

Secondary Level (Grade 9-10) Curriculum  
(For Technical and Vocational Stream)

# Computer Engineering

## 2072



Government of Nepal  
Ministry of Education  
**Curriculum Development Centre**

Sanothimi, Bhaktapur

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## Curriculum Structure

### Class 9

S.No.	Subject	Weightage/ week	Full Mark
1	Nepali	5 period	100
2	English	5 period	100
3	Mathematics	5 period	100
4	Science	5 period	100
5	Engineering Drawing	5 period	100
6	Computer Fundamentals	5 period	100
7	C - Programming	5 period	100
8	Fundamentals of Digital Systems (FDS)	5 period	100
9	Electrical Engineering	5 period	100
10	Web Page Development	5 period	100
	<b>Total</b>	50 period	1000

### Class 10

S.No.	Subject	Weightage/ week	Full Mark
1	Nepali	5 period	100
2	English	5 period	100
3	Mathematics	5 period	100
4	Science	5 period	100
5	Computer Repair and Maintenance	5 period	100
6	Computer Networks	5 period	100
7	Database Management System	5 period	100
8	Electronic Devices and Circuits	5 period	100
9	Microprocessor	5 period	100
10	Object Oriented Programming (OOP)	5 period	100
	<b>Total</b>	50 period	1000

\* (One Period =45 Minutes)

## **Level Wise Competencies ( Grade 9 & 10)**

1. Student will be familiar with the different types of computer programming logic and on the basis of that logic they will develop small program which they can implement in different types of organisations.
2. Student will acquire the knowledge of basic HTML Tags ,elements attributes, CSS and JavaScript which is most often used in the development of websites
3. Student will be able to handle drawing instruments and materials and identify different types of engineering curves, shapes and Geometrical construction.
4. Student will develop the general logic of Boolean algebra, logic gates, truth table combinational and flip-flops circuits.
5. Students get the knowledge of different types of internal and external components of computer, such as Power supply, CPU fan, CD and DVD-ROM, windows operating system and they know how to install different kinds of software.
6. Student will be able to handle or work with electrical equipments and components such as ammeter, voltmeter, resistor, capacitors and their colour combinations and values. They will also have an idea of Ohm's law equivalent circuit and how to find the total current of the circuit.
7. Student will get the general idea of registers, instruction sets, addressing modes, memory related operations and develop the simple programming logic used in the assembly language programming.
8. Student will identify the electronic components such as Diode, Transistor, FET and their characteristics and applications.
9. Student will get the depth concept on object oriented programming model. And they can construct class and create object of that class and understand the concept of inheritance, polymorphism, encapsulation and Abstraction.
10. Student will know the concept of database management system in which they will learn E-R Model which can help to develop the concept of relationship between the entities. It also helps students to create database in database package, creating table, inserting record, updating record, designing form, generating report etc.
11. Student will be familiar with different types of networking devices and be able to use them in the LAN configuration. It will also help students to prepare the different types of communication media used in the networking. They can configure client server and peer-to-peer networking.

# Engineering Drawing I

Grade: 9      Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction:

This course is designed to provide knowledge and skills on geometrical shapes, and its construction procedure, and interpretation of the views of objects by orthographic projection. This course includes graphical representation of physical object and their relationship. This course will meet important requirements of all technical people in engineering profession. This course mainly discusses about the geometrical drawing, it is the art of representation of objects. On completion of course the student will be able to develop the knowledge and skills on Basic drafting technique, Handling of drawing instruments and materials, Geometrical construction, Line work, Lettering, Dimensioning, Orthographic projection, Section, Simple intersection of solid and Surface development .

## 2. Competencies

1. Handle drawing instruments and materials;
2. Identify Geometrical construction and shape;
3. Describe the scale, its type and construction;
4. Draw different types of engineering curves and
5. Draw and interpret the multi view of solids with scale and dimensioning.

## 3. Learning Outcomes

**At the end of Grade 9, students will be able to:**

1. Use the drawing tools.
2. Construct the geometric shape.
3. Write the lettering and text in different font.
4. Describe the scale, its uses and conversion.
5. Give the dimension of any object, construct tangent, curve, conic section.
6. Draw the orthographic projection, section, surface development, intersection and land measurement.

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	<b>Introduction of drawing</b>	1.1 Types of drawing 1.2 Engineering drawing as universal language of engineering technical persons. 1.3 Introduction of drawing materials like drawing sheet, base paper, masking tape etc. 1.4 Introduction of drawing tools like T square, set square pencil, compass scale etc.	12
2.	<b>Introduction of line and geometrical shape</b>	2.1. Definition of line and its type, line weight and their uses. 2.2 Introduction of geometrical shape like rectangle, square triangle parallelogram, rhombus and polygon. 2.3 Circle and its parts name.	6
5	<b>Scale</b>	5.1. Full scale 5.2 Reduced scale 5.3 Enlarge scale 5.4 Scale construction (Reducing and enlarging scale) 5.5 Practicing the drawing of various length line using the scale	6
6	<b>Lettering</b>	6.1 Introduction of single and double stroke letter 6.2 Vertical and inclined letter. 6.3 Height and width ratio of the letter. 6.4 Practice of letter writing of upper case and lower case letter. 6.5 Practice of Devangiri letter.	4
7	<b>Dimensioning</b>	7.1 Dimension system 7.2 Chain and size dimension 7.3 Dimension and extension line placement of dimension text. 7.4 Uses of arrow head, dot and slash in dimension	6
8	<b>Geometrical construction.</b>	8.1.1 Know about the geometrical shape and their name 8.1.2 Construction of 90, 60 degree angle and given angle.	6

		<p>8.1.3 Construction of triangle by the help of given side.</p> <p>8.1.4 Construction of rectangle, square, pentagon hexagon, Heptagon etc</p> <p><b>Division</b></p> <p>8.2.1 Bisection and trisection of line and angle</p> <p>8.2.3 Line dividing any number of equal parts.</p> <p>8.2.3 Circle- Dividing five, six,,seven and eight equal parts</p> <p><b>Tangent</b></p> <p>8.3.1 Line tangent to a circle from any point.</p> <p>8.3.2 Uncrossed (open belt) and crossed (crossed belt) line tangent</p> <p>8.3.3 Arc tangent (Internal, external and combined)</p>	
9	<b>Orthographic Projection</b>	<p>9.1 Theory of projection</p> <p>9.2 Introduction of principal plane</p> <p>9.3 Introduction of first and third angle projection.</p> <p>9.4 Difference between first and third angle projection.</p> <p>9.5 Projection of point(s) and line(s) in first angle projection.</p> <p>9.6 Projection of line which is parallel to HP, parallel to VP and perpendicular to HP and VP. Inclined to HP and VP.</p> <p>9.7 Orthographic projection prism, cylinder, pyramid and cone.</p> <p>9.8 Orthographic projection of different models with flat, inclined and circular surface. (At least 12 practice)</p>	12
10	<b>Pictorial projection</b>	<p>10.1 Introduction of pictorial projection i.e. oblique ,Isometric and perspective</p> <p>10.2 Isometric view</p> <p>10.2.1 Isometric projection and isometric drawing</p> <p>10.3 Oblique view</p>	12
11	<b>Land measurement /Symbol</b>	<p>11.1 Land measurement by triangulation method.</p> <p>11.2 Unit of length/Unit of land Ropani/Bigha</p> <p>11.3 General symbol of civil, domestic electrical (fixtures) work and plumbing work.</p>	4
		Total	68



**(PRACTICAL)**

<b>Unit</b>	<b>Scope</b>	<b>Activities</b>	<b>Period</b>
1	Introduction of drawing	Introduction to tools, paper and drawing.	7
2	Introduction of line and geometrical shape	Introduction to geometric shape	8
3	Freehand practicing	Free hand practicing of lines.	10
4	Practicing the line and circle using drawing instruments	Draw the horizontal line, 45, and 60.	8
5	Scale	Practice using scale.	6
6	Lettering	Draw on practice lettering	9
7	Dimensioning	Practice on dimension	8
8	Geometrical construction.	Construct geometric shape, tangent, divide.	11
9	Engineering Curves	Practices on different curve	9
10	Orthographic Projection	Practice on orthographic projection.	8
11	Pictorial projection	Practice on isometric view.	12
12	Land measurement /Symbol	Practice on land measurement.	6
<b>Total</b>			<b>102</b>

**5. Learning Facilitation Process:**

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

### Specification Grid

## Subject: Engineering Drawing I

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Class: 9                      Times: 1 Hour and 15 Min.                      Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction of drawing	1			1
2	Introduction of line and geometrical shape	2	1	1	4
5	Scale	1	1		2
6	Lettering	1	1	1	3
7	Dimensioning	1	1		2
8	Geometrical construction.	2	1	1	4
9	Orthographic Projection	2	1	1	4
10	Pictorial projection	2	0	1	3
11	Land measurement /Symbol	1	1	1	3
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt Questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

**(PRACTICAL)****Time: 1 Hour and 45 Min.****Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

# Fundamental of computers

Grade: 9      Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction

This course is designed to impart knowledge on fundamental concept of computer, hardware components, internet, intranet, email and multimedia. This course specifically designed to understand basic knowledge of different kinds of hardware and software associated with it. It also provides knowledge of different kinds of operating system installation process. It also provides skills on word processing, spreadsheets, and presentation tools. This subject covers a foundational understanding of computer hardware, software, operating systems, peripherals email and internet.

