



GOVERNMENT OF INDIA  
MINISTRY OF SKILL  
DEVELOPMENT & ENTREPRENEURSHIP  
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

# COMPUTER OPERATOR AND PROGRAMMING ASSISTANT (COPA)

(Duration: One Year)  
Revised in July 2022

CRAFTSMEN TRAINING SCHEME (CTS)  
NSQF LEVEL- 3



SECTOR – IT & ITeS



Directorate General of Training

## 7. TRADE SYLLABUS

SYLLABUS FOR COMPUTER OPERATOR AND PROGRAMMING ASSISTANT			
DURATION: ONE YEAR			
Duration	Reference Learning Outcome	Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)
Professional Skill - 94 Hrs;  Professional Knowledge - 32 Hrs	Install and setup operating system and related software in a computer following safety precautions.  (Mapped NOS: SSC/N3022)	<p><b>Safe working practices (10 Hrs)</b></p> <ol style="list-style-type: none"> <li>1. Visit COPA Lab. of the institutes and locate the electrical connections with computer system setup. (3 Hrs)</li> <li>2. Identifying safety symbols and hazard identification. (3 Hrs)</li> <li>3. Practice safe methods of fire fighting in case of electrical fire. (2 Hrs)</li> <li>4. Use of fire extinguishers. (2Hrs)</li> </ol> <p><b>Assemble a Desktop PC (8 hrs)</b></p> <ol style="list-style-type: none"> <li>5. Identify computer peripherals and internal components of a desktop computer. (4 Hrs)</li> <li>6. Assemble components of desktop computer. (4 Hrs)</li> </ol> <p><b>Using Windows Operating Systems (20 hrs)</b></p> <ol style="list-style-type: none"> <li>7. Practice on Windows interface and navigating windows. (3 Hrs)</li> <li>8. Practice on managing files and folders using removable drives. (4 Hrs)</li> <li>9. Customize the desktop (2 hrs)</li> <li>10. Settings and manage user accounts. (1 Hr)</li> <li>11. View system properties and control panel details. (3 Hrs)</li> <li>12. Work with keyboard shortcut commands. (4 Hrs)</li> <li>13. Print and scan document using different commands. (3 Hrs)</li> </ol> <p><b>Computer basics and Software Installation (20 Hrs)</b></p>	<p><b>Introduction to Computers (3 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Safe working practices</li> <li>• Scope of the COPA trade.</li> <li>• Safety rules and safety signs.</li> <li>• Types and working of fire extinguishers.</li> </ul> <p><b>Introduction to Computer components (4 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Concepts of Hardware and Software.</li> <li>• Function of motherboard components and various processors.</li> <li>• Various Input/ Output devices in use and their features</li> </ul> <p><b>Introduction Windows Operating System (9 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Introduction to operating System</li> <li>• Main features of Windows OS</li> </ul>



		<p>14. View the BIOS settings and their modifications. (3 Hrs)</p> <p>15. Install Windows operating system. (4 Hrs)</p> <p>16. Format hard disk and create partition. (3 Hrs)</p> <p>17. Identify and rectify common hardware and software issues during OS installation. (3 Hrs)</p> <p>18. Install necessary application software for Windows i.e. Office Package, PDF Reader, Media Player etc. (2 Hrs)</p> <p>19. Configure Bluetooth and Wi-Fi settings. (1 Hr)</p> <p>20. Install Drivers for printer, scanner, webcam and DVD etc. (2 Hrs)</p> <p>21. Burn data, video and audio files on CD/DVD using application software. (2 Hrs)</p> <p><b>DOS Command Line Interface (9Hrs)</b></p> <p>22. Use basic DOS commands for directory listing. (5 Hrs)</p> <p>23. Manage files and folders using DOS commands. (4 Hrs)</p> <p><b>Install Ubuntu Linux operating system and execute basic Linux commands (27 Hrs)</b></p> <p>24. Installation of Ubuntu Linux operating system (6 Hrs)</p> <p>25. Install necessary application software for Linux i.e. Office Package, PDF Reader, Media Player etc. (4 Hrs)</p> <p>26. Use Basic Linux commands for directory listing, file and folder management, password etc. (6 Hrs)</p> <p>27. Use the Linux graphical user interface for file and folder management, exploring the system etc. (6 Hrs)</p> <p>28. Customize desktop settings and manage user accounts in Linux. (3 Hrs)</p>	<ul style="list-style-type: none"> <li>• Concept of various shortcut commands.</li> </ul> <p><b>Introduction to the booting process (6 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Introduction to various types of memories and their features.</li> <li>• Basic Hardware and software issues and their solutions.</li> <li>• Usage of Application software and Antivirus.</li> </ul> <p><b>Introduction to DOS Command Line Interface &amp; Linux Operating Systems (10 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Introduction to basic DOS Internal and External Commands.</li> <li>• Introduction to Open Source Software</li> <li>• Introduction to Linux Operating System features, structure, files and processes</li> <li>• Basic Linux commands.</li> </ul>
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		29. View system properties and manage system setting in Linux. (2 Hrs)	
Professional Skill – 47 Hrs.;  Professional Knowledge - 14 Hrs	Create, format, and edit document using word processing application software. (Mapped NOS: SSC/N3022)	<p><b>Using Word Processing Software (47 hrs)</b></p> <p><b>Manage documents (11 Hrs.)</b></p> <p><b>30. Navigate within documents (2 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Search for text</li> <li>• Link to locations within documents</li> <li>• Move to specific locations and objects in documents</li> <li>• Show and hide formatting symbols and hidden text</li> </ul> <p><b>31. Format documents (4.6 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Set up document pages</li> <li>• Apply style sets</li> <li>• Insert and modify headers and footers</li> <li>• Configure page background elements</li> </ul> <p><b>32. Save and share documents (2 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Save documents in alternative file formats</li> <li>• Modify basic document properties</li> <li>• Modify print settings</li> <li>• Share documents electronically</li> </ul> <p><b>33. Inspect documents for issues (2.4 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Locate and remove hidden properties and personal information</li> <li>• Locate and correct accessibility issues</li> <li>• Locate and correct compatibility issues</li> </ul> <p><b>Format documents (8 Hrs.)</b></p> <p><b>34. Insert text and paragraphs (2 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Find and replace text</li> </ul>	<p><b>Using Word Processing Software (14 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Introduction to the various applications in MS office.</li> <li>• Introduction to Word features, Office button, toolbars.</li> <li>• Creating, saving and formatting and printing documents using Word.</li> <li>• Working with objects, macro, mail merge, templates and other tools in Word.</li> </ul>



