

**DEPARTMENT OF COMPUTER SCIENCE,  
RABINDRANATH TAGORE UNIVERSITY,  
HOJAI: ASSAM**

**Computer Science Syllabus for UG courses, according to NEP2020 (CBCS)  
Subject details For First and Second Semester:**

<i>Class</i>	<i>Courses</i>	<i>Subject papers</i>	<i>Credits</i>
<i>SEM-I</i>	<i>CORE(Major)</i>	<i>Problem Solving using Computers Practical</i>	<i>3 1</i>
	<i>SEC</i>	<i>Computer Application Practical</i>	<i>1 2</i>
			<i>Total credit: 7</i>

<i>Class</i>	<i>Courses</i>	<i>Subject papers</i>	<i>Credits</i>
<i>SEM- II</i>	<i>CORE(Major)</i>	<i>Database Management System Practical</i>	<i>3 1</i>
	<i>SEC</i>	<i>HTML Programming Practical</i>	<i>1 2</i>
			<i>Total credit:7</i>

**Note: COR -Core; SE- Skill Enhancement.**

**Note:** Students who exits after first year will be awarded undergraduate certificate (in the field/discipline) if He/She completes a summer internship course of credit-4, in Second year.

# ***SEMESTER-I***

## **CORE COURSE(MAJOR)**

**Course Title : Problem Solving using Computers (including practical)**

**Course Code : MAJ-CSC-1.1**

**Nature of Course : Major**

**Total Credits : 4**

**Distribution of Marks : 60 (End -Sem) +15 (Sessional)+25(Practical)**

### **1) Course objectives:**

After going through the subject students will be able to learn

- Understand the basics of Computer and Programming
- Adopt algorithmic approach to solve problems using pseudocode and flowcharts.
- Understand and write programs in Python to implement conditions, loops, functions
- Programming Constructs

**2) Prerequisites:** NIL

**3) Theory Credit:**3

**4) Practical Credit:** 1

**5) No of Hours:**

- a) Theory: 45 hrs
- b) Practical: 30 hrs

### **UNIT 1:**

**(7 Hrs)**

**Computer Fundamentals** :Introduction to Computers: Characteristics of Computers, Uses of computers, Types and generations of Computers, Basic Computer Organization - UNITs of a computer, CPU, ALU, memory hierarchy, registers, I/O devices.

### **UNIT 2:**

**(8 Hrs)**

**Planning the Computer Program** :Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation, Techniques of Problem Solving : Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

**UNIT 3: (10 Hrs)**

**Overview of Programming** Structure of a Python Program, Elements of Python, Introduction to Python, Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

**UNIT 4: (8 Hrs)**

**Creating Python Programs:** (Input and Output Statements, Control statements (Looping- while Loop, for Loop, Loop Control, Conditional Statement- if...else, Difference between break, continue and pass).

**UNIT 5: (8 Hrs)**

**Structures:**Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.

**UNIT 6: (4 Hrs)**

**Introduction to Advanced Python:**Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI programming

**Practical:**

Introduction to Python console, operators, input and output statements.

- Python control statements and functions
- Data Structures in python
- Exception Handling
- File Handling
- Object Oriented Python programming
- Introduction to libraries (NumPy, Matplotlib, OpenCV)
- Python SQL Database Connection and database operations

**List of Books:**

- Core Python Programming, R. Nageswara Rao, Dreamtech Press.
- Python: The Complete Reference, Martin C. Brown, McGraw Hill Education.
- <http://docs.python.org/3/tutorial/index.htm>

# ***SEMESTER-I***

## **SEC-I**

**Course Title : Computer Application**

**Course Code : SEC-CSC-1.1**

**Nature of Course : SEC**

**Total Credits : 3**

**Distribution of Marks : 50 (Theory)+25(Practical)**

### **1. Course objectives:**

After going through the course the students will learn

- Install and use Microsoft Office and Libre Office software for various tasks.
- Format documents, create tables, and use drawing tools to enhance their word processing skills.
- Create spreadsheets, use basic formulas and functions, macros, and pivot tables to analyze data.
- Create effective presentations by adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide shows, using transitions, animations.
- Use cloud-based office automation tools and understand the advantages of using such tools in their work.