## 2. Competencies

1. Understand computer system and its hardware and software
2. Explain the internet, intranet and email
3. Understand the multimedia and its applications
4. Protect their computer by using antivirus software etc.
5. Perform applications software such as word processing, spreadsheets, and presentation tools

## 3. Learning Outcomes

**At the end of Grade 9, students will be able to:**

1. Develop concept about hardware and different types of software
2. Develop the knowledge about internet and intranet
3. Develop the concept of different types of operating system
4. Develop the concept of e-mail and internet
5. Use concept of multimedia technology in education, entertainment, training etc
6. Install different versions of operating systems in computer
7. Install customized software in the system

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	Introduction	1.1 Introduction to computer 1.2 History of computer and its generations. 1.3. Applications of computer in daily life. 1.4. Classifications of Computers: 1.4.1. Analog Computer 1.4.2. Digital Computer 1.4.3. Hybrid Computer 1.4.4. Super Computer 1.4.5. Mainframe Computer 1.4.6. Mini Computer 1.4.7. Micro-Computer or Personal computer 1.5. Characteristics of computer 1.6. Measurement of size and speed	10
2.	Computer software	2.1 Introduction to computer software. 2.2 Types of software and its features 2.2.1. System Software 2.2.2. Application Software 2.3. Features of System software 2.4. Features of Application Software 2.4 Word processor package 2.5 Spreadsheets package 2.6 Presentation package	15
3	Operating System overview	1.1. Operating system 1.2. Functions of operating system 1.3. Characteristics of operating system 1.4. Objectives of operating system 1.5. Types of operating system 1.5.1. Single user operating system 1.5.2. Multiuser operating system 1.5.3. Single tasking operating system 1.5.4. Multitasking operating system 1.6. Window operating system	8
4	Memory System Overview	4.1. Memory definition 4.2. Types of memory 4.2.1. Cache memory 4.2.2. Primary memory/Main Memory 4.2.3. Secondary memory 4.3. Advantages and disadvantages of cache memory 4.4. Characteristics of main memory 4.5. Characteristics of secondary memory	8

5	Components of Computer System	1.1. Input unit 1.2. Output unit 1.3. Memory unit 1.4. Process unit	6
6	Electronic Mail	6.1. E-mail and uses 6.2. E-mail ethics 6.3 Advantages and disadvantages 6.4 Create mail 6.5 Operation of mail	7
7	Internet , Intranet and Extranet	7.1 Intranet 7.2 Extranet 7.3 Difference in Internet and intranet 7.4. Advantages and disadvantages of Intranet 7.5 Search engine 7.6. Social media	6
8	Multimedia and its tools	8.1. Definition of Multimedia 8.2. Components of Multimedia 8.2.1. text 8.2.2. Audio 8.2.3. Video 8.2.4. Image 8.2.5. Animation 8.3. Applications of Multimedia 8.4. Advantages and Disadvantages of Multimedia	8
		Total	68

### (PRACTICAL)

Unit	Scope	Activities	Periods
2	Computer software	<ul style="list-style-type: none"> <li>• Installing windows 7 or upper operating system on the machine</li> <li>• Creating a user account</li> <li>• <b>Word processor Package practical:</b></li> <li>• Formatting Pages: <ul style="list-style-type: none"> <li>• Layout of word processor</li> <li>• Open, save, edit file</li> <li>• Text formatting</li> <li>• Adjust margin</li> <li>• Header and footer</li> <li>• Add page numbers</li> <li>• Insert page break</li> <li>• Cover pages</li> <li>• Page orientation</li> </ul> </li> <li>• Editing documents:</li> </ul>	40

		<ul style="list-style-type: none"> <li>• Find and replace</li> <li>• Spell check</li> <li>• Zoom in-out</li> <li>• Special symbols</li> <li>• Working with tables <ul style="list-style-type: none"> <li>• Create a table</li> <li>• Move a table</li> <li>• Resize a table</li> <li>• Merging cells</li> <li>• Split a table</li> <li>• Split cells</li> <li>• Add formulas</li> </ul> </li> <li>• Advanced operations <ul style="list-style-type: none"> <li>• Use templates</li> <li>• Use graphics</li> <li>• Auto correction</li> <li>• Auto formatting</li> <li>• Create a Table of contents</li> </ul> </li> <li>• Create a bibliography</li> <li>• Create a hyperlink in word document</li> <li>• <b>Spread sheet Practical:</b> <ol style="list-style-type: none"> <li>1. Insert data in excel and format them</li> <li>2. Sort data in ascending and descending order</li> <li>3. Freeze rows and columns in excel</li> <li>4. Filter data in an excel table</li> <li>5. Perform the simple formula result in excel which calculates total marks, percentage, division, distinction, pass, fail, rank.</li> </ol> </li> <li>• Presentation package practical <ul style="list-style-type: none"> <li>• Create slide</li> <li>• Format slide</li> <li>• Layout slide</li> <li>• Design slide</li> <li>• Animation slide</li> <li>• Transition slide</li> </ul> </li> </ul>	
3	Operating system	<ul style="list-style-type: none"> <li>• Formatting hard drives</li> <li>• Partitioning and naming hard drives</li> <li>• Changing hard disk drive letter</li> <li>• Installing different types of operating system like window 7, 8, 10 and Linux.</li> <li>• Setup bios password</li> <li>• Creating user accounts and restrict permissions</li> </ul>	26

		<ul style="list-style-type: none"> <li>• Install drivers</li> <li>• Operate control panel.</li> </ul>	
<b>6</b>	Electronic mail and internet	<ul style="list-style-type: none"> <li>• Creating an e-mail account</li> <li>• Sending message, pictures, video, and attaching files</li> <li>• Components of email messages: message envelope, the message header and the message body</li> <li>• Sending an e-mail to multiple people</li> <li>• Search contents on web</li> <li>• View social media site</li> <li>• Find the contents</li> </ul>	<b>25</b>
<b>9</b>	Project Work	Prepare document using word and excel.	<b>11</b>
<b>Total</b>			<b>102</b>

## 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process



Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

## Specification Grid

### ***Subject : Fundamental of computers***

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Table A**

**Class: 9      Times: 1 Hour and 15 Min.      Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	1	1	1	2
2	Computer software	3	1	1	2
3	Operating System overview	2	1	1	4
4	Memory System Overview	2	1	1	3
5	Components of Computer System	2	1	0	3
6	Electronic Mail	1	0	1	3
7	Internet and Intranet	1	1	0	2
8	Multimedia and its tools	1	1	1	3
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

**(PRACTICAL)****Time: 1 Hour and 45 Min.****Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

# C- Programming

Grade: 9      Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction

The C- Programming syllabus aims to help the students on computer programming language concept. The end goal is to develop basic programming knowledge and skill with the concept of variables, data types, control structure, loop, functions, array etc.

## 2. Competencies

1. Develop the knowledge of platform, compiler, interpreter, basic high level programming languages and difference of program and software.
2. Develop flow chart, algorithm, and pseudo codes.
3. Develop the knowledge of how computer language works and how they are used in the home, school, workplace and community.
4. Analyse the basic mathematical problem flow process into c-programming language.
5. Develop small program in C- Programming language.

## 3. Learning Outcomes

**At the end of Grade 9, students will be able to:**

1. Develop simple concept of basic programming language and code reducing computer programming.
2. Develop the flow chart, algorithm, and pseudo codes of basic mathematic problems.
3. Develop need of platform and compiler/interpreter.
4. Develop simple program using c-programming language.
5. Acquire skill of basic programming structure.

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	<b>Programming Languages</b>	1.1 Definition. 1.2. History/ Generation 1.3. Classification 1.4. Machine, Assembly, High Level, 4GL – their merits and demerits 1.5. Compiler, Interpreter and Assembler 1.6. List of High Level Programming Languages 1.7. Difference between Program and Software 1.8. Concept of Programming Statement 1.9. Syntax and Semantics error 1.10. Program Control Structures - Sequence, Selection and Iteration. 1.11. Program Design Tools (manage text format) 1.12. Algorithm 1.13. Flowchart and 1.14. Pseudo Code	<b>15</b>
2.	<b>C-fundamentals</b>	2.1. History of C-language 2.2. Basic Structures of C-Programming 2.3. Character sets, constants, and variables 2.4. Keywords 2.5. Data types 2.6. Escape sequences 2.7. Operators (arithmetic, relational, logical, assignment, unary)	<b>9</b>
4	<b>Input/output statements</b>	1.1. Header files 1.2. Formatted input/output 1.3. Character input/output 1.4. Program using input/output	<b>8</b>

5	<b>Control Statement</b>	5.1 Selective Structures 5.1.1 If, if else, if else ladder 5.1.2 Switch and goto statement 5.2 Repetitive Structure 5.2.1 While loop 5.2.2 Do while loop 5.2.3 For loop 5.3 Nested loop 5.4 Break and Continue statements	<b>18</b>
6	<b>Function</b>	1.1. Definition 1.2. Function types (library, and user defined function) 1.3. Programming examples of simple user defined function. 1.4. Function call by Value and Call By Reference 1.5. Return type and Non return type functions 1.6. Function prototyping 1.7. Passing arguments to functions	<b>6</b>
7	<b>Arrays &amp; String</b>	7.1 Definition 7.2 Arrays types 7.3. Single 7.4. Multi-dimension	<b>8</b>
8	<b>Structures</b>	1.1 Definition 1.2 Structure variable declaration 1.3 Accessing members of a structures	<b>2</b>
9	<b>Pointer s in C</b>	1.1. Pointer Definition 1.2. Declaration of pointer variable 1.3. Reference operator(&) 1.4. Deference operator(*)	<b>2</b>
		Total	<b>68</b>

**(PRACTICAL)**

<b>Unit</b>	<b>Scope</b>	<b>Activities</b>	<b>Period</b>
<b>2</b>	<b>C-fundamentals</b>	Installation of C compiler	<b>8</b>
<b>4</b>	<b>Input/output statements</b>	<ul style="list-style-type: none"> <li>Write a simple program which use formatted input/output</li> </ul>	<b>8</b>
<b>5</b>	<b>Control Statement</b>	<ul style="list-style-type: none"> <li>Program about operator</li> <li>Write program to use break and continue statement in For Loop, while Loop, Do-While Loop.</li> <li>Write a program using switch statement</li> <li>Program to display string message using For Loop</li> <li>Program to display a pattern using nested For loop</li> <li>Develop program to display 1 to 20 elements using For loop, While Loop, Do-While</li> <li>Develop program to test even or odd number of an integer variable using if-else statements</li> <li>Program to display the largest number between any two numbers.</li> <li>Program to display the smallest number between any two numbers.</li> <li>Program to calculate the simple interest</li> <li>Program to display the Fibonacci series</li> <li>Program to display the series 1, 5,9,13 up to 13 terms.</li> </ul>	<b>22</b>
<b>6</b>	<b>Function</b>	<ul style="list-style-type: none"> <li>Program to display "Welcome to My School" using function</li> <li>Program to find the summation of two variables using function</li> <li>Program to find the largest and smallest numbers using functions</li> <li>Program to find the factorial of any integer variable using recursion</li> <li>WAP to call function by Value and Call by Reference</li> </ul>	<b>15</b>
<b>7</b>	<b>Arrays &amp; String</b>	<ul style="list-style-type: none"> <li>Write a program to input 5 numbers in an array variable and display them.</li> <li>Write a program to input the age of 20 students and count the number of students</li> </ul>	<b>23</b>

