Course Code: CSI401
Course Name: Programming Methodology and Problem Solving on C
Credit Equivalent: 2 Credits (One credit is equivalent to 10 hours of lectures / organised classroom activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual / group work; obligatory / optional work placement; literature survey / library work; data collection / field work; writing of papers / projects / dissertation / thesis; seminars, etc.)

Course Objectives: The course is designed to

- The main purpose of this course is to introduce students with the Problem solving Analysis, Approach and Techniques using C Programming language. C being the rich source of built in functions and constructs will help students to write simple and complex programs.
- The students will be made aware about the concept of portability of C and its platform independenability, that is the C programs written for one computer can be executed on another with little or no modification.
- C is having the ability to extend itself. Thus students can continuously add their own functions to C library.
- Further as the course will continue the students will be introduced and taught many more concepts, features and programming skills in C.

Attendance Requirement:
Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:
1. Mid Term Examination: 25%
2. End Term Examination: 50%
3. Continuous Internal Assessment: 25%
   - i)   Assignment   15%
   - ii)   Class Participation   5%
   - ii)   Class tests   5%

Course Contents:

Unit-I: **(4 Hours)**
Introductory Concepts - Introduction to Computers, What is a Computer, Block Diagram of Computer, Computer Characteristics, Hardware vs Software, How to Develop a Program, Software Development Life Cycle, Structured Programming, Modes of Operation, Types of Programming Languages, Introduction to C, Desirable Program Characteristics, History of

C, Importance of C, Basic Structure of C Programs, Programming Style, Executing a 'C' Program.

Unit II: (4 Hours)

Constants, Variables, Data Types and Operators – Introduction, Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Declaration of Storage Class, Assigning Values to Variables, Defining Symbolic Constants, Declaring a Variable as Constant. Types of Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversion in Expressions, Operator Precedence and Associativity.

Unit-III: (4 Hours)

Decision Making and Branching – Introduction, Decision making with if Statement, if else statement, nesting of if statement, if else if else construct, switch statement, The ?: Operator, goto Statement.

Unit IV: (4 Hours)

Decision Making and Looping – Introduction, The while statement, do while statement, for statement, nested loops, Jumps in loops. Introduction to arrays, Single and Multi-dimensional arrays.

Unit-V: (4 Hours)

Character Arrays and Strings – Introduction to character input, various inbuilt functions for inputting a character, Declaring and initializing string variables, Reading strings from terminal, Writing string to screen, Putting string together, Comparison of two strings, String handling functions.

Prescribed Text Books:

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill.
2. Byron Gottfried, "Programming with C", Schaum's Outlines, Tata McGraw Hill.

Suggested Additional Reading:

1. Yashwant Kanetakar, "Let us C" BPB.
2. Kerninghan B.W. & Ritchie D.M. "The C Programming Language" Prentice-Hall.
3. Mullish Cooper, "The Spirit of C" Jaico Publishing House.

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

PO BOX: 21, DHARAMSHALA, DISTRICT KANGRA – 176215, HIMACHAL PRADESH

Website: www.cuhimachal.ac.in

Course Code: CSI 406 A

Course Name: Fundamentals of ICT

Faculty: Mr. Satish Sood

Credits Equivalent: 4 Credits (One credit is equivalent to 10 hours of lectures / organised classroom activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual/ group work; obligatory/ optional work placement; literature survey/ library work; data collection/ field work; writing of papers/ projects/dissertation/thesis; seminars, etc.)

Course Objectives:

- Knowledge of Basic Computing Concepts.
- Identifying the functions of Input & Output Devices.
- To understand the concept of Computer Software.
- In general, develop an intuitive sense of how computers work and how they can be used to make your work more efficient.

Attendance Requirements:

Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:

1. Mid Term Examination: 25%
2. End Term Examination: 50%
3. Continuous Internal Assessment : 25%
   - i.   Assignment: 15%
   - ii.   Surprise Test: 10%

Course Content:

UNIT - I:

Introduction: Computer, Data Processing, Computer System Characteristics, Evolution of Computers, Capabilities and Limitations, Generations of computers, Block diagram of computer, Basic components of a computer system- Input unit, Output unit, Storage unit, ALU, Control unit, Central Processing unit; Number Systems- Non-positional number system, Positional number system, Decimal Number system, Binary number system, Octal number system, Hexadecimal number system.