		<ul style="list-style-type: none"><li>• Insert symbols and special characters</li></ul> <p><b>35. Format text and paragraphs (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Apply text effects</li><li>• Apply formatting by using Format Painter</li><li>• Set line and paragraph spacing and indentation</li><li>• Apply built-in styles to text</li><li>• Clear formatting</li></ul> <p><b>36. Create and configure document sections (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Format text in multiple columns</li><li>• Insert page, section, and column breaks</li><li>• Change page setup options for a section</li></ul> <p><b>Manage tables and lists (9.5 Hrs)</b></p> <p><b>37. Create tables (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Convert text to tables</li><li>• Convert tables to text</li><li>• Create tables by specifying rows and columns</li></ul> <p><b>38. Modify tables (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Sort table data</li><li>• Configure cell margins and spacing</li><li>• Merge and split cells</li><li>• Resize tables, rows, and columns</li><li>• Split tables</li><li>• Configure a repeating row header</li></ul> <p><b>39. Create and modify lists (3.5 Hrs)</b></p> <ul style="list-style-type: none"><li>• Format paragraphs as numbered and bulleted lists</li><li>• Change bullet characters and number formats</li><li>• Define custom bullet characters and number formats</li><li>• Increase and decrease list levels</li></ul>	
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		<ul style="list-style-type: none"><li>• Restart and continue list numbering</li><li>• Set starting number values</li></ul> <p><b>Create and manage references (3 Hrs.)</b></p> <p><b>40. Create and manage reference elements (1.4 Hrs)</b></p> <ul style="list-style-type: none"><li>• Insert footnotes and endnotes</li><li>• Modify footnote and endnote properties</li><li>• Create and modify bibliography citation sources</li><li>• Insert citations for bibliographies</li></ul> <p><b>41. Create and manage reference tables (1.6 Hrs)</b></p> <ul style="list-style-type: none"><li>• Insert tables of contents</li><li>• Customize tables of contents</li><li>• Insert bibliographies</li></ul> <p><b>Manage graphic elements (8.5 Hrs.)</b></p> <p><b>42. Insert illustrations and text boxes (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Insert shapes</li><li>• Insert pictures</li><li>• Insert 3D models</li><li>• Insert Smart Art graphics</li><li>• Insert screenshots and screen clippings</li><li>• Insert text boxes</li></ul> <p><b>43. Format illustrations and text boxes (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Apply artistic effects</li><li>• Apply picture effects and picture styles</li><li>• Remove picture backgrounds</li><li>• Format graphic elements</li><li>• Format SmartArt graphics</li><li>• Format 3D models</li></ul> <p><b>44. Add text to graphic elements (1 Hr)</b></p> <ul style="list-style-type: none"><li>• Add and modify text in text boxes</li><li>• Add and modify text in shapes</li></ul>	
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		<ul style="list-style-type: none"> <li>• Add and modify SmartArt graphic content</li> </ul> <p><b>45. Modify graphic elements (1.5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Position objects</li> <li>• Wrap text around objects</li> <li>• Add alternative text to objects for accessibility</li> </ul> <p><b>Manage document collaboration (3.5 Hrs.)</b></p> <p><b>46. Add and manage comments (1 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Add comments</li> <li>• Review and reply to comments</li> <li>• Resolve comments</li> <li>• Delete comments</li> </ul> <p><b>47. Manage change tracking (2.5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Track changes</li> <li>• Review tracked changes</li> <li>• Accept and reject tracked changes</li> <li>• Lock and unlock change tracking</li> </ul> <p><b>Manage Mailings (3.5 Hrs)</b></p> <p><b>48. Perform mail merge (3.5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Create envelopes</li> <li>• Create labels</li> <li>• Create a new mailing list</li> <li>• Perform mail merge using an existing list</li> </ul>	
<p>Professional Skill - 72 Hrs.;</p> <p>Professional Knowledge - 18 Hrs</p>	<p>Create, format, edit and develop a workbook by using spreadsheet application software.</p> <p>(Mapped NOS: SSC/N3022)</p>	<p><b>Spread Sheet Application (72 Hrs)</b></p> <p><b>Manage Worksheets and Workbooks (12 Hrs.)</b></p> <p><b>49. Open files in MS Excel (1.5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Open MS Excel</li> <li>• Create a new Excel file</li> <li>• Create a new Excel file from a template</li> <li>• Open an existing Excel file</li> </ul> <p><b>50. Import data (1.5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Import data from txt files</li> <li>• Import data from csv files</li> </ul>	<p><b>Spread Sheet Application (18 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Introduction to Excel features and Data Types.</li> <li>• Cell referencing and linking Sheets.</li> <li>• Introduction to various functions in all categories of Excel.</li> </ul>



