BROADBAND INSTALLATION

TECHNICAL-PROFESSIONAL

Grade 12

Three-Term Budget Of Work (BOW)
for Learning Competencies

TECHNICAL-PROFESSIONAL
ICT SUPPORT AND COMPUTER PROGRAMMING TECHNOLOGIES
Grade 12

Three-Term Budget Of Work
For Learning Competencies

Please note that each Tech-Pro elective is completed in one term if delivered at Grade 12.

Elective	**Broadband Installation**
Prerequisite	**None**
Performance Standard	The learners perform mast and cable installation in accordance with technical specifications and industry standards.
Content Standard	The learners demonstrate an understanding of the principles, tools, safety procedures, and technical requirements necessary for the proper installation of mast, guy, and accessories in accordance with industry standards.

Week	Learning Competency	Suggested Activities
1	• **Discuss the fundamentals of broadband installation**	• **Match & Map Challenge** o Identify and connect broadband technologies, topologies, tools, and real-world applications. o Students will work in groups and be given different broadband scenarios (e.g., home internet, office setup, rural connection). They will identify the appropriate type of broadband, network topology, and data transmission method, as well as the tools and materials needed. Each group will create a simple map or diagram and explain how their chosen setup fits the scenario, including current trends. • **Build Your Broadband Business Plan** o Apply broadband installation knowledge by designing a business concept in the industry. o Students will form groups and create a broadband installation business idea. They will choose the services they will offer, identify broadband technologies and tools they will use, consider current industry trends, and describe possible career roles in their business. Each group will present their plan through a short pitch explaining how their business will operate and succeed.
	• **Discuss Fixed Wireless System**	• **Signal Hunters: Wireless Case Challenge**

Week	Learning Competency	Suggested Activities
		○ Analyze fixed wireless systems by identifying their characteristics, technologies, and suitable applications. ○ Students will work in groups and be given a real-life scenario such as a rural area, school campus, or city network. They will determine the characteristics, advantages, and limitations of fixed wireless systems in the scenario, identify the wireless communication technologies used, and select the appropriate spectrum or frequency bands. Each group will present their analysis and explain how the system works in their assigned case. ● Wireless Network Builder: Design & Defend" ○ Apply knowledge of fixed wireless systems by designing network architecture and explaining its workflow. ○ Students will form groups and design a simple fixed wireless network for a specific purpose. They will create a diagram showing the network architecture, including devices, connections, and data flow. They must also explain the technologies used, frequency bands selected, and the system's advantages and limitations. Each group will present and defend their design to the class.

Week	Learning Competency	Suggested Activities
	• **Discuss preparations for mast installation**	• **Hazard Hunt: Site Safety Mission** o Identify site hazards and apply proper safety measures in broadband installation. o Students will work in groups and analyze a given site scenario (e.g., rooftop, roadside, or indoor installation). They will identify possible hazards, assess risks, and suggest appropriate safety precautions, including the use of PPE. They must also consider site assessment, clearance, access, and environmental factors. Each group will present their findings and explain how to ensure a safe working environment. • **Safe Site Setup Challenge** o Apply site preparation and OHS procedures by planning a safe and organized installation site. o Students will form groups and design a site preparation plan for a broadband installation project. They will include site assessment steps, clearance and access planning, environmental considerations, hazard and risk assessment, and required PPE. Each group will present their plan and justify how it ensures safety and efficiency during installation.

Week	Learning Competency	Suggested Activities
	• **Perform installations of mast and accessories**	• **Mast Masters: Build & Balance Challenge** o Apply mast and guy installation procedures by designing a stable and safe setup. o Students will work in groups and create a step-by-step plan for installing a mast, including proper positioning, guy installation, and tensioning. They will illustrate their setup through a diagram and explain how stability and safety are ensured. Each group will present their plan and justify their installation process. • **Install & Report: Field Engineer Simulation** o Demonstrate understanding of installation procedures through proper documentation and reporting. o Students will form groups and simulate a completed mast installation project. They will prepare a simple installation report that includes the procedures followed, materials used, and observations during guy tensioning. Each group will present their report as field engineers, explaining their work clearly and accurately.
2	• **Discuss preparations for cable layout and installation**	• **Cable Setup Challenge: Plan It Right!** o Apply proper tool selection, cable handling, and safety procedures in installation planning.

