These are the specializations and their pre-requisites. These lists should be used as reference for curriculum maps.

## AGRI-FISHERY ARTS

| | Specialization | Number of Hours | Pre-requisite |
|---|---|---|---|
| 1. | Agricultural Crops Production (NC I) | | |
| 2. | Agricultural Crops Production (NC II)++ | 480 hours | |
| 3. | Agricultural Crops Production (NC III) | 640 hours | Agricultural Crops Production (NC II) |
| 4. | Animal Health Care Management (NC III) | 320 hours | Animal Production (NC II) |
| 5. | Animal Production (NC II) +<br>*When updated, this CG will become the following:*<br>*1. Animal Production (Poultry-Chicken) (NC II);*<br>*2. Animal Production (Ruminants) (NC II); and*<br>*3. Animal Production (Swine) (NC II)* | 480 hours | |
| 6. | Aquaculture (NC II) | 640 hours | |
| 7. | Artificial Insemination (Ruminants) (NC II) | 160 hours | Animal Production (NC II) |
| 8. | Artificial Insemination (Swine) (NC II) | 160 hours | Animal Production (NC II) |
| 9. | Agricultural Crops Production (NC I) | 320 hours | |
| 10. | Fish Capture (NC II) ++ | 640 hours | |
| 11. | Fishing Gear Repair and Maintenance (NC III) | 320 hours | |
| 12. | Fish-Products Packaging (NC II) | 320 hours | |
| 13. | Fish Wharf Operation (NC I) | 160 hours | |
| 14. | Food (Fish) Processing (NC II) | 640 hours | |
| 15. | Horticulture (NC II) + | 640 hours | |
| 16. | Horticulture (NC III) | 640 hours | Horticulture (NC II) |
| 17. | Landscape Installation and Maintenance (NC II) | 320 hours | Agricultural Crops Production (NC I) |
| 18. | Organic Agriculture (NC II) | 320 hours | Agricultural Crops Production (NC I) |
| 19. | Pest Management (NC II) | 320 hours | Agricultural Crops Production (NC I) |
| 20. | Rice Machinery Operation (NC II) | 320 hours | Agricultural Crops Production (NC I) |
| 21. | Rubber Processing (NC II) | 320 hours | |
| 22. | Rubber Production (NC II) | 320 hours | |
| 23. | Slaughtering Operation (NC II) | 160 hours | Animal Production (NC II) |

+CG to be updated by December 2015
++CG to be uploaded by December 2015

## HOME ECONOMICS

| | Specialization | Number of Hours | Pre-requisite |
|---|---|---|---|
| 1. | Attractions and Theme Parks (NC II) | 160 hours | |
| 2. | Barbering (NC II) | 320 hours | |
| 3. | Bartending (NC II) | 320 hours | |
| 4. | Beauty/Nail Care (NC II) | 160 hours | 40 hours of the subject during exploratory Grade 7/8 |
| 5. | Bread and Pastry Production (NC II) | 160 hours | |
| 6. | Caregiving (NC II) | 640 hours | 40 hours of the subject during exploratory Grade 7/8 |
| 7. | Commercial Cooking (NC III) | 320 hours | Cookery (NC II) |
| 8. | Cookery (NC II) | 320 hours | 40 hours of the subject during exploratory Grade 7/8 |
| 9. | Dressmaking (NC II) | 320 hours | 40 hours of the subject during exploratory Grade 7/8 |
| 10. | Events Management Services (NC III) | 320 hours | |
| 11. | Fashion Design (Apparel) (NC III) | 640 hours | Dressmaking (NC II) or Tailoring (NC II) |
| 12. | Food and Beverage Services (NC II) [+] | 160 hours | |
| 13. | Front Office Services (NC II) | 160 hours | 40 hours of the subject during exploratory Grade 7/8 |
| 14. | Hairdressing (NC II) | 320 hours | |
| 15. | Hairdressing (NC III) | 640 hours | Hairdressing (NC II) |
| 16. | Handicraft (Basketry, Macrame) (Non-NC) | 160 hours | |
| 17. | Handicraft (Fashion Accessories, Paper Craft) (Non-NC) | 160 hours | |
| 18. | Handicraft (Needlecraft) (Non-NC) | 160 hours | |
| 19. | Handicraft (Woodcraft, Leathercraft) (Non-NC) | 160 hours | |
| 20. | Housekeeping (NC II) [+] | 160 hours | |
| 21. | Local Guiding Services (NC II) | 160 hours | |
| 22. | Tailoring (NC II) | 320 hours | 40 hours of the subject during exploratory Grade 7/8 |
| 23. | Tourism Promotion Services (NC II) | 160 hours | |
| 24. | Travel Services (NC II) | 160 hours | |
| 25. | Wellness Massage (NC II) | 160 hours | |

