



Far Western University
Faculty of Education
Bachelor in Computer Science Education

Course Title: Fundamental of Computer and Information System

Course No.: CS.Ed.111

Nature of the Course: Theory and Practical

Level: B.Ed. First Semester

Total Number of practical Periods 15 (2 hours per period)

Full Marks: 100

Pass Marks: 45

Theory Period Per Week: 3

Total Periods: 45+15

1. Course Introduction

The idea behind this course is to explore various different ways in which information technology and Information Systems relates to system automation and goals in an organizational context, given the increasing inter-relationship between these two in today's global world. The course aims to acquaint the students with basic concepts of Computer Fundamental and Information Technology Theory and Practical. The course incorporates nine units. The first two unit's deals with the introductory part of Computer System. The Third unit concerns with practical aspects of Office Automation tools such as Word Processor, Spreadsheet, Database and Presentation. Unit four discuss the Information system and its roles in an organizations and education. Unit five introduce the Number System and concept of codes in computer system. The sixth unit deals with Telecommunication and Computer Network. The seventh unit discuss the Database Management System and its roles in organizations. The eighth unit introduce the Internet and modern computing trends. The ninth unit discuss the security threats and solutions.

2. General Objectives

The main objective to this course is to introduce the students with different aspects of Information Technology and Computer System for the easy of transaction processing in an organization. The other objectives of this course are as follows

- a) To know the fundamentals of computers
- b) To understand how to use computer applications in day to day operations
- c) Assess and explain global issues surrounding the adoption of information technology
- d) To understand how to use Information Systems in an Organizations
- e) To understand to how to use Network, Internet and other recent trends in business
- f) To gain the knowledge of computer security techniques and threat

3. Contents in Detail with Specific Objectives

Specific Objectives	Contents
<ul style="list-style-type: none">Describe about the computer and its characteristics.List the major parts of computer and computer system.Discuss the types of computers.Provide examples of input and output devices.Introduce the measurement units of computer memories and storages.	<p>UNIT I: Fundamental of Computer (5)</p> <p>1.1 Computer system concepts, Computer system characteristics, Capabilities and limitations, History of Computer , Generations of computers</p> <p>1.2 Types of computers (work, size, brand & model),</p> <p>1.3 Basic components of a computer system – CPU (CU, ALU, RA), Input/ Output Devices and characteristics and memory (Primary (RAM, ROM, Cache) and secondary Memory).</p>

<ul style="list-style-type: none"> • Describe two main categories of computer software. • List the specific types of application software and uses • List the major types of operating system and its functions • List all the major PC operating system • Demonstrates the types of programming languages 	<p>UNIT 2: Computer Software and Classification (4)</p> <p>2.1 Software and its Need, Types of Software - System software and Application software.</p> <p>2.2 System Software - Operating System, Language Processor (Compiler, Interpreter and Assembler) Utility software.</p> <p>2.3 Types and Functions of Operating System, files & directory structure and its naming rules, booting process.</p> <p>2.4 Programming languages and Types: Low level (Machine and Assembly), High (Procedural and problem oriented) and Natural Language and their merits and demerits.</p>
<ul style="list-style-type: none"> • • Identify basic word processing tools and simplify document editing. • Identify special features commonly found in modern word processor such as editing, formatting, mail merging etc. • Describe some financial, statistical, logical and mathematical formulas used in spreadsheet. • Define and differentiate the terms worksheet and spreadsheet. • List the types of data analysis tools commonly found in spreadsheet and describe their uses. • Discuss about formatting and printing graphs in spreadsheet • Describe the basic purpose of presentation program. • Explain process of creating a presentation slides. • Discuss the working mechanism of slide template and master slide 	<p>UNIT 3: Office Automation Software (7)</p> <p>3.1 Introduction</p> <p>3.2 Word processor</p> <p>3.2.1 Characteristics of word processor</p> <p>3.2.2 Creating and formatting documents</p> <p>3.2.3 Managing page number, header and footer</p> <p>3.2.4 Proofing a documents</p> <p>3.2.5 Inserting Object from other applications</p> <p>3.2.6 Mail merge, Macro, hyper link</p> <p>3.2.7 Inserting table and other objects</p> <p>3.2.8 Inserting citation in APA and other formats</p> <p>3.3 Spreadsheet Application and characteristics</p> <p>3.3.1 Creating, formatting and printing worksheets</p> <p>3.3.2 Working with mathematical, logical, financial and statistical functions.</p> <p>3.3.3 Creating, formatting and printing graphs</p> <p>3.4 Presentation Software and its Characteristics</p> <p>3.4.1 Creating presentation</p> <p>3.4.2 Working on design, animation and slide transition</p> <p>3.4.3 Working on template of slide</p> <p>3.4.4 Working and master slide</p>
<ul style="list-style-type: none"> • Introduce the concept of information system • Explain the types of information system • Explain the roles of information system in an organization • Differentiate between computer and manual information system 	<p>Unit 4: Information System (5)</p> <p>4.1 Introduction to Information System</p> <p>4.2 Terminologies in IS: Data, Information and Knowledge</p> <p>4.3 Activities in IS: Inputting, Processing, Storing, Outputting and feed back</p> <p>4.4 Components of Information System</p> <p>4.5 Computer Based Information System and Components</p> <p>4.6 Roles of Information System in an organization</p> <p>4.7 Types of Information Systems (TPS, MIS, DSS, ESS)</p>

