be scheduled for each of the role

Very noticeable in the new organizational chart is the installation of the ICT Manager, this serves three purposes: 1) The ICT director can focus on leadership role, coaching, training, and maintaining high value ICT services, while the ICT manager can focus on the assurance that ICT services are provided daily to meet the expectations of customers. This can make ICT a balance unit by focusing on strategies, while ensuring the accomplishment of daily tactical activities. 2) There will be a very solid succession path for the ICT organizational unit. 3) This structure also allows the ICT to create opportunities for TUA by allowing the ICT director to connect with other educational institutions to provide ict services such as information system solutions and trainings.

Since ICTU will be transformed as not only an ICT provider for TUA but also a training center and consulting unit, solutions and ideas designed by ICT can be developed by tapping outside expertise to help these ideas be transformed into concrete products and services. ICT projects that will enhance TUA's operation can be developed in collaboration with outside expertise on a per project basis. These developed product and services can then be offered to other educational institutions who also aspire for top class information system solutions. These products and services offered to other educational institutions can become a part of TUA's mandate to create research and at the same time develop what was researched into services that will create opportunities for community service. Community service in a sense that it will offer information system solutions to other educational institutions, especially in provinces, with a far lower total cost of ownership compared to established software vendors. Consequently, this can boost TUA's reputation and at the same time gain additional revenue.

Some of the products and services that can be offered by TUA to other educational institutions are the following:

- K to 12 responsive and integrated information systems
- K to 12 responsive and integrated electronic grading system
- Responsive and integrated online academic information management system for higher education institutions
- Responsive and integrated online academic information management system for all levels
- Responsive and integrated human resource information management system

The key word in the above services is the word responsive. Responsive means the service is accessible in all types of devices, whether it is mobile devices, tablet devices, or desktop devices. It is important to emphasize responsive since most of the system today used and offered in higher education institutions are already integrated and online and only few are designed for being responsive.

Another front that ICT is taking is the empowerment of TUA's constituents in using various ict tools. These ict tools when learned and mastered by TUA's constituents will make TUA workforce more potent.

An example of this is the implementation of G Suite communication and collaborative tools, wherein one of its benefits is the reduction of paper usage which entails a general cost reduction in printing materials. The mindset in this training service is to make TUA employees more efficient and more effective in their everyday work related undertakings.

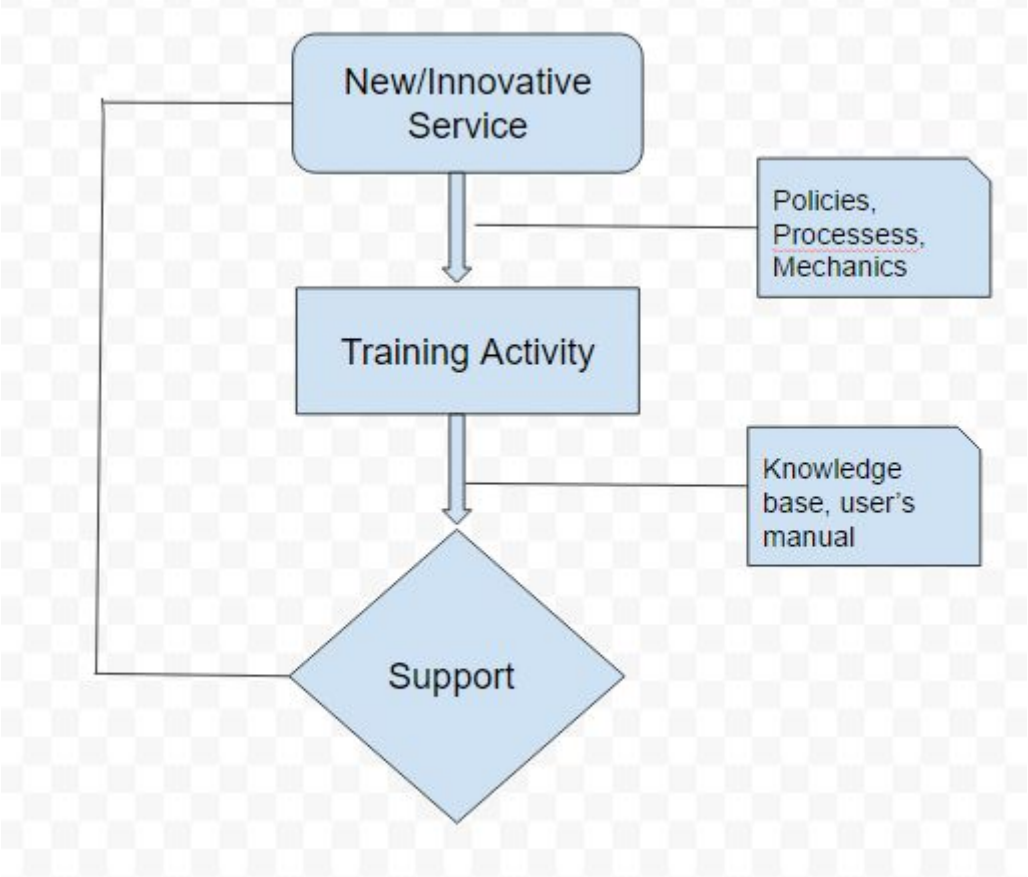
With the encouragement of the Vice President for Administration and Finance, ICT is taking the path of becoming a training center for TUA constituents. Included in the training line-up are the following:

Topic	Date	Time	Audience	Trainor	Venue
G Suite Administration Foundations	July 12, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
G Suite - Email App Foundations	July 12, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
G Suite - Google Drive Foundations	July 19, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
G Suite - Calendar Foundations	July 19, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
G Suite - Classroom Foundations	July 19, 2019	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
Common PC Troubleshooting*	July 26, 2019	8:00 am to 10:00 am	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
Common LCD/DLP Projector	August 2, 2017	8:00 am to 10:00 am	Faculty	ICT Staff	SSC-306

Troubleshooting*					
Basic Graphic Design*	August 11, 2017	8:00 am to 12:00 nn	NTP	ICT Staff	SS-406
G Suite - Email App Advance*	August 9, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
G Suite - Google Drive Advance*	August 9, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
G Suite - Calendar Adavance*	August 16, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
G Suite - Classroom Advance*	August 16, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
Cybersecurity 101*	August 23, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
Internet 101*	August 30, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307
Web Technology 101*	September 2, 2017	8:00 am to 12:00 nn	Admin, NTP, Faculty	ICT Dir, ICT Staff, CCIS Faculty	SSC-406, SSC-305, SSC-307

Those topics with asterisk have tentative schedule. And to ensure that there is continuity in the usage of the knowledge and skills that was acquired during the training, ICT will integrate the following processes to TUA's overall scheme:

- Request for the institutionalization of the innovative services being introduced by the training
- Setup the policies, processes, and mechanics of the innovative services
- Continually support the innovative services by their inclusion in the service desk item and by setting up knowledge bases and user's manual for them



Since ICT is eventually developing its training portfolio because of internal trainings and because of its own implementation of new/innovative systems, a new potential TUA product is consequently floated. This new product offers short training courses and consultation on various ict aspects. Listed below are the short training courses and ict consulting services that ICT can provide for external customers:

Topic	Product Type
G Suite short courses	training
G Suite setup	consulting
Network and Cybersecurity	training
Network and Cybersecurity setup	consulting
Information Systems	consulting
Website design setup	consulting
Website design	training
Digital marketing	consulting
Content management	consulting
Mobile development	training
Mobile app development	consulting
Digital marketing concepts	training
Content management concepts	training

These topics and services will be further developed to establish the coverage, content, duration, requirements, resources, and tools. ICT itself will develop these products. These products are targeted to be introduced in January 2018. This training endeavour will be taken care of by the Corporate Training specialist, a new role being established in the new ICT organizational structure.

The technical writer will assist ICT to document these new services especially on the fifth and sixth month of tenure. The technical writer's role will ensure that ICT's services and processes will be compliant, consistent, clear, and will continue improve to the next generations.