		<p>having age between 20 and 25.</p> <ul style="list-style-type: none"> <li>• Write a program to find the largest number among 'n' numbers</li> <li>• Write a program to initialize an array variable with 10 elements and display on the screen(not using loop)</li> <li>• Write a program to initialize an array variable with 10 elements and display on the screen( using For loop)</li> <li>• Write a program which holds string data type as elements of an array of size 10 and display using For Loop</li> <li>• Write a program to display elements of an array input through the keyword.</li> <li>• Write a program to multiply 2X2 array elements and display the output on the screen</li> <li>• Write a program to find whether the elements of an array is even or odd number</li> </ul>	
<b>8</b>	<b>Structures</b>	<ul style="list-style-type: none"> <li>• Write a program to create an structure of book having fields 'title', 'author', 'Publication', 'Price'</li> <li>• Write a C program that takes roll_no, fname, lname of 5 students and print the same record on the screen.</li> </ul>	<b>8</b>
<b>9</b>	<b>Pointers</b>	<ul style="list-style-type: none"> <li>• WAP to define a pointer variable which holds the address of a normal variable. And print the value stored at normal variable.</li> <li>• Test a program how pointer variable holds the address of another variable.</li> <li>• WAP to find the of value stored at pointer variable using deference operator.</li> </ul>	<b>8</b>
<b>10</b>	<b>Project Work</b>	<ul style="list-style-type: none"> <li>• Prepare project to simple operation of result of student</li> </ul>	<b>10</b>
<b>Total</b>			<b>102</b>

## 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

### Specification Grid

#### ***Subject : C- Programming***

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, below:

**Class: 9**                      **Times: 1 Hour and 15 Min.**                      **Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Programming Languages	2	1	1	3
2	C-fundamentals	1	1		1
3	Problem analysing	1	1	1	3



4	Input/output statements	1	0		2
5	Control Statement	2	1	1	3
6	Function	2	1	1	4
7	Arrays & String	2	1	2	2
8	Structures	1	1		2
9	Pointers in C	1	0		2
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

**(PRACTICAL)****Time: 1 Hour and 45 Min.****Full Marks: 60**

For Practical examination 60 full marks is divided as follows.

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Examination	15
Spotting	10
Viva	10
<b>Total</b>	<b>60</b>

# Fundamental of digital System

Grade: 9

Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction

This course provides basic knowledge and skills on logic design and digital circuit design with logic circuits. This course also provides elementary concepts on algorithm. This course includes logical circuits, encoder, decoder, multiplexer, and demultiplexer. This course provides the basic building block of real-world computers. In this course we also examine algebraic and comparator circuit.

## 2. Competencies

1. Develop the concept number system.
2. Develop the basics of logic system.
3. Develop the knowledge to test logic gates
4. Develop the concept to design combinational logic and sequential logic.
5. Develop the concept of flip-flop circuit.

## 3. Learning Outcomes

**At the end of Grade 9, students will be able to:**

1. Develop the simple arithmetic of number system
2. Develop simple concept of basics of different types of logic gates
3. Develop the concept of K-MAP up to 2 variables
4. Develop the concept of number system

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	<b>Number system</b>	1.1. Numbering concept 1.2. Different Types of numbering system 1.2.1 Decimal numbers 1.2.2 Binary numbers 1.2.3 Octal numbers 1.2.4 Hexadecimal numbers 1.3. Number conversion 1.3.1 Decimal Integers to Binary and Binary to Decimal conversion 1.4. Decimal Fractions to Binary conversion 1.4.1 Octal to Decimal and Decimal to Octal conversion	<b>8</b>
2.	Binary arithmetic Operations	2.1 1's complement operation 2.2 2's complement operation 2.3 Addition operation 2.4 Subtraction operation 2.5 Multiplication operation	<b>7</b>
3	<b>Logic Gate Concepts</b>	3.1 Notations 3.2 Concept of gate and truth table 3.2.1 Inverter 3.2.2 OR gate 3.2.3 AND gate 3.2.4 NOR gate 3.2.5 NAND gate 3.2.6 XOR gate 3.2.7 XNOR gate 3.2.8. Universal gates 3.3 De Morgan's Theorems concept	<b>7</b>
4	<b>Boolean Algebra and Karnaugh Map</b>	4.1. Boolean relations 4.2. Simplification 4.2.1 Sum-of-Product (SOP) 4.2.2 Product-of-Sum (POS) 4.2.3 Algebraic simplification 4.3. Karnaugh Map (K-Map) Simplification upto 2 variables 4.4. Don't-Care conditions	<b>10</b>

5	<b>Binary Arithmetic Logic</b>	5.1 Half adders 5.2 Binary adders 5.3 Half subtracters 5.4 Full adders 5.5 Full subtracters	<b>8</b>
6	<b>Combinational Logic</b>	6.1 Code converters 6.1.1 Decoders 6.1.2 Encoders 6.1.3 Circuit implementations 6.2 Multiplexers 6.2.1 Multiplexer logic 6.2.2 Demultiplexer logic 6.2.3 Circuit implementation 6.3 7-segment decoders concept	<b>18</b>
7	<b>Sequential Logic</b>	7.1 Basic Concepts 7.1.1 Latching effect 7.1.2 Level Clocking 7.1.3 Trigger and types 7.2 RS Flip-Flop 7.3 T-Flip-Flop 7.4 D-Flip-Flop 7.5 JK- Flip-Flop 7.6 JK- Master Slave Flip-Flop	<b>10</b>
		Total	<b>68</b>

### (PRACTICAL)

Unit	Scope	Activities	Period
<b>1</b>	<b>Number system Exercise</b>	1 Decimal numbers 2. Binary numbers 3 Octal numbers 4 Hexadecimal numbers 5 .Number conversion 6 Decimal Integers to Binary and Binary to Decimal conversion 7 Decimal Fractions to Binary conversion 8 Octal to Decimal and Decimal to Octal conversion	<b>15</b>
<b>2</b>	<b>Binary arithmetic Operations Exercise</b>	1 Addition operation 2 Subtraction operation 3 Multiplication operation 4 Division operation	<b>8</b>

<b>3</b>	<b>Logic Gate Concepts</b>	1 Inverter 2 OR gate 3 AND gate 4 NOR gate 5 NAND gate 6 XOR gate 7 XNOR gate	<b>16</b>
<b>4</b>	<b>Boolean Algebra and Karnaugh Map Exercise</b>	1 Sum-of-Product (SOP) 2 Product-of-Sum (POS) 3 Algebraic simplification 4 Karnaugh Map upto 2- variables 5. Don't-Care conditions	<b>15</b>
<b>5</b>	<b>Binary Arithmetic Logic</b>	1. Half adders 2 .Binary adders 3 .Half subtractar 4 .Full adders 5 .Full subtractor	<b>15</b>
<b>6</b>	<b>Combinational Logic</b>	1 .Code converters 2. Decoder 5 .Multiplexers 7 .De multiplexer 8 .7-segment decoders demo	<b>15</b>
<b>7</b>	<b>Sequential Logic</b>	RS Flip-Flop	<b>8</b>
<b>8</b>	<b>Project work</b>	Logically design the differ logic gates.	<b>10</b>
<b>Total</b>			<b>102</b>

### 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire

- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

### Specification Grid

#### ***Subject: Fundamental of digital System***

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Table A**

**Class: 9                      Times: 1 Hour and 15 Min.                      Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Number system	2	1	0	3
2	Binary arithmetic Operations	2	1	1	4
3	Logic Gate Concepts	2	1	1	4
4	Boolean Algebra and Karnaugh Map	2	1	1	4
5	Binary Arithmetic Logic	2	1	1	4
6	Combinational Logic	1	1	1	3
7	Sequential Logic	2	1	1	4
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>

<b>Marks</b>	<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>	<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

**(PRACTICAL)**

**Time: 1 Hour and 45 Min.**

**Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

# Electrical Engineering

Grade: 9

Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction:

This course provides knowledge on the basic theory of the fundamentals of electrical engineering and helps the students to develop the skills on different laboratories works related to the subject such as resistor, capacitor, inductance, voltage, current etc. Similarly, it also gives information and skill about single phase and three phases current, voltage and its functions.

## 2. Competencies

1. Develop a sense of information technology culture and an appreciation of the range two and power of computer applications
2. Develop an awareness of how computers work and how they are used in the home, school, workplace and community
3. Appreciate the role computers play in everyday life and the impact computers have on society and people
4. Acquire skills in using common application software to accomplish tasks

## 3. Learning Outcomes

**At the end of Grade 9, students will be able to:**

1. Understand and explain the basic laws of electrostatics, electrolysis, electrical circuits, electrical Power and energy, magnetism and electromagnetism.
2. Understand and calculate basic units of voltage, current, resistance, power, energy, and Capacitance
3. Understand the different terms and parameters related with AC signal.
4. Calculate different parameters related with AC circuits and their response in various types of circuits.
5. Know the basics related with single phase and three phase circuits and their parameters.



## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	<b>Electrostatics</b>	1.1 Provide the concept of Electricity. 1.2. Introduction to electricity and it's history 1.3. Definition of electricity. 1.4 Concept of Aton and its structure. <ul style="list-style-type: none"> <li>• Electron</li> <li>• Proton</li> <li>• Neutron</li> </ul> 1.5 Introduction to atomic number, atomic weight, free electrons and electric charge. 1.6 Types of electricity. <ul style="list-style-type: none"> <li>• Dynamic</li> <li>• Static</li> </ul> 1.2.1 Provide the concept of force 1.2.2 Introduction and definition of force 1.2.3 Define Colum's law between two charges. 1.2.4 Define electric field , potential and potential difference 1.2.5 Explain the sources of energy, voltage and its units.	4
2.	<b>Electric Circuit</b>	2.2.1 Define electric circuit and its parameter. <ul style="list-style-type: none"> <li>• Voltage</li> <li>• Current and</li> <li>• Resistance</li> </ul> 2.2.2. State the movement of electrons in a conductor. 2.2.3. Provide concept and definition of electric current and its unit ( with examples – running water forces) 2.2.4. Explain conventional direction of electric current. & its uses 2.2.5. Define and explain electric resistance and its unit. 2.2.6. Explain the role of electric resistance in electrical circuits. 2.2.7. Explain the factors affecting the value of resistances. 2.2.8. Explain the types of electric units <ul style="list-style-type: none"> <li>• Open circuit</li> <li>• Close circuit</li> <li>• Leakage circuit</li> <li>• Series circuit</li> <li>• Parallel circuit</li> <li>• Mix circuit</li> </ul> 2.3.1 Explain the connection of resistances in series and parallel. 2.3.2 Calculate the equivalent resistances. <ul style="list-style-type: none"> <li>• Series</li> <li>• Parallel</li> </ul> 2.3.3 Explain the uses of series and parallel circuit. 2.3.4. Explain the advantages and disadvantages of series and parallel circuit. 2.4.1 Explain Ohm's Law. 2.4.2 Verify ohm's Law. 2.4.3 Explain application of ohm's law. 2.5.1 Explain and state Kirchhoff's Laurent law. 2.5.2 Explain and state Kirchhoff's Voltage Law	10

