Basic IT Tools

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Basic IT Tools	2	0	0	2	Class XII	NA

Learning Objectives

The Learning Objectives of this course are as follows:
- To enable students develop IT skills that are a pre-requisite in today's work environment.
- To equip them with basic computing skills that will enhance their employability in general.
- To enable the student to analyse and present information in a meaningful manner.

Learning outcomes

The Learning Outcomes of this course are as follows:
- By studying this course, students will be able to use word-processor to generate documents with appropriate formatting, layout, review and referencing.
- By studying this course, students will be able to manage data in worksheets and workbooks and analyze it using spreadsheet functions and inbuilt formulas.
- By studying this course, students will be able to draw analysis on data using spreadsheets to make decisions.
- By studying this course, students will be able to make meaningful representations of data in the form of charts and pivot tables.
- By studying this course, students will be able to manage data in database tables and use the same for generating queries, forms and reports.

SYLLABUS

Course Contents:

Unit 1: Introduction to Spreadsheets (16 hours)

Spreadsheets: Concept of worksheets and workbooks, creating, opening, closing and saving workbooks, moving, copying, inserting, deleting and renaming worksheets, working with multiple worksheets and multiple workbooks, controlling worksheet views, naming cells using name box, name create and name define; Exchanging data using clipboard, object linking and

embedding; Printing and Protecting worksheets: Adjusting margins, creating headers and footers, setting page breaks, changing orientation, creating portable documents and printing data and formulae; Implementing file level security and protecting data within the worksheet; Understanding absolute, relative and mixed referencing in formulas, referencing cells in other worksheets and workbooks, correcting common formula errors, working with inbuilt function categories like mathematical, statistical, text, lookup, information, logical, database, date and time and basic financial functions.

Unit 2: Data Analysis in Spreadsheets (16 hours)

Consolidating worksheets and workbooks using formulae and data consolidate command; Choosing a chart type, understanding data points and data series, editing and formatting chart elements, and creating sparkline graphics, Analysing data using pivot tables: Creating, formatting and modifying a pivot table, sorting, filtering and grouping items, creating calculated field and calculated item, creating pivot table charts, producing a report with pivot tables. Introduction to recording and execution of macros.

Unit 3: Word Processing (12 hours)

Introduction: Creating and saving your document, displaying different views, working with styles and character formatting, working with paragraph formatting techniques using indents, tabs, alignment, spacing, bullets and numbering and creating borders; Page setup and sections: Setting page margins, orientation, headers and footers, end notes and foot notes, creating section breaks and page borders; Working with tables: Creating tables, modifying table layout and design, sorting, inserting graphics in a table, table math, converting text to table and vice versa; Create newspaper columns, indexes and table of contents, Spell check your document using inbuilt and custom dictionaries, checking grammar and style , using thesaurus and finding and replacing text; Create bookmarks, captions and cross referencing, adding hyperlinks, adding sources and compiling and bibliography; Mail merge: Creating and editing your main document and data source, sorting and filtering merged documents and using merge instructions like ask, fill-in and if-then-else; Linking and embedding to keep things together.

Unit 4: Databases (16 hours)

Introduction to Database Development: Database Terminology, Objects, Creating Tables, working with fields, understanding Data types, Changing table design, Assigning Field Properties, Setting Primary Keys, using field validation and record validation rules, Indexing, working with multiple tables, Relationships & Integrity Rules, Join Properties, Record manipulation, Sorting & Filtering; Select data with queries: Creating Query by design & by wizard (Select, Make Table, Append, Delete, Cross Tab, Update, Parameterized Query, Find Duplicate and Find Unmatched), Creating multi table queries, creating & working with table joins. Using operators & expressions: Creating simple & advance criteria; Working with forms: Creating Basic forms, working with bound, unbound and calculated controls, understanding property sheet, Working with Data on Forms: Changing Layout, creating Sub Forms, creating list box, combo box and option groups; Working with Reports: Creating Basic Reports, Creating Header & Footer, Placing Controls on reports, sorting & grouping, Creating Sub reports.

Essential/recommended readings

- Swinford, E., Dodge, M., Couch, A., Melton, B. A. (2013). Microsoft Office Professional 2013. United States: O'Reilly Media.
- Wang, W. (2018). Office 2019 For Dummies. United States: Wiley. Microsoft Lambert, J. (2019). Microsoft Word 2019 Step by Step. United States: Pearson Education.

Suggestive readings

- Jelen, B. (2013). Excel 2013 Charts and Graphs. United Kingdom: Que.
- Alexander, M., Jelen, B. (2013). Excel 2013 Pivot Table Data Crunching. United Kingdom: Pearson Education.
- Alexander, M., Kusleika, R. (2018). Access 2019 Bible. United Kingdom: Wiley.