To create connections and establish relations with potential customers of the products and services developed by ICTU, the Digital Engagement specialist is introduced as part of ICTU's organizational structure. But more than this, the Digital Engagement specialist role is created because ICTU saw the potential of social media and other web technologies in reaching out to potential and current students. ICTU saw that social media is a powerful platform to engage and encourage potential students to enroll in TUA. Social media also engages the current students to establish a stronger relationship with TUA, thus promoting loyalty and affiliations.

To establish the digital engagement activity of TUA, the following task will be undertaken:

- Establish a digital engagement strategy
- Closely collaborate with the marketing department
- Establish the processes that will allow TUA to engage properly with external customers, this includes response procedure and frequently asked questions
- Integrate social media platform with TUA website while establishing SEO and analytics

Found in Appendix C is the recommended digital engagement strategy. The digital engagement platform is targeted to be established in January 2018.

Two important factors are greatly considered for the inclusion of the Network and Security administrator role. These factors are the impending implementation and compliance to the Data Privacy Act in September 2017; and the proliferation and continuous evolution of security threats and attacks. The Network and Security specialist should ensure that threats are under control and all vulnerabilities are closely monitored. The role of the Network and Security specialist is also to ensure that Internet speed is at its optimum and is properly managed. Some example tasks of the Network and Security specialist are the following:

Tasks	Schedule
Establishment password management policy and its continuous implementation	July 12-14, 2017
Setup and management of SSL servers and digital certificates	July 10-12, 2017
Setup and management of DNS server	July 2018
Setup and management of Reverse proxy server (load balancer, caching)	July 2018
Completion of total 100% fiber optic infrastructure	January 2018

These tasks and other network and security related tasks are very critical in ensuring the quality and safe delivery of information throughout the organization.

The Communication Systems specialist is being established to ensure that telephony in TUA, which includes direct lines and PBX system, will remain to have 0% downtime and continue to deliver quality service. But more than this, it is being established because there is a need to implement the G Suite solutions in TUA. The G Suite solution is really a potential game changer in TUA's operation since it promotes cost-efficiency and collaborative interactions among constituents. In order to properly administer the G Suite solutions, the Communication Systems specialist is designated to be the administrator.

Since the inception of the the world wide wide in the early 90's, most of the organizations in the world have incorporated their own company website. And in today's internet landscape, a website site is a must for every organization. However, the nature of the website has changed significantly from an ordinary static content website to a highly dynamic engaging web application. The current website administrator role is no longer apt to the ever evolving web technology.

The current scheme of things in the web is you have to include SEO, responsiveness, analytics, social media integration, and user engagement. This is now the role that the Content Administrator will play to advance TUA's content to engage many more customers for TUA itself. The Content Administrator's role also covers content standardization wherein these content standards are intended to be institutionalized in TUA. See Appendix D for proposed standardized content. The Content Administrator will also advance the graphical content of TUA. Since the content administrator has a limited capacity to handle all of this, a training strategy will be conducted to empower several TUA constituents. This strategy will allow the Content Administrator to leverage collaboration as a technique to multiply his effectiveness.

To further organize ICTU, desktop system management will be divided into two sections. The first section is for the instructional equipment which involves computer laboratories, internet laboratories, and multimedia laboratories. The desktop systems in this section will be handled by the Instructional equipment administrator, which will also be responsible for lcd/dlp projectors.

The Service Desk administrator will then handle the desktop system in the offices and will be responsible in managing the service desk software tool. The service desk tool is an enhanced version of the Job Requisition System (JRS). The JRS is ITIL non-compliant tool and this is the main reason for its upgrade. Meanwhile, the handling of ID system is also the responsibility of the service desk administrator.

Finally, with all the application being developed and purchase one after another, the role of programmers have to be removed from the organizational structure. The main reason for the removal of the programmer's role is because it is detrimental and counterproductive to ICTU's mission. Coding and testing an application eats a significant amount of time in the general ICTUs scheme of things. Aside from leaving-out supporting existing systems, the quality of application developed is at low-level since because of haste in the deployment of the application, thorough design is always overlooked. To solve this issue, the Application administrator role will be introduced to focus on system design while system development will be delegated to outside expertise.

The Application administrator will also focus on production support which covers ensuring the high availability of existing systems. Another aspect of the application administrator role is the regular management of data and code versions, such as data and code backups.

