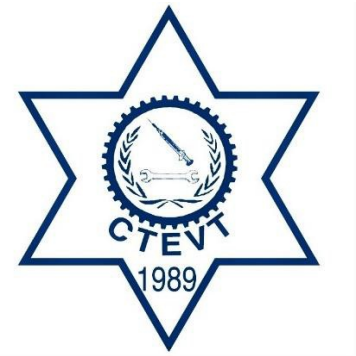
CURRICULUM

Pre-diploma in Electronics Engineering

(18 months)



Council for Technical Education and Vocational Training
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Introduction

The pre-diploma curriculum of Electronic Engineering is designed to produce competent middle level workforce equipped with knowledge, skills and attitudes related to the field of Electronics engineering. The knowledge and skills incorporated in this curriculum will be helpful to deliver the national needs in the field of Electronics Engineering.

Curriculum title

The title of this curricular program is **Pre-diploma in Electronics Engineering.**

Program aim

The aim of the program is to prepare middle level competent human resource in Electronics Engineering field who can work as **Assistant Sub-engineers** in rapid growing electronics items manufacturing industries as well as can provide service in electronics and communication fields.

Program objectives

This curriculum has following objectives to:

1. Perform basic mechanical fabrication practices
2. Calculate basic level mathematics related to the electronics engineering field.
3. Explain and draw basic level engineering drawing related to electronics engineering.
4. Perform household electrical installation
5. Perform basic electronics and computer works
6. Assist to install telecommunication system
7. Repair and maintain household electrical devices and equipment
8. Install and maintain audio video and multimedia system
9. Create self-employment opportunity to reduce the unemployment problems and poverty in the country.

Program Description

This programme is based on the job required to be performed by the Junior Electronics Technicians (Sub-overseer) in electronics goods manufacturing and service sectors. The manufacturing sector includes electronic items production and service sector includes electronics and communication system installation and maintenance. Therefore, this curriculum is designed to provide knowledge and skills focusing on Electronics Engineering related to the occupation. The curricular program consists of one year in house course and six months on the Job Training.

Similarly, the On-the-Job Training (OJT) for 6 months insists on the application of learned skills and knowledge in formal setting as well as the provision of OJT is also included to establish a linkage with employers and provides hands on work experience to students and promotes employability of graduates. Moreover, OJT takes place immediately after completing yearly final examination.

Program Duration

This course will be completed within 18 months (40 hrs./week X 39 weeks a year = 1560 hrs.)

class plus 6 months (40 hrs./week X 24 weeks = 960 hrs.) on the job training (OJT).

Focus of Curriculum

This is a competency-based curriculum. This curriculum emphasizes on competencies performance. Here 80% curricular time weightage is allotted for performance and remaining 20% time is allotted for related technical knowledge. Therefore, the focus will be on performance of the specified competencies in this curriculum.

Target Location

The target location will be all over Nepal.

Group Size

The group size of this program will be a maximum of 40 (forty) in a batch.

Target Group

The target group for this program will be all interested individuals who maintain the following entry qualification.

Entry Qualification

- SLC/SEE in any marks/grade/GPA obtained or equivalent or as per provisions mentioned in the admission guidelines of Office of the Controller of Examinations, CTEVT.
- Should pass entrance examination administered by CTEVT.

Medium of Instruction

The medium of instruction will be in English and/or Nepali language.

Pattern of Attendance

Minimum of 90% attendance in each subject is required to appear in the respective final examination.

Teacher and Students Ratio

- Overall ratio of teacher and student must be 1:10 (at the institution level)
- Teacher and student's ratio for theory class should be 1:40.
- Teacher and student's ratio for practical should be 1:10.

Qualification of Instructional Staff

- Instructors should be Bachelor Degree holder in Electronics Engineering or equivalent
- Assistant Instructors should be Diploma in Electronics Engineering or equivalent
- Teaching Aide should be Pre-diploma holder in Electronics Engineering or equivalent
- Good communication and instructional skills
- Experience in the related field

Instructional Media and Materials

The following instructional media and materials are suggested for the effective instruction, demonstration and practical.

- **Printed Media Materials** (Assignment sheets, Handouts, Information sheets, Individual training packets, Procedure sheets, Performance Check lists, Textbooks etc.).
- **Non-projected Media Materials** (Display, Photographs, Flip chart, Poster, Writing board etc.).
- **Projected Media Materials** (Multimedia, Overhead transparencies, Slides etc.).
- **Audio-Visual Materials** (Audiotapes, Films, Slide-tape programs, Videodiscs, Videotapes etc.).
- **Computer-Based Instructional Materials** (Computer-based training, Interactive video etc.)
- **Web-Based Instructional Materials** (Online learning)
- **Radio/Television/Telephone**
- **Education-focused social media platforms**

Teaching Learning Methodologies

The methods of teachings for this curricular program will be a combination of several approaches such as; Illustrated Lecture, Panel Discussion, Demonstration, Simulation, Group work, Guided practice, Practical experiences, Fieldwork, OJT, Report writing, Term paper presentation, Case analysis, Tutoring/coaching, Role-playing, Assignment, Heuristic, Project work and other Independent learning.

- Theory: Illustrated lecture Discussion, Seminar, Interaction, Assignment and Group work.
- Practical: Demonstration, Observation, Guided practice, Self-practice and Project work.
- OJT: Workplace-based learning at the related institutions under the supervision of supervisor of OJT providing institutions.

Approach of learning

There will be inductive, deductive and learner-centered approaches of learning.

Examinations and Marking Scheme

- The distribution of marks for theory and practical tests will be as per the marks given in the curriculum structure of this curriculum for each subject. Ratio of internal and final evaluation is as follows:

S.N.	Particulars	Internal Assessment	Final Exam	Pass %
1	Theory	50%	50%	40%
2	Practical	50%	50%	60%
3	OJT			60%

- There will be three internal assessments to be administered by the institute and one

final examination in each subject at the end of program. Moreover, the mode of internal assessment and final examination include both theory and practical or as per the nature of instruction as mentioned in the curriculum structure.

- Continuous evaluation of the students' performance is to be done by the related instructor/ trainer to ensure the proficiency over each competency under each area of a subject specified in the curriculum.
- The on-the-job training is evaluated in 300 full marks. The evaluation of the performance of the student is to be carried out by the three agencies; the concerned institute, OJT provider organization and the CTEVT Office of the Controller of Examinations. The student has to score minimum 60% marks for successful completion of the OJT.
- The students must secure minimum of 40% marks in theory and 60% marks in practical both in internal and final examinations.

Provision of Back Paper

There will be the provision of back paper but the students must pass all the subjects within three years from the enrollment date; however, there should be a provision of chance exam for the students as per CTEVT rules.

Disciplinary and Ethical Requirements

- Intoxication, insubordination or rudeness to peers will result in immediate suspension followed by review by the disciplinary review committee of the institute.
- Dishonesty in academic or practice activities will result in immediate suspension followed by administrative review, with possible expulsion.
- Illicit drug use, bearing arms at institute, threats or assaults to peers, faculty or staff will result in immediate suspension, followed by administrative review with possible expulsion.

Marking System

The marking system will be as follows:

Grading	Overall marks
Distinction	80% or above
First division	75% to below 80%
Second division	65% to below 75%
Third division	Pass aggregate to below 65%

Curriculum and Credits

In this curriculum, each subject has its full marks and instructional hours; and instructional hours are divided into theory hours, practical hours and On-Job-Training hours (Practical)

Certificate Requirements

The Council for Technical Education and Vocational Training, Office of the Controller of Examinations will award certificate of **Pre-diploma in Electronics Engineering** to those students who gain a minimum mark of **60% in practical exam** and **40% in theoretical**

exam in all subjects.

