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: CSI403

Course Name: Computer Organisation and Architecture

Credit Equivalent: 04 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 have a thorough understanding of the basic structure and operation of a digital computer.

To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.

To study the different ways of communicating with I/O devices and standard I/O interfaces.
To study the hierarchical memory system including cache memories and virtual memory.

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	10%
ii)	Class participation	5%
iii)	Class test	5%
iv)	Quiz	5%

Course Contents:

Unit-I: **(08 Hours)**

Brief introduction of Digital computers, Logic gates (OR, AND, NOR, NAND, XOR & XNOR), Boolean algebra, Demogran's laws, Boolean laws, Map simplification, Combinational circuits, half adder, full adder, Flip-flops- (RS, D, JK, Master-slave & & T flip-flops).

Unit-II: **(08 Hours)**

Digital Components: Integrated circuits, Decoders, Counters, Multiplexers, Registers.

Data Representation: Data types, Complements, binary arithmetic, Fixed point representation, Floating point representation.

Unit-III: **(08 Hours)**

Computer Basics and CPU: Von Newman model, various subsystems, CPU, Memory, I/O,

System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer. 8085 Microprocessor organization.

Unit-IV: **(09 Hours)**

Computer Arithmetic: Introduction, Addition and subtraction, Multiplication algorithms, Division algorithms, Floating-point arithmetic operations.

Input-Output Organization: Peripheral devices, Input output interface, Asynchronous data transfer, Modes of transfer, Direct memory Access, 8085 I/O structure, 8085 instruction set and basic programming.

Unit-V: **(07 Hours)**

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory management hardware. Multiprocessors: Pipeline and Vector processing.

Prescribed Text Book:

1. V. Rajaraman & T. Radhakrishanan, "Digital Logic and Computer Organization", PHI

Suggested Additional Reading:

William Stallings, "Computer Organization and Architecture– Designing for performance", 6th Edition, Pearson Education.

V. Rajaraman, Computer Organization and Architecture, PHI

Tanenbaum: Structured Computer Organization, Pearson Education

LECTURE PLAN

Lectures	Topics	Prescribed Text Book	Chapter No.
Lecture-1	Brief introduction of Digital computers	Book 1 & Book 2	Chapter-1
Lecture-2	Logic gates (OR, AND, NOR, NAND, XOR & XNOR),	Book 1 & Book 2	Chapter-1&2
Lecture-3	Boolean algebra, SOP,POS	Book 1 & Book 2	Chapter-1&2
Lecture-4	Demogran's laws, Boolean laws	Book 1 & Book 2	Chapter-1&2
Lecture-5	K - Map simplification	Book 1 & Book 2	Chapter-1&2
Lecture-6	Combinational circuits, half adder, full adder	Book 1	Chapter-1
Lecture-7	Flip flops RS	Book 1 & Book 2	Chapter-1& 4
Lecture-8	Flip flops JK, Master-slave	Book 1 & Book 2	Chapter-1& 4
Lecture-9	Flip flops T and D	Book 1 & Book 2	Chapter-1& 4
Lecture-10	Digital Components: Integrated circuits	Book 1 & Book 2	Chapter-2
Lecture-11	Decoders	Book 1 & Book 2	Chapter-2
Lecture-12	Counters	Book 1 & Book 2	Chapter-2
Lecture-13	Multiplexers	Book 1 & Book 2	Chapter-2
Lecture-14	Registers	Book 1 & Book 2	Chapter-2
Lecture-15	Data Representation: Data types, Complements, binary arithmetic,	Book 1	Chapter-3
Lecture-16	Fixed point representation, Floating point representation.	Book 1	Chapter-3
Lecture-17	Computer Basics and CPU: Von Newman model	Book 1	Chapter-5
Lecture-18	various subsystems, CPU, Memory, I/O	Book 1	Chapter-5
Lecture-19	System Bus, CPU and Memory registers	Book 1	Chapter-5
Lecture-20	Program Counter, Accumulator, Instruction register	Book 1	Chapter-5
Lecture-21	Micro operations, Instruction Fetch, decode and execution,	Book 1	Chapter-5
Lecture-22	data movement and manipulation	Book 1	Chapter-5