		<p><b>51. Navigate within workbooks (2 Hrs)</b></p> <ul style="list-style-type: none"><li>• Search data</li><li>• Navigate to named cells, ranges or workbook elements</li><li>• Insert and remove hyperlinks</li></ul> <p><b>52. Format worksheets and workbooks (2 Hrs)</b></p> <ul style="list-style-type: none"><li>• Modify page setup</li><li>• Adjust row height and column width</li><li>• Customize headers and footers</li></ul> <p><b>53. Customize options and views (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Display and modify content in different views</li><li>• Freeze rows and columns</li><li>• Change window views</li><li>• Modify basic workbook properties</li><li>• Display formulas</li></ul> <p><b>54. Configure content for collaboration (2 Hrs)</b></p> <ul style="list-style-type: none"><li>• Set a print area</li><li>• Save workbooks in alternative file formats</li><li>• Configure print settings</li></ul> <p><b>Manage data cells and ranges (12 Hrs.)</b></p> <p><b>55. Manipulate data (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Paste data by using special paste options</li><li>• Fill cells by using Auto Fill</li><li>• Insert and delete multiple columns or rows</li><li>• Insert and delete cells</li></ul> <p><b>56. Format cells and ranges (5 Hrs)</b></p> <ul style="list-style-type: none"><li>• Merge and Unmerge cells</li><li>• Modify cell alignment, orientation and indentation</li><li>• Format cells using Format Painter</li><li>• Wrap text within cells</li><li>• Apply number formats</li></ul>	<ul style="list-style-type: none"><li>• Concepts of sorting, filtering and validating data.</li><li>• Analyzing data using charts, data tables, pivot tables, goal seek and scenarios</li></ul>
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		<ul style="list-style-type: none"><li>• Apply cell formats from the Format cells dialog box</li><li>• Apply cell styles</li><li>• Clear cell formatting</li></ul> <p><b>57. Define and reference named ranges (4 Hrs)</b></p> <ul style="list-style-type: none"><li>• Define a named range</li><li>• Name a table</li><li>• Summarize data visually Insert spark lines</li><li>• Apply built in conditional formatting</li><li>• Remove conditional formatting</li></ul> <p><b>Manage tables and table data (12 Hrs.)</b></p> <p><b>58. Create and format tables (4 hrs)</b></p> <ul style="list-style-type: none"><li>• Create excel tables from cell ranges</li><li>• Apply table styles</li><li>• Convert tables to cell ranges</li></ul> <p><b>59. Manage tables and table data (5 Hrs)</b></p> <ul style="list-style-type: none"><li>• Add or remove table rows and columns</li><li>• Configure table style options</li><li>• Insert and configure total rows</li></ul> <p><b>60. Filter and sort table data (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Filter records</li><li>• Sort data by multiple columns</li></ul> <p><b>Perform operations using formulas and functions (12 Hrs.)</b></p> <p><b>61. Insert references (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Insert relative, absolute and mixed references</li><li>• Reference named ranges and named tables in formulas</li></ul> <p><b>62. Calculate and transform data (5 Hrs)</b></p> <ul style="list-style-type: none"><li>• Perform calculations using AVERAGE(), MIN(), MAX() and SUM()</li></ul>	
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		<ul style="list-style-type: none"> <li>• Count cells by using COUNT(), COUNTIF() and COUNTBLANK()</li> <li>• Perform conditional operations by using the IF() function</li> </ul> <p><b>63. Format and modify text(4 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Format text using RIGHT(),LEFT() and MID() functions</li> <li>• Format text using UPPER(), LOWER() and LEN() functions</li> <li>• Format text using CONCAT() and TEXTJOIN() functions</li> </ul> <p><b>Manage Charts (12 Hrs.)</b></p> <p><b>64. Create Charts (3 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Create charts</li> <li>• Create chart sheets</li> </ul> <p><b>65. Modify charts (4 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Add data series to charts</li> <li>• Switch between rows and columns in source data</li> <li>• Add and modify chart elements</li> <li>• Add trend lines to chart</li> </ul> <p><b>66. Format charts (5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Apply chart layouts</li> <li>• Apply chart styles</li> <li>• Add alternative text to charts for accessibility</li> </ul> <p><b>Manage Pivot Tables (12 Hrs.)</b></p> <p><b>67. Create Pivot Tables(12 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Create Pivot tables from cell ranges</li> <li>• Manipulate fields (columns) to get desired analysis</li> <li>• Use Filters for pivot tables</li> <li>• Represent data as Count, Sum, Average &amp; % of row / column</li> <li>• Group data in Columns &amp; rows for aggregate reports</li> </ul>	
Professional Skill - 53 Hrs;	Create and customize slides for presentation.	<p><b>Power point Presentations (9.5 Hrs.)</b></p> <p><b>68. Open files in MS PowerPoint (1 Hr)</b></p>	<p><b>Power point Presentations (13 Hrs.)</b></p>