		2.5.3 Explain practical application of Kirchhoff's Law. 2.4.3 Solve simple numerical of Unit 2.	
3	<b>Electrical Power and Energy</b>	3.1 Define electrical power, its unit and practical application 3.2 Define electrical energy, its unit and practical application 3.3 Simple numerical examples related to unit 3	4
4	<b>Cell and Battery</b>	4.1.1 Define cell and battery and it's classification <ul style="list-style-type: none"> <li>• Primary</li> <li>• Secondary</li> </ul> 4.1.2 Explain the voltaic cell 4.1.3 Explain the construction and working principle of the voltaic cell 4.1.4 Explain with types of charging and discharging process of cell as: <ul style="list-style-type: none"> <li>• Voltage controlled method</li> <li>• Current controlled method</li> </ul> 4.2.1 Explain the capacity of cell (AH) 4.2.2 Explain the characteristics of series and parallel connection of cell. 4.3.1 Explain the characteristics of series and parallel combination of cell for specified voltage and current. 4.3.2 Explain the advantages and disadvantages of combination of series / parallel connection. 4.4.1 Explain the real application of series and parallel connection of battery (use as Transport (for power), telecommunication, industry and alternative system (solar power) etc.	8
5	<b>Capacitors</b>	5.1.1 Explain the capacitor and capacitance and its units. 5.1.2 Explain the effecting factors of capacitance of a capacitor 5.1.3 Explain the characteristics of capacitance 5.1.4 Explain the characteristics of parallel plate capacitor 5.2.1 Differentiate the series and parallel connection of capacitor 5.2.2 Calculate the equivalent capacitance of list no 5.2.1 5.3.1 Explain the charging and discharging method of capacitor 5.3.2 Explain the advantages of parallel connection of capacitor	6
6	<b>Magnetism and Electromagnetism</b>	6.1.1 Explain the magnet and magnetism. 6.1.2 Explain the types of magnet <ul style="list-style-type: none"> <li>• Temporary magnet</li> <li>• Permanent magnet</li> </ul> 6.1.3 Explain the magnetic and non magnetic materials 6.1.4 Explain the magnetic terminology <ul style="list-style-type: none"> <li>• Magnetic field</li> <li>• Magnetic field intensity</li> <li>• Lines of magnetic flux</li> <li>• Flux density</li> </ul> 6.2.1 Explain the magnetic field and its direction due to a current carrying conductor 6.3.2.1 Explain the magnetic effect of current. 6.3.2 Explain application of magnetic effect of current 6.3.3 State the principle of electromagnetism. 6.3.4 State & explain Faraday's law of electromagnetic induction. 6.4.1 Explain statically and dynamically induced emf.	12

		6.4.2 State the Lenz's law. 6.5.1 Define the following terminologies <ul style="list-style-type: none"> <li>• Magnetic circuit</li> <li>• Magneto motive force (MMF)</li> <li>• Magnetizing force ( Ampere Turn )</li> <li>• Permeability (introduction only)</li> <li>• Reluctance (introduction only)</li> </ul> 6.5.2 Explain Cork screw rule <ul style="list-style-type: none"> <li>• Self Inductance</li> <li>• Mutual Inductance</li> </ul> 6.6.1 Compare between electric and magnetic circuit.	
7	<b>Fundamentals of alternating current and single phase circuits</b>	7.1.1 Define D C current and AC current 7.1.2 Compare with AC over DC 7.1.3 Explain the terms of AC fundamentals <ul style="list-style-type: none"> <li>• Frequency / cycle</li> <li>• Amplitude / wave form</li> <li>• Time period / Instantaneous value</li> <li>• RMS value / average value</li> <li>• Form factor / lagging or leading</li> <li>• Power factor / reactance</li> </ul>	16
8	<b>Three phase Circuit</b>	8.1.1 Explain the concept of poly phase system 8.1.2 Explain the three phase system 8.1.3 Clarify about phase sequence	8
		Total	<b>68</b>

### (PRACTICAL)

Unit	Scope	Content Area	Marks
1.	Electrostatic	1.1 Demonstrate the phenomenon of electrification by friction (static electricity) with the help of glass bar and silk.  1.2 Use electroscope to verify the interaction between electrical charges and hence observe the magnitude of the acting force between them.	9
2.	Electric Circuit	2.1. Perform the correct connection of the voltmeter, ammeter, fixed and variable resistors in an electrical circuit and hence observe the correct handling and application of the equipment.  2.2. Measure the resistance and specific resistance of a resistor using voltmeter and ammeter.  2.3. Connect the resistors in series and parallel and calculate the equivalent resistance using	23

		voltmeters and ammeters. 2.4. Connect the circuit with a voltmeter, ammeter, resistor and a switch to verify Ohm's law. 2.5. Connect a source of EMF and 3 resistors in (a) Parallel with ammeters in each parallel branch, verify Kirchhoff's first law. (b) Series with voltmeters for each resistor, verify Kirchhoff's second law.	
3	Electrical Power and Energy	3.1 Connect the circuit with a voltmeter, ammeter and a resistor and determine the power and energy consumed by the resistor in 5 minutes.	9
4	Cell and Battery	4.1 Connect a circuit with 4 batteries in series and parallel and hence find the equivalent e.m.f.	8
5	Capacitors	5.1. Construct a simple parallel plate capacitor and verify the factors upon which the capacitance of the capacitor depends. 5.2. Connect capacitors in series and parallel, charge them and hence find the equivalent capacitance and voltage.	18
6	Magnetism and Electromagnetism	6.1. Perform the experiments with permanent magnet and identify magnetic field, its density and characteristics and observe the interaction of magnets.	9
7	Fundamentals of alternating current and single phase circuits	7.1 Use oscilloscope and be familiar with its operation to measure dc/ac quantities.	8
8	Three phase Circuit	8.1. To be familiar with 3-phase supply and 3-phase load. 8.2. To be familiar with star and delta connections 8.3. Connect the load in star, measure line and phase currents and voltages.	18
	Total		102

## 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must

be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

### Specification Grid

### **Subject: Electrical Engineering**

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Table A**

**Class: 9**

**Times: 1 Hour and 15 Min.**

**Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1.	Electrostatic	1	2	1	
2.	Electric Circuit	2			
3	Electrical Power and Energy	2		2	

4	Cell and Battery	1	2		
5	Capacitors	1			
6	Magnetism and Electromagnetism	2	1	1	4
7	Fundamentals of alternating current and single phase circuits	2	1	1	4
8	Three phase Circuit	2	1	1	3
Total Question		13	7	6	26
Attempt questions		10	5	5	20
Marks		10	10	20	40
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

**(PRACTICAL)****Time: 1 Hour and 45 Min.****Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
<b>Total</b>	<b>60</b>

# Web Page Development

Grade: 9      Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction

Web technology is basically design to understand about the web pages. It is one of the booming technologies in this globalization society. The main objective of this course is to understand the basic concept used in HTML, CSS, JAVASCRIPT and editors. This course helps students to develop static web pages with embedding CSS and JavaScript as well. This course is specifically designed to focus on current IT job market with providing sound knowledge of web basics.

## 2. Competencies

1. Develop the knowledge of different of GUI based HTML editor software.
2. Develop the good command in HTML and CSS based static web pages.
3. Develop the knowledge of JavaScript which is used to develop the interactive webpage

## 3. Learning Outcomes

**At the end of Grade 9, students will be able to:**

1. Develop concept of web programming and using html and css
2. Develop the skill to manage site in GUI Based Editor.
3. Acquire skills in JavaScript to implement in web development
4. Edit html and CSS based static website.

## 4. Scope and Sequence

### THEORY


Unit	Scope	Content	Period
1.	Internet / Web basics	1.1 History of the internet 1.2. Protocol 1.3. Web Browsers 1.4. Www 1.5. Search Engine 1.6. Web 2.0	4
2	An Introduction to HTML	2.1. Introduction 2.2. 2.3. HTML attributes 2.4. Image 2.5.HTML Headings 2.6. Text formatting 2.7.HTML styles 2.8.HTML tables 2.9.HTML Lists 2.10.HTML forms 2.11.HTML Media 2.11.1. Video 2.11.2. Audio 2.12.HTML 5 introduction 2.13.What is new in HTML5 2.14.HTML 5 Canvas 2.15.HTML 5 Drag and Drop 2.16..HTML 5 Elements 2.17.HTML 5 attributes	6
3	<b>An Introduction to CSS</b>	3.1. Working with CSS: 3.1.1. Css background 3.1.2. Css boarder 3.1.3. Css Margins 3.1.4. Css padding 3.1.5. Height/widths 3.1.6. Css text 3.1.7. Css fonts 3.1.8. Css position 3.1.9. Css float 3.1.10. Css image opacity 3.1.11. Css attributes selector 3.2. Inline css 3.3.Internal css 3.4. External css 3.5. CSS selectors: 3.6.1. Class selector 3.6.2. Id selector  3.7.CSS3 introduction	15



		<p>3.8.CSS3 modules</p> <ul style="list-style-type: none"> <li>❖ Selectors</li> <li>❖ Box Model</li> <li>❖ Backgrounds and Borders</li> <li>❖ Image Values and Replaced Content</li> <li>❖ Text Effects</li> <li>❖ 2D/3D Transformations</li> <li>❖ Animations</li> <li>❖ Multiple Column Layout</li> <li>❖ User Interface</li> </ul> <p>3.9.CSS3 boarder</p> <p>3.10. CSS3 Margin</p> <p>3.11.CSS3 padding</p> <p>3.12.CSS3 rounded corner</p> <p>3.13.CSS3 backgrounds</p> <p>3.14.CSS3 Gradients</p> <p>3.15.CSS3 shadow</p>	
4	<b>JavaScript</b>	<p>5.1. Introducing JavaScript</p> <p>5.2. JavaScript Variables and Data Types</p> <p>5.3. Data Types</p> <p>5.4. Numeric</p> <p>5.5. Boolean</p> <p>5.6. Strings</p> <p>5.7. Variables</p> <p>5.8. Naming</p> <p>5.9. Numeric</p> <p>5.10.Javascript comments</p> <p>5.11. String Manipulation</p> <p>5.12. Arithmetic Operator</p> <p>5.13. Conditional Statements</p> <p>5.14. Comparison Operators</p> <p>5.15. Logical Operators</p> <p>5.16. And, Or, Not</p> <p>5.17. For Loops</p> <p>5.18. While Loops</p> <p>5.19. Functions</p> <p>5.20. Object-Oriented concepts in JavaScript</p> <p>5.21. Date Object</p> <p>5.22. Document Object</p> <p>5.23. Window Object</p> <p>5.24. Status Bar</p> <p>5.25. Dialog Boxes</p> <p>5.26. New Windows</p> <p>5.27. On Load &amp; on Unload</p>	<b>15</b>
5	<b>An introduction to XML</b>	<p>6.1..XML definition</p> <p>6.2.Advantage of using XML</p> <p>6.3.XML components</p> <ul style="list-style-type: none"> <li>❖ Declaration</li> <li>❖ Tags</li> <li>❖ Elements</li> <li>❖ Attributes</li> <li>❖ Comments</li> </ul> <p>6.4.Xml standards</p> <p>6.5.Xml and Web 2.0</p>	<b>4</b>