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		o Students will work in groups and be given an installation scenario. They will identify the correct tools and equipment for cable layout, demonstrate proper cable handling, and outline safety procedures and work requirements. They must also consider installation constraints such as space and environment. Each group will present their setup plan and explain their decisions. • **Installer's Simulation: Safe & Smart Setup** o Demonstrate safe and efficient equipment setup following installation requirements. o Students will form groups and simulate setting up installation equipment for a cable layout task. They will show proper handling of cables, apply safety procedures, and ensure all work safety requirements are followed while considering given constraints. Each group will present their process and justify how their setup ensures safety and efficiency.
	• **Perform cable layouts and installations**	• **Cable Routing Race: Plan & Solve!**

Week	Learning Competency	Suggested Activities
		o Apply cable routing methods and installation requirements in solving real-world layout challenges. o Students will work in groups and be given a layout scenario (e.g., building or campus). They will plan the cable route considering installation requirements and constraints, select appropriate routing methods, and include proper conduit bending with correct radius tolerance. Each group will present their layout plan and explain their decisions. • **Test & Trace: Cable Installation Simulation** o Demonstrate proper cable installation and testing procedures using tools and instruments. o Students will form groups and simulate a cable installation process. They will show how cables are properly laid out and supported, explain conduit use and bending limits, and demonstrate how to test the operation of cables using appropriate devices or instruments. Each group will present their process and discuss how they ensure a reliable installation.

Week	Learning Competency	Suggested Activities
Suggested Performance Tasks	• **Individual Performance Task: "Mast Mastery Mission"** o Demonstrate understanding of mast, guy, and accessory installation principles, tools, safety procedures, and technical requirements. o Students will individually create a step-by-step installation plan for a mast system, identifying the tools and materials needed, explaining proper procedures for mast and guy installation with correct tensioning, and highlighting safety measures and technical requirements to ensure compliance with industry standards. • **Group Performance Task: "Ultimate Mast Installation Challenge"** o Collaboratively apply installation principles, tools, and safety procedures to design a complete mast installation plan. o Students will work in groups to design and present a complete mast installation setup, including procedures for mast and guy installation, required tools and accessories, safety precautions, and technical standards. Each group will present their plan and justify how it ensures safety, stability, and compliance with industry practices.	
Performance Standard	The learners perform CPE installation and configuration in accordance with technical specifications and industry standards.	
Content Standard	The learner demonstrates an understanding of the tools, technical specifications, and configuration procedures necessary to install and set up Customer Premises Equipment (CPE) effectively, ensuring optimal functionality and connectivity	
2	• **Discuss the principles of Customer Premises Equipment (CPE).**	• **CPE Connection Quest** o Understand the role of CPE by identifying tools, devices, LOS, and BTS connections in real scenarios. o Students will work in groups and analyze a given broadband setup scenario. They will identify the required tools, materials,

Week	Learning Competency	Suggested Activities
		devices, and PPE, explain how Line of Sight (LOS) is verified, and describe how the CPE connects to the Base Transceiver Station (BTS). Each group will present their explanation and illustrate the connection process. • **Signal Link Challenge: Design & Demonstrate**" o Apply CPE installation concepts by designing a functional and safe broadband connection setup. o Students will form groups and design a simple CPE installation plan showing the placement of equipment, LOS alignment, and connection to the BTS. They must include the tools, materials, and PPE needed, and explain the role of CPE in the system. Each group will present their design and justify how it ensures a stable and safe connection.
3	• **Perform installations of Customer Premises Equipment (CPE) in accordance with industry standards**	• **CPE Install Pro: Step-by-Step Challenge** o Apply proper CPE installation procedures including physical setup, hardware, and software configuration. o Students will work in groups and create a step-by-step CPE installation plan that includes proper placement and mounting, cabling and connections, grounding and protection, device and power setup, and

Week	Learning Competency	Suggested Activities
		basic configuration. They will also include software installation steps such as updates and configuration, then present their process clearly. • **From Setup to Signal: CPE Simulation** o Demonstrate understanding of complete CPE installation from hardware setup to software configuration. o Students will form groups and simulate a full CPE installation process by illustrating device placement, connections, and configuration steps. They must explain hardware setup, power connections, and software installation including updates and settings. Each group will present their workflow and justify how it ensures a functional and reliable broadband connection.
	• **Perform configurations of Customer Premises Equipment (CPE) in accordance with industry standards**	• **Config Master: Network Setup Challenge** o Apply knowledge of network, service, and security configuration in a simulated CPE setup. o Students will work in groups and design a basic CPE configuration plan. They will outline network settings, define service configuration (e.g., internet access or connectivity type), and include essential