<ul style="list-style-type: none"> • Explain why knowledge of number systems and its important in computing. • Give examples to illustrate number system conversion • To illustrate the basic concept of codes used in computer 	<p>Unit 5: Number System and Their Conversion (3)</p> <p>5.1 Binary. Octal, Decimal, Hexadecimal Number System & conversion</p> <p>5.2 Calculation in Binary – addition, subtraction</p> <p>5.3 Introduction to EBCDIC, ASCII, and Unicode</p> <p>Unit Case Study</p>
<ul style="list-style-type: none"> • Describe the benefits of using a network. • Identify the media and topologies commonly used in networks. • Describe different network components. • Illustrate the uses of network operating system. • Explain how computer data travels over telephone line • Explain the importance of Telecommunication in modern business process. • Explain different types of computer network 	<p>UNIT 6: Telecommunication and Computer Network (6)</p> <p>6.1 Introduction Computer Network and Telecommunication</p> <p>6.2 Communication Process(model).</p> <p>6.3 Mode of Communication (Simplex, Half Duplex, Full Duplex),</p> <p>6.4 Types of Computer Network (Based on Geographical area and Architecture)</p> <p>6.5 Network Topology and Types: Bus, Ring, Star, Tree, Mesh and Hybrid with merits and demerits.</p> <p>6.6 Types Transmission Media(Channel): Wired and Wireless</p> <p>6.7 Networking Connecting Devices (Switch, Router, Hub, Bridge, NIC)</p> <p>6.8 business value of Telecommunications.</p> <p>6.9 Telecommunication Systems in Nepal.</p>
<ul style="list-style-type: none"> • Explain the importance of implementing data resource management process and technologies in an organization • Explain how database management software helps business professionals and supports the operations and management of a business • Provide examples to illustrate each of the following concepts: <ul style="list-style-type: none"> ○ Major types of database ○ Data warehouse and data mining ○ Fundamental database structure ○ Database Development 	<p>UNIT 7: Database Management System (7)</p> <p>7.1 Introduction to Database</p> <p>7.2 Application of Database and Database Management System</p> <p>7.3 Advantages of DBMS over File System</p> <p>7.4 Types of Database: Centralized, Distributed, Operational, Hypermedia and Analytical)</p> <p>7.5 Concepts of keys in DBMS (Primary and foreign)</p> <p>7.6 Creating Database on MS-Access</p> <p>7.7 Introduction to Data Warehouse and Data -Mining</p>
<ul style="list-style-type: none"> • Describe history of Internet and its uses. • Introduce technical term used in internet. • Describe different contemporary approaches. • Describe the basic of e-Commerce, its advantages and 	<p>UNIT 8: Internet Web and Current Trends in Computing (4)</p> <p>8.1 Introduction and History of Internet</p> <p>8.2 Internet Terminologies: Client, server, browser, web page, web site, search engine, URL, DNS, IP address</p> <p>8.3 Services Provided by Internet</p> <p>8.4 Cloud Computing</p> <p>8.5 Green Computing</p>

<p>disadvantages.</p> <ul style="list-style-type: none"> • Compare the technology of e-commerce and m-commerce. • Discuss the basic concept of E-governance and its types. 	<p>8.6 Virtual Computing 8.8 Edge Computing 8.9 Big Data Analysis 8.10 Cyber Security 8.11 IOT 8.11 E-learning, E-Library, Tele-medicine 8.12 Introduction to e-commerce and m-commerce: Types and advantages 8.13 Introduction to E-governance and Types</p>
<ul style="list-style-type: none"> • Identify several ethical issues in how the use of IT in business affects employments individuality, working conditions, privacy, crime, health and solutions to societal problems. • Identify several types of security management strategies and defences and explain how they can be used to ensure the security for business applications of IT. 	<p>UNIT 9: Computer Security (4) 9.1 Introduction to Computer Security 9.2 Security threat and attacks: Viruses and worms, Hacking, cyber theft, cyber terrorism, unauthorized use at work, Piracy: Software and intellectual Property 9.3 Security Techniques: Cryptography, Digital Signature, Firewall, Antivirus, User Identification and Authentication, Intrusion Detection Systems)</p>

Note: The figures in the parentheses indicate the approximate periods for the respective units.

