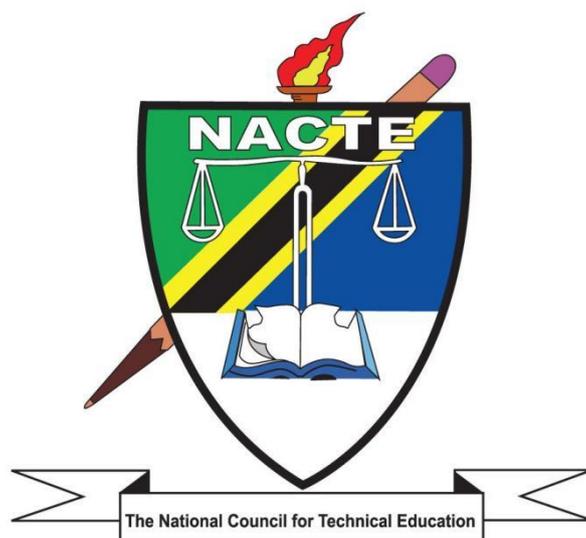


NATIONAL COUNCIL FOR TECHNICAL EDUCATION



SEPTEMBER 2022

PROPOSED OCCUPATIONAL STANDARDS

FOR ARCHITECTURAL TECHNOLOGIST

OCCUPATION: ARCHITECTURAL TECHNOLOGIST

LEVEL: NTA 7

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FOREWORD

The National Council for Technical Education (NACTE) is a corporate body established by the National Council for Technical Education Act, Cap.129. The Act provides a legal framework for the Council to coordinate the provision of technical education and training in Tanzania. The mandate of NACTE is three-fold, namely; Regulatory, Quality Assurance and Policy Advisory.

In discharging its mandate, the Council has been charged with the responsibilities, among others, to:

- (a) assist technical institutions in the transmission of knowledge, principles and training in the field of technical education and training for the benefit of the people of Tanzania;
- (b) assist technical institutions in the overall development of the quality of education they provide and to promote and to maintain approved academic standards;
- (c) establish and make awards in technical education which are consistent in standard and comparable to related awards in Tanzania and internationally; and
- (d) ensure that the quality of education required for the awards is met and maintained throughout the duration of the delivery of the course.

In the course of execution of these responsibilities, the Council has been instituting various measures aiming at advancing the quality of training provided in technical institutions in respect of the changing demands of the labour market, both local and international.

To achieve the above obligation, NACTE, under the Ministry of Education, Science and Technology implemented the East Africa Skills for Transformation and Regional Integration Project (EASTRIP), a project aiming at promoting regional integration through supporting the regional corridors and sector markets, developing common standards and qualifications, and promoting mobility of students, faculty, and graduates. The project supports the Government of Tanzania to address shortage of skills in five sectors namely:

- (a) Energy;
- (b) Construction;
- (c) Information and Communication Technology (ICT);
- (d) Transportation; and
- (e) Agribusiness.

To address the skills, miss-match and shortage in the five (5) sectors in the country, the project funded, among others, a component of Development of Occupational Standards for Technical and Vocational Education and Training (TVET). In this regard, NACTE endeavoured to identify qualified and highly experienced experts in the five sectors from both the industry and training institutions to carry out the development of Occupational Standards. The exercise was carried out at Morogoro Teachers College – Morogoro from 27th August to 24th September, 2021. The output of the exercise is Occupational Standards for 14 occupations. Occupational standards for Renewable Energy are among the occupational standards for 14 occupations which have been developed.

Since Occupational Standards are statements of work performance reflecting the ability to successfully complete the functions required in an occupation, as well as the application of knowledge, skills, attitudes and understanding in an occupation, it is the Council’s expectations that the developed standards will form a robust base for decision making and provide explicit guidance to policy makers, curriculum developers, educators, employers and other stakeholders in matters related to manpower planning as well as execution of Technical and Vocational Education and Training undertakings.