### **2. Prerequisites: NIL**

### **3. Theory Credit: 2**

### **4. Practical Credit:1**

### **5. No of Hours:**

a) Theory: 30 hrs

b) Practical: 45 hrs (Including Internal- 20 hrs)

### **Unit 1:**

**( 12 hrs)**

**Word Processing:**Introduction to Word processing, Word processing Concepts, Use of Templates, Working with Word Document: Editing Text, Find and Replace Text, Formatting, Spell Check, Auto Correct, Auto text; Bullets & Numbering, Tabs, Paragraph Formatting, Indent, Page Formatting, Header and Footer, Tables: Inserting, Filling and Formatting a Table, Inserting Pictures and Video, Mail Merge: Including Linking Database; Printing Documents.

**Unit 2:****(8 hrs)**

**Preparing Presentations:** Basics of Presentations: Slides, Fonts, Drawing, Editings; Inserting: Images, Texts, Symbols, Media; Design; Transition; Animation; and Slideshow.

**Unit 3:****( 10 hrs)**

**Spreadsheet and its Business Applications:** Spreadsheet Concepts, Managing Worksheets; Formatting, Entering Data, Editing, and Printing a Worksheet; Handling Operators in Formula, Project Involving Multiple Spreadsheets, Organizing Charts and Graphs.

Generally used Spreadsheet Functions: Mathematical, Statistical, Financial, Logical, Date and Time, lookup and Reference, Database and Text Functions.

**Practical:**

- Preparation of MS Word Document with various features (font, size, etc)
- Preparation of MS Excel Document with various features
- Preparation of PowerPoint Presentation.

**List of Books:**

- SushilaM , Introduction to Essential tools,JBA.
- Wang, W. (2018). Office 2019 For Dummies. United States: Wiley.
- Kumar, B. (2017). Mastering MS Office. India: V&S Publishers.
- Kumar A, (2019) Computer Basics with Office Automation, Dreamtech Press, ISBN: 9789389447194, 9789389447194.

# ***SEMESTER-II***

## **CORE COURSE(MAJOR)**

**Course Title : DATABASE MANAGEMENT SYSTEM**

**Course Code : MAJ-CSC-2.1**

**Nature of Course : Major**

**Total Credits : 4**

**Distribution of Marks : 60 (End -Sem) +15 (Sessional)+25(Practical)**

### **1. Course objectives:**

After the completion of this course, the learner will be able to:

- Database Management Systems and their characteristics.
- The concept of Conceptual Data Modeling using Entities and Relationships.
- Instruction of the Relational Model and its concepts, constraints, and update operations.
- Database design techniques using ER and EER to relational mapping, functional dependencies, and normal forms.
- Will be familiar with SQL and its data definition, constraints, retrieval queries, and data manipulation statements.

### **2. Prerequisites:**NIL

### **3. Theory Credit:**3

### **4. Practical Credit:** 1

### **5. No of Hours:**

a) Theory: 60 hrs

b) Practical: 40 hrs (Including Internal- 20 hrs)

## **UNIT-1: (10 hrs)**

**Introduction to Database Management Systems:**Characteristics of database approach, data models, DBMS architecture and data independence. Advantages of using the DBMS approach.

## **UNIT-2 : (15 hrs)**

**Conceptual Data Modelling using Entities and Relationships:**Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization.