[+]CG to be updated by December 2015

## INDUSTRIAL ARTS

| | Specialization | Number of Hours | Pre-requisite |
|---|---|---|---|
| 1. | Automotive Servicing (NC I) [+] | 640 hours | |
| 2. | Automotive Servicing (NC II) | 640 hours | Automotive Servicing (NC I) |
| 3. | Carpentry (NC II) | 640 hours | |
| 4. | Carpentry (NC III) | 320 hours | Carpentry (NC II) |
| 5. | Construction Painting (NC II) | 160 hours | |
| 6. | Consumer Electronics Servicing (NC II) [+] | 640 hours | |
| 7. | Domestic Refrigeration and Airconditioning (DOMRAC) Servicing (NC II) | 640 hours | |
| 8. | Driving (NC II) | 160 hours | |
| 9. | Electrical Installation and Maintenance (NC II) | 640 hours | |
| 10. | Electric Power Distribution Line Construction (NC II) | 320 hours | Electrical Installation and Maintenance (NC II) |
| 11. | Electronic Products Assembly and Servicing (NC II) [++] *(CG under construction based on Consumer Electronics Servicing (NC II) CG)* | 640 hours | |
| 12. | Furniture Making (Finishing) (NC II) [+] | 480 hours | |
| 13. | Instrumentation and Control Servicing (NC II) | 320 hours | Electronic Products Assembly and Servicing (EPAS) (NC II) |
| 14. | Gas Metal Arc Welding (GMAW) (NC II) | 320 hours | Shielded Metal Arc Welding (SMAW) (NC II) |
| 15. | Gas Tungsten Arc Welding (GTAW) (NC II) | 320 hours | Shielded Metal Arc Welding (GMAW) (NC II) |
| 16. | Machining (NC I) [++] | 640 hours | |
| 17. | Machining (NC II) | 640 hours | Machining (NC I) |
| 18. | Masonry (NC II) | 320 hours | |
| 19. | Mechatronics Servicing (NC II) | 320 hours | Consumer Electronics Servicing (NC II) |
| 20. | Motorcycle/Small Engine Servicing (NC II) | 320 hours | |
| 21. | Plumbing (NC I) | 320 hours | |
| 22. | Plumbing (NC II) | 320 hours | Plumbing (NC I) |
| 23. | Refrigeration and Air-Conditioning (Packaged Air-Conditioning Unit [PACU]/Commercial Refrigeration Equipment [CRE]) Servicing (NC III) | 640 hours | Domestic Refrigeration and Airconditioning (DOMRAC) Servicing (NC II) |
| 24. | Shielded Metal Arc Welding (NC I) | 320 hours | |
| 25. | Shielded Metal Arc Welding (NC II) | 320 hours | Shielded Metal Arc Welding (NC I) |
| 26. | Tile Setting (NC II) | 320 hours | |
| 27. | Transmission Line Installation and Maintenance (NC II) | 640 hours | Electrical Installation and Maintenance (NC II) |

[+]CG to be updated by December 2015
[++]CG to be uploaded by December 2015

## INFORMATION, COMMUNICATIONS AND TECHNOLOGY (ICT)

| | Specialization | Number of Hours | Pre-requisite |
|---|---|---|---|
| 1. | Animation (NC II) | 320 hours | |
| 2. | Broadband Installation (Fixed Wireless Systems) (NC II) | 160 hours | 1. Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) (NC II)<br>2. Telecom OSP Installation (Fiber Optic Cable) (NC II) |
| 3. | Computer Hardware Servicing (NC II) [+] | 320 hours | |
| 4. | Computer Programming (NC IV) [+]<br>*When updated, this CG will become the following:*<br>*1. Programming (.net Technology) (NC II)[++]*<br>*2. Programming (Java) (NC II)[++]*<br>*3. Programming (Oracle Database) (NC II)[++]* | 320 hours | |
| 5. | Computer System Servicing (NC II) [++]<br>*(CG under construction based on Computer Hardware Servicing (NC II) CG)* | 320 hours | |
| 6. | Contact Center Services (NC II) | 320 hours | |
| 7. | Illustration (NC II) | 320 hours | |
| 8. | Medical Transcription (NC II) | 320 hours | |
| 9. | Technical Drafting (NC II) | 320 hours | |
| 10. | Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) (NC II) | 320 hours | Computer Hardware Servicing (NC II) |
| 11. | Telecom OSP Installation (Fiber Optic Cable) (NC II) | 160 hours | Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) (NC II) |

[+]CG to be updated by December 2015
[++]CG to be uploaded by December 2015

**K to 12 BASIC EDUCATION CURRICULUM**
**JUNIOR HIGH SCHOOL TECHNICAL LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL - TECHNICAL-VOCATIONAL-LIVELIHOOD TRACK**
**INFORMATION AND COMMUNICATIONS TECHNOLOGY – COMPUTER PROGRAMMING (NC IV)**
(160 hours)

**Course Description:**

This is a specialization course that leads to a **Computer Programming** National Certificate Level IV (NC IV). It covers Personal Entrepreneurial Competencies (PECs), Environment and Market (EM), five **(5)** Common Competencies, and two **(2)** Core Competencies that a high school student ought to possess, namely: 1) designing program logic, and 2) applying program development approach.