To retool the current ICT personnel with their new roles, a series of trainings will be scheduled and undertaken through collaborative learning. Shown below is the schedule of training for each new role:

	month1				month2			
Role	week1	week2	week3	week4	week 1	week 2	week 3	week 4
Instructional Equipment Administrator	IT Service Desk: Customer Service Fundamentals Troubleshooting Common PC Issues for Users	CompTIA A+ (220-901) Cert Prep: 4 Displays and Printers	Learning PC Maintenance and Performance Troubleshooting Common PC Issues for Users	CompTIA A+ (220-902) Cert Prep: 6 Securing Computers CompTIA A+ (220-902) Cert Prep: 4 Virtualization Printers and Troubleshooting				
Communication Systems Specialist	Learning G Suite Administration Team Collaboration in G Suite Creating and Managing Your Google Account	Google Cloud Platform Essential Training	Learning Google Apps Script Creating and Managing Your Google Account	Google Hangouts Essential Training Google Cloud Platform Essential Training				
Network and Security Specialist	IT Security Foundations: Core Concepts Cybersecurity Foundations IT Security Foundations: Operating System Security	IT Security Foundations: Network Security Cybersecurity for IT Professionals	Cybersecurity Awareness: Security Overview Performing a Technical Security Audit and Assessment	CompTIA Network+ (N10-006) Cert Prep: 4 Making TCP/IP Work Cybersecurity Analyst+ (CS0-001) Cert Prep: First Look				

Service Desk Administrator	IT Service Desk: Customer Service Fundamentals Troubleshooting Common PC Issues for Users	Building Your Technology Skills	CompTIA Security+ (SY0-401) Cert Prep: Access Control and Identity Management CompTIA Security+ (SY0-401) Cert Prep: Application Data and Host Security	CompTIA Security+ (SY0-401) Cert Prep: Threats and Vulnerabilities CompTIA Network+ (N10-006) Cert Prep: 2 The Physical Network				
Digital Media Engagement Specialist	Online Marketing Foundations	Social Media Marketing: Facebook and Twitter	Building an Integrated Online Marketing Plan	SEO Foundations Content Marketing Foundations				
Corporate Training Specialist	Google Apps 2016 for Education Essential Training Gmail Essential Training	Migrating from Office 2010 to Google Apps	The Neuroscience of Learning Instructional Design: Models of ID Instructional Design: Needs Analysis	Instructional Design: Storyboarding Instructional Design: Working with SMEs Teaching Techniques: Writing Effective Learning Objectives Agile Instructional Design				

Content Administrator	Google Analytics Essential Training	UX Foundations: Content Strategy	UX Design Techniques: Overview UX Foundations: Prototyping UX Foundations: Multidevice Design	UX Design: 4 Ideation UX Design Techniques: Creating Scenarios and Storyboards UX Design: 6 Paper Prototyping				
Application Administrator	Programming Foundations: Object-Oriented Design Stay Competitive Using Design Thinking	Design Thinking: Understanding the Process Learning Design Thinking: Lead Change in Your Organization	Learning Design Research Learning Brainstorming	Design Thinking: Prototyping Design Thinking: Venture Design				

The training will continue until everyone of ICTU's personnel acquired the necessary skills and knowledge to perform their new tasks. This will be done in a collaborative environment which means no cost will be expended by TUA because the knowledge will come from an online source and will be validated by every member of the team.

The new roles identified should be clear to each of the personnel involved, in order to do this, job descriptions are created for approval by higher management. Attached with this document are the proposed job descriptions for the new roles found in Appendix E.