UNIT - II:

Memory: Main memory organization, Main memory capacity, RAM, ROM, PROM, EPROM, Cache Memory, Secondary storage devices: Sequential access devices- Magnetic tape; Direct access devices- Magnetic disks, Floppy disks, Optical disks, Types of Optical disks: CD-ROM, CD-R, CD-RW, DVD.

UNIT - III:

Input devices: Keyboard, Pointing Devices-Mouse, Touch screens, Joystick, Electronic pen, Trackball, Scanning devices: Optical Scanners, OCR, OMR, Bar code reader, MICR, Electronic card reader, Image capturing devices, Digital cameras.

Output devices: Monitors- CRT, LCD, Printers-Dot matrix, Inkjet, Laser; Plotters, Screen image projector.

UNIT - IV:

Introduction: Software, Relationship between Hardware and Software, Types of Software-System Software, Application Software; System Software-Operating System, Utility Program; Programming Languages-Machine, Assembly, High Level; Assembler, Compiler, Interpreter.

UNIT - V:

Data Communication & Computer Networks, Basic elements of a communication system, Data Transmission modes-Simplex, Half duplex, Full duplex; Data Transmission speed-Narrowband, Voice band, Broadband; Data Transmission media-Twisted Pair Wire, Coaxial cable, Optical fibers; Modems, Types of Network-LAN, WAN, MAN; Internet, World Wide Web, Web Browsers.

Prescribed Text Book:

3. Pradeep K. Sinha, Priti Sinha, "Computer Fundamentals", BPB Publications.

Suggested Additional Reading:

4. Rajaraman, V., "Fundamental of Computers", Fifth Edition, Prentice Hall India, New Delhi.

5. E. Balagurusamy, "Introduction to Computers (Special Indian Edition)", Tata McGraw Hill.

Central University of Himachal Pradesh

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PO BOX: 21, DHARAMSHALA, DISTRICT KANGRA – 176215, HIMACHAL PRADESH

Course Code: CSI407A

Course Name: LAB- C

Credit Equivalent: 2 Credits (One credit is equivalent to 10 hours of lectures / organised classroom activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual / group work; obligatory / optional work placement; literature survey / library work; data collection / field work; writing of papers / projects / dissertation / thesis; seminars, etc.)

Course Objectives: The course is designed to

*   The main purpose of this course is to introduce students with the Problem solving Analysis, Approach and Techniques using C Programming language. C being the rich source of built in functions and constructs will help students to write simple and complex programs.
*   The students will be made aware about the concept of portability of C that is the C programs written for one computer can be executed on another with little or no modification.
*   C is having the ability to extend itself. Thus students can continuously add their own functions to C library.
*   Further as the course will continue the students will be introduced and taught many more concepts, features and programming skills in C.

Attendance Requirement:

Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:

4. Mid Term Examination: 25%
5. End Term Examination: 50%
6. Continuous Internal Assessment: 25%

iii)   Lab Assignment   15%
ii)   Class Participation   5%
iv)   Class tests   5%

Course Contents:

Unit-I: **5 Hrs**

algorithm, flowcharts, Pseudo code and Decision table.
General Structure of C Program, C compilers, Editing, Compiling & , Running of a C program Data types, Constants and Variables, Operators and expressions, Storage Classes, Different types of expressions and their Evaluation, Conditional Expression, Assignment statement, Enumerated data type, Redefining/ Creating data types, Library functions, Type casting.

Unit II: **5 Hrs**

Input/Output- Unformatted and formatted I/O Functions.
Control Statements- Decision making using if, if-else, elseif and switch statements, Looping using for, while and do-while statements, Transferring Program controlling break and continue statements
Functions- Defining a function, Local variables, return statement, invoking a Function, specifying and passing arguments to a function, Functions returning non Integer, External, static, and register variable, block structure, initialization and recursion.

Unit-III: **5Hrs**

Array & strings- Introduction to arrays, Declaring arrays, Initializing, arrays, Processing arrays, Pointers to arrays, Passing arrays as arguments to functions, Introduction to strings, Pointers to strings, Passing strings and Arrays of strings as arguments to a function, Programming examples to illustrate the use of arrays and strings.
Pointers- Definition, Need of pointers, declaring Pointers, Accessing Values via Pointers, Pointer arithmetic, Types of pointers, Programming examples to illustrate the use of pointers.