The preliminaries of this specialization course include the following: 1) discussion of the relevance of the course, 2) explanation of key concepts of common competencies, 3) explanation of core competencies relative to the course. and 4) exploration on career opportunities.

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| **Introduction**<br>1. Relevance of the course<br>2. Concepts and core competencies in Computer Programming<br>3. Career opportunities | The learners demonstrate an understanding of key concepts, underlying principles and core competencies in Computer Programming | The learners shall be able to independently create/provide quality and marketable product and/or service in Computer Programming, as prescribed by TESDA Training Regulations | *The learners…*<br>1. Discuss the relevance of the course<br>2. Explain key concepts of common competencies<br>3. Explain core competencies of Computer Programming<br>4. Explore job opportunities for Computer Programming as a career | |
| **LESSON 1: PERSONAL ENTREPRENEURIAL COMPETENCIES (PECS)** | | | | |
| 1. Assessment of Personal Competencies and Skills (PECs) vis-à-vis a practicing entrepreneur/ employee in locality/town<br>1.1 Characteristics<br>1.2 Attributes<br>1.3 Lifestyle<br>1.4 Skills<br>1.5 Traits<br>2 Analysis of PECs in relation to a practitioner<br>3 Align, strengthen and develop one's PECs based on the result | The learners demonstrate an understanding of one's PECs in Computer Programming | The learners shall be able to recognize his/her PECs and prepares an activity plan that aligns with that of a practitioner/entrepreneur in Computer Programming | **LO 1. Recognize PECs needed in Computer Programming**<br>1.1 Assess one's PECs: characteristics, attributes, lifestyle, skills, and traits<br>1.2 Assess practitioner's: characteristics, attributes, lifestyle, skills, traits<br>1.3 Compare one's PECs with that of a practitioner /entrepreneur<br>1.4 Align one's PECs with that of a practitioner/entrepreneur | **TLE_PECS9-12-Ia-1** |
| **LESSON 2: ENVIRONMENT AND MARKET (EM)** | | | | |
| 1. Market (Locality/town)<br>2. Key concepts of market<br>3. Players in the market (Competitors) | The learners demonstrate an understanding of | The learners shall be able to create a business vicinity map reflective of | **LO 1. Recognize and understand the market in Computer Programming**<br>1.1 Identify the | **TLE_EM9-12-Ia-1** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| 4. Products and services available in the market | environment and market in Computer Programming in one's locality/town | potential market in Computer Programming in a locality/town | players/competitors within the town<br>1.2 Identify the different products/services available in the market | |
| 5. Market (Customer)<br>6. Key concepts of identifying and understanding the consumer<br>7. Consumer Analysis through:<br>7.1 Observation<br>7.2 Interviews<br>7.3 Focus Group Discussion (FGD)<br>7.4 Survey | | | **LO 2. Recognize the potential customer/market in Computer Programming**<br>2.1 Identify the profile of potential customers<br>2.2 Identify the customer's needs and wants through consumer analysis<br>2.3 Conduct consumer/market analysis | **TLE_EM9-12-Ia-2** |
| **LESSON 3: USE HAND TOOLS AND EQUIPMENT (UT)** | | | | |
| **1.** Hand tools in Computer Programming<br>**2.** Equipment in Computer Programming | The learners demonstrate an understanding of hand tools and equipment in Computer Programming | The learners shall be able to independently use hand tools and equipment in Computer Programming | **LO 1. Prepare hand tools and equipment in Computer Programming**<br>1.1 List hand tools and equipment based on job requirements<br>1.2 Identify appropriate hand tools and equipment<br>1.3 Classify hand tools and equipment according to function and task requirement | **TLE_ICTCP9-12UT-Ib-1** |
| 3. Procedure in accomplishing forms:<br>3.1 Job order slips<br>3.2 Tools and materials requisition slips<br>3.3 Borrower's slip<br>4. Requisition procedures | | | **LO 2. Inspect hand tools and equipment received in Computer Programming**<br>2.1 Check the list of tools and equipment requested per job requirement<br>2.2 Inspect the requested tools and equipment<br>2.3 Assess the condition of all hand tools and equipment for proper operation and safety | **TLE_ICTCP9-12UT-Ic-2** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| | | | | |
| **LESSON 4: MAINTAIN HAND TOOLS, EQUIPMENT AND PARAPHERNALIA (MT)** | | | | |
| 1. Safety procedures in using hand tools and equipment<br>2. Procedures in cleaning,<br>2.1 tightening and simple repairs of hand tools, equipment, and paraphernalia<br>3. Common malfunction in hand tools, equipment and paraphernalia<br>4. Reporting to property custodian | The learners demonstrate an understanding of concepts and underlying principles in maintaining hand tools, equipment, and paraphernalia | The learners shall be able to independently perform maintenance of hand tools, equipment, and, paraphernalia | **LO 1. Use and maintain hand tools, measuring instrument and equipment**<br>2.1 Perform safety procedures in using hand tools and equipment<br>2.2 Follow procedures in cleaning, tightening and simple repairing of hand tools, equipment, and paraphernalia<br>2.3 Identify common malfunctions (unplanned or unusual events) when using tools, equipment, and paraphernalia<br>2.4 Follow procedures in preparing a report to property custodian | **TLE_ICTCP9-12MT-Id-1** |