DESIGN AND DEVELOPMENT OF FUTURE PROOF INFORMATION SYSTEMS AND CONTENT SYSTEMS:

In 2014, ICTU designed and developed its homegrown enterprise system collectively known as TUAPORTAL. The TUAPORAL is composed of the following systems:

- **Registrar**: [Admission, Curriculum, Registration, Enrollment, Grades, TOR, Faculty Loading, Statistics, Reports, Online Registration, etc]
- **K12**: [Admission, Promotion, Registration, Statistics, etc]
- **Accounting and Finance**: [Cashiering, Statement of Account, Student Ledger, Accounting Settings, Accounting Reports, etc]
- **K12 Electronic Grading System**: [Grades Encoding, Grades Settings, Score Summary, Electronic Class Card, etc]
- **HRIS**: [Evaluation System, Employee Profile, HR Settings, HR Reports, HR Statistics, etc]
- **Asset Management**: [Asset Profile, Asset Settings, Asset Depreciation, Asset Reports, etc]

TUAPORTAL is running on TUA's on-premise servers and is currently being maintained by ICTU personnel. Although the system satisfies the current needs of various units here in TUA, it is now becoming a major concern for ICT because of the following circumstances:

- The data is growing exponentially
- The system is growing with new features added regularly
- Data Privacy Act implementation
- Changing user demands
- Advancement in technology

The implications of these circumstances are the following

- Since the data is growing, the system is becoming slower and slower in terms of performance. Data management and system backup is also becoming a time-consuming task.

- With new features added regularly the system is growing and because of design limitations, system maintenance is becoming a time consuming activity.

- Because of the Data Privacy Act, investing in industry standard security features which needed to be purchased, develop, and incorporated in the system must be pursued. An immediate implication of the data privacy act is to temporarily shutdown TUAPORTAL's module from internet access. The system should incorporate encryption mechanism such as SSL and also must strengthen its user authentication module. In addition to this, there should be an intrusion detection mechanism to monitor and control security risk and vulnerabilities.

- Users are demanding for real time access and online transactions. With design limitations, the TUAPORTAL is gradually experiencing difficulties to provide these demands.

- With the ubiquity of various types of devices from desktop to tablet to smart phones, applications need to adapt to these technology. With design limitations, TUAPORTAL interfaces should be upgraded to adapt to all types of devices.

- The advancement in technology also delays some system development activities such as the TBAMIMS since overall design is the highest factor to consider. In addition to this consideration, factors such as upgrades in software development skills, tools, and practices is becoming a necessity.

Since technology is moving fast and user demands are constantly changing, we need to build a system that is future proof. The current design, platform, and technology for the TUAPORTAL is not built for the future. In this regard, I am recommending the following strategy to help us build a future proof system.

- Take all the lessons learned and best practices of TUA and create a holistic design for TUA's integrated system
- Use cutting edge tools and framework in the creation of the integrated systems
- Focus in the design of the system and let the development be outsourced

The creation of the future-proof information system is laid out in the gantt chart as shown below. It is important that the new integrated system should have the following characteristics:

- Highly secure
- Highly available, robust, and fault tolerant
- High performance
- Responsive
- Highly usable
- Data privacy compliant

It is also highly recommended that the scope of the new system to be implemented only accepts record of new students both K12, undergraduate, and graduate students. This means that students with student number 2018xxxxxx, 18-xxxxxx and above will populate the new system. Transferee students with this set of student number will also be allowed to populate the new system.

The new system must be implemented on the first semester of school year 2018-2019. This is imperative, since the new system will start from the new set of data. Meanwhile, old students will still use the old system. In effect, two sets of system will be used by TUA starting SY 2018-2019 until the old system is retired which is most likely in SY 2022-2023. Consequently, report generation especially for accounting and finance will be integrated between two systems.

The timeline for the creation of the new system is indicated in the gantt chart below:

	2018						2018				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Business and Process Requirements analysis											
High Level Design											
Detailed Level Design											
User Management											
Access Management											
Email, Chat, SMS Management											

Registrar Module											
Finance Module											
K12 Module											
Reports Module											
Electronic Grading System											
Employee Profile											
Employee Evaluation											
Employee Reports and Demographics											
Asset Management											
Integrated Ticketing System											

ICTU personnel will perform the design phase. In the design phase a complete detailed design will be the output. This output will then be used by the developers to create the new TUA information system. The projected budget for the new information system which is composed of all important student and employee system is estimated to cost Php 1,000,000. This total cost of investment (TCO) can be recoup and can generate more income by offering this to other educational institutions, especially those in the provinces.