<p>Professional Knowledge - 13 Hrs</p>	<p>(Mapped NOS: SSC/N3022)</p>	<ul style="list-style-type: none"> <li>• Open MS PowerPoint</li> <li>• Create a new PowerPoint file</li> <li>• Create a new PowerPoint file from a template</li> <li>• Open an existing PowerPoint file</li> </ul> <p><b>69. Format PowerPoint Presentations (1.5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Add slides</li> <li>• Add titles and text</li> <li>• Select slide layouts</li> <li>• Add PowerPoint templates</li> <li>• Duplicate slides</li> </ul> <p><b>70. Modify slide masters, handout masters, and note masters (2 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Change the slide master theme or background</li> <li>• Modify slide master content</li> <li>• Modify slide layouts</li> </ul> <p><b>71. Change presentation options and views (1.5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Change slide size</li> <li>• Display presentations in different views</li> </ul> <p><b>72. Save and share PowerPoint Presentations (1.5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Save presentations in alternative file formats</li> <li>• Configure different Print settings</li> <li>• Share presentations electronically</li> </ul> <p><b>73. Configure and present slide shows (1 Hr)</b></p> <ul style="list-style-type: none"> <li>• Hide unwanted slides while presenting</li> <li>• Configure slide show options</li> <li>• Present slide shows by using Presenter View</li> </ul> <p><b>74. Prepare presentations for collaboration (1 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Protect presentations by using passwords</li> </ul>	<ul style="list-style-type: none"> <li>• Image editing, Presentations</li> <li>• Introduction to Open Office.</li> <li>• Introduction to the properties and editing of images.</li> <li>• Introduction to different formats of images and their uses.</li> <li>• Introduction to Power Point and its advantages.</li> <li>• Creating Slide Shows.</li> </ul> <p>Fine tuning the presentation and good presentation technique</p>
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		<ul style="list-style-type: none"><li>• Export presentations to other formats</li></ul> <p><b>Format presentations (6.5 Hrs.)</b></p> <p><b>75. Insert text and paragraphs (2 Hrs)</b></p> <ul style="list-style-type: none"><li>• Find and replace text</li><li>• Insert symbols and special characters</li></ul> <p><b>76. Format text and paragraphs (2 Hrs)</b></p> <ul style="list-style-type: none"><li>• Apply text effects</li><li>• Apply formatting by using Format Painter</li><li>• Set line and paragraph spacing and indentation</li><li>• Apply built-in styles to text</li></ul> <p><b>77. Create and configure sections (2.5 Hrs)</b></p> <ul style="list-style-type: none"><li>• Format text in multiple columns</li><li>• Text and image presentation styles</li><li>• Clear formatting</li></ul> <p><b>Manage tables and bulleted text (8 Hrs)</b></p> <p><b>78. Create tables (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Insert tables in PowerPoint</li><li>• Apply built-in table styles</li><li>• Create tables by specifying rows and columns</li></ul> <p><b>79. Modify tables (3 Hrs)</b></p> <ul style="list-style-type: none"><li>• Insert and delete table rows and columns</li><li>• Configure cell margins and spacing</li><li>• Merge and split cells</li><li>• Resize tables, rows, and columns</li></ul> <p><b>80. Create and modify bulleted text (2 Hrs)</b></p> <ul style="list-style-type: none"><li>• Format paragraphs as numbered and bulleted lists</li><li>• Change bullet characters and number formats</li></ul>	
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		<ul style="list-style-type: none"><li>• Increase and decrease list indents</li><li>• Set starting number values</li><li>• Restart and continue list numbering on different slides</li></ul> <p><b>Create and manage reference elements (hyperlinks) (1.25 Hrs)</b></p> <ul style="list-style-type: none"><li>• Create hyperlinks within presentations</li><li>• Create hyperlinks in presentations for files and other sources</li></ul> <p><b>Manage graphic elements (11.5 Hrs)</b></p> <p><b>81. Insert illustrations and text boxes (3.5 Hrs)</b></p> <ul style="list-style-type: none"><li>• Insert shapes</li><li>• Insert pictures</li><li>• Insert SmartArt graphics</li><li>• Insert screenshots and screen clippings</li></ul> <p><b>82. Format illustrations and text boxes (4 Hrs)</b></p> <ul style="list-style-type: none"><li>• Apply artistic effects</li><li>• Apply picture effects and picture styles</li><li>• Remove picture backgrounds</li><li>• Crop images</li><li>• Format graphic elements</li><li>• Format SmartArt graphics</li></ul> <p><b>83. Add and modify text in graphic elements (4 Hrs)</b></p> <ul style="list-style-type: none"><li>• Add and modify text in text boxes</li><li>• Add and modify text in shapes</li><li>• Add and modify SmartArt graphic text</li><li>• Create, insert and modify charts</li></ul> <p><b>Manage Audio &amp; Video elements (6.5 Hrs)</b></p> <p><b>84. Add Audio elements (2 Hrs)</b></p> <ul style="list-style-type: none"><li>• Import audio files in presentations</li><li>• Configure audio playback options</li></ul>	
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		<p><b>85. Add Video elements (4.5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Import video files in presentations</li> <li>• Resize video to fit slide</li> <li>• Configure video playback options</li> </ul> <p><b>Manage transitions and animations (9 Hrs)</b></p> <p><b>86. Add slide transitions (5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Add same slide transition for all slides</li> <li>• Set transition effect duration</li> <li>• Configure transition start and finish options</li> <li>• Customise select slide transitions</li> </ul> <p><b>87. Add animations (4 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Animate text and graphic elements</li> <li>• Order shapes, images, and text boxes</li> <li>• Group shapes, images, and text boxes</li> <li>• Configure animation effects</li> <li>• Configure animation paths</li> <li>• Reorder animations on a slide</li> </ul> <p><b>Manage collaboration (0.75 Hrs)</b></p> <p><b>88. Add and manage comments (0.75 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Add comments</li> <li>• Review and reply to comments</li> </ul>	
<p>Professional Skill - 53 Hrs.;</p> <p>Professional Knowledge - 13 Hrs</p>	<p>Create and manage database file by using MySQL. (NOS: SSC/N9401)</p>	<p><b>Demonstrate on (15 Hrs.)</b></p> <p>89. Installation of MySQL. (1 Hr)</p> <p>90. Troubleshooting basic installation issues. (1 Hr)</p> <p>91. Creation and use of database. (3 Hr)</p> <p>92. Designing of tables. (3 Hr)</p> <p>93. Applying data integrity rules. (2 Hr)</p> <p>94. Using the DDL, DCL and DML statements. (2 Hrs)</p>	<p><b>Database Concepts (4 Hrs.)</b></p> <ul style="list-style-type: none"> <li>• Concept of DBMS, RDBMS.</li> <li>• Data Models, Concept of DBA, Database Users.</li> <li>• Database Schema.</li> <li>• Designing Database using Normalization Rules.</li> <li>• Various data types Data integrity, DDL DML and DCL statements.</li> <li>• Enforcing Primary key and foreign key.</li> </ul>