| **LESSON 5: PERFORM MENSURATION AND CALCULATION (MC)** | | | | |
| **1.** Measuring instruments /Measuring tools<br>**2.** Proper handling of measuring instruments | The learners demonstrate an understanding of concepts and underlying principles in performing measurement and calculation | The learners shall be able to independently perform accurate measurement and calculation based on a given task | **LO 1. Select measuring instruments**<br>1.1 Interpret object or component to be measured according to the appropriate regular geometric shape<br>1.2 Select measuring tools appropriate to the object to be measured based on job requirements<br>1.3 Obtain correct specification from relevant sources<br>1.4 Select appropriate measuring instruments according to job requirements<br>1.4 Use alternative measuring | **TLE_ICTCP9-12MC-Ie-1** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| | | | tools without sacrificing cost and quality of work | |
| 3. Trade Mathematics/Mensuration<br>3.1 Four fundamental operations<br>3.2 Kinds of measurement<br>3.3 Dimensions<br>3.4 Ratio and proportion<br>3.5 Trigonometric functions<br>3.6 Algebraic equations<br>3.7 Fractions, percentage and decimals<br>3.8 Conversion<br>4. Numbering Systems<br>4.1 Decimal<br>4.2 Binary<br>4.3 Octal<br>4.4 Hexadecimal<br>5. American Standardized Code for Information Interchange (ASCII) table and other data representation tables<br>6. Arithmetic operations on binary values<br>7. Numbering systems conversion<br>7.1 Decimal to any numbering system<br>7.2 Binary to any numbering system<br>7.3 Octal to any numbering system<br>7.4 Hexadecimal to any numbering system<br>8. Measuring memory and file capacity | | | **LO 2. Carry out mensuration and calculation**<br>2.1 Perform calculation needed to complete task using the four mathematical fundamental operations (addition, subtraction, multiplication and division)<br>2.2 Employ different techniques in checking for the accuracy of the computation<br>2.3 Identify the storage capacity of media<br>2.4 Perform arithmetic computation on different numbering systems<br>2.5 Identify the machine equivalent values of human-readable characters using ASCII Table<br>2.6 Measure the storage requirement of a file<br>2.7 Compute for the storage requirement of files | **TLE_ICTCP9-12MC-If-2** |
| **LESSON 6: PREPARE AND INTERPRET TECHNICAL DRAWING (ID)** | | | | |
| 1. Drawing symbols, signs, and data<br>2. Trade mathematical conversions | The learners demonstrate an understanding | The learners shall be able to independently read and | **LO 1. Analyze signs, symbols, and data**<br>1.1 Prepare tools and instruments | **TLE_ICTCP9-12ID-Ig-1** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| | of concepts and underlying principles in preparing and interpreting technical drawings in Computer Programming | interpret technical drawings accurately | used in Computer Programming<br>1.2 Interpret signs, symbols, and data according to job specifications<br>1.3 Perform simple trade mathematical conversions | |
| 3. Basic illustration<br>4. Technical plans and schematic diagram<br>5. Symbols and abbreviations | | | **LO 2. Interpret illustration drawings and plans**<br>2.1 Identify illustration tools and materials to be used in preparing a simple illustration<br>2.2 Identify dimensions and specifications according to job requirements | **TLE_ICTCP9-12ID-Ih-2** |
| **LESSON 7: PRACTICE OCCUPATIONAL HEALTH AND SAFETY (OHS) PROCEDURE (OS)** | | | | |
| 1. Safety procedures<br>2. Identification of hazards, risks, and control<br>3. For users and technicians<br>4. Damage equipment<br>5. Environment<br>6. Organizational safety and health protocol<br>7. OHS indicators | The learners demonstrate an understanding of concepts and underlying principles of Occupational Health and Safety Procedure in relation to health and risk hazards in the workplace | The learners shall be able to independently observe precautionary measures and responds to OHS procedures in the workplace, as prescribed by TESDA Training Regulations | **LO 1. Identify hazards and risks**<br>1.1 Follow OHS policies and procedures in identifying hazards and risks<br>1.2 Explain hazards and risks in the workplace<br>1.3 Identify hazards and risks indicators as prescribed by the manufacturer<br>1.4 Apply contingency measures in accordance with the OHS procedures | **TLE_ICTCP9-12OS-Ii-1** |
| 8. Safety regulations in the workplace<br>9. Methods of controlling hazards and risks<br>10. Disaster preparedness and | | | **LO 2. Evaluate and control hazards and risks**<br>2.1 Determine the effects of hazards in the workplace<br>2.2 Identify the methods in | **TLE_ICTCP9-12OS-Ij-2** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| management | | | controlling hazards and risks<br>2.3 Follow OHS procedures for controlling hazards and risks | |