Week	Learning Competency	Suggested Activities
		security settings such as passwords or access controls. Each group will present their configuration plan and explain how it ensures a stable and secure connection. • **Secure Signal Lab: Configure & Defend** o Demonstrate understanding of CPE configuration by designing a secure and functional broadband setup. o Students will form groups and simulate a CPE configuration process focusing on network setup, service activation, and security protection. They must identify appropriate settings, explain how services are configured, and apply basic security measures to protect the network. Each group will present and "defend" their configuration against possible security threats or connection issues.
4	• **Perform testing and adjustment of Customer Premises Equipment (CPE) in accordance with the industry's installer manual**	• **Signal Check: CPE Testing Mission** o Apply appropriate testing methodologies to evaluate CPE performance in a simulated setup. o Students will work in groups and simulate a CPE installation that requires testing. They will identify and apply suitable testing methodologies to check connectivity, signal quality, and device functionality. Each group

Week	Learning Competency	Suggested Activities
		will document their findings and explain how they determined whether the system is working properly. • **Fine-Tune the Signal: Adjustment Challenge** o Demonstrate proper adjustment procedures to improve CPE performance and connectivity. o Students will form groups and be given a scenario where a CPE system has weak or unstable performance. They will propose and demonstrate adjustment procedures such as repositioning devices, modifying settings, or improving alignment. Each group will present how their adjustments improve system performance and reliability.
Suggested Performance Tasks	• **Individual Performance Task: "CPE Setup Sprint: From Tools to Connection"** o Demonstrate understanding of tools, technical specifications, and configuration procedures for effective CPE installation and setup. o Students will individually create a complete CPE installation and setup plan that identifies the appropriate tools and materials, explains key technical specifications, and outlines step-by-step configuration procedures. The plan must show how to ensure proper installation, optimal functionality, and stable connectivity from start to finish. • **Group Performance Task: "Mission: Stable Connection – CPE System Build"** o Collaboratively design and justify a fully functional CPE installation and configuration setup for optimal network performance.	

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	o Students will work in groups to design a complete CPE system setup, including tool selection, installation procedures, device configuration, and alignment with technical specifications. They will also explain how their setup ensures reliable connectivity and optimal performance. Each group will present and defend their design as a technical team proposing a real-world broadband solution	
Performance Standard	The learners perform installation and maintenance of fiber optic networks, achieving high signal quality, low loss, and reliable system operation, while adhering to the industry's best practices and safety standards	
Content Standard	The learners demonstrate an understanding of the fundamentals of fiber optic broadband network installation, maintenance, and quality assurance.	
4	• **Discuss the fundamentals of fiber broadband**	• **Fiber Evolution Explorer: From Light to Speed** o Understand the evolution, structure, and principles of fiber broadband technologies. o Students will work in groups and create a visual "fiber evolution map" showing how broadband technologies developed into fiber optics. They must include advantages over DSL, cable, and satellite, types of fiber optic cables, structure of fiber cables, and light transmission principles. They will also compare single-mode and multi-mode fibers and explain how wavelengths affect transmission speed. Each group will present their output as a "technology story" from past to present.

Week	Learning Competency	Suggested Activities
		• **Build a Fiber Network: Design the Future Internet** o Apply knowledge of fiber network types and components by designing a complete fiber broadband system. o Students will form groups and design a fiber network (FTTH, FTTP, FTTC, FTTB, or FTTN). They must identify and include key components such as optical fiber cables, OLT, ONT, PON/AON systems, splitters, and connectors. Each group will create a labeled diagram showing how data travels through their system and explain how their design ensures fast and reliable connectivity.
5	• **Discuss preparation for fiber optic cable layout and installation**	• **Fiber Site Scout: Plan the Perfect Route** o Apply site survey, planning, and compliance knowledge to design a safe and efficient fiber optic cable layout. o Students will work in groups and act as fiber site engineers assigned to a project area (school, community, or building). They will conduct a simulated site survey and create a cable route plan that considers safety and regulatory compliance. They must also justify their selection of fiber optic cables and

Week	Learning Competency	Suggested Activities
		components, and outline worksite readiness requirements. Each group will present their proposed installation plan. • **Ready for Install: Fiber Deployment Simulation** o Demonstrate understanding of tools, equipment, logistics, and installation preparation for fiber optic deployment. o Students will form groups and prepare a complete pre-installation checklist for a fiber optic project. They will identify required tools and equipment, ensure proper cable route preparation, and plan worksite readiness and logistics. Each group will present their readiness plan as if preparing for an actual fiber installation project in the field.
	• **Discuss preparation for fiber optic cable for splicing and joining**	• **Fiber Prep Lab: Clean, Cut, Connect** o Apply proper fiber preparation techniques including stripping, cleaning, and cleaving for accurate splicing. o Students will work in groups and simulate a fiber preparation station. They will demonstrate and explain the steps of cable stripping, coating removal, and proper fiber cleaving using correct tools and techniques. They must also consider environmental factors that may affect preparation quality.