Eventually, this new system entails hardware upgrades as shown in Appendix F. Shown in appendix F is the current configuration of TUAPORTAL in the overall TUA network. The characteristics of the current configuration as described in the network model depicts limited capability, capacity, availability, and usability.

The current system with the current configuration has the specific limitations as stated below:

- TUAPORTAL's design is not built to last
- TUAPORTAL is already outpaced by the current wave of emerging technologies
- TUAPORTAL is already insecure because of the evolution of security threats in the internet
- TUAPORTAL is not compliant with the Data Privacy act

There are important questions that needs to be answered before proceeding with building the future-proof system.

First question is: In the first place, why the factors above were not considered before the current system was built?

The answers for this question are: 1) The baseline design of TUAPORTAL is based on what was designed by the previous vendor. The scope of the baseline design is limited to admission, registration, cashiering, student ledger, and statement of accounts. TUAPORTAL is a much bigger system which should include HRIS, access management, user management, mobile presence, email integration, sms integration, parameterized reports, etc. The baseline design is also plagued with cross-over subject codes which affects the student curriculum. 2) Today's tools such as nodejs, angularjs, PHP7, bootstrap, etc were immature during the time when the current system was built in

2013. 3) The Data Privacy Act just came to the picture this 2017. 4) The nature of security threats are constantly evolving.

Second question is: How can you ensure that the future-proof system that will be built not easily be outpaced by evolving technologies in the future? The answer for this is: There is no assurance on what technologies will emerge in the future and whether these technologies are too disruptive for the present technologies. But one thing for sure, if we don't enhanced, we will further lag behind, while the competitions are advancing further forward. Building is inevitable today as for tomorrow it will be more costly to build. For a bit of an assurance, tools that we will be using are just emerging but mature enough already. These emerging tools at least has a life span of 10 years. So if we finished the system by 2018,we have at least a good ten years utilizing the system. If the foundational design of data and processes are solid, then in the next iteration of technological advances, enhancements will be more far easy. In here we are not just building technology, but more than this we are building legacy that will be passed to the next generations.

Meanwhile, the new network configuration also shown in appendix F depicts a setup that overcomes the limitations of the current network configuration. This new network configuration requires additional investment for three (3) servers and an upgrade in the firewall system. The cost of investment for this upgrade is shown below:

Hardware Equipment	Cost
Second database server for clustering	150,000.00
DNS Server	100,000.00
Reverse proxy server, load balancer, caching	100,000.00
TOTAL COST	**350,000.00**

In addition to this hardware upgrade, TUA firewall should also be upgraded to address the ever present security risk. An additional annual cost of Php 50,000 should be allocated for this.

The total cost of investment for the future-proof TUAPORTAL is at least Php 1,400,000.00. This cost can be considered as a small amount since comparatively if this is purchased from a software vendor, it will be around Php 6,000,000.00.

Nevertheless, the amount to be invested in the future-proof TUAPORTAL is expected to be recoup because the plan is to offer the system to other educational institutions. The projection is, the system can be offered to other schools with an amount of at least one million pesos per school. It is projected that there are a total of 1,000 schools who still needs to implement future-proof system around the Philippines. If 10% of these numbers acquired our system, a projected Php 100,000,000 return-on-investment is expected.

MODERNIZING TUA's NETWORK INFRASTRUCTURE AND INTERNET SPEED

As ICTU continue to support TUAs mission of providing excellent services for a quality learning environment and it's vision to become one of the top universities in Asia, it is incumbent upon us to also continue the building of fast, resilient, robust, and secure network infrastructure. This type of network infrastructure is the required foundation of a high available internet service for the entire organization.

Three important areas in our university still experience slow Internet service because of inadequate infrastructure. These three areas are the Basic Education campus, graduate school library, and the College of Education.

This new equipment which uses the fiber optic technology will replace the old equipment which uses the copper wire technology. The fiber optic technology utilizes 10GB bandwidth while the copper wire technology utilizes 1GB bandwidth only. The switches currently being used in the Basic Education campus will then be reused by the graduate school library and the College of Education connections.

A budget of Php 2,500,000.00 is necessary to install this equipment in TUA's networks infrastructure.