| 11. OHS procedure, practices and regulations<br>12. Emergency-related drills and training | | | **LO 3. Maintain Occupational Health and Safety**<br>3.1 Observe established procedures in responding to emergency-related drill<br>3.2 Fill-up OHS personal records in accordance with workplace requirement | **TLE_ICTCP9-12OS-Ij-3** |
| **LESSON 8: DESIGNING PROGRAM LOGIC (PL)** | | | | |
| 1. The program design and structure<br>2. Flowchart symbols<br>3. Algorithm<br>4. Pseudo Code<br>5. Elements of Programming Language<br>6. Program Control Structure<br>7. Program constructs/ modules/objects | The learners demonstrate an understanding of the concept and underlying principles of designing program logic | The learners shall be able to independently design program logic based on job requirements, as prescribed by the TESDA Training Regulations | **LO 1. Select the program logic design approach**<br>1.1 Obtain design documentation<br>1.2 Identify systems specifications and requirements 1.3 Select the design approach to be followed in coding<br>1.4 Identify the applicable diagram based on the job requirements<br>1.5 Identify the required links<br>1.6 Identify the required modules | **TLE_ICTCP9-12PL-IIa-1** |
| 8. Coding the Programs<br>9. Steps/Procedures to document the program<br>10. Application of documentation tools<br>11. Printing the programs | | | **LO 2. Document the program logic or design**<br>2.1 Follow project standards in structuring diagrams of program flow and modules<br>2.2 Document the program scope and limits according to project standards<br>2.3 Document special routines or procedures according to project standards | **TLE_ICTCP9-12PL-IIa-j-2** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| | | | 2.4 Follow project standards in creating special routines or procedures<br>2.5 Identify references for tables, files, inputs, outputs, and other program functionalities according to project standards<br>2.6 Revise references for tables, files, inputs, outputs, and other program functionalities according to project standards<br>2.7 Use applicable templates | |
| 12. Review the designed program logic flow<br>13. Coding, Compiling and Debugging<br>14. Program or design specifications<br>15. Test and implementation of the program<br>16. Duties and responsibilities of:<br>16.1 User/Client<br>16.2 Systems Analyst<br>16.3 Systems Designer<br>16.4 Systems Developer/ Programmer<br>16.5 Quality Assurance Officer<br>16.6 Database Administrator<br>16.7 Supervisor<br>16.8 Document Officer<br>17. Techniques in gathering feedback/input from appropriate persons | | | **LO 3. Validate the design**<br>3.1 Check program flow for interfaces and compliance to design documentation requirements<br>3.2 Check states or conditions for interfaces and compliance to design documentation requirements<br>3.3 Discuss the different duties and responsibilities of persons involved in project development<br>3.4 Gather feedback/input from appropriate persons as needed | **TLE_ICTCP9-12PL-IIIa-j-3** |
| **LESSON 9: APPLYING PROGRAM DEVELOPMENT APPROACH (PD)** | | | | |
| **1.** Concept of Programming Languages<br>**2.** Evolution of Programming Languages | The learners demonstrate an understanding of | The learners shall be able to independently create a software development plan that applies | **LO 1. Determine and select appropriate program development approach**<br>1.1 Select appropriate program | **TLE_ICTCP9-12PD-IVa-e-1** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| **3.** Integrated Development Environment<br>**4.** Graphical User Interface<br>**5.** Procedures of Programming<br>**6.** Writing Elementary Program | concepts and underlying principles of applying program development approach | applicable program development approach, as prescribed by TESDA Training Regulations | development approach<br>1.2 Determine appropriate program activities based on the job requirements<br>1.3 Create an initial plan that will guide the program development process | |
| 7. Use of documentation tools:<br>7.1 Word processing Software<br>7.2 Visio<br>7.3 Smart draw<br>7.4 CASE tools<br>7.5 Client documentation standards<br>8. Program specifications and user requirements<br>9. Programming elements<br>10. Procedures in writing and developing program<br>11. Programming constructs/ modules/ objects<br>12. Naming conventions<br>13. Resources Required in Programming<br>14. Managing lessons learned | | | **LO 2. Apply the selected development approach**<br>2.1 Use a documentation tool for program development<br>2.2 Draw program structure and organization<br>2.3 Define naming conventions<br>2.4 Use proper naming conventions<br>2.5 Document input and output forms<br>2.6 Document program flow and processes<br>2.7 Identify resources for coding Identify resources for testing programs<br>2.8 Check programming activities with the development plan<br>2.9 Review opportunities for improvement, lessons learned, and possible recommendations for future projects<br>2.10 Document opportunities for improvement, lessons learned, and possible recommendations for future projects<br>2.12 Present program deliverables to appropriate person for approval | **TLE_ICTCP9-12PD-IVf-j-2** |