Week	Learning Competency	Suggested Activities
		Each group will present their fiber preparation process step-by-step. • **Splice Ready: Precision Setup Challenge** o Demonstrate understanding of fusion splicer setup, maintenance, and protection sleeve preparation for fiber optic splicing. o Students will form groups and prepare a complete fusion splicing readiness plan. They will explain splicer setup and calibration, electrode cleaning and maintenance, and environmental considerations such as temperature and humidity. They must also select appropriate protection sleeves and demonstrate proper loading of fibers. Each group will present their "splicing readiness checklist" as field technicians preparing for actual installation.
	• **Perform splicing/joining fibers and installing protection sleeves using a fusion machine**	• **Fusion Lab Challenge: Perfect the Splice** o Apply fusion splicing techniques by performing proper fiber alignment, splicing parameters, and sleeve application. o Students will work in groups and simulate a fiber fusion splicing process. They will demonstrate manual and automatic fiber alignment, interpret alignment indicators, and set appropriate arcing parameters (current and time) for different splicing

Week	Learning Competency	Suggested Activities
		modes. They must also show proper sleeve placement and describe the use of the heat shrink oven. Each group will explain their splicing process step-by-step. • **Splice Detective: Test, Inspect, Improve** o Evaluate fiber splice quality through testing, inspection, and troubleshooting procedures. o Students will form groups and analyze a simulated fiber splice output. They will conduct visual inspection, interpret OTDR and power meter results, and identify possible splice loss issues. Each group will propose troubleshooting solutions and explain how to improve splice quality and performance. They will present their findings as "fiber quality assurance engineers."
Suggested Performance Tasks	• **Individual Performance Task: "Fiber Mastery Mission: From Install to Inspect"** o Demonstrate understanding of fiber optic broadband installation, maintenance, and quality assurance principles. o Students will individually create a comprehensive fiber optic network process plan that explains the steps of installation, basic maintenance practices, and quality assurance procedures. The plan must include fiber preparation, splicing concepts, testing methods (e.g., OTDR or power meter), and troubleshooting approaches to ensure reliable network performance. • **Group Performance Task: "Fiber Command Center: Build, Maintain, Verify"**	

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	o Collaboratively design a complete fiber optic network workflow that integrates installation, maintenance, and quality assurance. o Students will work in groups to design a full fiber optic network system workflow, from installation to maintenance and quality control. They must illustrate key processes such as splicing, testing, inspection, and troubleshooting, and explain how quality assurance is maintained at each stage. Each group will present their "fiber command plan" as if managing a real broadband deployment project.	
Performance Standard	The learners perform splicing/joining fibers and installation of protection sleeves using mechanical methods as well as installation of aerial and underground cable support while adhering to the industry's best practices and safety standards.	
Content Standard	The learners demonstrate an understanding of principles in splicing/joining fibers and installation of protection sleeves using the mechanical method as well as installation of aerial and underground cable support.	

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6	• **Perform splicing/joining fibers and installation of protection sleeves using the mechanical method**	• **Mechanical Splice Lab: Build It Right!** o Apply the correct mechanical splicing process including fiber preparation, alignment, and protection sleeve installation. o Students will work in groups and simulate a mechanical fiber splicing procedure. They will demonstrate proper fiber preparation (stripping, cleaning, and cleaving), explain fiber core alignment, and describe correct insertion and securing inside a mechanical splicer. They must also select and install appropriate protection sleeves while ensuring strain relief and durability. Each group will present their complete splicing workflow step-by-step. • **Splice Inspector: Test, Measure, Fix!** o Evaluate mechanical splice quality through testing, loss measurement, and troubleshooting procedures. o Students will form groups and analyze a simulated mechanical splice output. They will conduct visual inspection, interpret OTDR results, and perform attenuation testing to determine splice quality. Based on findings, they will identify possible splice issues and propose troubleshooting solutions. Each