Prof. J. W. Kondoro
Chairman

Dar es Salaam
September, 2022

ACKNOWLEDGEMENT

The National Council for Technical Education (NACTE) is charged with the mandate to be the Quality Assurance organ of the Government in matters related to Technical and Vocational Education and Training (TVET) and production of qualified manpower for both local and international labour markets. In order to realize this obligation, NACTE endeavours to institute policies, guidelines and standards and to set the quality benchmarks for training institutions.

However, this is only possible if there is a strong base, linking the training institutions on one hand and the demands of the industry/labour market for relevant manpower on the other hand. Therefore, the Council undertook a step to develop Occupational Standards in sectors considered to be the engine to steer the country's desire to achieve an industrial economy. This exercise would not be a success without the input and support from our stakeholders. I am indebted to acknowledge some of them here.

I wish to acknowledge and appreciate the support from the Ministry of Education, Science and Technology through the East Africa Skills for Transformation and Regional Integration Project (EASTRIP) for the financial support which facilitated the preparation of this document. I wish also to appreciate Mrs Leah Lukindo and Eng. Dr. Simon Baregu for the tireless efforts and commitment in facilitating and guiding the standards development process, Ms. Eileen Tzamburakis and Ms. Chausiku Yakweli Ibrahim for compiling and type setting the final document; and the NACTE Secretariat for coordinating the whole activity.

In a very special way I wish further to extend my sincere gratitude to this team of wonderful experts who tirelessly dedicated their time and availed their invaluable intellect in the preparation of this document. I would like to recognise the colossal inputs of the following experts:

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6.	Arch. Thabit Khalid	Architect	Architect and Architect Technologist	AQRB

In addition, the Council hopes to further enhance the internationalization of Occupational Standard and promote the modernization and internationalization of industries in Tanzania, so as to facilitate Tanzania's integration into the international market and tap its development potential. Therefore, the Council invited the China - Africa Vocational Education Alliance, China - Africa (Chongqing) Vocational Education Alliance, and Chinese vocational colleges to participate in the development, revision, and review of the Occupational Standard documents. It is firmly believed that they will provide strong support for the development of vocational education and related industries in Tanzania based on their rich experience in vocational education, relying on China's advanced and complete industrial chain as well as its status in the international market.

Therefore, I would like to express my heartfelt appreciation to this professional team composed of Chinese colleges, institutions and experts for their hard work and dedication. They've made great contributions to the compilation of this document. I would like to thank the following colleges and experts for their support.

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2	Chengdu Polytechnic	Li Yushu	Professor/Civil Engineering (Geotechnics)
3	Chengdu Polytechnic	Fan Chao	Engineer/Architectural Engineering
4	Chengdu Polytechnic	Peng Li	Senior Engineer/Vocational Education
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Dr. A. B. Rutayuga
Executive Secretary

Dar es Salaam
September 2022

ABBREVIATIONS

AQRB	Architects and Quantity Surveyors Registration Board
BOQ	Bills of Quantities
DLP	Defects Liability Period
ICT	Information and Communication Technology
NACTE	National Council for Technical Education
NOS	National Occupational Standards National Occupational Standards
OS	Occupational Standards
PPE	Physical Protective Equipment
RFP	Request for Proposal
TET	Technical Education and Training
TOR	Terms of Reference
TVET	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Circumstantial knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues
Competence:	The ability to use knowledge, understanding, practical and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based education:	An instructional program that derives its content from validated tasks and bases assessment on the learner's performance
Curriculum:	A description or composite of statements about “what is to be learned” by the trainee/student in a particular instructional programme; a product that states the “intended learning outcomes”.
Educational/training programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational analysis:	A process used to identify the tasks that are important to employees in any given occupation
Occupational area:	This is a broad grouping of related jobs. Example: food service
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as performance tool of assessment of the pre – scribed outcomes.

Performance criteria:	Indicate the expected end results or outcome in form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.
Standards:	it is a set of statement, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance
Task analysis:	The process of analysing each task to determine the steps, related knowledge, attitudes, performance standards, tools and materials needed, and safety concerns required of employees performing it.
Tasks:	A work activity that has a definite beginning and ending, is observable or measurable, consists of two or more definite steps, and leads to a product, service, or decision.
Underpinning Knowledge:	This is crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification process:	The process of having experts review and conform the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.
Occupational Competence:	The application of knowledge and skills to perform consistently to the standards required in the work context.