6	<b>GUI Based HTML Editor</b>	<p>7.1. Introduction to different types of HTML editors</p> <p>7.2. Create a page /view page</p> <p>7.3. Formatting page</p> <p>7.4. Linking HTML pages With the CSS page</p> <p>7.5. Managing the website in the editor</p> <p>7.6. Editing HTML and CSS templates using editor</p> <p>7.7. Create a Simple HTML and CSS Template in Editor.</p> <p>7.8. Integrating the web Templates in the editor</p>	<b>15</b>
7	<b>Project Work</b>	<p>8.1. Gathering Information</p> <p>8.2. Layout</p> <p>8.3. Deign</p> <p>8.4. Color combinations</p> <p>8.5. Usages of Graphics Images</p> <p>8.6. Home Page (Develop the simple HTML ,CSS Static Web Page of Your School )</p>	<b>9</b>
		Total	<b>68</b>

**(PRACTICAL)**

Unit	Scope	Activities	Periods
2	HTML	<ul style="list-style-type: none"> <li>• <b>Basic Tags:</b> Heading Tags, paragraph tag, Line break tag , centering content tag, Horizontal Lines Tag, preserve formatting tag, nonbreaking spaces (&amp;nbsp;),</li> <li>• Html elements</li> <li>• Nested Html elements</li> <li>• Html comments: Single line comment, Multiple Line comments</li> <li>• Html formatting</li> <li>• Html fonts, colors, marquee,forms,frames ,links etc</li> <li>• Html table</li> <li>• <b>Html list:</b> order list, unordered list, definition list</li> <li>• <b>Html attributes:</b> Lang attribute, title attribute, href attributes, size attributes, alt attributes</li> <li>• <b>Html forms Elements:</b>  <b>Elements:</b> input element, select element , option elements, textarea , button  <b>Input type:</b> text, password submit, radio, checkbox,</li> <li>•  <b>HTML 5 elements: Semantic elements:</b> <ul style="list-style-type: none"> <li>• &lt;article&gt;</li> <li>• &lt;aside&gt;</li> <li>• &lt;details&gt;</li> <li>• &lt;figcaption&gt;</li> <li>• &lt;figure&gt;</li> <li>• &lt;footer&gt;</li> <li>• &lt;header&gt;</li> <li>• &lt;main&gt;</li> <li>• &lt;mark&gt;</li> <li>• &lt;nav&gt;</li> <li>• &lt;section&gt;</li> <li>• &lt;summary&gt;</li> <li>• &lt;time&gt;</li> </ul> </li> </ul>	30

3	CSS	<p><b>Cascading style sheet:</b></p> <ul style="list-style-type: none"> <li>• Inline css</li> <li>• Internal css</li> <li>• External css</li> <li>• Css background</li> <li>• Css margin</li> <li>• Css padding</li> <li>• Css heights/widths</li> <li>• Css text</li> <li>• Css fonts</li> <li>• Css max widths</li> <li>• Css float</li> <li>• Css position</li> </ul> <ul style="list-style-type: none"> <li>• Css3 rounded corner</li> <li>• Css3 boarder images</li> <li>• Css3 backgrounds</li> <li>• Css3 colors</li> <li>• Css3 gradients</li> <li>• Css3 shadow</li> <li>• Css3 text</li> <li>• Css3 buttons</li> <li>• Css3 2D transforms</li> <li>• Css3 3D transforms</li> </ul>	16
5	Java Script	<ul style="list-style-type: none"> <li>• Printing javascript statements in standard output device</li> <li>• Single line comment</li> <li>• Multiline comments</li> <li>• WAP in Javascript using For Loop, while loop and Do-While loop</li> <li>• use JS break statements in loops</li> <li>• <b>JavaScript Events:</b> On click, Onchange, OnMousehover, onload</li> <li>• Html form validation using JavaScript.</li> <li>• WAP to display array elements in Javascript.</li> <li>• WAP to print IF-Else statements in javascript</li> <li>• <b>Javascript Dialogue Box:</b> Alert Dialogue Box, confirmation Dialogue box, Prompt Dialogue Box,</li> </ul>	20
6	GUI Based HTML Editor	<ul style="list-style-type: none"> <li>• Online searching of the editor and install them on local machine</li> </ul>	26

		<ul style="list-style-type: none"> <li>• Creating the first page in the editor</li> <li>• Create your own website in the editor</li> <li>• Editing the source code in the editor</li> <li>• Connecting external CSS file to HTML document</li> </ul>	
7	Project work	Develop the simple HTML and CSS templates of your school	10
	Total		102

## 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

## Specification Grid

### ***Subject : Web Page Development***

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, below:

**Table A**

**Class: 9**

**Times: 1 Hour and 15 Min.**

**Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Internet / Web basics	1	1	0	2
2	An Introduction to HTML	3	2	1	6
3	An Introduction to CSS	2	1	1	4
4	J-Query	2	1	1	4
5	JavaScript	2	1	1	4
6	An introduction to XML	1	1	1	3
7	GUI Based HTML Editor	1	0		1
8	Project Work	1	0	1	2
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

**(PRACTICAL)****Time: 1 Hour and 45 Min.****Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

# Class 10



# Computer Repair and Maintenance

Grade: 10

Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction

The objective of this course is to provide fundamental concept of hardware, assembling of computer system. This course includes the practical concept of different types of hardware of the computer system like motherboard, hard drive, primary memory, cabling system etc. Likewise this course also provides the concept of hardware related issues and troubleshooting the problem. This course is also intended to diagnosis of the actual problem of computer hardware.

## 2. Competencies

1. Develop the knowledge of different types of hardware of the computer
2. Develop the basic concept of how to assemble the computer
3. Develop the knowledge of primary and secondary memory
4. It helps students to troubleshoot hardware related issues.
5. Develop the concepts of preventive maintenance and safety.

## 3. Learning Outcomes

**At the end of Grade 10, students will be able to:**

1. Develop simple concept on how the computer system is properly operating.
2. Develop the general concept to find out bugs in the hardware parts of the computer system
3. Develop the skill to troubleshoot the virus related problems of the system
4. Develop the skill, how to backup and what to backup
5. Find out any kind of booting issues and trouble shoot them.
6. Find out the graphics or VGA problems and fix such types of issues.
7. Install different hardware devices like NIC, external graphics card etc.
8. Extend the useful life of computer hardware.
9. Avoid major problems caused by unexpected downtime.

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	<b>Introduction to computers</b>	<p>System Case, Styles and Sizes, Form Factors, Switches</p> <p>1.1. Power: The internal Power Supply, Parts of the Power Supply, Form Factors</p> <p>1.1.1. Motherboard and System Devices</p> <p>1.1.1.1. Motherboard Form Factors</p> <p>1.1.1.2. Parts of the Motherboard</p> <p>1.1.1.3. System Bus Functions</p> <p>1.1.1.3.1. Peripheral Component Interconnect (PCI) Local Bus</p> <p>1.1.1.3.2. Accelerated Graphics Port (AGP)/PCI express</p> <p>1.1.2. System BIOS</p> <p>1.1.2.1. System BIOS Functions and Operation, BIOS Settings</p> <p>1.2. The Processor</p> <p>1.2.1.1. Processor Power and Voltage</p> <p>1.2.1.2. Processor Cooling</p> <p>1.2.1.3. Processor Sockets and Slots</p> <p>1.2.2. System Memory, Memory Technology Types, Speed, Size</p> <p>1.3. Video Cards</p> <p>1.3.1. Video Modes, Resolution and Color</p> <p>1.3.2. Video Display Standards</p> <p>1.4. Hard Disk Drives</p> <p>1.4.1. Construction and Operation of the Hard Disk Drive</p> <p>35</p> <p>1.4.1.1. Hard Disk Geometry, Tracks, Cylinders and Sectors</p> <p>1.4.1.2. Partitioning, Partition Sizes and Drive Lettering</p> <p>1.4.1.3. Formatting and Capacity</p> <p>1.4.2. Hard Disk Interfaces and Configuration</p> <p>1.4.2.1. Interface: IDE/ATA/ATAPI, SATA, USB</p> <p>1.5. CD, DVD-ROM Drives and Interfaces</p> <p>1.5.1. CD, DVD-ROM Drive Construction and Operation</p> <p>1.5.2. Recordable CD (CD-R)</p> <p>1.5.3. Rewriteable CD (CD-RW)</p> <p>1.6. Monitors</p> <p>1.6.1. Monitor Resolution, Colour and Refresh rate</p> <p>1.6.2. Monitor Size</p> <p>1.6.3. CRT and LCD monitors</p> <p>1.7. Keyboards and Mouse</p>	<b>28</b>