(160 hours)

**Course Description:**

This is a specialization course that leads to a **Computer Programming** National Certificate Level IV (NC IV). It covers Personal Entrepreneurial Competencies (PECs), Environment and Market (EM) and **two (2)** core competencies that a high school student ought to possess, namely: 1) applying programming skills in a second language, and 2) applying object-oriented programming language skills.

The preliminaries of this specialization course include the following: 1) discussion of the relevance of the course, 2) explanation of core competencies relative to the course, and 3) exploration of career opportunities.

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| **Introduction**<br>**1.** Relevance of the course<br>2. Core competency in Computer Programming<br>3. Career opportunities | The learners demonstrate an understanding of underlying principles and core competencies in Computer Programming | The learners shall be able to<br><br>independently creates/provides quality and marketable product and/or service in Computer Programming as prescribed in the TESDA Training Regulations | *The learners…*<br>1. Discuss the relevance of the course<br>2. Explain the core competencies in Computer Programming<br>3. Explore job opportunities for Computer Programming as a career | |
| **Lesson 1: PERSONAL ENTREPRENEURIAL COMPETENCIES (PECS)** | | | | |
| 1. Assessment of Personal Competencies and Skills (PECs) vis-à-vis a practicing entrepreneur/employee in a province<br>1.1 Characteristics<br>1.2 Attributes<br>1.3 Lifestyle<br>1.4 Skills<br>1.5 Traits<br>2. Analysis of PECs in relation to a practitioner<br>3. Application of PECs to the chosen business/career | The learners demonstrate an understanding of one's PECs in Computer Programming | The learners shall be able to independently create a plan of action that strengthens/further develops one's PECs in Computer Programming | **LO 1. Develop and strengthen PECs needed in Computer Programming**<br>1.1 Identify areas for improvement, development, and growth<br>1.2 Align one's PECs according to his/her business/career choice<br>1.3 Create a plan of action that ensures success of his/her business/career choice | **TLE_PECS9-12-Ia-1** |
| **Lesson 2: ENVIRONMENT AND MARKET (EM)** | | | | |
| 1. Product Development<br>2. Key concepts of developing a product | The learners demonstrate an understanding of environment and market in | The learners shall be able to independently create a business vicinity map reflective | **LO 1. Develop a product/ service in Computer Programming** | **TLE_EM9-12-Ia-1** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| 3. Finding Value<br>4. Innovation<br>4.1 Unique Selling Proposition (USP) | Computer Programming in one's locality | of potential market in Computer Programming within a province | 1.1 Identify what is of "Value" to the customer<br>1.2 Identify the customer to sell to<br>1.3 Explain what makes a product unique and competitive<br>1.4 Apply creativity and Innovative techniques to develop marketable product<br>1.5 Employ a Unique Selling Proposition (USP) to the product/service | |
| 5. Selecting Business Idea<br>6. Key concepts in Selecting a Business Idea<br>6.1 Criteria<br>6.2 Techniques | | | **LO 2. Select a business idea based on the criteria and techniques set**<br>2.1 Enumerate various criteria and steps in selecting a business idea<br>2.2 Apply the criteria/steps in selecting a viable business idea<br>2.3 Determine a business idea based on the criteria/techniques set | **TLE_EM9-12-Ia-2** |
| 7. Branding | | | **LO 3. Develop a brand for the product**<br>3.1 Identify the benefits of having a good brand<br>3.2 Enumerate recognizable brands in the town/province<br>3.3 Enumerate the criteria for developing a brand<br>3.4 Generate a clear and appealing product brand | **TLE_EM9-12-Ib-3** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| | | | | |
| **LESSON 3: APPLYING PROGRAMMING SKILLS IN A SECOND LANGUAGE (PS)** | | | | |
| 1. Semantics and Syntax<br>2. Elements of Programming<br>3. Program Control Structure | The learners demonstrate an understanding of basic concepts, and underlying principles in programming in a second language | The learners shall be able to independently create/provide a quality and marketable product and/or service in programming in a second language, as prescribed by TESDA Training Regulations | **LO 1. Apply basic language syntax and layout**<br>1.1 Follow basic language syntax rules and best practices in program coding<br>1.2 Use language-data types, operators, and expressions<br>1.3 Use the appropriate language syntax for sequence, selection, and iteration constructs | **TLE_ICTCP9-12PS-Ic-j-1** |
