COMPUTER SCIENCE
GRADE-XII

Full Marks: 100 (75T + 25P)
Teaching Hours: 150

Course Contents:

Unit 1 System Development Concept **(15 hrs)**

1.1. Introduction: System, Information System
1.2. Types of Information System Unit 1.1.1 and Unit 1.1.2: 1 hr)
1.3. System Analyst – roles, responsibilities and characteristics. (1 hr)
1.4. System development Life Cycle (SDLC)
1.5. Importance and the necessity of SDLC Unit 1.1.4 and Unit 1.1.5: 3 hrs
1.6. System Development Models: Waterfall, Prototype, Spiral (2 hrs)
1.7. System Development Phase (2 hrs)
1.7.1.System Study
1.7.2.System Analysis
1.7.3.Feasibility Study: Technical, Economical, Operational
1.7.4.System Design
1.7.5.System Development
1.7.6.System Testing
1.7.7.Implementation
1.7.8.Maintenance and Reviews
1.8 System Design Tools (Context Diagram, DFD, E-R Diagram, System Flow Chart, Decision Table, Decision Tree, Use Case, UML) (3 hrs)
1.9 Case Study (3 hrs)

Unit 2 Database

2.2.1 Database Concept (15 hrs)

2.1.1 Introduction: Data, Information, Database and DBMS
2.1.2 Objectives of DBMS (Unit 2.1.1 and Unit 2.1.2: 3 hrs)
2.1.3 Database Model: Relational Model, Network Model, Hierarchical Model, Entity Relational Data Model (4 hrs)
2.1.4 Concept of Normalization
2.1.5 Types of Normalization 1NF, 2NF, 3NF (Unit 2.1.4 and Unit 2.1.5: 4 hrs)
2.1.6 Structured Query Language (2 hr)
2.1.7 Centralized Vs. Distributed Database (2 hrs)
2.1.8 Data Security. (1 hr)

2.2 Design Database using DBMS Software **(15 hrs)**

2.2.1 Create a Database
2.2.2 Create Tables and Fields and its properties(Unit 2.2.1 and Unit 2.2.2: 4 hrs)
2.2.3 Create a Relational Databases (2 hrs)
2.2.4 Create and Run Queries (4 hrs)
2.2.5 Working with Forms
2.2.6 Generate Reports (Unit 2.2.5 and Unit 2.2.6: 4 hrs)
2.2.7 Formatting Forms and Reports (1 hr)

2.3 Project Work on DBMS Software

Unit 3 Communication and Networking (15 hrs)

3.1. Introduction: Definition, Purpose of networking

3.2. Analog and Digital Signal, Modulation(AM, FM, PM) (Unit 3.1 and Unit 3.2: 1 hr)
3.3. Direction of communication flow(Simplex, Duplex,) (0.5 hr)
3.4. Types of Network: Peer-to-peer and Client/Server, LAN, MAN and WAN
3.5. LAN Topologies :Bus, Star, Ring, Tree, Mesh Topologies (Its definition, structure, advantages & disadvantages) (Unit 3.4 and Unit 3.5: 3 hrs)
3.6. Transmission Media: Bound Media (Coaxial Cable, Twisted Pair cable and Optical Fiber Cable – its description, structure, advantages and disadvantages), Unbound Media (Satellite, Wireless Media, Microwave Transmission)(3 hrs)
3.7. Network Connecting Device: Modem, NIC, Switch / Hub, Router, Gateway, Repeater, Bluetooth, IR, WiFi (2 hrs)
3.8. OSI Reference Model – Layer wise use and function (2 hrs)
3.9. Communication Protocol: TCP/IP, SMTP, POP3, FTP, Telnet protocol (2.5 hrs)
3.10. Demonstration of Communication Media and Connecting Devices (1 hr)

Unit 4 Programming in C (30 hrs)