		<p>95. Enforcing constraints, primary key and foreign key. (2 Hrs)</p> <p>96. Adding indices to Tables. (1 Hr)</p> <p><b>Demonstrate on (15 Hrs)</b></p> <p>97. Simple select queries. (5 Hrs)</p> <p>98. Insert and delete queries Update queries. (10 Hrs)</p> <p><b>Demonstrate on (23 Hrs)</b></p> <p>99. Using the Number, Date and Character functions. Joins and Functions (11.5 Hrs)</p> <p>100. Joins, Group by, Having, Sub query. (11.5 Hrs)</p>	<ul style="list-style-type: none"> <li>• Adding Indices.</li> </ul> <p><b>Queries (4 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Concepts of Transactions</li> <li>• ACID Property of Transaction Constraints.</li> </ul> <p><b>Joins and Functions (5 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Joining of tables</li> <li>• Sub Queries</li> <li>• Functions used in query like sum, average, max, min, count etc.</li> </ul>
<p>Professional Skill - 68 Hrs;</p> <p>Professional Knowledge - 16 Hrs</p>	<p>Install, setup/ configure, troubleshoot, and secure computer network including Internet. (Mapped NOS: SSC/N3022)</p>	<p><b>Computer Network (68 Hrs.)</b></p> <p><b>Set-up &amp; configure a Computer Network (48 Hrs.)</b></p> <p>101. View Network connections. (2 Hrs)</p> <p>102. Connect a computer to a network and share Devices i.e. Printers, files, folders and drives. (4 Hrs)</p> <p>103. Work with various Network devices, connectors and cables. Create straight and cross cable and punch a UTP cable in the patch socket and test the connectivity. (4 Hrs)</p> <p>104. Practice IP Addressing and Subnet masking for IPV4/ IPV6 and pinging to test networks. (4 Hrs)</p> <p>105. Configure Hub and Switch. (4 Hrs)</p> <p>106. Set up and configure wired and wireless LAN in a Computer Lab within at least three computers. (6 Hrs)</p>	<p><b>Communicating in a Connected World (12 Hrs.)</b></p> <ul style="list-style-type: none"> <li>• Local Networks,</li> <li>• Communicating on a Local Network, Principles of Communications,</li> <li>• How do Ethernet Networks Work?,</li> <li>• How are Networks Built?,</li> <li>• Routing Across Networks</li> <li>• Explain how end-user devices and local networks interact with the global Internet.</li> <li>• Communicating in a Connected World Explain the concept of network communication.</li> </ul>



		<p>107. Use patch panel &amp; I/O Box for wired LAN and installing &amp; configuring Internet connection in a single PC and in a LAN. (6 Hrs)</p> <p>108. Set up a proxy server/ DHCP Server with firewall. (8 Hrs)</p> <p>109. Set up video conferencing using open-source software. (4 Hrs)</p> <p>110. Use various tools (by open source /free) for network troubleshooting, maintenance and security for both Wired and Wireless (6 Hrs)</p> <p>111. <b>Set up Internet access &amp; communication (10 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Set-up internet connectivity</li> <li>• Set-up digital communication</li> </ul> <p>112. <b>Use the Internet (10 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Browse the Internet</li> <li>• Use e-mail</li> <li>• Use Social Media</li> <li>• Use the phone for online activities</li> </ul>	<ul style="list-style-type: none"> <li>• Local Networks</li> <li>• Explain the roles of devices in a network.</li> <li>• What Does a Home Network Look Like?</li> <li>• How Does Wi-Fi Work?</li> <li>• Introduction to LAN Devices, Internetworking Devices,</li> </ul> <p><b>Internet Concepts (4 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Introduction to www, Concept of Internet, Web Browsers, internet servers and search engines.</li> <li>• Concepts of Domain naming Systems and E mail communication.</li> <li>• Introduction to video chatting tools and Social Networking concepts.</li> </ul>
<p>Professional Skill - 67 Hrs;</p> <p>Professional Knowledge - 17 Hrs</p>	<p>Develop web pages using HTML and CSS. (Mapped NOS: SSC/N0503, SSC/N0501)</p>	<p><b>Create simple static web pages using HTML tags (67 Hrs.)</b></p> <p>113. <b>Practice HTML (46 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Practice with basic HTML elements (e.g. head, title, body), tag and attributes.</li> <li>• Design simple web page with text, paragraph and line break using HTML tags</li> <li>• Format text, change background colour and insert pictures in web page</li> <li>• Design simple web page with tables and lists.</li> </ul>	<p><b>Web Design Concepts (17 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Concepts of Static and Dynamic Web pages.</li> <li>• Introduction to HTML and various tags in HTML.</li> <li>• Concepts of different controls used in Web Pages.</li> <li>• Concepts of CSS and applying CSS to HTML.</li> <li>• Introduction to open source CMS</li> </ul>