1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's Development Vision 2025 intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical Education has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupation Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical wiring circuits, performs trouble shooting in electrical wiring, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the occupational standards and the training standards to respond to demands of the labour market.

In TET delivery, Tanzania adopted the Competence-based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus the starting point for developing Competence-based Education and Training (CBET) programs. TET institutions will be required to benchmark their curricula with relevant occupational standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The Architectural Technologist Occupation has its own set of occupational standards. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational standards development process began with an examination of major documents that guide Tanzanian skill development. The 10-year National Skills Development Strategy (2016-2026) was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes. These sectors include: Transport and logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of expert workers and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The workshop thereafter continued with the development of occupational standards. Experts in Occupational Analysis and Occupational Standards Development facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the occupational standards. Architects, supervisory Architectural technologists on the job, and experienced Architectural technologists were key informants in the survey to establish occupational trends. This information was used to gain insight from the workplaces regarding trends and changes in

the profession, including how well graduates are prepared for working in the occupation. A total of online surveys were completed by experts from the labour market across the country. Apart from the survey aiding in defining the scope for the occupational analysis, they served to engage a wide cross-section of experts in the occupation. The stakeholders' forum was attended by participants from different parts of the country representing various companies.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR ARCHITECTURAL TECHNOLOGIST

These standards cover a broad range of duties and tasks that can be performed by an Architectural technologist. However, these occupation standards are not meant to replace individual job descriptions, as they are to be used for guidance in defining skill levels and knowledge for both in specific settings and positions. The architectural technologist may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large Organizations an individual may be employed or designated to perform specific tasks.

Architectural technologists are professionals who apply the science of architecture and typically concentrate on the technology of building, design technology and construction. Architectural technologist concentrates on the ever-increasingly complex technical aspects in a building project. They may negotiate the construction project, and manage the process from conception and manage the process from conception through to completion.through to completion. project. The professional Architectural Technologist must be capable of doing the following main duties:

- a) Develop Architectural concept design for the project
- b) Prepare Design model for construction project
- c) Provide Construction technology and methodology of the design
- d) Prepare architectural detailed drawings for Construction Project
- e) Prepare detailed documents for construction work
- f) Administer Construction contract of project
- g) Participate to the closure of the Construction project
- h) Oversee technical compliance of the project on construction site

The Occupational standards have been clustered into NTA qualification levels i.e. NTA level 7 and 8.

4.0. VALIDITY PERIOD

The occupational standards will be valid for 3-5 years due to the fast-changing nature of technology. The review will proceed in the same manner as the previous one, with new occupational standards being developed based on current labour market Information.

5.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

- **5.1 OCCUPATIONAL STANDARDS FOR ARCHITECTURAL TECHNOLOGIST HIGHER DIPOLMA – NTA 7**

OCCUPATION	ARCHITECTURAL TECHNOLOGIST	OCCUPATION CODE	
DUTY TITLE	PREPARE ARCHITECTURAL DESIGN MODEL FOR CONSTRUCTION PROJECT	DUTY NO.	701
TASK TITLE	GENERATE COMPUTER MODEL (3D)	TASK NO	7011
PERFORMANCE CRITERIA	The person performing this task must be able to generate computer model (3D) as per technical requirement.		
RANGE STATEMENT	The task will be performed in the office under the supervision of an Architect. The following equipment, tools and materials will be needed in performing the task: note book, pen, computer, printer, software etc.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Interpret design concept from architect; 2. Establish tools and software required; 3. Generate computer model 4. Establish model finishing materials required; 5. Integrate site features to the generated model; 6. Prepare simulation model to reflect environmental characteristics of the building at site; 7. Verify the validity of the generated model; 8. Prepare presentation impression of the project. 		<p>Detailed knowledge about:</p> <p>1.0. Methods The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1. Interpret building technology in the design concept; 1.2. Identify tools and software required for model generation; 1.3. Incorporate model design with site features; 1.4. Prepare simulation model to reflect environmental characteristics of the building at site; 1.5. Prepare presentation impression of the project 1.6. Transmitting dimensions from drawings to the model; 1.7. Translating the construction technology in the real model. <p>2.0. Principles 2.1. The person must be able to explain the principles of representation of the model.</p> <p>3.0. Theories The person must be able to explain:</p> <ol style="list-style-type: none"> 3.1. Measurement of labour and materials; 3.2. Building and Construction Technology; 3.3. Building development conditions; 3.4. Health and safety management; 3.5. Landscape; 3.6. Basic knowledge of building materials; 3.7. Fundamental principles of building design 3.8. Basic knowledge of BIM. <p>4.0. Essential skills</p>	