		<ul style="list-style-type: none"> <li>1.7.1. Keyboard Construction and Operation</li> <li>1.7.2. Keyboard, Key Groupings <ul style="list-style-type: none"> <li>1.7.2.1. Alphanumeric Key Layouts</li> <li>1.7.2.2. Standard Keyboard Layouts</li> </ul> </li> </ul>	
2.	<b>System Care Guide</b>	<ul style="list-style-type: none"> <li>2.1. Preventive Maintenance</li> <li>2.2. System Care: <ul style="list-style-type: none"> <li>2.2.1. Cooling and Ventilation</li> <li>2.2.2. Virus Detection and Protection</li> <li>2.2.3. Background on Viruses</li> <li>2.2.4. Virus Infection Mechanisms and Prevention</li> <li>2.2.5. Virus Scanning and Antivirus Software</li> </ul> </li> <li>2.3. Backups <ul style="list-style-type: none"> <li>2.3.1. Backup Methods, Devices and Media</li> <li>2.3.2. Backup Scheduling and Media Rotation Systems</li> <li>2.3.3. What To Back Up</li> <li>2.3.4. How To Back Up</li> <li>2.3.5. Boot Disks</li> </ul> </li> </ul>	<b>18</b>
3	<b>Troubleshoot, Repair and maintenance</b>	<ul style="list-style-type: none"> <li>3.1. General Troubleshooting Techniques <ul style="list-style-type: none"> <li>3.1.1. Steps To Take First When Troubleshooting</li> <li>3.1.2. General Diagnostic Techniques</li> </ul> </li> <li>3.2. Diagnostic, Troubleshooting and Repair Tools <ul style="list-style-type: none"> <li>3.2.1. Troubleshooting Boot Problems <ul style="list-style-type: none"> <li>3.2.1.1. Troubleshooting Boot-Time Error Messages</li> <li>3.2.1.2. Troubleshooting System Slowdowns</li> </ul> </li> <li>3.2.2. Troubleshooting Specific Components <ul style="list-style-type: none"> <li>3.2.2.1. System Case <ul style="list-style-type: none"> <li>3.2.2.1.1. Assembly of Physical devices issues <ul style="list-style-type: none"> <li>3.2.2.1.2. LEDs, Case Buttons, Key Lock</li> </ul> </li> <li>3.2.2.2. Power Sources and Power Protection Devices</li> <li>3.2.2.3. Motherboard and System Devices</li> <li>3.2.2.4. The Processor</li> <li>3.2.2.5. System Memory <ul style="list-style-type: none"> <li>3.2.2.5.1. Memory Not Recognized</li> <li>3.2.2.5.2. Out of Memory Problems</li> </ul> </li> <li>3.2.2.6. Video Cards <ul style="list-style-type: none"> <li>3.2.2.6.1. Failure or Improper Operation</li> <li>3.2.2.6.2. Image Quality Problems(Video Controller Issue)</li> <li>3.2.2.6.3. Performance or Video Mode Issues</li> </ul> </li> <li>3.2.2.7. Monitors <ul style="list-style-type: none"> <li>3.2.2.7.1. Failure or Improper Operation</li> <li>3.2.2.7.2. Image Quality Problems(Monitor itself)</li> </ul> </li> <li>3.2.2.8. CD-ROM Drives <ul style="list-style-type: none"> <li>3.2.2.8.1. Drive Not Recognized</li> <li>3.2.2.8.2. Configuration Problems</li> <li>3.2.2.8.3. Physical Problems</li> </ul> </li> </ul> </li> </ul> </li> </ul> </li></ul>	<b>22</b>

		3.2.2.9. Peripheral I/O Ports 3.2.2.10. Keyboards 3.2.2.11. Mouse	
		Total	<b>68</b>

### (PRACTICLE)

Unit	Scope	Activities	Periods
<b>1</b>	<b>Introduction to computers</b>	1.1. Perform Physical Installation Procedure 1.2. Perform Memory Module Physical Installation Procedure 1.3. Perform Motherboard Physical Installation Procedure 1.4. Perform Identification Procedures 1.4.1. Video Card Identification Procedure 1.4.2. Operation System Identification Procedure 1.4.3. File System Identification Procedure	<b>25</b>
<b>3</b>	<b>Troubleshoot, repair and maintenance</b>	3.1. Perform I/O Port Physical Installation Procedures 3.1.1. System Case Preparation Procedure 3.1.2. Hard Disk Drive Physical Installation Procedure 3.1.3. CD-ROM Drive Physical Installation Procedure 3.1.4. Processor Physical Installation Procedure 3.1.5. Heat Connector Physical Installation Procedure 3.1.6. PS/2 Mouse Port Connector Physical Installation Procedure 3.1.7. Video Card Physical Installation Procedure 3.2. Perform Uninstallation and Disassembly Procedures 3.2.1. System Case Cover Removal Procedure 3.3. Perform Setup and Inspection Procedures 3.3.1. Post-Assembly Inspection Procedure 3.3.2. Post-Assembly Initial Boot Procedure 3.3.3. Safe BIOS Setup Procedure 3.3.4. Post-Assembly Initial Test Procedure 3.3.5. Hard Disk Partitioning and Formatting Procedure 3.3.6. CD-ROM Driver Installation Procedure  <b>Mobile System Repairing :</b> 1.1. Factory reset without loss of information 1.2. Troubleshoot battery problem. 1.3. Display problems 1.4. Memory related problem 1.5. Connection of wifi, bluetooth, GPRS probks 1.6. Repair and trouble shoot computer system	<b>67</b>
<b>10</b>	<b>Project work</b>		<b>10</b>
<b>Total</b>			<b>102</b>

## 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

### Specification Grid

#### Subject : Computer Repair and Maintenance

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Table A**

**Class: 10**

**Times: 1 Hour and 15 Min.**

**Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction to computers	6	3	2	11

<b>2</b>	<b>System Care Guide</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>6</b>
<b>3</b>	<b>Troubleshoot, Repair and maintenance</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>9</b>
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

### (PRACTICAL)

**Time: 1 Hour and 45 Min.**

**Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
<b>Total</b>	<b>60</b>

# Computer Network

Grade: 10

Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction

This course is designed to provide the basic knowledge of computer networking and how they are interconnected to each other. It also provides the concept of different types of networking devices such as hub router, switch etc, security system, and OSI reference model of the computer network. This course is designed to understand the concept of client server network model configuration which is one of the core concepts of networking. It also helps students to understand the basics of different types of server configuration like mail server, FTP server IIS server. One of the important aspects of this course is to provide the concept of DHCP and DNS server configuration

## 2. Competencies

1. Develop the knowledge of computer networking.
2. Develop the concept about client-server network.
3. Develop the knowledge of different types of network devices and media preparation.
4. Develop the concept of how to setup local area network
5. Analyse the security problem of the computer network.

## 3. Learning Outcomes

**At the end of Grade 10, students will be able to:**

1. Develop simple concept of computer networking devices
2. Develop the concept of client server architecture model and peer-to-peer network
3. Develop the knowledge of how to setup Local network.
4. Develop the concept of different types of heterogeneous network.
5. Acquire skills of installing the networking devices.
6. Understand how to create active directive for user control
7. Install the network printer, troubleshoot and maintenance

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	Introduction to computer network	1.1. Overview of a computer networks 1.2. Business applications 1.3. Home applications 1.4. Mobile applications	<b>4</b>
2.	Types of networks	2.1. Local area network 2.2. MAN 2.3. Wide area network 2.4. Wireless networks 2.5. Home networks 2.6. Internetworks	<b>10</b>
3	Network topologies	3.1 Star network 3.2 Ring network 3.3 Bus network	<b>6</b>
4	IP Address	7.1. IP Address and its class 7.2. IPV4 Vs IPV6 Format 7.3. Sub netting	<b>10</b>
5	Network architecture and devices	4.1 Peer to peer architecture 4.2 Client/server architecture 4.3 Repeater, Hub, NIC, Bridge, Switch, Router, Gateway	<b>10</b>
6	Introduction to OSI reference model	5.1 Physical layer 5.2 Data link layer 5.3 Network layer 5.4 Transport layer 5.5 Session layer 5.6 Presentation layer 5.7 Application layer	<b>20</b>
7	Network security	6.1 Cryptography concept 6.2 Digital signature concept 6.3 Firewalls 6.4 Web security 6.5 Virtual private network	<b>8</b>
		Total	<b>68</b>



**(PRACTICAL)**

<b>Unit</b>	<b>Scope</b>	<b>Activities</b>	<b>Periods</b>
<b>2</b>	LAN Setup	<ul style="list-style-type: none"> <li>physical configuration of LAN in computer LAB</li> </ul>	<b>8</b>
<b>3</b>	Media Preparation	<ul style="list-style-type: none"> <li>Connecting RJ-45</li> <li>Preparation of straight Cabling and cross-Over Cabling</li> <li>Optical fibre cable</li> <li>Setup internet in the computer LAB</li> </ul>	<b>17</b>
<b>4</b>	IP Address	<ul style="list-style-type: none"> <li>Configuring private IP address of Class C</li> <li>Installing external NIC card</li> </ul>	<b>10</b>
<b>5</b>	Network architecture and devices	<ul style="list-style-type: none"> <li>Configure peer-to-peer networking</li> <li>Creating the logical diagram of client server Architecture model</li> <li>Implementing client server architecture model</li> <li>Creating active directory for user control</li> <li>Configuring firewall</li> <li>Implementing windows server in the network system</li> </ul>	<b>42</b>
<b>7</b>	Network security	<ul style="list-style-type: none"> <li>Antivirus and antispysware</li> <li>Firewall to block unauthorized access to your network</li> <li>Monitoring worm ,Trojan horses and viruses</li> </ul>	<b>15</b>
<b>8</b>	Project work	Installation of LAN in Your School	<b>10</b>
<b>Total</b>			<b>102</b>

**5. Learning Facilitation Process:**

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit

- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

### Specification Grid

#### *Subject : Computer Network*

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Table A**

**Class: 10      Times: 1 Hour and 15 Min.      Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction to computer network	1	0	0	1
2	Types of networks	2	1	1	4
3	Network topologies	2	1	1	4
4	IP Address	1	1	0	2
5	Network architecture and devices	2	1	1	4
6	Introduction to OSI reference model	3	2	2	7

7	Network security	2	1	1	4
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

**(PRACTICAL)**

**Time: 1 Hour and 45 Min.**

**Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
<b>Total</b>	<b>60</b>

# Database Management System

Grade: 10

Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction

The objective of this course is to provide fundamental concept, theory and practices and implementation of DBMS. This course explains the basics of DBMS such as its architecture, data models, data schemas, data independence, E-R model, relation model, relational database design, and storage. It also provides the core concept of structured query language execution statements. This course covers database design and the use of database management systems for applications. This course covers database design and the use of database management systems for applications. It includes extensive coverage of the relational model, relational algebra, and SQL.

## 2. Competencies

1. Develop the knowledge of relation database design
2. Develop the concept of sql query to run in the Microsoft Access
3. Develop the knowledge on security of database
4. Develop the concept of creating forms, inserting data and generating the report in MS-Access.