		<ul style="list-style-type: none"> <li>• Use marquees, hyperlinks and mail to link in designing web pages</li> <li>• Create frames, add style and design layout.</li> <li>• Display a web page within a web page using iframes.</li> <li>• Insert text, check and combo box in web page.</li> <li>• Design web page using password field, submit button</li> <li>• Reset button and radio button etc.</li> <li>• Design a web page adding flash file, audio and video files.</li> <li>• Design web page with forms and form controls using HTML tags</li> </ul> <p><b>114. Create simple static web pages using CSS (21 Hrs )</b></p> <ul style="list-style-type: none"> <li>• CSS syntax, Adding colors, fonts, backgrounds, images borders, text alignment, text transformation, Lists etc.</li> <li>• 3 types of CSS</li> <li>• Adding a Navigation Bars(vertical/horizontal bars)</li> <li>• CSS drop downs &amp; Forms</li> <li>• CSS counters and website layout, Multiple backgrounds &amp; Putting the stylesheet in a separate file</li> <li>• CSS Animations &amp; CSS Buttons</li> </ul>	<p>viz, Joomla, Word press etc. and Web authoring tools viz. Kompozer, WordPress, Front Page etc.</p>
<p>Professional Skill - 173 Hrs;</p> <p>Professional Knowledge - 35 Hrs</p>	<p>Develop web pages using JavaScript.</p> <p>(Mapped NOS: SSC/N0503, SSC/N0501)</p>	<p><b>JavaScript (173 Hrs)</b></p> <p><b>Embed JavaScript in HTML Pages (127 Hrs)</b></p> <p>115. Practicing the JavaScript in creating dynamic HTML pages. (53 Hrs)</p> <p>116. Embed JavaScript in HTML to Display Information in Web pages. (31 Hrs)</p>	<p><b>Introduction to JavaScript (35 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Introduction to Programming and Scripting Languages.</li> <li>• Introduction to JavaScript and its application for the web.</li> </ul>



		<p>117. Use error handling techniques in JavaScript. (11 Hrs)</p> <p>118. Use objects and classes in JavaScript. (31 Hrs)</p> <p>119. Describe Animation and Multimedia using JavaScript. (1 Hr)</p> <p><b>Create a dynamic website using an open-source tool (40 Hrs)</b></p> <p>120. Develop dynamic HTML pages using JavaScript.</p> <p><b>Deploy a simple web project (6 Hrs)</b></p> <p>121. Deploy web project using IIS.</p>	<ul style="list-style-type: none"> <li>• Introduction to Web Servers and their features.</li> <li>• JavaScript Basics – Data types, Variables, Constants and Conversion between data types.</li> <li>• Arithmetic, Comparison, Logical Operators in JavaScript. Operator precedence.</li> <li>• Program Control Statements and loops in JavaScript.</li> <li>• Arrays in JavaScript – concepts, types and usage.</li> <li>• The String data type in JavaScript. Introduction to String, Math and Date.</li> <li>• Introduction to Functions in JavaScript.</li> <li>• Built in JavaScript functions overview.</li> <li>• Concepts of Pop Up boxes in JavaScript.</li> <li>• Introduction to the Document Object Model.</li> <li>• Concepts of using Animation and multimedia files in JavaScript.</li> </ul>
Professional Skill – 73 Hrs	Create workbooks with advanced formulas, macros, charts, pivot tables	<b>Data Visualization or analysis using Excel – (73 Hrs)</b> <b>Create advanced formulas and macros (24 Hrs)</b>	<b>Advanced Excel Concepts - Theory- (17 Hrs)</b>



<p>Professional Knowledge - 17 Hrs.</p>	<p>and demonstrate ability to use Power tools. (NOS: SSC/N9402)</p>	<p>122. Create and modify simple macros (6 Hrs)            123. Perform form controls and create simple data entry form with macros. (6 Hrs)            124. Look up data by using functions. (6 Hrs)            125. Use advanced date functions.(6 Hrs)  <b>Manage advanced charts and tables (21 hrs)</b>            126. Create and modify advanced charts. (10 Hrs)            127. Create and modify PivotTables. (11 Hrs)  <b>Use Power Query and Power BI (24 Hrs)</b>            128. Create a Power Query, Power Query Function. Invoking the Power Query function and combining queries. Organize the workbook queries (12 Hrs)            129. Use Power BI for simple data visualizations. (12 Hrs)  <b>Make a dashboard in Excel (4 Hrs)</b></p>	<ul style="list-style-type: none"> <li>• MS excel revision (row, columns, basic formatting, insert menu, Print setup, etc. ) and Look up introduction and functions</li> <li>• Types of references and cell naming</li> <li>• Excel Linkage Custom Format and Excel Protection</li> <li>• Tips and tricks</li> <li>• Pivot table and Pivot chart</li> <li>• Conditional formatting</li> <li>• Advanced Graphs</li> <li>• Power Queries</li> </ul>
<p>Professional Skill - 25hrs;  Professional Knowledge - 10 Hrs.</p>	<p>Browse, select, and transact using E-commerce websites(NOS: SSC/N9403)</p>	<p><b>Browse e-Commerce sites to identify products &amp; services (6.5 Hrs)</b>            130. Demonstrate e-Commerce sites. (1.5 Hrs)            131. List features of e-commerce sites. (2 Hrs)            132. Use e-commerce sites to source an item. (3 Hrs)  <b>Shop online (4.5 Hrs)</b>            133. Undertake transactions on an e-commerce site. (4.5 Hrs)  <b>Manage e-commerce operations (14 Hrs)</b>            134. Add products to an ecommerce website. (4 Hrs)            135. Practice order processing. (3 Hrs)            136. Practice payment processing. (4.5 Hrs)</p>	<p><b>e-Commerce (10 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Introduction to E Commerce and advantages.</li> <li>• Building business on the net.</li> <li>• Payment and Order Processing, Authorization, Chargeback and other payment methods.</li> <li>• Security issues and payment gateways.</li> </ul>