	<ul style="list-style-type: none"> 4.1. Analytical mind; 4.2. Mathematic skills; 4.3. BIM software application skills; 4.4. Presentation skills; 4.5. Report writing skills; 4.6. Organizational skills; 4.7. Communication skills; 4.8. A keen eye for details skill; 4.9. Aesthetic judgement of architectural art.
Description of the end products/service	Computer model (3D) is generated as per technical specifications.
Circumstantial knowledge	<p>Detailed knowledge about:</p> <ul style="list-style-type: none"> 1. Specific environmental and social impact of the project; 2. Regulations and bylaws of local government; 3. Occupational safety and health occupational safety and health; 4. Cleaning and Storage of the tools and equipment.

OCCUPATION	ARCHITECTURAL TECHNOLOGIST	OCCUPATION CODE	
DUTY TITLE	PREPARE ARCHITECTURAL DESIGN MODEL FOR CONSTRUCTION PROJECT	DUTY NO.	701
TASK TITLE	CONSTRUCT PHYSICAL MODEL	TASK NO	7012
PERFORMANCE CRITERIA	The person performing this task must be able to construct a physical model as per contract		
RANGE STATEMENT	The task will be performed in the office under the supervision of an Architect. The following equipment, tools and materials will be needed in performing the task: note book, pen, knife, cardboard, wood, foam, glue, scale ruler, colour spray, artificial grass, toys, computer, printer etc.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Interpret design concept from architect; 2. Establish tools and materials required; 3. Establish model finishing materials required; 4. Establish proper scale to use for model construction; 5. Fabricate and assemble physical models; 6. Construct to integrate site features to the constructed model to establish climate characteristics on building; 7. Prepare presentation of the project model. 		<p>Detailed knowledge about:</p> <p>1.0. Methods The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1. Interpret building technology in the design concept; 1.2. Identify tools and materials required for model construction; 1.3. Effectiveness of the model on the site; 1.4. Transmitting dimensions from drawings to the model; 1.5. Translating the construction technology in the real model. <p>2.0. Principles The person must be able to explain the principles of representation of the model.</p> <p>3.0. Theories The person must be able to explain:</p> <ol style="list-style-type: none"> 3.1. Architectural Measurement; 3.2. Building and Construction Technology; 3.3. Building development conditions; 3.4. Health and safety management; 3.5. Landscaping; 3.6. Model building process; 3.7. Fabrication and assembly technology of physical model. <p>4.0. Essential skills</p> <ol style="list-style-type: none"> 4.1. Analytical mind; 	

	<p>4.2. Mathematic skills;</p> <p>4.3. BIM software operation skills;</p> <p>4.4. Basic Carpentry skills;</p> <p>4.5. Presentation skills;</p> <p>4.6. Report writing skills;</p> <p>4.7. Organizational skills;</p> <p>4.8. Communication skills;</p> <p>4.9. A keen eye for details skill;</p> <p>4.10. Architectural drawing reading skill;</p> <p>4.11. Aesthetic judgement of architectural art.</p>
DESCRIPTION OF THE END PRODUCTS /SERVICES	Physical model is constructed as per contract.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Specific environmental and social impact of the project; 2. Regulations and bylaws of local government; 3. Occupational safety and health.