In addition, OJT has to be evaluated by keeping 500 as full marks. The evaluation of the performance of the students is to be carried out by the concerned employer **where the student is placed and the CTEVT** unless otherwise directed by Office of the Controller of Examinations of the Council for Technical Education and Vocational Training. Here also the student has to score 60% or above for successful completion of the curricular program.

Career Path

The graduates will be eligible to work in the position of **Assistant Sub-engineer (Electronics Engineering)** in the government related organizations as prescribed by the Public Service Commission or other concerned agencies.

General Attitudes Required

An apprentice should demonstrate following general attitudes for effective and active learning.

Acceptance, Affectionate, Ambitious, Aspiring, Candid, Caring, Change, Cheerful, Considerate, Cooperative, Courageous, Decisive, Determined, Devoted, Embraces, Endurance, Enthusiastic, Expansive, Faith, Flexible, Gloomy, Motivated, Perseverance, Thoughtful, Forgiving, Freedom, Friendly, Focused, Frugal, Generous, Goodwill, Grateful, Hardworking, Honest, Humble, Interested, Involved, Not jealous, Kind, Mature, Open minded, Tolerant, Optimistic, Positive, Practical, Punctual, Realistic, Reliable, Distant, Responsibility, Responsive, Responsible, Self- confident, Self-directed, Self-disciplined, Self-esteem, Self-giving, Self-reliant, Selfless, Sensitive, Serious, Sincere, Social independence, Sympathetic, Accepts others points of view, Thoughtful towards others, Trusting, Unpretentiousness, Unselfish, Willingness, Work-oriented.

Curriculum Structure
Pre-Diploma in Electronics Engineering

S.N.	Code No.	Subject	Teaching Scheme						Examination Scheme						Total Marks	Remarks
			Mode				Weekly Hours	Credit Hours	Theory			Practical				
			L	T	P	L /C			Assmt. Marks	Final		Assm. Marks	Final			
										Marks	Time (Hrs.)		Marks	Time (Hrs.)		
1		Applied Math	2				2	2	10	40	1.5	-	-	-	50	*continuous assessment
2		Engineering Drawing				3	3	2	-	-	-	60	40	3	100	
3		Entrepreneurship Development	2				2	2	10	40	1.5	-	-	-	50	
4		Electrical installation				4	4	2	-	-	-	60	40	3	100	
5		Mechanical Workshop Practice				2	2	1	-	-	-	30	20	1.5	50	
6		Fundamental of Basic and Digital Electronics	2			4	6	4	10	40	1.5	60	40	3	150	
7		Electronics Technology	2			4	6	4	10	40	1.5	60	40	3	150	
8		Repair and Maintenance of Application				6	6	3	-	-	-	90	60	4	150	
9		Computer Application, Hardware and Networking	2			3	5	4	10	40	1.5	60	40	3	150	
10		Communication System	1			3	4	3	25	-	-	60	40	3	125	
		Subtotal	**11**			**29**	**40**	**35**	**170**	**680**		**120**	80		**1075**	
11		**On the Job Training (6Month)**					**960**						500		**500**	
		Total													**1575**	

T= Theory
P= Practical.

Applied Math

Total: 2 hours /week
Lecture: 2 hour/week
Tutorial: 0 hours/week
Practical: 0 hours/week
Lab: 0 hours/week

Description:	This course is designed to help students to calculate and apply the mathematics in a standard applied manner. This course fulfills the basic knowledge required for Electronics engineering and technical students.
Objectives:	At the end of the course the participants will be able to: ▪ Calculate and convert units. ▪ Calculate electrical and electronics parameters. ▪ Apply fundamental of DC circuits calculation. ▪ Develop skill of simple mathematic calculation. ▪ Develop the skill needed for the calculation of electronic engineering mathematics

S.N.	Topic	Contents	Time Hours
1.	Convert number system	**Number system** • Introduction • Decimal to Binary and vice-versa • Decimal to Octal and vice-versa • Decimal to Hexa-Decimal and vice –ver • Some simple exercises	6
2.	Calculate Geometric shape	Geometric shape • Length • Area • Volume • Conversion units • Some simple exercises	6
3.	Calculate Percentage	Percentage • Profit • Loss • Discount • Commission • Some simple exercises	4
4.	Calculate electrical Parameters	Electrical Parameters • Resistance, Voltage, Current • Power • Energy • Resistivity • Resistance in series and parallel circuit • Some simple exercises	10

S.N.	Topic	Contents	Time Hours
5.	Calculate Cost per unit	**Cost per unit** • Unitary method • Depreciation cost • Some simple exercises	3
6.	Calculate Frequency	**Frequency** • Introduction • Wave length • Frequency • Speed of sound • Some simple exercises	4
7.	Calculate simple Quadratic Equation	**Quadratic equation** • Introduction • Description of $ax^2+bx+c=0$ • Some simple exercises	6
8.	Calculate Permutation and Combination	Permutation and Combination • Introduction • laws • Meaning of np_r and nc_r • Some simple exercises	6
9.	Calculate Matrix and Determinant	Matrix and Determinant • Introduction • Types • Addition and Subtraction of 2x2 matrix • Determinant of 2x2 matrix • Some simple exercises	6
10.	Calculate Trigonometry	**Trigonometry** • Introduction • Pythagoras Theorem • Trigonometric ratios • Trigonometric table • Some simple exercises	9
11.	Logarithms & Anti-Logarithms	**Logarithms & Anti-Logarithms** • Definition of logarithms: logarithmic functions of base 10 and "e" • Method of finding Characteristics and Mantissa • Definition Antilogarithms • Method of finding Antilog of logarithm number • Some simple exercises	4
12.	Calculate the Limit	**Limit** • Introduction • Meaning of $x \rightarrow a$ • Some simple exercises	6
		Total	70

Reference Books:

- Mehta, R & Mehta, V.K. (2021) *Principle of Electronics*, S. Chand Publishing
- Dahal, H.P (2023), *Excel in Mathematics*. Vedanta Publication (P) Ltd.

Engineering Drawing

Total: 3 hours /week
Lecture: hour/week
Tutorial: 0 hours/week
Practical: 3 hours/week
Lab: 0 hours/week

Description:	This course designed to help the students to provide skill on handling of drawing instruments and materials and drawing free hand lettering, lines and deferent geometrical shapes, isometric and orthographic drawing. This course also provides comprehensive knowledge and skills on designing electronics and electrical circuits with circuit maker. It also deals with drawing circuits manually, with the help of Electronics CAD, electrical and simulation of drawn circuits.
Objectives:	After completion of this course students will be able to: • Project point, line, plane and other geometrical shapes. • Understand and draw isometric and orthographic drawing • Represent 3 dimensional objects. • Use free hand techniques to sketch different shapes • Draw basic electronics symbols • Draw simple circuit diagram using circuit maker. • Explain drawing of electronics and electrical circuit (block diagram) • Explain assembling and manufacturing drawing. • Be familiar with Electronics CAD • Explain electronic and electrical circuit simulation.