Week	Learning Competency	Suggested Activities
		group will present their analysis as "fiber quality control engineers" ensuring reliable network performance.
7	• **Perform installation of aerial cable closure and support**	• **SkyLine Installers: Build the Aerial Network** o Apply safe and correct procedures in aerial fiber installation including support structures, lashing, and closures. o Students will work in groups and design a step-by-step aerial installation plan for a fiber optic network along utility poles. They will include site preparation and safety considerations, installation of messenger wire and support hardware, proper lashing of fiber cables, and placement of fiber closures. Each group will present their installation plan as if preparing for real field deployment. • **Pole-to-Pole Challenge: Safe & Secure Build"** o Demonstrate understanding of aerial fiber installation with proper grounding, bonding, and securing techniques. o Students will form groups and simulate an aerial cable installation scenario. They will explain how fiber cables are safely lashed to messenger wires, how closures are properly mounted and secured on poles, and how grounding and bonding are applied for safety

Week	Learning Competency	Suggested Activities
		and protection. Each group will present their "aerial safety and installation report" emphasizing compliance with industry standards.
8	• **Perform installation of underground cable closure and support**	• **Underground Fiber Engineers: Dig, Duct, Deploy!** o Apply proper underground installation procedures including trenching, ducting, conduit placement, and fiber cable deployment. o Students will work in groups and design a step-by-step underground fiber installation plan. They will include trenching methods, duct and conduit placement, and procedures for pulling or blowing fiber optic cables through conduits. Each group will present their plan as if managing a real underground broadband installation project. • **Hidden Network: Seal & Secure Challenge** o Demonstrate understanding of underground fiber protection through proper enclosure installation, sealing, and waterproofing techniques. o Students will form groups and simulate the installation of fiber in underground enclosures. They will explain the preparation

Week	Learning Competency	Suggested Activities
		of manholes and handholes, installation of fiber closures, and proper sealing and waterproofing methods. Each group will present their "underground protection strategy" to ensure long-term durability and reliability of the fiber network
9	• **Perform connection of fiber to the premises**	• **Fiber Home Connect: From Street to Setup** o Apply proper procedures in selecting entry points, routing fiber cables, and installing termination points. o Students will work in groups and design a fiber-to-the-premises installation plan for a home or building. They will identify the best fiber entry point, plan cable routing, and include proper drilling and cable management techniques. Each group will present their layout as if preparing a real residential fiber installation. • **ONT Ready: Power Up the Connection** o Demonstrate understanding of ONT installation and power supply setup for a functional fiber connection. o Students will form groups and simulate the final stage of fiber installation at the customer premises. They will explain how the Optical Network Terminal (ONT) is installed, how it is properly connected, and how the

Week	Learning Competency	Suggested Activities
		power supply is set up. Each group will present their "final connection setup" ensuring a working and reliable broadband system.
10	• **Perform testing & activation**	• **Signal Check Squad: Activate the Connection** o Apply testing procedures to verify signal strength, connectivity, and broadband activation readiness. o Students will work in groups and simulate a fiber broadband activation process. They will perform signal strength testing, check connectivity, and conduct speed testing to evaluate system performance. Each group will record their results and present whether the connection is ready for activation or needs adjustment. • **Fiber Fix-It Lab: Configure, Test, Troubleshoot** o Demonstrate proper ONT configuration and troubleshooting skills to ensure stable broadband performance. o Students will form groups and simulate a broadband system that requires activation. They will configure the ONT, verify correct setup, and identify possible connectivity issues. They must propose troubleshooting

Week	Learning Competency	Suggested Activities
		steps and adjustments to improve performance. Each group will present their final "network optimization report" explaining how they achieved a stable connection.
Suggested Performance Tasks		• **Individual Performance Task: Fiber Field Engineer Challenge: Build, Protect, and Connect** o Demonstrate understanding of mechanical fiber splicing, protection sleeve installation, and aerial/underground cable support principles. o Students will individually create a complete fiber installation plan that integrates mechanical splicing procedures, proper installation of protection sleeves, and both aerial and underground cable support methods. The plan must clearly explain fiber preparation, alignment, securing techniques, and protection strategies, while ensuring safe and reliable network deployment. • **Group Performance Task: "End-to-End Fiber Network Mission: From Splice to Support"** o Collaboratively design a complete fiber optic network installation that applies splicing, protection, and cable support systems in real-world scenarios. o Students will work in groups to design a full fiber installation project covering mechanical splicing, protection sleeve application, and both aerial and underground cable support systems. They will illustrate the installation flow from fiber joining to final support structure placement, ensuring safety, durability, and industry compliance. Each group will present their "fiber deployment mission" as a complete real-world broadband solution.