		137. Identify common security issues. (3.5 Hrs )	
Professional Skill - 20 Hrs  Professional Knowledge - 10 Hrs.	Secure information from Internet by using cyber security concept. (NOS: SSC/N9404)	<p>138. <b>Protect information, computers and networks from viruses, spyware and other malicious code (19 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Explain Cyber security (2 Hrs)</li> <li>• Secure computers &amp; the network (5.5 Hrs)</li> <li>• Reduce cyber security threats (2 Hrs)</li> <li>• Secure a Wi-Fi Network (4 Hrs)</li> <li>• Use Anti-Virus software (3 Hrs)</li> <li>• Perform back-ups of files, data &amp; information (2.5 Hrs)</li> </ul> <p>139. <b>Explain compliance with IT Act (1 Hr)</b></p> <ul style="list-style-type: none"> <li>• Identify steps for information privacy. (0.5 Hrs)</li> <li>• Identify common cybercrimes and penalties applicable. (0.5 Hrs)</li> </ul>	<p><b>Cyber Security (10 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Overview of Information Security, SSL, HTTPS, Security threats, information Security vulnerability and Risk management.</li> <li>• Introduction to Directory Services, Access Control, Security, Privacy protection, Audit and Security.</li> <li>• Introduction to IT Act and penalties for cybercrimes.</li> </ul>
Professional Skill –25 Hrs;  Professional Knowledge 15 Hrs.	Explain Cloud concepts & services and Describe Application Development Life Cycle. (NOS: SSC/N9405)	<p><b>Cloud Computing (15 Hrs)</b></p> <p><b>Working with Cloud Services (12 Hrs)</b></p> <p>140. Practice with IaaS using free cloud services. (4 Hrs)</p> <p>141. Practice with PaaS using free cloud services. (4 Hrs)</p> <p>142. Practice with SaaS using free cloud services. (4 Hrs)</p> <p><b>Web hosting in Cloud (3 Hrs)</b></p> <p>143. Host a website in a free cloud. (3 Hrs)</p> <p><b>Develop an application and perform the Application Development Life Cycle (10 Hrs)</b></p> <p>144. Identify Phases of the Application Development Life Cycle. (5 Hrs)</p> <p>145. Describe Roles in each of the phases of Application</p>	<p><b>Introduction to Cloud Computing (12 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Benefits of cloud services, different categories.</li> <li>• Resources available in cloud.</li> </ul> <p><b>Explain the Application Development Life Cycle (3 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Identify Phases of the Application Development Life Cycle.</li> <li>• Describe Roles in each of phases of the Application Development Life Cycle.</li> </ul>

		Development Life Cycle. (5 Hrs)	
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To be selected either “Programming in Python” or “Programming in Java” as Elective Module for COPA.

<b>COPA - Elective Module – I</b>		<b>Programming in Python</b>	
Professional Skill - 70 Hrs;  Professional Knowledge - 30 Hrs.	Write programs using Python language. ( NOS: SSC/N9406)	<p><b>Programming language (Python) Use Python from command line (7 Hrs)</b></p> <ol style="list-style-type: none"> <li>1. Install, set up the environment &amp; run Python. (3 Hrs)</li> <li>2. Use Command Line and IDE to create and execute a python program. (4 Hrs)</li> </ol> <p><b>Perform Operations using Data Types and Operators (15 Hrs)</b></p> <ol style="list-style-type: none"> <li>3. Write and test a python program to demonstrate print statement, comments, different types of variables. (5 Hrs)</li> <li>4. Write and test a python program to perform data and data type operations, string operations, date, input and output, output formatting and operators. (5 Hrs)</li> <li>5. Determine the sequence of execution based on operator precedence. (5 Hrs)</li> </ol> <p><b>Control Flow with Decisions and Loops (20hrs)</b></p> <ol style="list-style-type: none"> <li>6. Construct and analyze code segments that use branching statements. (10 Hrs)</li> <li>7. Construct and analyze code segments that perform iteration. (10 Hrs)</li> </ol> <p><b>Document and Structure Code (18 Hrs)</b></p>	<p><b>Programming language (Python) (30 Hrs)</b></p> <ul style="list-style-type: none"> <li>• Introduction to Python History</li> <li>• Features, Setting up path Basic Syntax, Comments, Variable</li> <li>• Different Data Types</li> <li>• Casting, string, Boolean</li> <li>• Python Operators</li> <li>• Conditional Statements</li> <li>• Looping</li> <li>• Control Statements, String Manipulation, Lists, Tuple, sets</li> <li>• Dictionaries</li> <li>• Arrays</li> <li>• Iterators, modules, dates, math,</li> <li>• Modules, Input and Output.</li> </ul>