Unit IV: **5Hrs**

Structures- Declaring a structure type, Declaring Variables of structure type, Initializing Structures, Accessing Elements of structures, arrays of structures, nested structures, Pointers to structures Programming examples to illustrate the use of Structures.
Data files- Definition of data files, different ways of file processing (standard I/O and system I/O), description of various library functions for file handling, updating files, Programming examples to illustrate the use of Data Files.
Prescribed Text Books:

4. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill.
5. R S Salaria, Application in C, Khanna book publishing.
6. Anita Goel, Computer fundamentals, Pearson.

Suggested Additional Reading:

6. Yashwant Kanetakar, "Let us C" BPB.
7. Kerninghan B.W. & Ritchie D.M. "The C Programming Language" Prentice-Hall.
8. Mullish Cooper, "The Spirit of C" Jaico Publishing House.
9. Byron Gottfried, "Programming with C", Schaum's Outlines, Tata McGraw Hill.

10. Herbert Schildt, C: The complete reference, Tata mcCgraw hill

Course Code: CSI413
Course Name: Computer Networks
Credit Equivalent: 4 Credits (One credit is equivalent to 10 hours of lectures / organised classroom activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual / group work; obligatory / optional work placement; literature survey / library work; data collection / field work; writing of papers / projects / dissertation / thesis; seminars, etc.)

Course Objectives: The course is designed
- To introduce the concepts, terminologies and technologies used in modern days computer networks.
- To understand the concept of data communication.
- To study the functions of different layers.
- To make the students get familiarized with different protocols and network components.

Attendance Requirement:
Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:
7. Mid Term Examination: 25%
8. End Term Examination: 50%
9. Continuous Internal Assessment: 25%
   - v)   Assignment   15%
   - ii)   Class participation   5%
   - vi)   Class tests   5%

Course Contents:

Unit-I:

Introduction – Data communication concepts: Data communication, Components of data communication system, Data representation, Data transmission, Parallel & Serial transmission, Transmission modes, Simplex, Half Duplex, Full Duplex; Overview of computer networks; Uses of computer networks, Networks for companies & people; Network Hardware: Broadcast networks & Point to point networks; Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Wireless networks, Internetworks, Topologies; Network Software: Protocols, Services, network architecture, design issues; OSI Reference model, TCP/IP Reference model. Example Networks: Novell Netware, Internet.

Unit-II:

Physical Layer – Transmission Media: Twisted Pair, Coaxial Cable, Fiber Optics; Wireless Transmission: Radio Transmission, Microware Transmission, Infrared waves; The telephone system: The local loop, Transmission Impairments, Modems; Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing; Switching: Circuit and Packet switching; Communication Satellites: Geosynchronous Satellites, Low orbit Satellites.

Unit-III:

Data Link Layer – Data Link Layer design issues, Framing, Error control, Flow control, Error detection and correction; Elementary Data Link Protocols: An Unrestricted Simplex Protocol, A Simplex Stop and Wait Protocol; Sliding Window Protocols; The Data Link Layer in the Internet: SLIP- Serial Line IP, PPP-Point to Point Protocol; Medium Access Sub layer: Channel allocation –static and dynamic; Digital Cellular Radio: Global System for Mobile Communication (GSM), Code Division Multiple Access(CDMA); IEEE 802.3 Ethernet, IEEE 802.4 Token Bus; IEEE 802.5 Token ring; Bridges.

Unit-IV:

Network Layer – The Network Layer Design Issues: Services Provided to the Transport Layer, Internal organisation of the Network Layer, Comparison of Virtual Circuit and Datagram Subnets; Routing Algorithms; Internetworking: Connectionless Internetworking; Tunneling; Firewalls; The Network Layer in the Internet: The IP Protocol, IP Address, internet multicasting.

Unit-V:

The Transport Layer – The Transport layer services: Services Provided to Upper Layers, Transport service primitives, Multiplexing, Crash Recovery; The Internet Transport Protocols (TCP/IP)

The Presentation and Application Layer – Network Security: Traditional Cryptography, Two fundamental Cryptographic Principles, Secret Key Algorithms, Public key Algorithms, Authentication protocols, DNS, E-mail.

Prescribed Text Book:

7. Andrew S. Tanenbaum, "Computer Networks" 3rd Edition, Pearson Education.

Suggested Additional Reading:

11. Natalia Olifer & Victor Olifer, "Computer Networks" , John Wiley & Sons Ltd.

12. Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw Hill Company.
13. William Stallings, "Data & Computer Communication", Pearson Education.