### **UNIT 3:**

**(15 hrs)**

**Relational Model:**Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations.

### **UNIT 4:**

**(10 hrs)**

**Database design:**ER and EER to relational mapping, functional dependencies, normal forms up to third normal form.

### **UNIT 5:**

**(10 hrs)**

**SQL:**SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.

## **Practical:**

**The following concepts must be introduced to the students:**

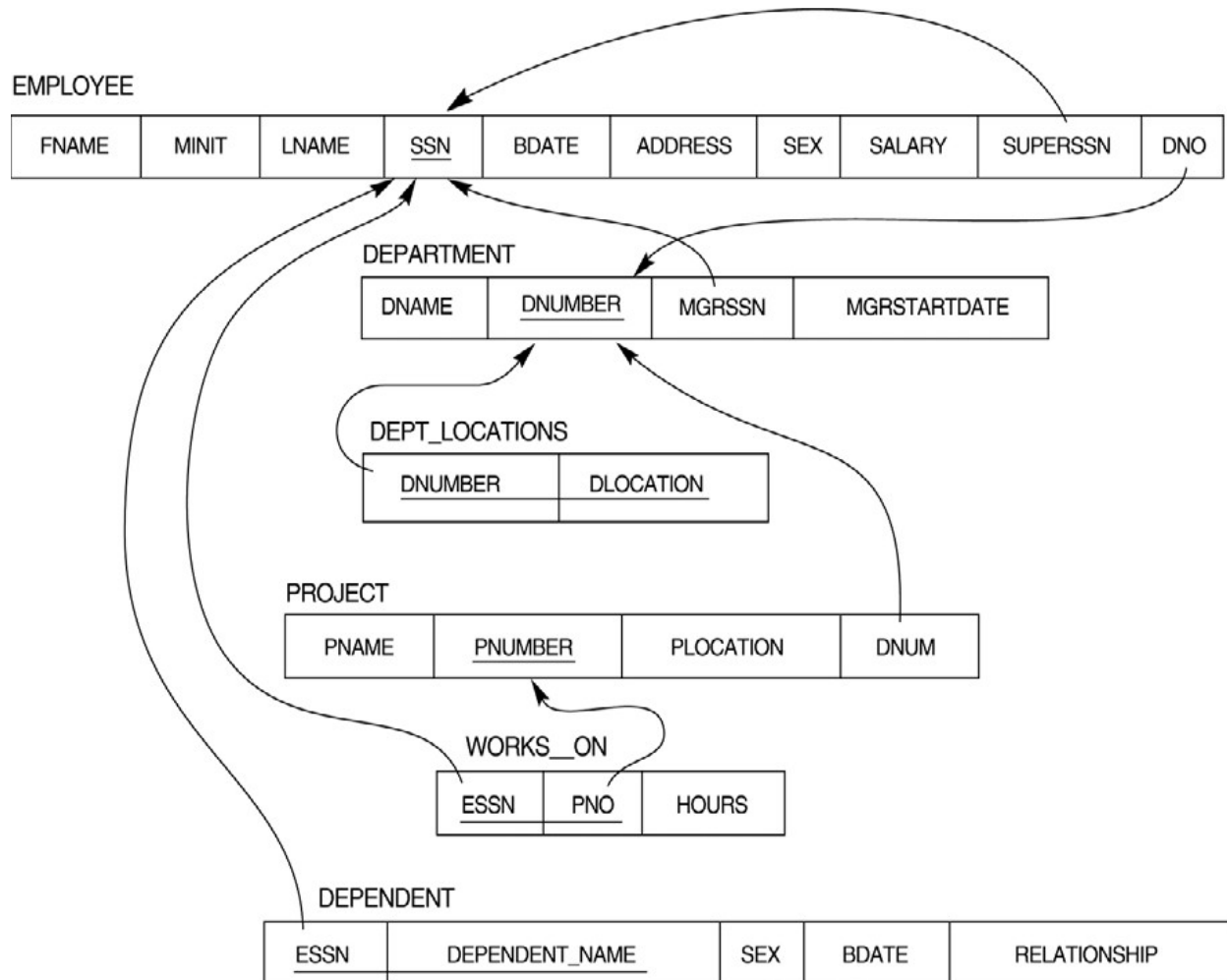
### **DDL Commands**

- Create table, alter table, drop table

### **DML Commands**

- Select , update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or,not,=,<>, >, <, >=, <=)
- Arithmetic operators and aggregate functions(Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, notexists, union, intersect, minus, etc.)
- Categorization using group by.....having
- Arranging using order by

# Relational Database Schema – COMPANY



## Questions to be performed on above schema

- I. Create tables with relevant foreign key constraints
- II. Populate the tables with data
- III. Perform the following queries on the database :
  1. Display all the details of all employees working in the company.
  2. Display ssn, lname, fname, address of employees who work in department no 7.
  3. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
  4. Retrieve the name and salary of every employee
  5. Retrieve all distinct salary values
  6. Retrieve all employee names whose address is in 'Bellaire'
  7. Retrieve all employees who were born during the 1950s



8. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
9. Retrieve the names of all employees who do not have supervisors
10. Retrieve SSN and department name for all employees
11. Retrieve all combinations of Employee Name and Department Name
12. Select the names of employees whose salary does not match with salary of any employee in department 10.
13. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.
14. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
15. For each department, retrieve the department number, the number of employees in the department, and their average salary.
16. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
17. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively.
18. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.
19. Delete all dependents of employee whose ssn is '123456789'.
20. Perform a query using alter command to drop/add field and a constraint in Employee table.

### **List of Books:**

- R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2016.
- R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Mc Graw Hill , 2018
- A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2019.