S.N.	Skills/ Topic	Contents	Time hrs		
			Th.	Pr.	Total
Geometrical Engineering Drawing					
1.	Handle basic drawing tools/instruments	**Drawing tools & instruments** • Introduction • Types • Importance and use. • Handling techniques • Precautions		4	4
2.	Prepare drawing sheet with title block.	**Drawing sheets and title block** • Introduction • Types and size • Importance and use. • Border lines		3	3
3.	Draw Geometrical shapes	**Geometrical shapes** • Introduction • Process • Lines • Square • Triangle		20	20

S.N.	Skills/ Topic	Contents	Time hrs		
			Th.	Pr.	Total
		• Circle • Lines angles • Arcs of circle • Regular Polygon (Pentagon, Hexagon, Octagon) • Tangent line of circle • Rectangle • Ellipse • Prism • Circular involute			
4.	Apply different scales (linear and non-linear)	**Scales** • Introduction • Types • Importance and use • Representative fraction		2	2
5.	Draw different types of lines.	**Lines** • Introduction • Types • Importance and use		2	2
6.	Write lettering	**Lettering** • Introduction • Importance and use • Types • Sizes • Process		2	2
7.	Draw Isometric drawing	**Isometric drawing** • Introduction • Process • Uses and importance		12	12
8.	Draw Orthographic view	**Orthographic view** • Introduction • Types • Importance and use • Procedure and method • System of orthographic projection: First angle and Third angle		15	15
9.	Draw electronics symbol and circuits	**Electronics symbol and circuits** • Introduction • Symbols • Logic gates • Voltmeter • Ammeter • Ohm meter		20	20

S.N.	Skills/ Topic	Contents	Time hrs		
			Th.	Pr.	Total
		• Block diagram (Radio Receiver, Transmitter, Power Supply) • Circuit diagram (Multi-Voltage Power Supply, Water Level Controller, Amplifier Circuit)			
10.	Draw electronics circuit using CAD	**Electronics CAD** • Introduction • Basic commands • Symbols & Circuit Diagrams		25	25
	Total			**105**	**105**

Tools and Materials:

Drawing Board	T-Scale
Set square	Scale
Pencil	Eraser
Drawing Paper	Masking Tape
Sharpener	PC set
Electronics Simulation software	Protector
Compass	

Reference Book:

1. Luzadder, W.J. (1977) *Fundamental of engineering drawing*, Prentice-hall of India Pvt ltd, New Dehli, latest edition.
2. Bhatt N.D. and Panchal V.M., *Engineering Drawing* , Charotar Publishing House, 2001
3. Kataraia, S.K. & Sons (2004/2005), General Electrical Drawing.
4. Panchol.V.M. (2001), Engineering Drawing, Charolar Publishing House.

Entrepreneurship Development

Total: 2 hours /week
Lecture:2 hour/week
Tutorial: 0 hours/week
Practical: 0 hours/week
Lab: 0 hours/week

S.N.	Skills/ Topic	Contents	Time Hours		
			T.	Pr.	Total
	Unit 1: Introduction to Entrepreneurship and Business				
1.	Overview of Entrepreneurship Development and Business	• Concept of entrepreneurship, enterprise and business • Difference between enterprise and business • Difference between employment, self-employment and business • Challenges in entrepreneurship • Advantages and disadvantages of being entrepreneur • Stages (socialization, startup, acceleration, expansion and sustainability) of entrepreneurship development • History of enterprise in Nepal. • Types of enterprise based on the Industrial Enterprise Act, 2076 of Nepal	3.0	-	3.0
	Unit 2: Exploring and Developing Entrepreneurial Competencies				
2.	Conduct self-assessment	• Importance of self-assessment to be a successful entrepreneur. • "Who am I?" technique of self-assessment. • Components of Johari Window. • Johari Window analysis process. • Characteristics of successful entrepreneur	4.0		4.0
3.	Analyze Risk	• Concept of risk • Types of risk (external/internal, low/medium/high) • Risk taking behavior • Risk minimizing techniques	4.0		4.0
4.	Assess Decision-Making Attitude	• Definition • Concept of Decision-making attitude • Decision making Process • Dos and Don'ts while making decision	2.0		2.0
5.	Overview of creativity and innovation in business	• Stages of creativity (preparation, concentration, incubation, illumination, evaluation and application) • Barrier of creativity • Way of developing creativity	2.0		2.0

S.N.	Skills/ Topic	Contents	Time Hours		
			T.	Pr.	Total
		• Innovation in business (SCAMPER Model)			
	Unit 3: Market and Marketing				
6.	Develop Marketing Strategy	• Definition of market and marketing • Concept of marketing cycle • 4 - PS (product, place, price and promotion) • Basic marketing strategies. • Factors to be considered while selecting marketing strategy.	2.0		2.0
	Unit 4: Business Identification and Selection				
7.	Overview of business identification and selection process	• Sources and method of generating business ideas. • Selection of viable business ideas (selection criteria) • Legal provisions for the selected business (registration, documents requirements, facilities/subsidies)	2.0		2.0
8.	Conduct Market Survey	• Procedure of assessing market situation • Market estimation process	6.0		6.0
9.	Conduct SWOT Analysis	• Four components of SWOT analysis matrix • Factors to be considered during SWOT analysis • SWOT analysis procedure	4.0		4.0
	Unit 5: Business Plan				
10.	Overview of Business Plan	• Concept of business plan • Importance of business plan • Factors to be considered while preparing business plan • Components of business plan	1.0		1.0
11.	Prepare Marketing Plan	• Description of product or service • Targeted market and customers • Location of business establishment • Competitors analysis • Estimation of market demand • Estimation of market share • Measures for business promotion • Procedure of preparing marketing plan	6.0		6.0
12.	Prepare Organizational and human resource plan	• Legal status of business • Management structure • Required human resource and cost • Roles and responsibility of staff	6.0		6.0

S.N.	Skills/ Topic	Contents	Time Hours		
			T.	Pr.	Total
13.	Prepare Business Operation Plan	• Process of product or service creation • Required fix assets • Level of capacity utilization • Depreciation & amortization • Estimation of office overhead and utilities • Procedure of preparing business operation plan	7.0		7.0
14.	Prepare Financial Plan	• Concept of financial plan • Steps of financial plan • Working capital estimation • Pricing strategy • Profit/loss calculation • BEP and ROI analysis • Procedure of preparing business operation plan	8.0		8.0
15.	Appraise Business Plan	• Return on investment • Breakeven analysis • Risk factors	8.0		8.0
	Unit 6: Book Keeping				
16.	Maintain basic book keeping	• Concept and need of book keeping • Methods and types of book keeping • Procedure to maintain day book and sales records	5.0		5.0`
	Total		**70**		**70**

Reference book:

- जोशी बिष्णु, (२०७६). *उद्यमशीलता विकास.* अनुभूति नेपाल प्रा.लि.
- Agrawal, G.R. (2015). *Entrepreneurship Development in Nepal. M.K. Publishers & Distributors*
- सिटिईभिटि. (२०७०). *उद्यमशीलता, प्राविधिक शिक्षा तथा व्यावसायिक तालीम परिषद, डिप्लोमा तह, प्रा.एस.एल.सी तह, छोटो अवधिको पाठ्यक्रममा आधारित, प्रशिक्षकहरूका लागि निर्देशिका/प्रशिक्षण सामग्री*
- Shrestha Er. Santosh Kumar, Bhattarai Er. Subash Kumar, Ghimire Mr. Subas, A Textbook of Entrepreneurship Development, Heritage Publishers & Distributors Pvt. Ltd., 2023
- Dhakal Sirjana, Entrepreneurship Development, G. L. Book House, 2080
- Poudyal Prof. Dr. Santosh Raj, Pradhan Dr. Gopal Man, Entrepreneurship and Enterprise Development, Advance Saraswoti Prakashan,2020

Electrical Installation

Total: 4 hours /week
Lecture: hour/week
Tutorial: 0 hours/week
Practical: 0 hours/week
Lab: 4hours/week

Description:	This course provides knowledge and skills related on basic electrical installation techniques. It also covers classification of wiring, selection of materials, simple design and installation of domestic electrification.
Objectives:	After completing this course students will be able to: • Apply electrical safety rules. • Identify tools, equipment, materials and machines used in electrical system. • Familiarize with electrical components related with electrical system. • Interpret layout and wiring diagram. • Perform basic electrical installation. • Repair and maintain electrical installation. • Perform wiring system and electrical safety test. • Perform earthing system. • Perform invertors system. • Perform different electrical measuring device.