| 4. Algorithm<br>5. Pseudocodes<br>6. Arrays<br>7. Binary files<br>8. Modular Programming<br>9. Structured Query Language<br>9.1.1. (SQL) and other language facilities<br>10. Basic Programming Constructs<br>10.1. Iteration or repetition<br>10.2 Decision or choice<br>10.3 Sequence<br>11. Updating content of a one-dimensional array:<br>11.1. sequential search<br>11.2. insertion<br>11.3. deletion | | | **LO 2. Code using standard algorithms**<br>2.1 Use basic programming-constructs algorithms<br>2.2 Use modular programming approach<br>2.3 Perform sequential search, insertion, and deletion algorithms to operate on one-dimensional array<br>2.4 Code standard sequential access algorithms for text and binary files<br>2.5 Use standard sequential access algorithms for text and binary files<br>2.6 Use SQL or language facilities to access databases | **TLE_ICTCP9-12PS-IIa-b-2** |
| 12. Testing techniques<br>13. Errors Handling<br>14. Debugging options<br>15. Procedures in debugging and editing the program | | | **LO3. Debug code**<br>3.1 Review codes visually<br>3.2 Review codes by using debugging tools provided by the system or the | **TLE_ICTCP9-12PS-IIc-3** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| 16. Compiling the program<br>17. Run the application or program | | | industry<br>3.3 Use a debugger to trace code execution<br>3.4 Examine variable contents to detect and correct errors | |
| 18. Coding Standards<br>18.1. Java Coding Standards<br>18.2. GNU Coding Standards<br>18.3. Client Coding Standards<br>18.4. Hungarian Notation<br>19. Documentation techniques<br>20. Program and documentation standards<br>21. Internal documentation techniques | | | **LO 4. Document activities**<br>4.1 Follow guidelines for developing a maintainable code that adheres to a set of coding standards<br>4.2 Follow internal documentation standards and tools<br>4.3 Use internal documentation standards and tools | **TLE_ICTCP9-12PS-IId-f-4** |
| 22. Testing techniques<br>23. Program and documentation standard<br>24. Users Manual<br>25. Printing documents of the programs | | | **LO 5. Test code**<br>5.1 Develop simple tests to confirm that the coding process meets design specifications<br>5.2 Conduct simple tests to confirm that the coding process meets design specifications<br>5.3 Document the tests performed<br>5.4 Correct errors in the code<br>5.5 Document modifications in the code | **TLE_ICTCP9-12PS-IIg-j-5** |
| **LESSON 4: APPLYING OBJECT-ORIENTED PROGRAMMING LANGUAGE SKILLS (OP)** | | | | |
| 1. Semantics and Syntax<br>2. Language Operators<br>3. Elements of Programming<br>4. Program Control Structure<br>5. Modular programming<br>6. Arrays | The learners demonstrate an understanding of concepts and underlying principles in object-oriented programming language | The learners shall be able to independently create/provide quality and marketable product and/or service in object-oriented programming language, as prescribed by TESDA Training Regulation. | **LO 1. Apply basic language syntax and layout**<br>1.1 Follow basic language syntax rules and best practices in program coding<br>1.2 Use language-data types, operators, and expressions<br>1.3 Use the appropriate language syntax for | **TLE_ICTCP9-12OP-IIIa-e-1** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| | | | sequence, selection, and iteration constructs<br>1.4 Use the appropriate language syntax for iteration constructs<br>1.5 Use modular programming approach<br>1.6 Create arrays and arrays of objects | |
| 7. Principles of object–oriented programming language<br>8. Encapsulation<br>9. Inheritance<br>10. Polymorphism<br>11. Form, Module, Class, and Objects | | | **LO 2. Apply basic object oriented principles in the target language**<br>2.1 Construct a class that contains primitive member/instance variables<br>2.2 Construct a class that contains multiple options for object construction<br>2.3 Use a user-defined aggregation in a class<br>2.4 Implement inheritance to at least two (2) levels of depth<br>2.5 Use polymorphism at a simple level through inheritance to enable easy code extension | **TLE_ICTCP9-12OP-IIIf-g-2** |
| 12. Integrated Development Environments (IDEs):<br>12.1. Visual C++<br>12.2. Visual Studio Suite<br>12.3. Eclipse<br>12.4. J-Edit<br>12.5. Code Warrior<br>12.6. JBuilder<br>13. Errors Handling<br>14. Debugging options<br>15. Procedures in debugging and editing the program | | | **LO 3. Debug code**<br>3.1 Use an Integrated Development Environments<br>3.2 Use language debugging facilities of any IDE in debugging<br>3.3 Detect errors using an applicable program debugging technique<br>3.4 Resolve errors using an applicable program debugging technique | **TLE_ICTCP9-12OP-IIIh-j-3** |