# ***SEMESTER-II***

## **SEC-II**

**Course Title : HTML Programming**

**Course Code : SEC-CSC-2.1**

**Nature of Course : SEC**

**Total Credits : 3**

**Distribution of Marks : 50 (Theory)+25(Practical)**

### **1. Course Objective:**

After the completion of this course, the learner will be able to:

- Understand the history and importance of HTML.
- Write HTML code and view HTML webpages using appropriate software.
- Use HTML tags and attributes to create effective webpages.
- Format webpages using basic HTML tags, formatting tags, and color coding.
- Use HTML lists, images, hyperlinks, tables, forms, and headers to enhance their webpages.

**2. Prerequisites:**NIL

**3. Theory Credit:** 2

**4. Practical Credit:**1

**5. No of Hours:**

a) Theory: 30 hrs

b) Practical: 45 hrs (Including Internal- 15 hrs)

**Unit 1 :** **(8 hrs)**

**Introduction:**History of HTML, Software required for writing HTML code and viewing HTMLwebpage, HTML Tags and Attributes: HTML Tag vs. Element, HTML Attributes.

**Unit 2 :** **(8 hrs)**

**HTML-Basic Formatting Tags:**HTML Basic Tags, HTML Formatting Tags, HTML Color Coding, HTML-Grouping Using Div Span, Div and Span Tags for Grouping.

**Unit 3:** **(6 hrs)**

**HTML-Lists:**Unordered Lists, Ordered Lists, Definition list.

**HTML-Images:**Image and Image Mapping.

**HTML-Hyperlink:** URL-Uniform Resource Locator, URL Encoding.

**Unit 4 :**

**(8 hrs)**

**HTML-Table:**< table >,<th>,< tr >,< td >,< caption>  
,<thead>,<tbody>,<tfoot>,<colgroup>,<col >

**HTML-Form:**< input > , <textarea>, < button > , < select > , < label >

**HTML-Headers:**Title, Base,Link, Styles, Script, Meta

**Practical:**

- Create an HTML document with the following formatting options:
  - Bold
  - Italics
  - Underline
  - Headings (Using H1 to H6 heading styles)
  - Font (Type, Size and Color)
  - Background (Colored background/Image in background)
  - Paragraph
  - Line Break
  - Horizontal Rule
  - Pre Tag
- Create an HTML document which consists of:
  - Ordered List
  - Unordered List
  - Nested list
  - Image
- Create an HTML document which implements Internal linking as well as External

Linking.

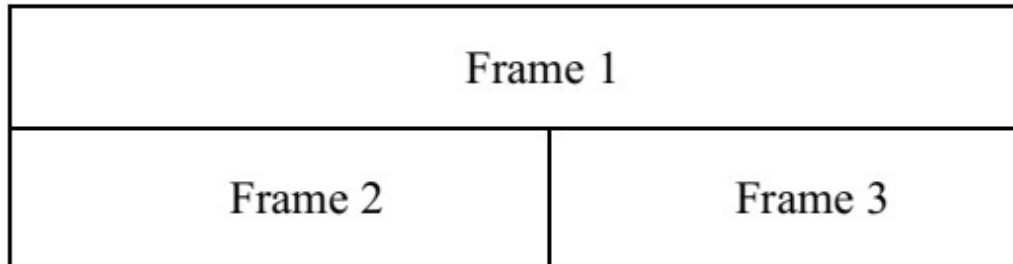
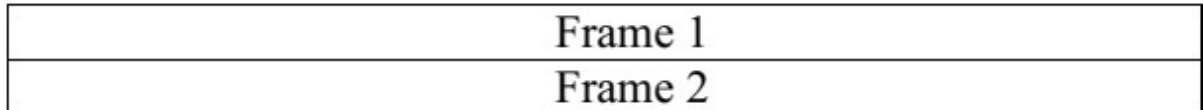
- Create a table using HTML which consists of columns for Roll No., Student's name and grade.

Result		
Roll No	Name	Grade

- Create a Table with the following view:

				Place an Image Here

- Create a form using HTML to collect personal information.
  
- Create HTML documents (having multiple frames) in the following three formats:



### List of Books:

- Huddleston, R. (2018), Introduction to HTML and CSS -- O'Reilly.
- Jon Duckett (2019), HTML and CSS, John Wiley.
- Minnick, J. (2015). Web Design with HTML5 and CSS3 (8th Edition). Cengage Learning.
- James P. (2011), Professional Mobile Web Development with WordPress, Joomla! and Drupal, Wiley Publications, ISBN: 978-0-470-88951-0