S.N.	Skills/ Topic	Contents	Time Hours		
			T.	Pr.	Total
1.	Interpret electrical diagram	**Electrical diagram** • Introduction • Types o Wiring o Layout • Importance and use		3	3
2.	Familiar with Electrical wiring symbols	**Electrical symbols** • Introduction • Layout symbols • Wiring symbols		3	3
3.	Handle electrical tools and equipment.	**Electrical tools and equipment** • Introduction • Types • Importance & use • Safety		3	3
4.	Select the electrical materials and accessories	**Electrical materials** • Introduction • Types • Importance and use • Safety		2	2

S.N.	Skills/ Topic	Contents	Time Hours		
			T.	Pr.	Total
5.	Electrical safety	**Electrical safety** • Introduction • Types • Safety rules • Importance		4	4
6.	Electric shock and its effect	**Electric shock** • Introduction • Effect • Safety Measure		2	2
7.	Select electric protective devices	**Electric Protective device** • Introduction • Types • Importance & use		4	4
8.	Provide first aid services	**First aid for electric shock** • Introduction • Importance and application • Process • Simulation		3	3
9.	Introduce to Electrical Law	**Ohms law** • Introduction • Advantages • Applications **Kirchhoff's law** • Introduction of current law (1st law) • Introduction of voltage law (2nd law) • Applications		4	4
10.	Introduce the wire and cable.	**Wire and cable** • Introduction • Types • Differences • Joints • Insulation test		4	4
11.	Introduce basic electrical measuring Instruments.	**Electrical measuring Instruments** • Introduction • Types o Multimeter o Meggar o Energy Meter o Earthing Tester Instrument • Uses		4	4
12.	Perform wiring.	**Board Wiring** • Estimating and costing of installation with working procedure			

S.N.	Skills/ Topic	Contents	Time Hours		
			T.	Pr.	Total
		• One bulb control by one-way switch with Protective device • Two bulb control by one-way switch in series condition with Protective device • Two bulb control by one-way switch in parallel condition with Protective device • One bulb control by one-way switch with 2/5pin Socket and indicator with Protective device • One bulb control by one-way switch with push button with Protective device switch controlled by buzzer • One bulb control by 2-way switch with 3pin switch combined power socket with Protective device • One bell control by one-way switch and other bulb control by two-way switch with 3pin switch combined power socket with Protective device • One bulb control by 3 places using 2 ways switches and one cross way switch with Protective device • Call bell system • Go down circuit • Energy meter installation • Bulb, Tube light set and fan control by three one way switch and dimmer		84	84
13.	Install inverter	**Inverter** • Introduction • Connection diagram • Connection process • Use and importance		6	6
14.	Perform earthing	**Earthing** • Introduction • Importance and application • Types • Methods • Process of earthing • Earthing test		14	14
		Total		**140**	**140**

Reference Books:

- Threaja, B.L. (2005). *A Textbook of Electrical Technology* - Volume I
- *Basic Electrical Engineering* (Volume 1). S. Chand Publishing
- Anwani, M.L. (2009). *Basic Electrical Engineering*. Danpat Rai & Co.

Required tools and equipment

• Metal electrical tool box	• Augur/barma
• Allen key set	• Measuring tape
• Flat pliers	• Cable cutter
• Cable drawer	• Chisel
• Spanner set	• Try square/bottom
• Clamp on meter	• Combinational pliers
• Crimping tools	• Cutting pliers
• Earth resistance tester	• Extension ladder (sliding type)
• File different size/ models	• Finishing towel (Ruksa)
• Hand drill machine	• Folding ladder
• Screw driver set	• Hammer
• Marking scriber	• Hand grinder
• Hand hacksaw frame with blade	• Level pipe
• Nose pliers	• Phase tester
• Frequency meter	• Pipe cutter
• Megger	• Pulling spring
• Multi meter	• Shovel
• Ammeter(AC/DC)	• Soldering lead, paste and flux
• Voltmeter (AC/DC)	• Sprit level
• Ohm meter	• Wire stripper/cable stripper
• Phase tester	• Whole saw cutter
• Plumb bob	• Soldering iron with stand

Materials list

• All types of one-way switch	• Bracket holder
• Ceiling rose	• Dimmer switch
• Floating switch	• Fluorescent lamp holder
• Lamp holder	• Lux switch/photo switch
• Main switch	• Pendent holder
• Push bottom switches	• Rotary switch
• Screw type bulb holder	• Socket outlet terminal
• Starter holder	• Surface tumbler switch
• MCB, MCCB	• Two way switch

Mechanical Workshop Practice

Total: 2 hours /week
Lecture: hour/week
Tutorial: 0 hours/week
Practical: 0 hours/week
Lab: 2 hours/week

Description:	This course provides basic skills and knowledge related to mechanical workshop practice. It imparts skills to use, care and maintain basic hand tools for metalwork. Mechanical workshop practice undertakes shaping jobs of all basic mechanical fittings carry out on bench work.
Objectives:	At the end of the course, the participants will be able to: ▪ Identify hazards ▪ Apply safety rules. ▪ Use and care for mechanical tools, instruments and machines. ▪ Perform basic operations related to mechanical work, such as: measuring, marking, cutting, bend, file, drill, and rivet according to the specification. ▪ Perform sheet metal works. ▪ Perform gas welding.

S.N.	Skills/ Topic	Contents	Time hrs		
			Th	Pr.	Total
1.	Perform filling	**Filling** • Introduction • Types • Tools/materials • Importance • Applications • Process • Safety precautions		14	14
2.	Perform measuring and marking	**Measuring & marking** • Introduction • Types • Tools/materials • Importance • Applications • Process • Safety precautions		3	3
3.	Perform the punching	**Letter, number and center punch** • Introduction • Size • Tools/materials • Importance • Applications • Process • Safety precautions		4	4
4.	Perform the sawing	**Sawing** • Introduction • Types		5	5

		• Tools/materials • Importance • Applications • Process • Safety precautions			
5.	Perform the drilling	**Drilling** • Introduction • Types • Parts • Tools/materials • Importance • Applications • Process • Size of drill bits • Safety precautions		9	9
6.	Perform Tapping	**Thread cutting (Tapping)** • Introduction • Types • Importance and uses • Procedure • Applications • Safety precautions		5	5
7.	Perform Welding	Welding • Introduction • Types • Importance and uses • Procedure • Applications Safety precautions		6	6
8.	Perform Sheet metal work (figure cutting)	Sheet metal • Introduction • Tools and materials • Application • Safety precautions •		5	5
		Folding • Introduction • Types • Importance and uses • Methods • Safety precautions		10	10
		Riveting • Introduction • Importance and application • Types • Uses • Methods		9	9
		Total		**70**	**70**

Reference Book:

- Chaudhary, S.H. & Choudhary, A.H. (1989). *Work Shop Technology-Volume I. Media Promotors and Publishers, Mumbai*

Required Tools and Equipment

• Bench Vice	• Metal Chisel
• Bench Cleaning Brush	• Metal Scissor
• Anvil	• Micro meter
• C- Clamp	• Number punch
• Center punch	• Oil Cane
• Clamp	Pin Punch
• Divider	• Pliers
• Draft Punch	• Rivet Punch
• Drill Machine with drill bit	• Safety Gloves
• File Brush	• Safety Goggles
• Files	• Screw Driver
• Tongs	• Spanner
• Hack saw With Blade	• Steel rular
• Hammer	• Taps Set
• Helmet	• Try square
• Leather Apron	• Varnier caliper
• Letter punch	• V-block
• Mallet	• Wire Brush
• Marking scriber	Welding Machine, Welding shield

Material List

• MS flat	• MS black sheet
• Rivet	• Sheet metal
• Steel strip	• U channel
• V channel	• Welding bit

Fundamental of Basic and Digital Electronics

Total: 6 hours /week
Lecture: 2 hour/week
Tutorial: 0 hours/week
Practical: 0 hours/week
Lab: 4 hours/week

Description:	This course is designed to provide knowledge and skills on essential modern components particularly on linear circuits. It is imparted with view that the use of electronics, specially the semiconductors has expanded in recent years has made a strong need of knowledge. This course also deals with the principles and applications of digital electronics. This course imparts knowledge and skills on number system, basic gates, logic circuits, Boolean algebra, combinational circuits and sequential circuits.
Objectives:	At the end of the course the participants will be able to: ▪ Describe various electronics components. ▪ Interpret their characteristics and applications. ▪ Calculate the value of electronics components. ▪ Test electronics components. ▪ Design electronic circuits using diodes. ▪ Construct voltage regulator with transistor and zener diode. ▪ Construct NOT, AND, OR, NAND, NOR Logic gate in IC. ▪ Apply safety precaution during electronics works.

S.N.	Skills/ Topic	Contents	Time Hours		
			Th.	Pr.	Total
1.	Introduce to Electronics	**Electronics** • Introduction • Types • Active and passive componen • Importance and uses • Work report	2	0	2
2.	Handle Electronics Tools, Instruments and Materials	**Electronics Tools, Instruments a Materials** • Introduction • Types • Importance and uses • Function • Advantage • Procedure • Work report	2	4	6
3.	Calculate and check the value of resistor.	**Resistor** • Introduction • Importance and uses • Types • Color code • Combination of resistor	2	10	12

S.N.	Skills/ Topic	Contents	Time Hours		
			Th.	Pr.	Total
		• Measurement of current and voltage • Work report			
4.	Calculate and Check t value of capacitor	**Capacitor** • Introduction • Importance and uses • Types • Color code • Combination of capacitor • Work report	2	5	7
5.	Calculate and Check t value of Inductor	**Inductor** • Introduction • Importance and uses • Types • Color code • Combination of Inductor • Work report	2	4	6
6.	Introduce to transformer	**Transformer** • Introduction • EMF Equation • Types • Importance and uses • Work report	2	5	7
7.	Introduce to Semiconductor	**Semiconductor** • Introduction • Types • PN junction formation • Work report	3	0	3
8.	Introduce to Semiconductor diode	**Semiconductor diode** • Introduction • Biasing of diode • Types and its uses (Zener ,LED, Photo, varactor, tunnel and schott diode) • V-I characteristics of semiconductor diode, Zener diode • Zener diode as a voltage regulator • Work report	8	18	26
9.	Perform rectifier circui	**Rectifier Circuits** • Introduction • Importance and uses • Types • Circuit diagram • Working principle and wave Form	4	12	16

S.N.	Skills/ Topic	Contents	Time Hours		
			Th.	Pr.	Total
		• Block diagram of DC power supp • Work report			

10.	Introduce to transistor	**Transistors**
		• Introduction
		• Types
		  • BJT (NPN, PNP)
		  • FET (MOSFETs)
		• Working principle of BJT
		• Applications
		• Configuration
		• Work report
			6	12	18

11.	Familiarize with ICs	**ICs** • Introduction • Types • Working principle of 741, 317 an 555 Timer IC • Advantages • Importance and uses • Work report	3	10	13
12.	Introduce to oscillator	**Oscillator** • Introduction • Types (LC oscillator, Hartely oscillator, crystal oscillator) • Importance • Application • Work report	3	4	7
13.	Introduce operational Amplifier	**Operational Amplifier** • Introduction • Types (Inverting and non-invertin amplifier) • Importance • Application • Work report	3	6	9
14.	Introduce to number system	**Number system** • Introduction • Types • Conversion among different Number System • Bit, Nibble and Byte • Importance and uses • Work report	5	0	5
15.	Perform Logic gates operation	**Logic Gate ICs** • Introduction • Importance and uses • Types	4	10	14

S.N.	Skills/ Topic	Contents	Time Hours		
			Th.	Pr.	Total
		• Symbols • Logical expression • Truth table • Function • Circuit diagram • Advantage • Procedure • Work report			
16.	Introduce to Boolean Algebra	**Boolean Algebra** • Introduction • Laws/Postulates • De-Morgans Theorems • Application of Universal gates • Work report	4	8	12
17.	Introduce to half and full adder and Subtractor	**Half and Full adder and Subtracto** • Introduction • Truth table • Logical expression • Logical diagram • Application • Work report	4	10	14
18.	Introduce to Encoder, Decoder	**Encoder, Decoder (2:4, 4:2 and** • Introduction • Truth table • Logical expression • Logical diagram • Application o Seven segment display decoder • Work report	3	6	9
19.	Introduce to Multiplexer, De-Multiplexer	**Multiplexer, De-multiplexer (4:1 a 1:4)** • Introduction • Truth table • Logical expression • Logical diagram • Application • Work report	2	4	6
20.	Introduce to FLIP-FLOP	**FLIP-FLOP** • Introduction • Types o RS o JK	2	4	6
21.	Introduce to Counter	**Counter** • Introduction • Types	2	4	6

S.N.	Skills/ Topic	Contents	Time Hours		
			Th.	Pr.	Total
		○ Synchronous ○ Asynchronous			
22.	Introduce to shift register	**Shift register** • Introduction • Types	2	4	6
		Total	70	140	210

Reference Books:

- Meheta, V.K. & Rohit, M (2008). *Basic Electronics Engineering*. S. Chand Publishing
- Gupta, J.B. (2013). *Basic Electronic Principle*. Icataria and Sons
- Molvino, A.P., & Bates, D.J. (1993). *Electronic Principles*, Glencoes
- Barg, R.K., Dixit, A., & Yadav, P. (2008). *Basic Electronic*. Firewall Media

Electronics Technology

Total: 6 hours /week
Lecture: 2 hour/week
Tutorial: 0 hours/week
Practical: 0 hours/week
Lab: 4 hours/week

.

Description:	This course intends to provide knowledge on skill. The fundamental facts of preventive and post fault maintenance have been emphasized in this course. It also deals with operation, installation and troubleshooting of electrical and electronics appliances and equipment
Objectives:	At the end of the course the participants will be able to: ▪ Assemble and Repair SMPS power supply. ▪ Repair and maintain AM,FM, Radio Receiver with USB, Bluetooth device ▪ Familiars with Microphone & Loud speaker ▪ Familiars with Amplifier ▪ Familiars with Public Address (PA) system ▪ Install cable TV network with dish antenna ▪ Repair and maintenance of Television. ▪ Repair and maintenances of TV remote control. ▪ Familiars with Satellite Signal Meter ▪ Apply safety precautions.