Examination scheme and mode:

Evaluation scheme and mode will be as per the guidelines notified by the University of Delhi.

DOCUMENT PREPARATION & PRESENTATION SOFTWARE

Credit distribution, Eligibility and Prerequisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Document Preparation & Presentation Software	2	0	0	2	Class XII	NIL

Learning Objectives:

- To develop proficiency in the use of document preparation software such as document LaTeX, LibreOffice.
- To make a presentation using LaTeX, LibreOffice.
- To serve as a tool for conveying/communicating one's ideas, views, and observations.

Learning Outcomes

On completion of the course, a student will be able to

- Create a text document using LaTeX using a standard template.
- Incorporate well-formatted mathematical equations, algorithms, figures, tables and references in a document.
- Use Zotero for reference management.
- Format text, including alignment, emphasis and fonts.
- Handle basic aspects of document structure, including sections, subsections, paragraphs, and bulleted and enumerated lists.
- Page set a document including header, footer, and page numbering. Make a presentation.

Practical

Unit 1: Introduction (4 Hours)
1. Create a LaTeX/ LibreOffice document having several paragraphs, including comments in LaTeX.
2. Organize content into sections, including preface/abstract. Using the article and book class of LaTeX. Handling errors.

Unit 2: Styling Pages (6 Hours)
1. Loading and using packages, setting margins, header and footer, and page orientation.
2. Organizing the document into multiple columns

Unit 3: Formatting Content (10 Hours)
1. Formatting text (styles, size, alignment)
2. Adding colours to a block of text/ page
3. Adding ordered and unordered lists
4. Inserting mathematical expressions – subscripts, superscripts, fractions, binomials, aligning equations, operators, Greek and mathematical symbols, and mathematical fonts.

Unit 4: Tables and Figures (10 Hours)
1. Create basic tables
2. Adding different types of borders to a table
3. Merging rows and columns
4. Splitting tables across multiple pages.
5. Incorporating figures and subfigures, explore different properties like rotation and scaling.

Unit 5: Algorithms and Equations (12 hours)
1. Incorporating algorithms, body typesetting, organizing algorithms across multiple pages.
2. Incorporating equations, indentation, and captioning.

Unit 6: Referencing and Indexing (6 hours)
1. Insert captions, labels, and references
2. Incorporate cross-referencing (refer to sections, table, and images)
3. Incorporate a bibliography
4. Create a back index.

Unit 7: Making Presentations (12 hours)
1. Create a slideshow
2. Incorporate logo
3. Highlight important points
4. Create a title page
5. Make a table of contents
6. Incorporate special effects in a slideshow.

Exercises:

For the following figures, create LaTex documents using concepts from above:

1.

<div align="center">

Hello World!

Prof. Naveen Kumar

November 15, 2022

</div>

Hello World! Today I am learning LATEX. LATEX is a great program for writing math. I can write in line math such as $a^2 + b^2 = c^2$. I can also give equations their own space:

$$\gamma^2 + \theta^2 = \omega^2$$

2.

<div align="center">

Integrals, Sums and Limits

Dr. Neeraj Kumar Sharma

</div>

1 Integrals

Integral $\int_a^b x^2 dx$ inside text.

The same integral on display:

$$\int_a^b x^2\, dx$$

and multiple integrals:

$$\iint_V \mu(u, v)\, du\, dv$$

$$\iiint_V \mu(u, v, w)\, du\, dv\, dw$$

$$\oint_V f(s)\, ds$$

2 Sums and products

Sum $\sum_{n=1}^{\infty} 2^{-n} = 1$ inside text.

The same sum on display:

$$\sum_{n=1}^{\infty} 2^{-n} = 1$$

Product $\prod_{i=a}^{b} f(i)$ inside text.

The same product on display:

$$\prod_{i=a}^{b} f(i)$$

3 Limits

Limit $\lim_{x \to \infty} f(x)$ inside text.

The same limit on display:

$$\lim_{x \to \infty} f(x)$$

3.

Equations

Prof. Naveen Kumar[1], Dr. Neeraj Kumar Sharma[2], and Sakeena Shahid[3]

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November 15, 2022

1 Maxwell's Equations

"Maxwell's equations" are named for James Clark Maxwell and are as follow:

$$\vec{\nabla} \cdot \vec{E} = \frac{\rho}{\epsilon_0} \qquad \text{Gauss's Law} \qquad (1)$$

$$\vec{\nabla} \cdot \vec{B} = 0 \qquad \text{Gauss's Law for Magnetism} \qquad (2)$$

$$\vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t} \qquad \text{Faraday's Law of Induction} \qquad (3)$$

$$\vec{\nabla} \times \vec{B} = \mu_0 \left(\epsilon_0 \frac{\partial \vec{E}}{\partial t} + \vec{J} \right) \qquad \text{Ampere's Circuital Law} \qquad (4)$$

Equations 1, 2, 3, and 4 are some of the most important in Physics.