The hardware component is just the first half of the equation, the other half is the Internet bandwidth which is based on recommendations of the required bandwidth per number of users as shown:

Required bandwidth per 1,000 users : 100 mbps
Current TUA bandwidth : 36 mbps
: 20 mbps (offices)
: 16 mbps (wifi and labs)

The recommended bandwidth per 1,000 concurrent users is 100 Mbps, currently TUA has only 36 Mbps, which is short of 64 Mbps. To reach the 100 Mbps level, the challenge is to increase the computer development fee as per school year which is shown below. A much greater challenge is to increase the number of students per school year also as shown below. Currently, graduate school students does not have a computer development fee, since they are also using the Internet facilities, some graduate school courses should be assigned with computer development fee.

School Year	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Computer Development Fee (Php)	1,010.00	1,111.00	1,222.00	1,344.00	1478.00
Projected Number of students	3,200	3,500	4,000	5,000	6,000
Revenue x 2	6,464	9,000,000	20,000,000	35,000,000	54,000,000
Bandwidth Projection (mbps)	36	40	50	75	100
Cost (Php)	900,000.00	950,000.00	1,200,000.00	1,800,000.00	2,500,000.00
Bandwidth Manager (Php)	250,000				

MODERNIZING TUA's HARDWARE INFRASTRUCTURE

TUA's three computer laboratories namely SSC-305, SSC-306, and SSC-307 has a combined 120 desktop computers. The average years-of-service of each of the desktop computers is 8.5 years. In any standard, these desktop computers are already old. The normal lifespan of desktop computers in a computer laboratory should only be five years. The time is ripe to replace these desktop computers with brand new models. Below is the timeline to replace the desktops in each of the computer laboratories:

Comlab	Timeline	Cost
SSC-305	2018-2019	3,000,000
SSC-306	2019-2020	3,000,000
SSC-307	2020-2021	3,000,000

Another hardware that is also in dire need of replacement is the ID-Turnstile system, there were already two times that ICTU tried to replace the ID-Turnstile with a new unit, however due to budget constraints, the plan was not pursued. In this instance, the ID-Turnstile system should be pursued in year 2019-2020 with an allocated budget of Php 1,500,000.00. We should pursue the integration of the ID-Turnstile because that is a value added service that will further enhance the general security and welfare of TUA students.

Listed in Appendix G are several of the system and hardware configuration currently served by the ICTU, also listed are the proposed configuration of this systems during the modernization phase.

IMPLEMENTATION OF CLOUD BASED COMMUNICATION AND COLLABORATIVE TOOLS

The G Suite communication and collaboration system is already ripe for implementation in TUA. The G Suite formerly called Google App, was setup in TUA in 2012. In recent years, the G Suite started to mature and presented itself as a great alternative for other counterpart tools which requires licensing. G Suite for Education does not require any licenses and is free to be used by an educational institution such as TUA.

The features provided by G Suite can help TUA reduce printed materials consumption and targeted to have a reduction of at least 50% of it. It can also significantly speed up some communication processes. G Suite implementation also targets the reduction of Microsoft license software by 50%, which can be translated to a saving of Php 500,000.00.

Here are the major reasons why TUA can confidently implement G Suite:

- Increase in the number of office bandwidth to 20 Mbps
- G Suite has an offline backup
- Every transaction in G Suite Administration has an audit trail
- G Suite drive's spreadsheets, docs, forms, and presentations almost equal its licensed counterpart

Meanwhile, G Suite usefulness can be very evident in the following activities:

- It can replace traditional interoffice communications, such as general announcements, notifications, invitations, even memorandums.
- It can replace licensed counterpart tools
- Organization of files and file searching is more convenient in G Suite
- G Suite storage is unlimited and accessible anywhere
- Contact management and group email is easy to organize
- G Suite can still be used even without the Internet

CREATION OF SERVICE AND REVENUE OPPORTUNITY

Because of the Information systems that is targeted to be developed by March 2018 and the training materials that is going to be established by January 2018, opportunities for research, community service, and revenue generation became very evident.