S.N.	Skills/ Topic	Contents	Time hrs		
			Th	Pr.	Total
1.	Assemble/Repair SMPS and variable power supply	**SMPS and variable Power supply** • Introduction • Importance and uses • Circuit diagram • Working principle • Repair and maintenance • Process of dismantle and assemble • Fault finding • Safety precautions • work report	6	22	28
2.	Repair and maintain AM,FM, Radio Receiver with USB, Bluetooth device	**AM, FM, USB and Bluetooth device** • Introduction • History • Types of Modulation • Transmitter and Receiver • Block Diagram • Circuit Diagram • Audio Frequency (A.F.) • Radio Frequency (R.F.)	12	22	34

S.N.	Skills/ Topic	Contents	Time hrs		
			Th	Pr.	Total
		• Intermediate Frequency(I.F.) • Working principle • Repair and maintenance • Fault finding • Importance and uses • Safety precautions • work report			
3.	Introduce to Microphone & Loud speaker	**Microphone & Loud speaker** • Introduction • Types • Application • Working principle • Repair and maintenance • Fault finding • Importance and uses • Safety precautions	4	8	12
4.	Introduce to Amplifier	**Amplifier** • Introduction • Types • Application • Working principle • Repair and maintenance • Fault finding • Importance and uses • Safety precautions • work report	3	8	11
5.	Introduce to Public Address (PA) system	**PA system** • Introduction • Block Diagram • Application • Working principle • Repair and maintenance • Fault finding • Importance and uses • Safety precautions • Work report	3	6	9
6.	Install cable TV network with dish antenna	**Cable Network Dish Antenna** • Introduction • Types • Components of dish system • Working principle • Installation techniques • Importance and uses • Fault finding • Safety precautions	12	22	34

S.N.	Skills/ Topic	Contents	Time hrs		
			Th	Pr.	Total
		• Work report			
7.	Introduce to Satellite Signal Meter	**Satellite Signal Meter** • Introduction • Function • Importance and uses • Safety precautions	2	4	6

8.	Repair and Maintain LCD/LED Television	**Television**
		• Introduction
		• Working principle
		• History
		• Types
		  • CRT
		  • Liquide Cristal Display (LCD)
		  • Light Emitting Diode (LED)
		• Smart TV
		• Interactive Smart Board
		• Block diagram of LCD and LED
		• Circuit diagram of LCD and LED
		• Repair and maintenance
		• Fault finding
		• Safety precautions
		• Work report
			22	42	64

9.	Repair Remote Control	**Remote control** • Introduction • Function • Importance and uses • Working principle • Circuit diagram • Repair and maintenance • Fault finding • Safety precautions • work report	6	6	12
		Total	**70**	**140**	**210**

Reference:

- Pathet, G. N. *Television Servicing.* Volume. I to IV, Norman, London
- Owes, P. (1976), *Stereo Troubleshooting and Repair Manual*. Prentice hall, USA
- Hoff, P. *Consumer Electronics for Engineers*, University Press, UK

Required tools and equipment:

• Multimeter	• Soldering Iron with stand
• De-soldering pump	• Soldering leads
• Soldering flux	• Wire cutter
• Screw driver set	• Nose plier
• Tweezers	• Flat pliers
• Slide wrench	• Measuring tape
• AC main socket	• Variable power supply
• Metal tool box set	• Plain PCB
• Hacksaw frame with blade	• Satellite Meter
• Amplifier	• PCB cleaner
• Gloves	• Pattern generator
• AC/DC power cable	• Oscilloscope
• Signal generator	• Heat sink paste
• High voltage probe	• Signal strength meter
• EMT paste	• Smart TV
• Radio set with usb and Bluetooth	•
• LCD/LED TV	• Portable SMPS power supply
• USB Radio Receiver	• Loud Speaker
• Microphone	• Mixer

Repair and Maintenance of Appliances

Total: 6 hours /week
Lecture: hour/week
Tutorial: 0 hours/week
Practical: 0 hours/week
Lab: 6 hours/week

Description:	This course provides skill and knowledge of domestic and commercial electrical and electronics appliances and equipment. The fundamental facts of preventive and post fault maintenance have been emphasized in this course. It also deals with operation, installation and troubleshooting of electrical and electronics appliances and equipment
Objectives:	At the end of the course the participants will be able to: • Repair and maintenance of measuring instruments. • Familiar with circuit diagram of electronics appliances. • Install solar power system • Troubleshooting of electronics appliances • Understand the fundamental elements that make up a CCTV System. • Set up a Camera • Set up a Monitor • Set up Network devices • Set up recording devices (NVR,XVR & DVR) • Set up Storage device. • Set up UPS connection. • Repair and maintenance of domestic appliances. • Assemble/ Repair variable voltage power supply. • Connect up and test system elements • Perform Trouble shooting and maintenance • Perform Testing and Commissioning. • Apply safety precautions. • Repair/ Replace small transformer

S.N.	Skills/ Topics	Contents	Time hrs		
			Th	Pr.	Total
1.	Repair and maintain Multimeter	**Multimeter** • Introduction • Types • Importance and uses • Circuit diagram • Working principle • Safety precautions • Work report		10	10
2.	Repair and maintain solar photo-voltaic system	**Solar photo-voltaic system** • Introduction • Install • Principle • Solar cells o Electrical parameters		15	15

S.N.	Skills/ Topics	Contents	Time hrs		
			Th	Pr.	Total
		○ Environmental impacts on the performance • Components ○ Solar panel ○ Charge controller ○ Battery ○ Distribution Box (DB) ○ Load • Designing of solar PV system ○ Load calculation ○ Layout diagram ○ Wiring diagram • Method of using hydrometer • Fault finding • Repair and maintain • Application • Safety precautions • Work report			
3.	Repair and maintain solar charge controller.	**Solar charge controller** • Circuit diagram • Concept of sensor • Fault finding • Repair and maintain • Application • Safety precautions • Work report		6	6
4	Repair and Maintain Battery	**Battery** • Introduction • Types • Working principle • Charging and discharging • Connection • Uses • Repair and maintain • Safety precautions		6	6
5	Repair and Maintain Battery Charger	**Battery charger** • Introduction • Types • Circuit diagram • Working principle • EV System • Fault Finding • Repair and maintenance • Safety Precautions • Work report		12	12
6.	Repair AC/DC lights	**AC/DC Light**		12	12

S.N.	Skills/ Topics	Contents	Time hrs		
			Th	Pr.	Total
		• Introduction • Principle of operation • Circuit diagram • Fault finding • Application • Safety precautions • Work report			
7.	Familiar with Design Printed Circuit Board(PCB)	**PCB** • Introduction • Types • PCB design • Methods • Procedure • Circuit diagram • PCB layout • Chemical (ferric chloride) • Drilling • Soldering and de-soldering • Application • Safety precautions • Work report		25	25
8	Assemble/Repair volt guard	**Volt guard** • Introduction • Circuit diagram • Working principle • Process of dismantle and assemble • Fault Finding • Repair and maintenance • Safety Precautions • Work report		16	16
9.	As Assemble/Repair voltage stabilizer	**Voltage Stabilizer** • Introduction • Types • Circuit diagram • Working principle • Process of dismantle and assemble • Fault Finding • Repair and maintenance • Safety Precautions • Work report		22	22
10.	Repair and maintain Inverter /UPS system	**Inverter/UPS system** • Introduction • Application • Types • Circuit diagram • Working principle		22	22