OCCUPATION	ARCHITECTURAL TECHNOLOGIST	OCCUPATION CODE	
DUTY TITLE	PROVIDE CONSTRUCTION TECHNOLOGY AND METHODOLOGY OF THE DESIGN	DUTY NO.	702
TASK TITLE	CONDUCT MARKET SURVEY FOR CONSTRUCTION MATERIALS AND TECHNOLOGY	TASK NO	7021
PERFORMANCE CRITERIA	The person performing this task must be able to conduct market survey for construction materials and technology as per technical requirements		
RANGE STATEMENT	The task will be performed in the office under the supervision of an Architect. The following equipment, tools and materials will be needed in performing the task: note book, pen, computer, printer, software etc.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Select tools, equipment and safety gear; 2. Prepare checklist of building materials required; 3. Identify building materials manufacturers, suppliers, appointed agents etc; 4. Prepare presentation for materials suppliers; 5. Establish technology availability in construction industries; 6. Recommend appropriate building technology based on design and budget; 7. Compile presentation report for approval; 8. Clean tools and equipment; 9. Store tools and equipment. 		<p>Detailed knowledge about:</p> <p>1.0. Methods The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1. Interpret building technology in the design concept; 1.2. Identify suppliers, manufactures and appointed agents; 1.3. Coordinate meeting among client, suppliers and design team; 1.4. Recommend appropriate technology for the construction project. <p>2.0. Principles The person must be able to explain the principles of:</p> <ol style="list-style-type: none"> 2.1. Project Budgeting; 2.2. Time management in recommending suppliers, technology and building materials; 2.3. Building Construction. <p>3.0. Theories The person must be able to explain:</p> <ol style="list-style-type: none"> 3.1. Building and construction materials 3.2. Building and Construction Technology 3.3. Basic knowledge of building equipment 3.4. Procurement and logistic supply 3.5. Market Survey 3.6. Traditional and modern building technology <p>4.0. Essential skills</p>	

	<ul style="list-style-type: none"> 4.1. Analytical mind 4.2. Mathematic skills 4.3. Research skills 4.4. Marketing skills 4.5. Computer program skills 4.6. Presentation skills 4.7. Report writing skills 4.8. Organizational skills 4.9. Communication skills 4.10. A keen eye for details skill
Description of the end products /service	Market survey for construction materials and technology is conducted and a report is prepared ready for presentation as per approved standards.
Circumstantial knowledge	Detailed knowledge about: <ul style="list-style-type: none"> 1. Regulations and bylaws of local government; 2. Occupational safety and.

OCCUPATION	ARCHITECTURAL TECHNOLOGIST	OCCUPATION CODE	
DUTY TITLE	PROVIDE CONSTRUCTION TECHNOLOGY AND METHODOLOGY OF THE DESIGN	DUTY NO.	702
TASK TITLE	ORGANIZE TECHNICAL PRESENTATION OF MATERIALS AND TECHNOLOGIES FROM MANUFACTURERS AND SUPPLIERS.	TASK NO.	7022
PERFORMANCE CRITERIA	The person performing this task must be able to organize technical presentation of materials and technologies from manufacturers and suppliers as per established standards.		
RANGE STATEMENT	The task will be performed in the office under the supervision of an Architect. The following equipment, tools and materials will be needed in performing the task: note book, pen, computer, printer, software etc.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Select tools, equipment and safety gear; 2. Prepare shortlist of indicative building material manufacturers, suppliers and appointed agents for presentation; 3. Prepare timetable, venue and indicative date for display and presentation to the design team and client's representative; 4. Invite selected manufacturer/suppliers and agents for presentation; 5. Compile catalogue and specifications with recommendations for client's approval; 6. Incorporate the approved building materials specification and technology in designing; 7. Clean tools and equipment; 8. Store tools and equipment. 		<p>Detailed knowledge about:</p> <p>1.0. Methods The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1. Identify indicative building material manufacturers, suppliers and appointed agents; 1.2. Determine presentation venue and schedule; 1.3. Establish appropriate catalogues and specifications for recommendation to client; 1.4. Establish approved building materials and technology. <p>2.0. Principles The person must be able to explain the principles of:</p> <ol style="list-style-type: none"> 2.1. Project Budgeting; 2.2. Time management in recommending suppliers, technology and building materials. <p>3.0. Theories The person must be able to explain:</p> <ol style="list-style-type: none"> 3.1. Building and construction materials; 3.2. Building and Construction Technology; 3.3. Basic knowledge of building equipment; 3.4. Procurement and logistic supply; 3.5. Market Survey; 3.6. Traditional and modern building technology. <p>4.0. Essential skills</p>	