4.1 Introduction: **(2 hrs)**
4.1.1 Overview, History, Features, Advantages and Disadvantages of C Language.**(1 hr)**
4.1.2 Structure of C program.
4.1.3 Compiling Process.
4.1.4 C Preprocessor and Header Files (Unit 4.1.2 and Unit 4.1.4: 1 hr)
4.2 Fundamentals of C **(2 hrs)**
4.2.1 Character Set used in C
4.2.2 Use of Comments
4.2.3 Identifiers and Keywords
4.2.4 Data Types in C
4.2.5 Constants and Variables
4.2.6 Type of Specifier
4.2.7 Statements – Simple and Compound Statements
4.3 Operators and Expressions
4.3.1 Operators
4.3.2 Expressions
4.3.3 Type Casting and Conversions
4.3.4 Introduction to Library Functions
4.4 Input/Output (I/O) Functions (Unit 4.3 and Unit 4..4: 1 hr)
4.5 Control Structures **(6 hrs)**
4.5.1 Decisions (if, if else, else if, switch, ? operator)
4.5.2 Looping (while, do, for)
4.6 Array and String **(4 hrs)**
4.6.1 Definition of array and string
4.6.2 Types of Array – One-Dimensional and Two-Dimensional(definition, declaration, and initialization.)
4.6.3 String Function : strlen(), strcat(), strcmp(), strrev(), strcpy(), strlwr() , strupr()
4.7 Functions **(6 hrs)**
4.7.1 Concept of Function, function definition, function prototype.
4.7.2 Return and Void statements of a function
4.7.3 Accessing a Function – Function Call(by value, by reference)
4.7.4 Concept of Recursion
4.8 Structures and Unions **(3 hrs)**
4.8.1 Definition and Difference between Structure and Union.

4.8.2 Structure: Declaration, Initialization and Size of Structure.

4.9 Pointers **(2 hrs)**

4.9.1 Definition of Pointer

4.9.2 Address (&) and indirection (*) operator

4.9.3 Pointer Expression and Assignment

4.10 Working with Files **(4 hrs)**

4.11 Concept of Data File

4.12 Sequential and Random File

4.13 Opening, Reading, Writing and Appending on/from Data File

Unit 5 Object-Oriented Programming (OOP) (6 hrs)

5.1 Concept of OOP. (1 hr)

5.2 Features of OOP: Class, Object, Polymorphism and Inheritance. (3 hrs)

5.3 Application of OOP (1 hr)

5.4 Difference between OOP and Structured Programming Language (1 hr)

Unit 6 Information Communication Technology and Cyber Law (6hrs)

6.1 Social Impact of the ICT

6.2 Digital Divide (Unit 6.1 and Unit 6.2: 1 hr)

6.3 Computer Ethics

6.4 Intellectual Properties Right (Unit 6.3 and Unit 6.4: 1 hr)

6.5 Privacy, Anonymity

6.6 Computer Crime (Unit 6.5 and Unit 6.6: 1 hr)

6.7 Concept of Cyber Law

6.8 Area of Cyber Law (Unit 6.7 and Unit 6.8: 1 hr)

6.9 Cyber Law in Nepal (1 hr)

6.10 IT Policy in Nepal (1 hr)

Unit 7 Multimedia **(4 hrs)**

7.1 Introduction to Multimedia (0.5 hr)

7.2 Component of Multimedia : Text, Graphics, Audio, Video and Animation (1 hr)

7.3 Application of Multimedia (2.5 hrs)

Unit 8 Artificial Intelligence **(3 hrs)**

8.1 Concept of AI

8.2 Component of AI (Unit 8.1 and Unit 8.2: 2 hrs)

8.3 Uses of AI

8.4 Ethical Aspect of AI (Unit 8.3 and Unit 8.4: 1 hr)

Unit 9 Contemporary Technology **(8 hrs)**

9.1 e- Business

9.2 e-Learning

9.3 e-Governances

9.4 e-Medicine (Unit 9.1 to Unit 9.4: 5 hrs)

9.5 Virtual Reality (2 hrs)

9.6 Robotics (1 hr)

Unit 10 Final Project Work

10.1 Project Synopsis of the Project

10.2 Project Development using C Programming

10.3 Project Report

(Project should be assigned to individual students.)