2 Matrix Equations

$$\begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{pmatrix} \begin{bmatrix} v_1 \\ v_2 \\ \vdots \\ v_n \end{bmatrix} = \begin{matrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{matrix}$$

4.

List of mathematical functions:

- Trigonometric functions

  - sine

  - cosine

  - tangent

- Special functions

  - Beta function

  - Gamma function

  - Riemann zeta function

5. Add the following algorithm to the document.

90

Algorithm 1: Example code

Input: Your Input
Output: Your output
Data: Testing set x

1    $\sum_{i=1}^{\infty} := 0$ `// this is a comment`

     `/* Now this is an if...else conditional loop`   `*/`

2   **if** *Condition 1* **then**

3   Do something   `// this is another comment`

4   **if** *sub-Condition* **then**

5   Do a lot

6   **else if** *Condition 2* **then**

7   Do Otherwise

       `/* Now this is a for loop`   `*/`

8   **for** *sequence* **do**

9   loop instructions

10 **else**

11   Do the rest

     `/* Now this is a While loop`   `*/`

12 **while** *Condition* **do**

13   Do something

6.

col1	col2	col3
Multiple row	cell2 cell5 cell8	cell3 cell6 cell9

7.

Country List		
Country Name or Area Name	ISO ALPHA 2 Code	ISO ALPHA 3
Afghanistan	AF	AFG
Aland Islands	AX	ALA
Albania	AL	ALB
Algeria	DZ	DZA
American Samoa	AS	ASM
Andorra	AD	AND
Angola	AO	AGO

8. Insert four sub-figures as given below, and add captions. Also, refer to these sub-figures in the text.

(a) Subfigure 1 caption   (b) Subfigure 2 caption

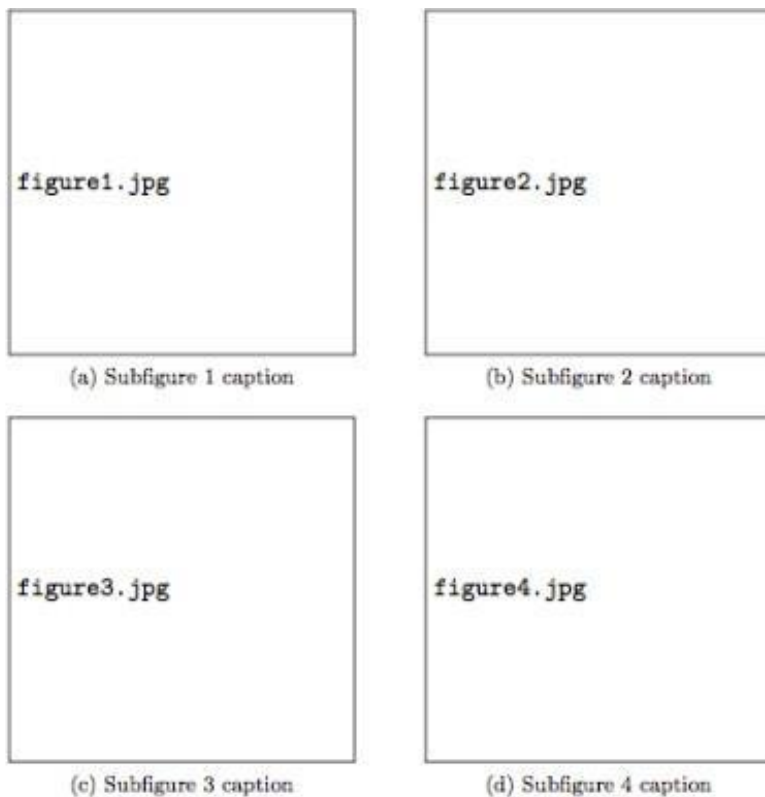(c) Subfigure 3 caption   (d) Subfigure 4 caption

Figure 1: This is a figure containing several subfigures.

In the text, you can refer to subfigures of figure 1 as 1a, 1b, 1c and 1d and to the sub-index as (a), (b), (c) and (d).

9. Add a table of contents, a list of figures, and a list of tables in the document as given below.

Contents

List of Tables

List of Figures

10. Add a list of references in the document as given below and cite them in the text.

This document is an example of `natbib` package using in bibliography management. Three items are cited: *The LaTeX Companion* book [2], the Einstein journal paper Einstein [1], and the Donald Knuth's website [3]. The LaTeX related items are [2, 3].