	<ul style="list-style-type: none"> 4.1. Analytical mind; 4.2. Mathematic skills; 4.3. Research skills; 4.4. Marketing skills; 4.5. Computer program skills; 4.6. Presentation skills; 4.7. Report writing skills; 4.8. Organizational skills; 4.9. Communication skills; 4.10. A keen eye for details skill.
DESCRIPTION OF THE END PRODUCTS / SERVICE	<ul style="list-style-type: none"> • Technical presentation of materials and technologies from manufacturers and suppliers is organized and conducted as per approved standards.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ul style="list-style-type: none"> 1. Regulations and bylaws of local government; 2. Occupational safety and health.

OCCUPATION	ARCHITECTURAL TECHNOLOGIST	OCCUPATION CODE	
DUTY TITLE	PREPARE DETAILED ARCHITECTURAL DRAWINGS FOR CONSTRUCTION PROJECT	DUTY NO.	703
TASK TITLE	DEVELOP DETAILED ARCHITECTURAL DRAWINGS FOR CONSTRUCTION	TASK NO	7031
PERFORMANCE CRITERIA	The person performing this task must be able to develop detailed technological drawings for construction as per contract.		
RANGE STATEMENT	The task will be performed in the office under the supervision of an Architect. The following equipment, tools and materials will be needed in performing the task: note book, pen, computer, printer, software etc.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Review Architectural scheme drawings; 2. Prepare checklist of drawings to be detailed from the main Architectural drawing according to relevant professional specifications and standards; 3. Establish Construction technology to be adopted; 4. Prepare detailed technical drawings for construction project; 5. Prepare materials' specifications as per architectural drawings; 6. Produce architectural construction documents for project. 		<p>Detailed knowledge about:</p> <p>1.0. Methods The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1. Review Architectural scheme drawings. 1.2. Identify drawings to be detailed; 1.3. Determine construction technology to be adopted; 1.4. Prepare detailed drawings for construction project; 1.5. Determine materials specification as per architectural drawings; 1.6. Generate construction drawings with BIM software. <p>2.0. Principle The person must be able to explain the principles of:</p> <ol style="list-style-type: none"> 2.1. Selecting Building and construction technology; 2.2. Selecting Construction methods. <p>3.0. Theories The person must be able to explain:</p> <ol style="list-style-type: none"> 3.1. Building materials; 3.2. Building mechanics and structure; 3.3. Building construction; 3.4. Building design specifications and requirement; 3.5. Reading and preparation of building drawings; 3.6. BIM knowledge; 3.7. Overview of prefabricated building. 	

	<p>4.0. Essential skills</p> <p>4.1. A keen eye to detail;</p> <p>4.2. Analytical mind;</p> <p>4.3. Computer skills;</p> <p>4.4. Report writing skill;</p> <p>4.5. Team work skills;</p> <p>4.6. Communication skills;</p> <p>4.7. Integrity;</p> <p>4.8. Mathematical skills;</p> <p>4.9. Inquiry learning ability.</p>
DESCRIPTION OF THE END PRODUCTS / SERVICE	Detailed architectural drawings for construction are prepared as per contract.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Regulation and bylaws governing construction at site;</p> <p>2. Record keeping;</p> <p>3. Occupational safety and health;</p> <p>4. Clean and storage of tools and equipment.</p>