V. Instructional Materials:

- To be guided by Teaching Manual

VI. Instructional Techniques:

- To be guided by Teaching Manual

VII. Evaluation Schemes

a) Theory Evaluation:

- Short Question
- Long Question
- Short Notes

Theory Questions are guided by marks distribution and model question

b) Practical Evaluation:

S. No.	Unit	Topics	No of Exercise	Mini Projects Evaluation	Remarks
1	2.2	Database Management System	10	10	Practical Marks Evaluated By: External Examiner: 10 Internal Examiner: 15 Based on Mini Project, Lab Exercise and Final Project
2	3.10	Networking	2	-	
3	4	C programming Language	30	15	
4	10	Final Project			

Lab Exercises are guided by marks distribution and Teaching Manual.

VIII. Marks and hours distribution

Unit	Mark Distribution		Number of Hours	
	Theory	Practical	Theory	Practical
1	10		15	
2	15	10	15	15
3	10		15	3
4	25	15	30	30
5	3		6	
6	3		6	
7	3		4	
8	2		3	
9	4		8	
10				
Total	75	25	102	48

IX. Reference Books:

- Gurung J.B, Baskota A, Baral D.S., Baral D., Niroula R., Dhakal, T.P., *A Text Book on Computer Science Part-B,* Bhundipuran Parkasan , Kathmandu
- Subba B.R., *Computer Science Class-XII,* Taleju Parkasan, Kathmandu
- Baral D.S., Baral D., Ghimire S.K., *The Secretes of C Programming Language* , Bhundipuran Parkasan , Kathmandu, 2008
- Subba B.R., *Computer Programming,* Taleju Parkasan, Kathmandu
- Khanal R. C , *Computer Concept for Class XII,* Ekata Publication, Kathmandu, 2007

- E. Balaguruswamy, *Programming in ANSI C, Second Edition*, Tata McGraw Hill Publishing Company, 2000.
- B.S. Gottfried, *Schaum's Outline Series for Programming with C, Second Edition,* Tata McGraw Hill Publishing Company, 2001..
- Yashavant P. Kanetkar, *Let Us C E/D*, BPB Publications, 2008
- URL: *http://en.wikipedia.org/*

HSEB
Computer Science-Grade XII
Model Questions

Full Marks: 75
Pass Marks: 27
Time: 3 Hrs.

Candidates are required to give their answers in their own words as far as practicabl
the margin indicate full marks.

Group – A
(Long Answer Questions)

Attempt any Four Questions *[4x10=40]*

1. What is Entity-Relationship Data Model? Give an ER-diagram for a database showing fatherhood, motherhood and spouse relationship among men and women. [4+6]

2. The rate of interest offered by a bank on fixed deposit:
   i) Period < 6 month 5%
   ii) Period 6 to 12 month 6%
   iii) Above 1 year 10%
   Write a flowchart and program using C language to calculate monthly interest of customer. [3+7]

3 Write a program that reads several different names and addresses into the computer, rearrange the names into alphabetical order. Make use of structure variables. [10]

4. Write a program that will read successive records from the new data file and display each record on the screen in an appropriately formatted form. [10]

5. Write a program with function and input menu from keyboard & activate these functions:
   i) print a circle()
   ii) reverse string() [10]

Group – B
(Short Answer Questions)

Attempt any Seven Questions *[7x5=35]*

6. What is feasibility study? Why feasibility study is important in system analysis phase?. Explain. [2+3]
7. What are the different types of LAN topology? Write merits and demerits of Star Topology. [2+3]

8. Write short notes on (any two): [2.5+2.5]
   (a) Coaxial Cable (b) Fiber-Optic Cable (c) Switch
9. Differentiate between array and structure with suitable examples. [2.5+2.5]
10. What do you mean by parameter "Passing by value" and "Passing by reference" in C? Explain with suitable example. [2.5+2.5]
11. Explain the terms Polymorphism and Inheritance. [2.5+2.5]
12. Describe the limitations of using *getchar()* and *putchar()* functions for reading strings. [2.5+2.5]
13. What do you understand by AI? How it may effect the society? [3+2]
14. Write short notes on (any two): [2.5+2.5]
   (a) Cyber Law (b) Normalization (c) Context Diagram