For research item, the design and development of a future-proof information system with the following characteristics not present in the current information systems:

- SMS, Email, Chat, Real-time notifications features
- Highly portable to various school settings
- Highly responsive to various devices
- Comprehensive and integrated to include HR Systems
- Data Privacy Compliant

For community service purposes:

- Least capable schools can be offered with the system with the lowest cost of ownership to the point of being free
- Least capable schools can be offered consulting services with the lowest possible consulting fee to the point of being free

For income generation purposes:

- Advance features of the future-proof information system can be offered to medium level capable schools
- Training portfolio can be offered to aspiring learners
- Consulting services can be offered to medium level capable schools

The total cost of development for the future-proof information system which is Php 1,000,000.00 which is a small amount if the potential revenue of this system is factored in for the next five years.

Assuming that there will be five medium level capable school's going to purchased the system for the next five years for 1.5 million pesos, the total revenue to be generated is 22.5 million pesos.

For the consulting and training services the expectation is an earning of Php 50,000.00 monthly which is a descent Php 600,000 a year.

INSTALLATION OF A DISASTER RECOVERY PLAN (DRP)

Having a disaster recovery plan (DRP) for TUA in 2019-2020 signifies that the university already belongs to the top league schools. This means that the school already achieved its financial goals and can already afford this high value infrastructure.

TUA can avail of the service provided by top telecoms organization. TUA can avail for a server for lease package which can be subscribed whether monthly or annually.

Summary of Cost and Benefits

If everything goes into plan, the benefits are really immense for TUA. Aside from the below figures, there will be intangible benefits that cannot be measured by any amount such as reputation and stakeholder's delight. And off course, there are also that can be measured such as cost-efficiency and cost savings. Meanwhile, below is the approximate cost to be expended for ICTU CAPEX/OPEX for this three modernization plan and the expected and potential earnings that it can give TUA.

Cost/CAPEX	Jan 2018	Mar 2018	April 2018	April 2019	Jan 2020	TOTAL COST
Technical Writer	72,000.00					
Future-proof Information Systems		1,000,000.00				
Three Servers		350,000.00				
Additional Security feature		50,000.00				
ID-Turnstile System				1,500,000.00		
Fiber optic switches for basic Ed			2,500,000.00			
Wireless Access Point					500,000	
	72,000.00	1400000	2500000	1500000	500000	5,972,000.00

Cost/CAPEX	Mar 2018	Mar 2019	Mar 2020	
Computer Lab SSC-305	3,000,000.00			CCIS
Computer Lab SSC-306		3,000,000.00		CCIS
Computer Lab SSC-307			3,000,000.00	CCIS

Cost/OPEX	2018-2019	2019-2020	2020-2021	
bandwidth	40 mbps	50 mbps	75 mbps	
Internet	950,000.00	1,200,000.00	1,800,000.00	TUA Budget
Microsoft License	1,200,000.00	700,000.00	500,000.00	TUA Budget
Cyberoam Firewall	250,000.00	300,000.00	300,000.00	ICTU
Esset License	250,000.00	250,000.00	250,000.00	TUA Budget
Preventive Maintenance	150,000.00	150,000.00	150,000.00	ICTU
Miscellaneous	200,000.00	200,000.00	200,000.00	ICTU

Equipment						
TOTAL	3,000,000.00	2,800,000.00	3,200,000.00			
COST	2018-2019	2019-2020	2020-2021	TOTAL		
CAPEX	3,972,000.00	1,500,000	500,000.00			
OPEX	3,000,000.00	2,800,000.00	3,200,000.00			
TOTAL	6,972,000.00	4,300,000	3,700,000.00	**11,272,000.00**		
EARNINGS	2018-2019	2019-2020	2020-2021	TOTAL		
Computer Development Fee	1,500.00	2,500.00	3,500.00			
Total Number of Students * 2	3,000.00	4,000.00	5,000.00			
	9,000,000.00	20,000,000.00	35,000,000.00	**64,000,000.00**		
POTENTIAL EARNINGS	2018-2019	2019-2020	2020-2021			
Information Systems	5,000,000.00	7,000,000.00	8,000,000.00			
Training	300,000.00	350,000.00	400,000.00			
Consulting	350,000.00	400,000.00	500,000.00			
	5,650,000.00	7,750,000.00	8,900,000.00	**22,300,000.00**		