## 3. Learning Outcomes

### At the end of Grade 10, students will be able to:

1. Develop simple concept in design to relational database
2. It helps student to provide security of database
3. Develop the skill of database administrator of Bms package
4. Develop the concept to design database using MYSQL workbench tool.
5. Develop the concept to normalization of the database.
6. Create simple database for schools

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	Introduction to Database System Architecture	1.1. Introduction to Database System, 1.2. Database Manager and users 1.3. Needs and organization of database 1.4. Client-Server Architecture	<b>6</b>
2.	Entity Relationship Model(ER-Model)	2.1. Definition 2.2. attributes 2.3. Data type 2.4. Entity set and keys 2.4.1. super key 2.4.2. Candidate key 2.4.3. Primary key 2.5. Mapping Cardinalities 2.5.1. one-to-one 2.5.2. one-to-many 2.5.3. many-to many	<b>11</b>
3	Introduction to Relational Database, SQL and Relational Model Basics	3.1. Introduction to ER Model 3.2. Integrity constraints 3.3. Referential integrity 3.4. Structure Query Language(SQL) 3.4.1. CRUD 3.4.2. Join 3.4.2.1. left Join 3.4.2.2. Right join 3.4.2.3. inner join 3.4.2.4. outer join 3.5 DML, DDL, DCL Concept	<b>16</b>
4	Database Design	5.1 Functional Dependencies: Introduction, Trivial and Non-trivial Dependencies, Closure of a Set of Dependencies, Closure of a Set of Attributes. 5.2 Data Normalization: Introduction, Decomposition and Functional Dependencies INF, 2NF and 3NF	<b>17</b>
5	Concurrency control and recovery	6.1. Introduction of transaction 6.2. Properties of transaction 6.2.1. Atomicity 6.2.2. Consistency 6.2.3. Durability 6.2.4. Isolation 6.3. State of transaction 6.4. Requirements for recovery	<b>12</b>

7	Security	7.1 Introduction, 7.2. Discretionary Access Control, 7.3. Mandatory Discretionary Access Control, 7.4. Statistical Database, 7.5. Data Encryption.	<b>6</b>
		Total	<b>68</b>

### (PRACTICAL)

Unit	Scope	Activities	Periods
<b>1</b>	Database Management Using MS-Access tools	<ol style="list-style-type: none"> <li>1. Create database</li> <li>2. Create table</li> <li>3. Design view</li> <li>4. Adding data</li> <li>5. Create form</li> <li>6. Modify form</li> <li>7. Create a relationship</li> <li>8. Create a query <ul style="list-style-type: none"> <li>❖ Select query</li> <li>❖ Insert query</li> <li>❖ Delete query</li> <li>❖ Update query</li> </ul> </li> <li>9. Modify a query</li> <li>10. Export access database to excel</li> <li>11. Generate report</li> <li>12. Ms access Functions: <ul style="list-style-type: none"> <li>❖ Numeric/Mathematical functions</li> <li>❖ Date and time functions</li> <li>❖ Logical functions</li> <li>❖ Group by functions</li> </ul> </li> </ol>	<b>82</b>
<b>2</b>	Project work	<ol style="list-style-type: none"> <li>1. Develop a relational database of student information system</li> <li>2. Develop a relational database of online shopping centre and implement it on MS-Access</li> </ol>	<b>20</b>
<b>Total</b>			<b>102</b>

### 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge,

skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

### Specification Grid

#### ***Subject : Database Management System***

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Table A**

**Class: 10                      Times: 1 Hour and 15 Min.                      Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction to Database System Architecture	1	1		2
2	Entity Relationship Model	2	2	1	4
3	Introduction to Relational Database, SQL and	3	1	1	3

	Relational Model Basics				
<b>4</b>	Data Integrity and Views	<b>2</b>	<b>2</b>	<b>1</b>	<b>4</b>
<b>5</b>	Database Design	<b>2</b>	<b>2</b>	<b>1</b>	<b>4</b>
<b>6</b>	Concurrency control and Recovery	<b>1</b>	<b>1</b>		<b>2</b>
<b>7</b>	Security	<b>2</b>	<b>1</b>	<b>1</b>	<b>3</b>
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

**(PRACTICAL)**

**Time: 1 Hour and 45 Min.**

**Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
<b>Total</b>	<b>60</b>



# Electronic Device and Circuit

Grade: 10

Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction:

This syllabus of “Electronic Device and Circuit” provides knowledge and skills on Passive components, semiconductor, power supplies, Bipolar Junction transistors, Special purpose transistor and field effect transistors. This course introduces fundamental building block that exist in all integrated structures. It will also introduce the student to more advanced applications and analysis of diode circuits and devices. This course examines the basic operational characteristics of PN junction and forward and reverse bias current.

## 2. Competencies

1. Develop a technological soundness in handling and realizing the various electronic devices
2. Develop an awareness of how one electronic device works and its implications in the real works
3. Develop the competent knowledge in realizing the semiconductor world that surrounds the quotidian life.
4. Acquire skills in using common electronic devices.

## 3. Learning Outcomes:

**On completion of this course the student will be able to:**

1. Identify the passive elements (R, L, and C) and understand their characteristics
2. Identify and explain the working principles of semiconductor diodes and transistors, related to their characteristics and application
3. Identify FET, MOSFET, relate to their characteristics and application
4. Explain the characteristics of CB, CE, CC transistor configuration circuit.
5. Identify biasing circuit and types of amplifier.

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1	<b>Introduction</b>	1.1. Explain the Matter, molecule, and atom 1.2. Explain the charges and its electric quantity, electric current 1.3. Explain the potential differences between electromotive force and potential difference 1.4. Explain the direct current and alternating current 1.5. Explain the Basic parameter of alternating current: definition of amplitude, frequency, wavelength, peak to peak value, root mean square value, average value 1.6. Explain the review on Ohm's Law and Kirchhoff's voltage and current laws	8
2	<b>Introduction to Passive Component</b>	2.1 Explain the Resistors, construction, types, characteristics, color code 2.2 Explain the capacitors, construction, types, characteristics, color code 2.3 Explain the inductor, construction, types, characteristics, color code	10
3	<b>Semiconductor</b>	3.1. Explain the energy levels, energy bands and conduction of electrons and holes 3.2. Classify the semiconductor materials and characteristics of Germanium and Silicon materials, doping, P type, N type materials, minority and majority carrier 3.3. Formation of PN junction, depletion layer, energy barrier potential, forward and reverse bias of PN Junction 3.4. Explain the reverse breakdown effects: Avalanche and Zener breakdown	17
4	<b>Power supplies</b>	4.1 Explain the Basic rectifier circuits, types, working principle, characteristics and applications. 4.2. Zener voltage regulator circuit design with principle and calculation	6
5	<b>Bipolar junction transistors</b>	5.1. Explain the types of transistors with working principles, circuit characteristics and applications 5.2. Transistor configuration: CB, CE,CC 5.3. Explain the operation of transistor in saturation and cut off region.	15
6	<b>Special purpose Transistors</b>	6.1 Explain Unijunction transistor, characteristics and application 6.2 Programmable unijunction transistor.	5

		6.3 Explain photo transistor, characteristics and application.	
7.	<b>Field Effect Transistor</b>	7.1.1 Explain the field effect transistors. 7.1.2 Explain the types and working principles of field effect transistors 7.1.3 Explain the characteristics and applications of field effect transistors. 7.2 MOSFET, types, working principles and characteristics and applications 7.3. Difference between E-MOSFET and D-MOSFET	7
		TOTAL	68

### (PRACTICAL)

Unit	Scope Area	Activities	Period
2	<b>Passive component</b>	2.1. Measure R, L, C, circuits	20
3	<b>Semiconductor</b>	3.1. Assess Diode characteristics	8
		3.2. Assess Half wave and Full wave rectifier circuits	18
		3.3. Assess Zener voltage regulator	15
		3.4. Use of semiconductor manuals	9
5	<b>Bipolar junction transistors</b>	5.1. Identify transistor characteristics	18
7	<b>Field Effect Transistors</b>	7.1. Assess FET characteristics	14
<b>Total</b>			<b>102</b>

### 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works

- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

### Specification Grid

#### Subject : **Electronic Device and Circuit**

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Table A**

**Class: 10                      Times: 1 Hour and 15 Min.                      Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	2	0		2
2	Introduction to Passive Components	1	1	1	3
3	Semiconductor	3	2	1	6
4	Power Supplies	2	1	1	4
5	Bipolar Junction Transistor	2	1	2	5
6	Special Purpose Transistors	1	1		2
7	Field Effect Transistor	2	1	1	4
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

**(PRACTICAL)****Time: 1 Hour and 45 Min.****Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

# Microprocessor

Grade: 10

Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction

The course is designed to provide students a comprehensive knowledge and understanding of why we use microprocessor systems. What is the importance of microprocessor systems in our life? This course will provide the knowledge of software simulator kit of 8085 microprocessor as well as Hardware Kit writing the assembly language program.

## 2. Competencies

1. Develop the knowledge of internal structure of Microprocessor.
2. Develop the basic concept of how data flow from memory unit to microprocessor
3. Develop the knowledge of how to do simple assembly language program in 8085 microprocessor Kit or in software simulator
4. It helps students about the interfacing of microprocessor

## 3. Learning Outcomes

**At the end of Grade 10, students will be able to:**

1. Develop simple concept of microprocessor based system
2. Develop the flow chart, algorithm, of simple 8085 microprocessor
3. Develop the skill to operate the 8085 microprocessor.
4. Develop simple assembly language program like addition, subtraction, multiplication, memory related operations etc.
5. Develop more complex program like copying the contents of memory from source to Destination
6. Learn the 8085 software simulator kit to write assembly code

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	Introduction	1.1 Definition of microprocessor and its application 1.2. Evolution of microprocessor 1.3. Von Neumann architecture 1.4. Basic organization of microprocessor 1.5.Types of microprocessor	6
2.	Components of Microprocessor	2.1. Input/output 2.2.Memory 2.2.1.Primary memory 2.2.2.Secondary memory 2.3. Processor unit: 2.3.1.Arithmetic and logic unit (ALU), Control unit (CU), Registers 2.4. 8085 bus structure 2.5.Data flow from Memory to MPU	10
3	Instruction Cycle	3.1. Instruction cycle, machine cycle and T states 3.2.Machine cycle of 8085 Microprocessor: 3.2.1. Op-code fetch Machine cycle 3.2.2. Memory read machine cycle 3.2.3. Memory write Machine cycle 3.2.4. I/O read Machine cycle 3.2.5. I/O write Machine cycle 3.3.Timing diagram of MOV, MVI, IN, OUT, LDA, STA	10
4	Intel 8085 microprocessor	4.1. Functional block diagram 4.2. Pin configuration 4.3. Description of each blocks: Registers, Flag, Data and address bus, Timing and control unit, Interrupts 4.4. Instructions - Opcode and Operands 4.5. Addressing modes	12
5	Programming with Intel 8085 microprocessor	5.1. Instruction format and data format 5.2. Intel 8085 Instruction Set 5.3. Assembly language program and flowchart 5.4. Instruction types: Data transfer, Arithmetic, Logic, Branching, Miscellaneous 5.5. Simple sequence programs, Branching, Looping 5.6 Various Programs in 8085 ❖ Simple Programs with Arithmetic and Logical Operations ❖ Conditions and Loops ❖ Memory Related program ❖ Multiplication and Division	12