OCCUPATION	ARCHITECTURAL TECHNOLOGIST	OCCUPATION CODE	
DUTY TITLE	PREPARE DETAILED ARCHITECTURAL DRAWINGS FOR CONSTRUCTION PROJECT	DUTY NO.	703
TASK TITLE	COMPILE DRAWINGS TO ACQUIRE CONSTRUCTION BUILDING PERMIT	TASK NO.	7032
PERFORMANCE CRITERIA	The person performing this task must be able to compile drawings that will facilitate acquisition of construction building permit as per contract.		
RANGE STATEMENT	The task will be performed in the office under the supervision of an Architect. The following equipment, tools and materials will be needed in performing the task: note book, pen, computer, printer, software etc.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Prepare checklist for drawings required for construction building permit; 2. Fill relevant application forms for building permit; 3. Collect plot ownership documents from the client/user for building permit. 4. Collect and compile drawings from other consultants to be used in applying for building permit; 5. Review completeness and standardness of drawings from other sub consultants for building permit purpose; 6. Stamp the drawings to abide to legal requirement; 7. Apply for construction building permit from authorities. 		<p>Detailed knowledge about:</p> <p>1.0. Methods The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1. Identify documents to be issued for building permit; 1.2. Apply building permit for construction project; 1.3. Review completeness and standardness of drawings from other sub consultants for building permit purpose. <p>2.0. Principles The person must be able to explain the principles of:</p> <ol style="list-style-type: none"> 2.1. Status of land ownership; 2.2. Familiarity with local municipal procedures for building permit. <p>3.0. Theories The person must be able to explain:</p> <ol style="list-style-type: none"> 3.1. Urban and town planning; 3.2. Land surveying; 3.3. The basic of record and documentation; 3.4. The importance of the building permit; 3.5. Requirements for obtaining a building permit. <p>4.0. Essential skills</p> <ol style="list-style-type: none"> 4.1. Communication skills; 4.2. Team work skills; 4.3. A keen eye to detail; 4.4. Analytical mind; 	

	<p>4.5. Computer skills;</p> <p>4.6. Report writing skills;</p> <p>4.7. Integrity;</p> <p>4.8. Work under pressure;</p> <p>4.9. Adaptability;</p> <p>4.10. Record keeping skill.</p>
DESCRIPTION OF THE END PRODUCTS / SERVICE	Drawings for application of building permit are compiled and application for building permit is lodged as per applicable regulations.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Regulation and bylaws governing construction at site; 2. Occupational safety and health; 3. Clean and storage of tools and equipment.

OCCUPATION	ARCHITECTURAL TECHNOLOGIST	OCCUPATION CODE	
DUTY TITLE	PREPARE DETAILED ARCHITECTURAL DRAWINGS FOR CONSTRUCTION PROJECT	DUTY NO.	703
TASK TITLE	SUBMIT CONSTRUCTION TENDER DOCUMENTS	TASK NO	7033
PERFORMANCE CRITERIA	The person performing this task must be able to submit construction tender documents as per contract.		
RANGE STATEMENT	The task will be performed in the office under the supervision of an Architect. The following equipment, tools and materials will be needed in performing the task: note book, pen, computer, printer, software etc.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE		
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Prepare checklist of drawings and documents required to be submitted to client; 2. Collect tender documents from quantity surveyor and final drawings and specifications from sub consultants; 3. Compile and review the final documents for tendering procedure; 4. Submit final documents to the client; 5. Unify and standardize the format of collected documents according to the contract. 	<p>Detailed knowledge about:</p> <p>1.0. Methods The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1. Identify drawings and documents to be submitted to client; 1.2. Review tender document from quantity surveyor and final drawings and specifications from sub consultants; 1.3. Manage the tender documents with information management system. <p>2.0. Principles The person must be able to explain the principles of:</p> <ol style="list-style-type: none"> 2.1. Preparing Tendering documents; 2.2. Preparing Construction documents; 2.3. Preparing Contract document. <p>3.0. Theories The person must be able to explain:</p> <ol style="list-style-type: none"> 3.1. Tendering procedure; 3.2. Building construction documentation; 3.3. Tender document format; 3.4. Laws and regulations related to engineering construction; 3.5. Security of data. <p>4.0. Essential skills</p> <ol style="list-style-type: none"> 4.1. A keen eye to detail; 4.2. Analytical mind; 4.3. Computer programme skills; 4.4. Report writing skills; 		

	<p>4.5. Team work skills;</p> <p>4.6. Communication skills;</p> <p>4.7. Integrity;</p> <p>4.8. Awareness of confidentiality.</p>
DESCRIPTION OF THE END PRODUCTS / SERVICE	Construction tender documents are submitted as per contract.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Record keeping; 2. Construction knowledge.