S.N.	Skills/ Topics	Contents	Time hrs		
			Th	Pr.	Total
		• Process of dismantle and assemble • Fault Finding • Repair and maintenance • Safety Precautions • Work report			
11.	Repair and Maintain Emergency Light	**Emergency light** • Introduction • Circuit diagram • Working principle • Sensor • Relay • Battery • Fault Finding • Repair and maintenance • Safety Precautions • Work report		8	8
12.	Introduce to CCTV System	**CCTV System** • Introduction • Application • Basic Elements • Camera types and specifications • Power supply • Cables and connectors • Site sketches & drawings. • Lens types • Video Recorder types • Video Management Software • Estimating and costing		2	2
13.	Install CCTV Camera	**CCTV Camera** • Installation • RJ45 Connector Crimping • Camera Mounting, Marking and Assembling. • Network Cable Connection. • Network Rack Installation. • Hard Disk Installation. • Power Supply Adapter Connection. • Network Cable connection • Lens Adjustment. • Fault Finding • Repair and maintenance • Safety Precautions • Site tidiness. • Work report	0	17	17

S.N.	Skills/ Topics	Contents	Time hrs		
			Th	Pr.	Total
14.	Repair and maintain Electronics appliances	Electronics appliances (**Water level controller, Automatic Door Opener, Digital Display board)** • Introduction • Importance and use • Working principle • Process • connection diagram • Work report		16	16
15.	Repair and maintain electrical appliances	Electrical appliances (**heater, Kettle, Iron, Heating Element)** • Introduction • Importance and use • Working principle • Process • connection diagram • Work report		16	16
16.	Repair/ Replace small transformer	**Transformer (12-0-12 V.)** • Introduction • Principle of transformer • Types • Repair small transformers		5	5
		Total		**210**	**210**

Required tools and equipment:

Hacksaw frame with blade	Permanent marker(nail polish)	Portable drilling machine	Soldering Iron with stand
De-soldering pump	Gloves	BNC connector	Soldering leads
Soldering flux	NVR	Cat 6 cable	Wire cutter
Screw driver set	AC/DC power cable	3+1 cable	Nose plier
Tweezers	Monitor	RJ 45 Crimping Tool	Flat pliers
Slide wrench	DVR	Drill bit	Hydrometer
AC main socket	DC connector	Heater	Measuring tape
Metal tool box set	Cat 5 cable	Electric Kettle	Variable power supply
Multimeter	LAN tester	Heating Element	Plain PCB
RJ45	Insulating Tape	Hammer	Ferric Chloride
Heater Rod	Iron	CCTV camera	PCB cleaner

Reference:

Computer Application, Hardware & Networking

Total: 5 hours /week
Lecture: 2 hour/week
Tutorial: 0 hours/week
Practical: 0 hours/week
Lab: 3 hours/week

Description:	This course deals with the fundamental of the Microsoft Windows based computer operating and application software. It also imparts knowledge and skills on internet and email handling. Moreover, it intends to provide skill on computer virus cleaning, this also intends to impart knowledge and skills on computer hardware components and networking system. It also deals with installation of operating system applications and utility software, moreover, computer hardware components repairing and maintenance along with printer .
Objectives:	At the end of the course the participants will be able to: ▪ Explain Microsoft windows operating system. ▪ Explain disk operating system ▪ Explain typing and keyboard format ▪ Explain MS office (Word, Excel & PowerPoint) ▪ Explain Media player application program. ▪ Explain internet, E-mail. ▪ Able to repair and maintain different computer peripherals ▪ Carry out installation of operating system, applications and utility software ▪ Develop computer system configuration ▪ Conduct diagnostics - testing and inspection ▪ Acquire knowledge of hardware components and latest development in the field ▪ Conduct repair and maintenance of computer. ▪ Perform computer networking and system connectivity. ▪ Familiar with safety precautions and applying the same in practice

S.N.	Skills/ Topic	Contents	Time hrs		
			Th.	Pr.	Total
Computer Application					
1.	Identify computer peripheral	**<u>Fundamentals of computer</u>** • Introduction • Central Processing Unit (CPU) • Motherboard parts • Memory Unit • Auxiliary storage devices • Various ports	8	0	8
2.	Introduce Operating System	**<u>Operating System</u>** • Introduction • Working with desktop • Control panel settings • Functions	8	6	14

S.N.	Skills/ Topic	Contents	Time hrs		
			Th.	Pr.	Total
		• Types (CUI & GUI) **Disk Operating system:** • Introduction • Types			
3.	Perform typing work	**Typing work** • Introduction • Methods • Commands • Use of menu bar • Switching between basic, high & advanced level typing • Nepali Typing • Uses of different toolbars	2	14	16
4.	Operate MS Word	**MS Word** • Introduction • Toolbar/menu • Features • Using important shortcut keys • Editing text • Formatting text • Creating table • Saving document • Opening document • Printing • Creating Word Arts • Creating Charts • Creating Shapes • Page Setup • Making Watermark • Making Page Border • Hyperlink • Inserting Header and Footer	6	18	24
5.	Operate MS Excel	**MS Excel** • Introduction • Toolbar/menu • Features • Using important shortcut keys • Concept of column, row, cell, workbook, worksheet • Editing text • Formatting text • Applying Table Border • Saving Worksheet • Opening Worksheet • Creating Word Arts • Creating Charts	8	21	29

S.N.	Skills/ Topic	Contents	Time hrs		
			Th.	Pr.	Total
		• Creating Shapes • Sorting data • Filtering data • Page Setup • Making Watermark • Making Page Border • Hyperlink • Using logical formulae • Using conditional formatting • Creating PDF • Printing			
6.	Operate PowerPoint	**PowerPoint** • Introduction • Toolbar/menu • Application • Major shortcut keys • Editing text • Formatting text • Creating table • Saving slide • Opening slide • Creating Word Arts • Creating Charts • Creating Shapes • Page setup • Making watermark • Hyperlink • Slide animation • Screen Projection • Printing	4	6	10
7.	Familiarize with email and Internet	**email and Internet** • Introduction • Application • Creating email id • Email Conversation • IP address • Cyber Ethics and Laws (Nepal)	4	4	8
8.	Introduce Microprocessor	**Microprocessor** • Introduction • Evolution of Microprocessor • 8085 Architecture	10	0	10

S.N.	Skills/ Topic	Contents	Time hrs		
			Th.	Pr.	Total
9.	Assemble / Dissemble Computer	**Assembling/ dissembling of computer:** • Introduction • Block Diagram • Layout Diagram • Procedure • Parts / Accessories o CPU o Memory Unit o Motherboard o SMPS o Monitor o Keyboard o Mouse o UPS	4	16	20
10.	Install Software and Drivers	**Software and Drivers** • Introduction • Types o Utility software o System software o Application software • Procedure	4	4	8
11.	Perform computer networking.	**Computer Networking** ▪ Definition ▪ Types o LAN o MAN o WAN ▪ Network Topology ▪ Layout diagram ▪ Networking procedures ▪ Advantage	6	8	12
12.	Install Router and Cabling	**Router and Cabling** • Introduction • Types o HUB o Switch • Function • Connection diagram • Procedures • Cable Types & Size • Optical Fiber Types & Size • Patch cable preparation • Firewalls	4	4	8
13.	Install and Repair printer and Scanner	**Printer and Scanner** ▪ Definition			