References

[1] A. Einstein. Zur Elektrodynamik bewegter Körper. (German) [On the electrodynamics of moving bodies]. *Annalen der Physik*, 322(10):891–921, 1905. doi: http://dx.doi.org/10.1002/andp.19053221004.

[2] M. Goossens, F. Mittelbach, and A. Samarin. *The LaTeX Companion*. Addison-Wesley, Reading, Massachusetts, 1993.

[3] D. Knuth. Knuth: Computers and typesetting. URL http://www-cs-faculty.stanford.edu/~uno/abcde.html.

Examination scheme and mode:
Evaluation scheme and mode will be as per the guidelines notified by the University of Delhi.

Front End Web Design and Development

Credit distribution, Eligibility and Prerequisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Front End Web Design and Development	2	0	0	2	Class XII	NIL

Learning Objectives:

The Learning Objectives of this course are as follows:
- To introduce the basic concepts and techniques of client-side web programming.
- To enable the students to develop simple, interactive, and stylish websites using HTML, CSS and JavaScript.

Learning Outcomes

The Learning Outcomes of this course are as follows:
- After studying this course, students will be able to build websites using the elements of HTML.
- After studying this course, students will be able to build interactive and stylish websites using client-side programming techniques with CSS and Javascript.
- After studying this course, students will be able to learn to validate client-side data.
- After studying this course, students will be able to define the structure and contents of the website using different features of CSS.

SYLLABUS

Unit-1: Introduction   **(8 hours)**
Introduction: Introduction to internet and web design. Basic concepts of web architecture.

Unit-2: HTML   **(8 hours)**
Introduction to hypertext mark-up language (html), creating web pages, lists, hyperlinks, tables, web forms, inserting images, frames.

Unit-3: Cascading style sheet (CSS)   **(8 hours)**
Concept of CSS, creating style sheet, Importing style sheets, CSS properties, CSS styling (background, text format, controlling fonts), CSS rules, Style Types, CSS Selectors, CSS cascade, working with block

elements and objects, working with lists and tables, CSS id and class, box model (introduction, border properties, padding properties,
margin properties).

Unit-4: Basics of Javascript (8 hours)

Document object model, data types and variables, functions, methods and events, controlling program flow, built-in objects and operators, validations.

Practical Exercise (28 hours)
HTML

- Create an HTML document with following formatting – Bold, Italics, Underline, Colors, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking text as well as marquee text.
- Create an HTML document with Ordered and Unordered lists, Inserting Images, Internal and External linking
- Create an HTML document for displaying the current semester's timetable.
- Create a website with horizontal and vertical frames. Top horizontal frame needs to show your college's name and logo. Bottom horizontal frame is to be split into two vertical frames. The left frame has hyperlinks to pages related to faculty, courses, student activities, etc. The right frame shows the corresponding webpage based on the link clicked on the left frame.
- Create a student registration form using HTML which has the following controls and make an interactive content presentation using CSS.:

  I.   Text Box   II.   Dropdown box   III.   Option/radio buttons

  IV.   Check boxes V.   Reset and Submit button

- Create a webpage for your department with a drop-down navigation menu for faculty, courses, activities, etc.. Implement the webpage using styles, rules, selectors etc. learned in CSS
- Write event-driven programs in JavaScript for the following:
  - Enter a number and on click of a button print its multiplication table.
  - Print the largest of three numbers entered by the user.
  - Find the factorial of a number entered by the user.
  - Enter a list of positive numbers using the prompt terminated by a zero. Find thesum and average of these numbers.
- Create a student registration form using text, radio button, check box, drop down box, text field and all other required HTML elements. Customize the CSS and javascript to input and validate all data. Create functions to perform validation of each element, example:
  - Roll number is a 7-digit numeric value
  - Name should be an alphabetical value (String)
  - Non-empty and valid fields like DOB

Essential/recommended readings

- Nixon, R., Learning PHP, MySQL & JavaScript with jQuery, CSS and HTML5, O'Reilly, 2018.
- Powell, T.A. HTML & CSS: The Complete Reference, 5th edition, Tata McGrawHill, 2017.
- Duckett, J., JavaScript and JQuery: Interactive Front-End Web Development, Wiley, 2014.

Suggested Readings

- Boehm, A., & Ruvalcaba, Z., Murach's HTML5 and CCS, 4th edition, Mike Murach & Associates, 2018.
- Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtml, Javascript, Perl CGI, BPB Publications, 2010.

Examination scheme and mode:

Evaluation scheme and mode will be as per the guidelines notified by the University of Delhi.