TABLE 1 - DACUM CHART FOR ARCHITECTURAL TECHNOLOGIST - LEVEL 7

DUTIES	TASK	ENABLERS
<p>1.0. Prepare Architectural Technology Design model for construction project</p>	<p>1.1. Generate computer model (3D) 1.2. Construct physical model</p>	<p>General Skills and Knowledge</p> <ul style="list-style-type: none"> • Knowledge of other related fields (e.g. Structural Engineering, Services Engineering and Material technology) • Free hand drawing ability • Aesthetic judgement of architectural art • Strong Mathematical Skills • Strong organizational skills • An eye for detail and building design • Understanding on building materials and technology • Awareness on space utilization • Handwork ability • Ability to work under time frame and constraint budget • Experience in the construction industry • Ability to communicate • Writing skills • Analytical skills • Computer literate • Problem solver • Entrepreneurship skills • Presentation skills <p>Tools and Equipment</p> <ul style="list-style-type: none"> • Computer • Standards and design guidelines • Tape measure • Camera • Office furniture • Internet • Printer • Photocopy Machine • Transport • Binding Machine • Clip Board

DUTIES	TASK	ENABLERS
		<p>Materials</p> <ul style="list-style-type: none"> • Materials for fabricating physical models <p>Work Behaviour</p> <ul style="list-style-type: none"> • Team spirit • Trustworthy • Time management
<p>2.0. Provide construction technology and methodology of the design</p>	<p>2.1. Conduct market survey for construction material and technology</p> <p>2.2. Organize technical Presentation of materials and technologies from manufacturers and suppliers</p>	<p>General Skills and Knowledge</p> <ul style="list-style-type: none"> • Knowledge of other related fields (e.g. Structural Engineering, Services Engineering and Material technology) • Free hand drawing ability • Strong Mathematical Skills • Strong organizational skills • An eye for detail and building design • Understanding on building materials and technology • Awareness on space utilization. • Ability to work under time frame and constraint budget <ul style="list-style-type: none"> • Experience in the construction industry • Ability to communicate • Writing skills • Analytical skills • Computer literate • Problem solver • Entrepreneurship skills • Presentation skills <p>Tools and Equipment</p> <ul style="list-style-type: none"> • Computer • Standards and design guidelines • Tape measure • Camera • Office furniture • Internet • Printer • photocopy Machine

DUTIES	TASK	ENABLERS
		<ul style="list-style-type: none"> • Transport • Binding Machine • Clip Board <p>Work Behaviour</p> <ul style="list-style-type: none"> • Team spirit • Trustworthy • Time management
<p>3.0. Prepare detailed architectural drawings for construction project</p>	<p>3.1. Develop detailed technological drawings for construction</p> <p>3.2. Compile drawings to acquire construction building permit</p> <p>3.3. Submit Construction tender documents</p>	<p>General Skills and Knowledge</p> <ul style="list-style-type: none"> • Knowledge of other related fields (e.g. Structural Engineering, Services Engineering and Material technology) • Free hand drawing ability • Strong Mathematical Skills • Strong organizational skills • An eye for detail and building design • Understanding on building materials and technology • Awareness on space utilization. • Ability to work under time frame and constraint budget <ul style="list-style-type: none"> • Experience in the construction industry • Inquiry learning ability • Ability to communicate • Writing skills • Analytical skills • Computer literate • Problem solver • Entrepreneurship skills • Presentation skills <p>Tools and Equipment</p> <ul style="list-style-type: none"> • Computer • Standards and design guidelines • Tape measure • Camera • Office furniture • Internet • Printer • photocopy Machine

DUTIES	TASK	ENABLERS
		<ul style="list-style-type: none"> • Transport • Binding Machine • Clip Board <p>Work Behaviour</p> <ul style="list-style-type: none"> • Team spirit • Trustworthy • Time management • Commitment • Work ethic • Adaptability • Respect and predictability • Introspection and summary ability <p>Other Resources</p> <ul style="list-style-type: none"> • Human Resource (Supporting Staffs) • Technicians and Technologist • Financial Resource