		<p>8. Document code segments using comments and documentation strings. (3 Hrs)</p> <p>9. Construct and analyze code segments that include List comprehensions, tuple, set and Dictionary comprehensions. (16 Hrs)</p> <p><b>Perform Operations Using Modules and Tools (10 Hrs)</b></p> <p>10. Perform basic operations using built-in modules. (5 Hrs)</p> <p>11. Solve complex computing problems by using built-in modules. (5 Hrs)</p>	
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<b>COPA - Elective Module – II</b>		<u>Programming in JAVA</u>	
<p>Professional Skill - 70 Hrs;</p> <p>Professional Knowledge - 30 Hrs.</p>	<p>Writing programs using JAVA. (SSC/N9407)</p>	<p><b>Object Oriented Programming and JAVA Language (15 Hrs)</b></p> <ol style="list-style-type: none"> <li>1. Installing JAVA.</li> <li>2. Setting the Class path.</li> <li>3. Writing and Executing a simple JAVA Program to display "Hello".</li> </ol> <p>Demonstrate writing JAVA programs:</p> <ol style="list-style-type: none"> <li>4. Use of various data types in JAVA.</li> <li>5. Use of various operators in JAVA.</li> <li>6. Create and use of Local, Instance and Class variables.</li> <li>7. Read text from the keyboard using scanner class read text from the keyboard using console class.</li> </ol>	<p>Explain the following:</p> <ul style="list-style-type: none"> <li>• Object Oriented Programming with Core Java</li> <li>• Java Programming features</li> <li>• JVM, Byte codes and Class path</li> <li>• Java Program Development</li> <li>• Compilation and Execution of JAVA programs</li> <li>• Basic JAVA language elements – keywords, comments, data types and variables.</li> <li>• JAVA Arithmetic, Assignment, Relational, Logical, Increment /</li> </ul>



			<p>Decrement operators and expressions.</p> <ul style="list-style-type: none"><li>• JAVA String Operators</li><li>• JAVA Input and Output streams, System in, System out.</li><li>• Input using Scanner class and Console class methods. (10Hrs.)</li></ul>
		<p><b>JAVA Program Flow Control (20 Hrs)</b></p> <p>Demonstrate writing JAVA programs:</p> <ol style="list-style-type: none"><li>8. Use of the if and if ... else statements.</li><li>9. Use of the Switch statement.</li><li>10. Use of the Do ... While and while – do loops.</li><li>11. Use of the For Loop.</li><li>12. Use of the Break and Continue Keywords.</li><li>13. Use of the JAVA Numbers Class methods.</li><li>14. Use of the JAVA Character Class methods.</li><li>15. Use of the JAVA String Class methods.</li><li>16. Create and use of arrays.</li></ol>	<p>Explain the following:</p> <ul style="list-style-type: none"><li>• Decision making and flow control using if...then, if then else, nested if, switch case and the conditional ternary operators in JAVA.</li><li>• Loop control flow using while – do, do – while loops, for loop, using the break, continue statements.</li><li>• Terminating the JAVA program. JAVA Number, Character and String Classes. Arrays in JAVA. (6Hrs.)</li></ul>



		<p><b>JAVA Classes, Overloading and Inheritance (20 Hrs)</b></p> <p>Demonstrate writing JAVA programs:</p> <ol style="list-style-type: none"> <li>17. Create and use of simple classes, objects and methods in JAVA.</li> <li>18. Pass data and Objects to Methods.</li> <li>19. Return data and Objects from Methods.</li> <li>20. use of constructors in JAVA.</li> <li>21. Create and use of Overloaded methods in JAVA.</li> <li>22. Override methods in JAVA.</li> <li>23. Create and use of Super class, Sub class in JAVA.</li> </ol>	<p>Explain the following:</p> <ul style="list-style-type: none"> <li>• JAVA Objects, Classes and Methods.</li> <li>• Passing data and objects as parameters to methods.</li> <li>• Method Overloading.</li> <li>• Constructors and Overloaded constructors.</li> <li>• Inheritance in JAVA.</li> <li>• Method Overriding in JAVA. (8Hrs.)</li> </ul>
		<p><b>Abstract Classes and Interfaces in JAVA (15 Hrs)</b></p> <p>Demonstrate writing JAVA programs:</p> <ol style="list-style-type: none"> <li>24. Create and use virtual methods.</li> <li>25. Create abstract classes and methods.</li> <li>26. Create interfaces in JAVA.</li> <li>27. Override methods in JAVA.</li> <li>28. Create and implement an interface.</li> <li>29. Extend interfaces in JAVA.</li> <li>30. Create and use a package in JAVA.</li> </ol>	<p>Explain the following:</p> <ul style="list-style-type: none"> <li>• Concept of Virtual methods.</li> <li>• Concept of Abstract classes and methods</li> <li>• Features of Abstract Classes</li> <li>• JAVA Interfaces and their advantages</li> <li>• Method Overriding in JAVA</li> <li>• Polymorphism in JAVA</li> <li>• Creating, implementing and extending interfaces</li> <li>• Creating and using Packages in JAVA. (6Hrs.)</li> </ul>



		<b>Troubleshooting Java issues</b> Download and Install Java, Check and Verify Java Configurations, Test Java, Remove Old Versions of Java, Find Java version, Always redirected to the java.com download page.	
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**Industrial Visit/Project work**

**Broad Area:**

- a) Create and host a web site of at least 6 web pages using JavaScript & CSS containing interactive objects, functions etc.
- b) Create a project with Excel on Payroll Systems.
- c) Create a database with MySQL on Library management system.
- d) Create project in Python/Java programming language.