4. Methodology and Techniques

Modes of instruction: Lecture, seminar, exercise course, guided personal study, tutorial, independent study, project work, Assignments in different topics, group discussion, reflective writing

Types of learning activities: attending lectures, performing specific assignments, writing papers, independent and private study, reading books, journals and papers, providing constructive feedback, group study and peer discussion.

5. Evaluation Scheme

5.1 Internal Evaluation 40%

Internal Evaluation will be conducted by course teacher based on following activities.

- a) **Attendance and Participation in class activities:** **5+5= 10 marks**
- b) **Assignment I: Reflective Notes and Class presentation:** **5+5= 10 marks**
(Reflective notes on 2 to 4 questions given by teacher at the end of the every unit and presentation on any two questions among them)
- c) **Assignment II: one Term paper/ Essay/Project and Interview:** **5+5=10 marks**
(Logical essay/term paper/project on the topics chosen by students and approved by the teacher and interview)
- d) **Mid-term exam:** **10 marks**

5.2 External Evaluation (Final Examination) 40%

Office of the Controller of Examination will conduct final examination at the end of semester.

Types of questions	Total questions to be asked	Number of questions to be answered and marks allocated	Total marks
Group A: Multiple choice items	8 questions	8×1	8
Group B: Short answer questions	6 with 2 'or' questions	6×4	24
Group C: Long answer questions	1 with 1 'or' question	1×8	8

5.3 External Practical Evaluation (20%)

Office of the Controller of Examination will conduct final practical examination at the end of final examination.

After completing the end semester theoretical examination, practical examination will be held. External examiner will conduct the practical examination according to the following evaluation criteria. There will be an internal examiner to assist the external examiner. Three hours' time will be given for the practical examination. In this examination Students must demonstrate the knowledge of the subject matter.

Evaluation System

Practical	Weightage	Marks
Practical Report Copy	5	20
Viva	5	
Practical Exam	10	

Laboratory Work

Student should write programs, prepare lab sheet for each of the topics discussed in classes. Minimum 3 lab hour per week is required. Nature of programming problem can be decided by instructor.

Strict Notice: Each student must secure 40% marks with 80% attendance in internal evaluation in order to qualify the End-Term Examinations. Failing to get such score will be given NOT QUALIFIED (NQ) and the student will not be eligible to appear the End-Term examinations.

Prescribed Books

1. Norton, P. (2006). *Introduction to computers*. McGraw-Hill. (Unit I-IX)
2. Rajaraman, V. (2018). *Introduction to information technology*. Prentice-Hall of India. (Unit I-IX)
3. O'Brien, J. A. (2017). *Introduction to information system*. Tata Mc-Graw Hill. (Unit I-IX)

References

1. Turban, E., Rainer, R. K., & Potter, R. E. (2001). *Introduction to information technology*. John Wiley & Sons.
2. Bhatt, B.P., Chataut, G.P., & Bhatt, H.S. (2016 B.S.). *Fundamental of computer and information system*. Dreamland Publication.



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Course Title: Programming in C

Course No. CS. Ed. 112

Nature of the Course: Theory and Practical

Theory Period Per Week: 3

Total Number of practical period 15 (2 hours per period)

Level: B.Ed. First Semester

Full Marks: 100

Pass Marks: 45

Total Hours: 45+15

1. Course Introduction

This course is designed to develop acquaintance with fundamental concepts of program design and computer programming. The course starts with the basic concepts of algorithm and flow chart and also includes the concepts of C programming including data types, operators, control statements, arrays, functions, pointers, structures, unions, and data files and introduction to graphics.

2. General Objectives

On completion of this course, students will be able to develop their knowledge in program design and computer programming and they will be able to develop small to medium size computer programs using different concepts of C programming language.

3. Contents in Detail with Specific Objectives

Specific Objectives	Contents
<ul style="list-style-type: none">Describe program, programming language, its types, and generations.List out compilers and interpreters and their differences.Develop knowledge in program design tools like algorithms and flowcharts and able to write algorithms and draw flowcharts..	Unit One: Programming Preliminaries (3) 1.1. Introduction to Program and Programming Language 1.2. Compilation and execution 1.3. Debugging, testing and documentation 1.4. Program Design Tools (Algorithms and Flowcharts, Pseudocode)
<ul style="list-style-type: none">Introduce C programming and its basic structure.Write a simple program using C compiler.List different character set of C compiler.Describe identifiers and keywords and their differences.Give idea of basic data types, qualifiers, and conversion.Discuss variables and constants and their differences.Give the concept of different styles of writing comments.Introduce different types of operators, their precedence, and associativity.Describe different types of expressions and statements	Unit Two: C Fundamentals (4) 2.1. Introduction and Basic Structure of C 2.2. Writing a Simple C Program 2.3. The C Character Set 2.4. Identifiers and Keywords 2.5. Data Types 2.6. Variables and Constants 2.7. Writing Comments 2.8. Operators (arithmetic, relational, logical, assignment, ternary, bitwise, increment and decrement) 2.9. Expressions and statements 2.10. Operator precedence and associativity.
<ul style="list-style-type: none">List getchar() and putchar() functions for input and outputIntroduce to enter data using scanf function	Unit Three: Data Input and Output (3) 3.1. Single Character Input – The Getchar Function, Single Character Output – The