S.N.	Skills/ Topic	Contents	Time hrs		
			Th.	Pr.	Total
		▪ Types of printer and Scanner ▪ Function ▪ Connection diagram ▪ Installation procedures ▪ Sensor ▪ Cartridge ▪ Resources Sharing	2	4	6
Total			70	105	175

Required Tools and materials:

Computer set	
Media player software	Screw-driver set
Tweezers	AC mains socket with power supply
Multimeter	Wire cutter
Clamper	Cable tester
Pen drive	CMOS Battery
Soldering Iron	Cat 6 cable
RJ45	External Hard disk
Printer	Speaker
SMPS	UPS
AC cord	Keyboard
Mouse	CD
DVD	Cooling Paste
Router	Hub
Switch	NIC card
Sound card	Monitor

Reference:

Communication System

Total: 4 hours /week
Lecture: 1 hour/week
Tutorial: 0 hours/week
Practical: 0 hours/week
Lab: 3 hours/week

Description:	This module intends to provide knowledge and skills on operating as well as repairing and maintenance of telecommunication devices such as intercom system, telephone sets, mobile phones, telecom switching system, optical fiber and wireless system.
Objectives:	After completion of this course, students will be able to: • Understand application and principle of operation of telecommunication devices. • Install telecommunication devices. • Operate telecommunication devices. • Repair and maintain telecommunication devices.

S.N.	Objectives/Skills	Contents	Time Hours		
			Th.	Pr.	Total
1.	Introduce to Communication System	**Communication System** • Introduction • Types • Signals and its types • Block diagram • Noise and its effects • Transmission Media and its types • Basics of Modulation and its necessity	6	2	8
2.	Introduce to telecommunication System	**Introduce to telecommunication System** • Introduction • Block Diagram • Components	4	0	4
3.	Install and Repair Telephone Set	**Telephone set** • Introduction. • Parts of telephone set • Working Principle • Application and advantages of telephone system • Installation process • Repair and maintenance • Fault finding • Work Report	2	8	10

S.N.	Objectives/Skills	Contents	Time Hours		
			Th.	Pr.	Total
4.	Install Intercom system	Intercom system • Introduction and Purpose • Types. • Ethernet and Telephone cable connectors: RJ11 and RJ45 • Connection diagram. • Installation and handling. • Repair and maintenance • Fault finding • Safety precautions • Work Report	4	12	16
5.	Repair and Maintain Mobile Phone	Mobile Phone • Introduction. • Types. • Block diagram • Circuit diagram • Principle of operation • Basic Introduction of Mobile generation (3G, 4G, 5G, CDMA, GSM, NGN). • Components • Firmware and Software (OS, Application Software) • Troubleshooting • Repair and Maintenance • Safety precautions • Work report	14	67	81
6.	Introduce to Optical Fiber.	Optical Fiber • Introduction. • Types • Advantages and Uses • Losses • Optical Sources and Detectors • Fiber FTTx • Basic introduction and demonstration of ODF(Optical Distribution Frame) • Connection and testing. • Work Report	5	16	21
		Total	35	105	140

Reference Book:

- Miliaf, H. (1976) *Electronics Volume 1 to 7*, Traapore Valla Sons, India

Required Tools and Materials

• Screw Driver Set	• Rojet Box
• Computer set	• Mobile Sets
• Mobile Software	• Mobile Accessories
• Telephone	• Cord
• Manual	• Telephone set
• Multimeter	• Soldering iron with Stand
• De-soldering pump	• Soldering leads
• Soldering Paste/ Flux	• Wire Cutter
• Wire Stripper for RJ 45,11	• Nose pliers
• Telephone line with Socket	• Frequency Counter
• SMD Rework Station	• PCB Holder
• Multivibrator	• Propyl Alcohol
• Universal Flashing Device	• Hammer
• Pair Cable	• Magnifying Glass With Lamp/ Microscope
• Touch pad Glue	• Touch Pad Remover
• Kron connector	• Distribution Box (MDF,DB)

On the Job Training (OJT)

Full Marks: 500 **Practical: 24 weeks/960 Hrs**

Description:
On the Job Training (OJT) is a 6-month (24 weeks/144 working days) program that aims to provide trainees an opportunity for meaningful career related experiences by working fulltime in real organizational settings where they can practice and expand their classroom-based knowledge and skills before graduating. It will also help trainees gain a clearer sense of what they still need to learn and provides an opportunity to build professional networks. The trainee will be eligible for OJT only after attending the final exam. The institute will make arrangement for OJT. The institute will inform the CTEVT at least one month prior to the OJT placement date along with plan, schedule, the name of the students and their corresponding OJT site.

Objectives:
The overall objective of the On the Job Training (OJT) is to make trainees familiar with firsthand experience of the real work of world as well as to provide them an opportunity to enhance skills.

The specific objectives of On the Job Training (OJT) are to;

- apply knowledge and skills learnt in the classroom to actual work settings or conditions and develop practical experience before graduation
- familiarize with working environment in which the work is done
- work effectively with professional colleagues and share experiences of their activities and functions
- strengthen portfolio or resume with practical experience and projects
- develop professional/work culture
- broaden professional contacts and network
- develop entrepreneurship skills on related occupation.

Activity:
In this program the trainees will be placed in the real work of world under the direct supervision of related organization's supervisors. The trainees will perform occupation related daily routine work as per the rules and regulations of the organization.

Potential OJT Placement Sites:
The nature of work in OJT is practical and potential OJT placement site should be as follows;

- Telecommunication service providers
- Television broadcasting organizations
- Electronics goods manufacturers
- Electronics repair & maintenance workshops
- Radio broadcasting organizations
- FM stations
- Electronics equipment production industries

Requirements for Successful Completion of On the Job Training:
For the successful completion of the OJT, the trainees should;

- submit daily attendance record approved by the concerned supervisor and minimum 144 working days attendance is required
- maintain daily diary with detail activities performed in OJT and submit it with supervisor's signature
- prepare and submit comprehensive final OJT completion report with attendance record and diary
- secured minimum 60% marks in each evaluation

Complete OJT Plan:

SN	Activities	Duration	Remarks
1	Orientation	2 days	Before OJT placement
2	Communicate to the OJT site	1 day	Before OJT placement
3	Actual work at the OJT site	24 weeks/960 hours	During OJT period
4	First-term evaluation	one week (for all sites)	After 6 to 7 weeks of OJT start date
5	Mid-term evaluation	one week (for all sites)	After 15 to 16 weeks of OJT start date
6	Report to the parental organization	1 day	After OJT placement
7	Final report preparation	5 days	After OJT completion

- First and mid-term evaluation should be conducted by the institute.
- After completion of 6 months OJT period, trainees will be provided with one-week period to review all the works and prepare a comprehensive final report.
- Evaluation will be made according to the marks at the following evaluation scheme but first and mid-term evaluation record will also be considered.

Evaluation Scheme:

Evaluation and mark distribution are as follows:

S.N	Activities	Who/Responsibility	Marks
1	OJT Evaluation (should be three evaluation in six months –one evaluation in every two months)	Supervisor of OJT provider	300
2	First and mid- term evaluation	The Training Institute	200
	Total		**500**

Note: Trainees must secure 60 percent marks in each evaluation to pass the course.

OJT Evaluation Criteria and Marks Distribution:

- OJT implementation guideline will be prepared by the CTEVT. The detail OJT evaluation criteria and marks distribution will be incorporated in the guidelines.
- Representative of CTEVT, Regional offices and CTEVT constituted technical schools will conduct the monitoring & evaluation of OJT at any time during the OJT period.

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