6	Basic I/O, Memory R/W and Interrupt Operations	6.1. Memory read/write, Input/output read/write operation in 8085 microprocessor based system 6.2. Direct memory access (DMA) <ul style="list-style-type: none"> <li>❖ Introduction, advantage and application</li> </ul> 6.3. Interrupt <ul style="list-style-type: none"> <li>❖ 8085 interrupt pins and interrupt priority</li> <li>❖ Maskable and non-maskable interrupts</li> <li>❖ Vector and polled</li> </ul> 6.4. 8259 operation <ul style="list-style-type: none"> <li>❖ Block diagram and explanation</li> <li>❖ Priority modes and other features</li> </ul>	10
7	Input/output Interfaces	7.1. Parallel communication: introduction and applications 7.2. Serial communication <ul style="list-style-type: none"> <li>❖ Introduction and applications</li> <li>❖ Introduction to Programmable Communication Interface 8251</li> <li>❖ Basic concept of synchronous and asynchronous modes</li> </ul> 7.3. Simple I/O, strobe I/O, Single handshake I/O, double handshake I/O 7.4. 8255A and its working <ul style="list-style-type: none"> <li>❖ Block diagram</li> <li>❖ Modes of operation</li> <li>❖ Control word</li> </ul> 7.5. RS-232: Introduction, pin configuration (9 pin and 25 pin)	8
		Total	68

### (PRACTICAL)

Unit	Scope	Activities	Period
5	Programming with Intel 8085 microprocessor	<p style="text-align: center;"><b><u>Assembly language programming</u></b></p> <ul style="list-style-type: none"> <li>• Write instructions to load 16-bit numbers 2050 H in the register pair HL using LXI MVI opcodes, and explains the difference between the two instructions</li> <li>• The memory location 2050 H holds the databyte F7H. Write instruction to transfer the data byte to the accumulator using three different opcodes: MOV, LDAX and LDA</li> <li>• Sixteen byte of data is stored in memory locations at XX50H to XX5FH. Transfer the entire block of data to new locations starting at XX70H</li> <li>• Write instructions to add the contents of the</li> </ul>	92



		<p>memory location 2040H to (A), and subtract the contents of the memory location 2041H from the first sum. Assume the accumulator has 30H, the memory location 2040H has 68H and the location 2041H has 7FH.</p> <ul style="list-style-type: none"> <li>• WAP to add two numbers stored at memory location 2040H and 2041H and store the final result to the address 2042H.</li> <li>• WAP to add two 8-bit numbers stored in memory location 3000H and 3001H. Store the result in memory location 4000H. Ignore the carry after 8-bits.</li> <li>• Write instructions to load the two hexadecimal numbers 32H and 48H in register A and B respectively. Add the numbers , and display the sum at the LED and output port1</li> <li>• Load the hexadecimal number 37H in register B, and display the number at the output port Labelled PORT1</li> <li>• The contents of the accumulator are 93H and the contents of register C are B7H. Add both contents.</li> <li>• Write a program to perform the following functions, and verify the output.             <ol style="list-style-type: none"> <li>1. Load the number 8BH in register D</li> <li>2. Load the number 6FH in register C</li> <li>3. Increment the contents of register C by one.</li> <li>4. Add the contents of register C and D and display the sum at the output PORT1</li> </ol> </li> </ul>	
<b>10</b>	<b>Project Work</b>		<b>10</b>
<b>Total</b>			<b>102</b>

## 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

### Specification Grid

#### *Subject : Microprocessor*

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Table A**

**Class: 10                      Times: 1 Hour and 15 Min.                      Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	1	1	0	2
2	Components of microprocessor	2	1	1	4
3	Instruction Cycle	2	1	1	4
4	Intel 8085 microprocessor	2	1	1	4
5	Programming with Intel 8085 microprocessor	2	1	2	5
6	Basic I/O, Memory R/W and Interrupt	2	1	1	4

	Operations				
7	Input/output Interfaces	2	1	0	3
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>

### (PRACTICAL)

**Time: 1 Hour and 45 Min.**

**Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
<b>Total</b>	<b>60</b>

# Object oriented programming

Grade: 10      Theory: 40 Full Marks (68 Period)

Practical: 60 Full Marks (102 Period)

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## 1. Introduction

This course will help students to basics of class, object, inheritance, polymorphism, and encapsulation. After understanding these features students would enhance the knowledge in the fields of OOPs with the help of C++.

## 2. Competencies

1. Develop the knowledge of real-world object
2. Develop the concept of class and object construction and accessing them in the main program.
3. Develop the concept of polymorphism which has the immense use of C++ and Java programming language.
4. Develop small program in OOP language.

## 3. Learning Outcomes

**At the end of Grade 10, students will be able to:**

1. Develop simple to more complex program in C++ programming language.
2. Develop simple program using C++ programming language.
3. Acquire skills in using common application programs.
4. Develop a concept of class construction and object initialization
5. Understand different types of programming logic for further programming language
6. Develop the understanding of inheritance
7. Develop the concept of polymorphism.

## 4. Scope and Sequence

### THEORY

Unit	Scope	Content	Period
1.	Overview	1.1.Procedural language limitations 1.2.Benifits of OPPs 1.3.The object-oriented approach 1.4.Object-oriented concepts 1.4.1. Object 1.4.2. Class 1.4.3. Abstraction 1.4.4. Encapsulation 1.4.5. Inheritance 1.4.6. Polymorphism 1.5.Difference between C and C++	5
2.	<b>C++ basic input/output</b>	2.1. Input output Library header Files 2.1.1. Iostream 2.1.2. Iomainp 2.1.3. Fstream 2.2. The standard output stream(cout) 2.3. The standard input stream(cin)	6
3	Objects and Classes	1.7. Class-Object concept 1.8. Difference between class and structures 1.8.1. Accessing members of structures 1.9. Simple class construction 1.10. Defining class 1.11. Class variables and methods. 1.12. Accessing data members and member functions of class 1.13. .Access specifies 4.7.1.Public,private and protected 1.14. Initializing class objects 1.15. Constructors and destructor 4.10. Default copy constructor 4.11. Static data member in a class 4.12. Static Member function of a class 4.13. Inline Function. 4.14. Data encapsulation and its example 4.15. Passing parameters to a constructor function 4.16. Difference between Constructors and member function	15
4	Polymorphism	5.1. Introduction to polymorphism 5.2. Function overriding 5.3. Virtual function 5.4. Runtime polymorphism 5.5. Static binding and Dynamic binding 5.6. Abstract class and pure virtual function	12

5	Operator Overloading	7.1. Overloading unary operators 7.1.1. Operator argument 7.1.2. Operator return values 7.1.3. Postfix notation 7.2. Overloading binary operators 7.2.1. Arithmetic operators 7.2.2. Concatenating strings	8
6	Inheritance	8.1. Introduction to Inheritance 8.2. Basic Concepts 8.3. Base class and derived class 8.4. Accessing base class members 8.5. Public, Private and Protected inheritance in C++ 8.5. Abstract base class 8.6. Forms of inheritance	10
		Total	68

### (PRACTICAL)

Unit	Scope	Activities	Periods
4	Object and classes	<ul style="list-style-type: none"> <li>• Simple class construction</li> <li>• Defining variables and functions inside a class</li> <li>• Creating an object of a class in Main() function</li> <li>• Accessing functions and variables using object reference variable</li> <li>• Access Modifiers: Public, private and protected</li> <li>• Writing a constructor function inside a class and accessing them into a main program</li> <li>• Initializing constructor function with different types and numbers of parameters</li> <li>• Simple program to overload the constructor function</li> </ul>	36
5	Operator overloading	<ul style="list-style-type: none"> <li>• Unary operator overloading</li> <li>• Binary operator overloading</li> <li>• Relational operator overloading</li> <li>• Assignment operator overloading</li> </ul>	22
6	Inheritance	<ul style="list-style-type: none"> <li>• Creating base class and derived class</li> <li>• Inheriting more than one the derived class from single base class</li> <li>• Accessing the members of derived class using object variable in main program</li> <li>• Writing a constructor function in derived class</li> </ul>	24

		<ul style="list-style-type: none"> <li>• Testing of protected specifier of base class in derived class</li> <li>• Simple program to construct abstract base class</li> </ul>	
<b>9</b>	Virtual Function	<ul style="list-style-type: none"> <li>• Virtual function</li> <li>• Pure virtual function</li> </ul>	<b>20</b>
<b>Total</b>			<b>102</b>

## 5. Learning Facilitation Process:

This course provides both theoretical as well as practical knowledge on computer engineering. In this subject there are both subjective contents as well as practical activities. This curriculum focuses on providing practical knowledge to the students. It provides knowledge, skill, and self confidence to the students. To fulfill the objectives, the instructor must involve the students in classroom activities as well as practical field visits. Locally available material must be used to conduct teaching learning activities. To achieve the entire objective from this syllabus, teacher must use different techniques and process while teaching. Some of the important techniques and processes that can be used are given below:

- Group Discussion
- Field Visit
- Demonstration
- Case study
- Questionnaire
- Practical Works
- Audio/Visual Class
- Web surfing
- Project Works
- Problem Solving.

## 6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

## Specification Grid

### Subject : Object oriented programming

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

**Table A**

**Class: 10**

**Times: 1 Hour and 15 Min.**

**Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Overview	2	0	1	3
2	C++ basic input/output	1	1	0	2
3	C++ advanced	1	1		2
4	Objects and classes	3	2	2	7
5	Polymorphism	2	1	1	4
6	Concept of Array	1	1	1	3
7	Operator overloading	1	0	0	1
8	Inheritance	2	1	1	4
<b>Total Question</b>		<b>13</b>	<b>7</b>	<b>6</b>	<b>26</b>
<b>Attempt questions</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Marks</b>		<b>10</b>	<b>10</b>	<b>20</b>	<b>40</b>
<b>Time</b>		<b>18</b>	<b>18</b>	<b>39</b>	<b>75 min.</b>



**(PRACTICAL)****Time: 1 Hour and 45 Min.****Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60