<ul style="list-style-type: none"> • Introduce to output data using printf function • Describe gets and puts functions for input and output 	Puchar Function 3.2. Entering Input Data – The Scanf Function 3.3. Writing Output Data – The Printf Function 3.4. The Gets and Puts Functions
<ul style="list-style-type: none"> • Develop knowledge about if statement and its types, and switch statement along with the flow chart and example • Illustration of different looping statements and their similarities and differences • Introduce different nested control statements • Describe use of break and continue statements 	Unit Four: Control Statements (5) 4.1 Branching Statements – If and Switch Statements 4.2 Looping Statements – For, While, and Do While Statements 4.3 Nested Control Statements 4.4 Jumping Statements: Goto , Break and Continue
<ul style="list-style-type: none"> • List the uses of functions along with function prototype, definition, and function call • Develop knowledge on advantages of using functions • Discuss different types of functions • Develop knowledge about recursive function and comparing it with non-recursive function • Introduce different storage classes like automatic, external, static • Develop knowledge about the preprocessor directives 	Unit Five: Functions (6) 5.1. Introduction, Function Prototype, Function Definition, and Function Call 5.2. Advantages of Using Function 5.3. Types of Functions – Library Function and User Defined Function 5.4. Recursive Function 5.5. Calling Convention (Call by value and call by reference) 5.6. Storage Classes 5.7. The Preprocessor - #include and #define
<ul style="list-style-type: none"> • Develop knowledge about arrays including array definition and its processing • Introduce how to pass arrays to functions • Develop knowledge about multidimensional arrays • Develop knowledge about strings and its processing 	Unit Six: Arrays (5) 6.1. Introductions of Array. 6.2. Types of an array (1-D, 2-D and Multi-dimensional) 6.3. Accessing array 6.4. Passing Arrays to Functions, 6.5. String handling functions
<ul style="list-style-type: none"> • Develop knowledge on pointers and its declaration • Discuss about pass pointers to functions • Comparing one dimensional array with pointer • Describe allocate memory dynamically • Develop knowledge about different operations on pointers • Comparing pointers with multidimensional arrays • Develop knowledge on arrays of pointers 	Unit Seven: Pointers (6) 7.1. Fundamentals and Pointer Declarations 7.2. Passing Pointers to a Functions 7.3. Pointers and One-dimensional Arrays 7.4. Dynamic Memory Allocation 7.5. Operations on Pointers 7.6. Pointers and Multi-Dimensional Arrays 7.7. Arrays of Pointers
<ul style="list-style-type: none"> • Develop knowledge about structures and know to process it • Discuss about typedef • Develop knowledge to use structures and pointers 	Unit Eight: Structures and Unions(5) 8.1. Defining and Processing Structure 8.2. User Defined Data Types (Typedef) 8.3. Array of structure, array with in structure and nesting of structure.

<ul style="list-style-type: none"> • Introduce how to pass structures to functions • Discuss about self-referential structures • Describe unions and its comparison with structure 	8.4. Structures and Pointers 8.5. Passing Structures to Functions 8.6. Self-referential Structures 8.7. Unions
<ul style="list-style-type: none"> • Develop knowledge about importance of file handling • Introduce about how to open and close data files • Discuss how to read and write data files • Describe processing a data file • Describe how to use unformatted data files and binary files 	Unit Nine: Data Files (5) 9.1. Introduction to Files 9.2. Modes of file 9.3. Opening and Closing a Data File 9.4. Reading and Writing a Data File 9.5. Processing a Data File 9.6. Unformatted Data Files and binary files
<ul style="list-style-type: none"> • Introduce graphics • Describe graphics modes • Implement graphics handling functions 	Unit Ten: Introduction to Graphics (3) 10.1 Introduction to Graphics. 10.2 Graphics Initialization and Mode 10.3 Graphics functions(Line , Circle ,Rectangle , Ellipse, Arc, Bar etc)

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2. Kelly, A., & Pohl, I. (1998). *A book on C: Programming in C* (4th ed.). Addison-Wesley Professional.
(Unit I-X)
3. Kernighan, B.W., & Ritchie, D.M. (1988). *The C programming language*. Pearson. (Unit I-X)