| CONTENT | CONTENT STANDARD | PERFORMANCE STANDARD | LEARNING COMPETENCIES | CODE |
|---|---|---|---|---|
| 16. Compiling the program<br>17. Run the application or program | | | | |
| 18. Documentation techniques<br>19. Program and documentation standards<br>20. Internal documentation techniques | | | **LO 4. Document activities**<br>4.1 Follow guidelines for developing maintainable code that adheres to a set of coding standards<br>4.2 Follow internal documentation standards<br>4.3 Use internal documentation standards | **TLE_ICTCP9-12OP-IVa-e-4** |
| 21. Testing techniques<br>22. Program and documentation standard<br>23. Users Manual<br>24. Printing documents of the programs | | | **LO 5. Test code**<br>5.1 Develop simple tests to confirm that the coding process meets design specification<br>5.2 Conduct simple tests to confirm that the coding process meets design specification<br>5.3 Document the performed tests<br>5.4 Apply necessary corrections to the code and documentation | **TLE_ICTCP9-12OP-IVf-j-5** |

**K to 12 BASIC EDUCATION CURRICULUM**
**JUNIOR HIGH SCHOOL TECHNICAL LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL - TECHNICAL-VOCATIONAL-LIVELIHOOD TRACK**
**INFORMATION AND COMMUNICATIONS TECHNOLOGY – COMPUTER PROGRAMMING (NC IV)**

**Code Book Legend**
**Sample: TLE_ICTCP9-12OP-IVf-j-5**

| LEGEND | | SAMPLE | |
|---|---|---|---|
| **First Entry** | Learning Area and Strand/ Subject or Specialization | Technology and Livelihood Education_ Information and Communications Technology Computer Programming | **TLE_ ICT CP 9-12** |
| | Grade Level | Grade 9/10/11/12 | |
| **Uppercase Letter/s** | Domain/Content/ Component/ Topic | Applying Object-Oriented Programming Language Skills | **OP** |
| | | | **-** |
| **Roman Numeral** **Zero if no specific quarter* | Quarter | Fourth Quarter | **IV** |
| **Lowercase Letter/s** **Put a hyphen (-) in between letters to indicate more than a specific week* | Week | Week Six to Ten | **f-j** |
| | | | **-** |
| **Arabic Number** | Competency | Test Code | **5** |

| DOMAIN/ COMPONENT | CODE |
|---|---|
| Personal Entrepreneurial Competencies | PECS |
| Environment and Market | EM |
| Use of Hand Tools and Equipment | UT |
| Maintain Hand Tools, Equipment, and Paraphernalia | MT |
| Perform Mensuration and Calculation | MC |
| Prepare and Interpret Technical Drawing | ID |
| Practice Occupational Health and Safety Procedures | OS |
| Designing Program Logic | PL |
| Applying Program Development Approach | PD |
| Applying Programming Skills In A Second Language | PS |
| Applying Object-Oriented Programming Language Skills | OP |

Technology-Livelihood Education and Technical-Vocational Track specializations may be taken between Grades 9 to 12.

Schools may offer specializations from the four strands as long as the minimum number of hours for each specialization is met.

Please refer to the sample Curriculum Map on the next page for the number of semesters per ICT specialization and those that have pre-requisites. Curriculum Maps may be modified according to specializations offered by a school.

**K to 12 BASIC EDUCATION CURRICULUM**
**JUNIOR HIGH SCHOOL TECHNICAL LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL - TECHNICAL-VOCATIONAL-LIVELIHOOD TRACK**
**INFORMATION AND COMMUNICATIONS TECHNOLOGY – COMPUTER PROGRAMMING (NC IV)**

## SAMPLE ICT CURRICULUM MAP** (as of November 2015)

| Grade 7/8 (EXPLORATORY) | GRADES 9-12 | |
|---|---|---|
| EXPLORATORY<br>4 sems | Computer System Servicing (NC II)++<br>4 sems | |
| | Computer Hardware Servicing (NC II)+<br>4 sems | *Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) (NC II)<br>4 sems |
| | | *Telecom OSP Installation (Fiber Optic Cable) (NC II)<br>2 sems<br>***Broadband Installation (Fixed Wireless Systems) (NC II)<br>2 sems |
| | Illustration (NC II)<br>4 sems | Medical Transcription (NC II)<br>4 sems |
| | Technical Drafting (NC II)<br>4 sems | Contact Center Services (NC II)<br>4 sems |
| | Computer Programming (NC IV)+<br>When updated, this CG will become the following:<br>1. Programming (.net Technology) (NC II)<br>2. Programming (Java) (NC II)<br>3. Programming (Oracle Database) (NC II)<br>4 sems | Animation (NC II)<br>4 sems |

* Please note that these subjects have pre-requisites mentioned in the CG.
\+ CG to be updated by December 2015
++ CG to be uploaded by December 2015
*** Subject has two pre-requisites
Other specializations with no pre-requisites may be taken up during these semesters.
Pre-requisites of the subjects to the right should be taken up during these semesters.

****This is just a <u>sample</u>. Schools make their own curriculum maps considering the specializations to be offered. Subjects may be taken up at any point during Grades 9-12.**