Lecture-23	Instruction formats and addressing modes of basic computer	Book 1	Chapter-8
Lecture-24	8085 Microprocessor organization	Book 1	Chapter-8
Lecture-25	Computer Arithmetic: Introduction, Addition and subtraction,	Book 1	Chapter-8
Lecture-26	Multiplication algorithms	Book 1	Chapter-8
Lecture-27	Division algorithms	Book 1	Chapter-8
Lecture-28	Floating-point arithmetic operations	Book 1	Chapter-8
Lecture-29	Input-Output Organization: Peripheral devices, Input output interface	Book 1	Chapter-8
Lecture-30	Asynchronous data transfer	Book 1	Chapter-8
Lecture-31	Modes of transfer	Book 1	Chapter-8
Lecture-32	Direct memory Access, 8085 I/O structure	Book 1	Chapter-8
Lecture-33	8085 instruction set and basic programming	Book 1	Chapter-9
Lecture-34	Memory Organization: Memory Hierarchy	Book 1	Chapter-9
Lecture-35	Main memory, Auxiliary memory	Book 1	Chapter-9
Lecture-36	Associative memory, Cache memory	Book 1	Chapter-9
Lecture-37	Virtual memory	Book 1	Chapter-9
Lecture-38	Memory management hardware	Book 1	Chapter-9
Lecture-39	Multiprocessors: Pipelining	Book 1	Chapter-9
Lecture-40	Vector processing	Book 1	Chapter-9

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Course Code: CSI531

Course Name: Theory of Computation

Credit Equivalent: 04 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 cover the underlying concepts and techniques used in Theory of Computation. In this syllabus we cover finite automata, pushdown automata, Context free grammars and Turing machines.

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%

v)	Assignment	10%
vi)	Class participation	5%
vii)	Class test	10%

Course Contents:

Unit-I: **(08 Hours)**

Alphabet, Strings and their properties, Definition of an automation, Description of a finite Automation, Transition graph, transition function, Acceptability of a string by a Finite Automation, Deterministic and nondeterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore machines, Minimization of finite automata.

Unit-II: **(08 Hours)**

Chomsky classification of Languages, Languages and their relation, Languages and Automata, Regular sets, regular expression, Regular Grammars, Finite state machine and regular expression, Pumping lemma for regular sets, Application of pumping lemma, closure properties of regular sets.

Unit-III: **(08 Hours)**

Introduction to CFG, Context-free languages and Derivation Trees, Ambiguity in context-free Grammars, simplification of context-free Grammars, Normal forms for context-free Grammars – Chomsky normal form and Greiback normal form.

Unit-IV: **(09 Hours)**

Pushdown Automata: Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Pushdown automata and CFL, PDA corresponding to given CFG, CFG corresponding to a given PDA, pumping Lemma for context-free Languages, Closure properties of CFL's.

Unit-V: **(07 Hours)**

Introduction, TM model Representation of Turing machines, languages acceptability of TM, Design of TM, Universal TM & Other modification, Church's hypothesis, Properties of recursive and Recursively enumerable languages.
Tractable and Untractable Problems: P, NP, NP complete and NP hard problems

Prescribed Text Book:

1. John E. Hopcroft, Jeffery Ullman,"Introduction to Automata theory, Langauges & computation" , Narosa Publishers.
2. K.L.P Mishra & N.Chandrasekaran,"Theory of Computer Science", PHI Learning

Suggested Additional Reading:

John C Martin, "Introdution to languages and theory of computation", McGraw Hill Daniel I.A. Cohen,"Introduction to Computer Theory",Wiley India.

Peter Linz, "An Introduction to Formal Languages and Automata", Jones & Bartlett Learning

LECTURE PLAN

Lectures	Topics	Prescribed Text Book
Lecture-1	Introduction and need of TOC, Alphabet, Strings and their properties,	Book 1 & Book 2
Lecture-2	Definition of automation, Description of a finite Automation, Transition graph, transition function.	Book 1 & Book 2
Lecture-3	Acceptability of a string by a Finite Automation, Deterministic and nondeterministic FSM's,	Book 1 & Book 2
Lecture-4	Equivalence of DFA and NDFA,	Book 1 & Book 2
Lecture-5	Mealy & Moore machines, conversion of moore machine to mealy machine.	Book 1 & Book 2
Lecture-6	Conversion of mealy machine to moore machine.	Book 1 & Book 2
Lecture-7	Designing of FSM, Modulo machine.	Book 1 & Book 2
Lecture-8	Minimization of finite automata.	Book 1 & Book 2
Lecture-9	Chomsky classification of Languages, Languages and their relation, Languages and Automata	Book 1 & Book 2
Lecture-10	Regular sets, regular expression, Regular Grammars	Book 1 & Book 2
Lecture-11	Finite state machine and regular expression	Book 1 & Book 2
Lecture-12	Conversion of FSM to R.E.	Book 1 & Book 2
Lecture-13	Conversion of R.E. to FSM.	Book 1 & Book 2
Lecture-14	Pumping lemma for regular sets.	Book 1 & Book 2
Lecture-15	Application of pumping lemma.	Book 1 & Book 2
Lecture-16	Closure properties of regular sets.	Book 1 & Book 2
Lecture-17	Introduction to CFG, Context-free languages and Derivation Trees.	Book 1 & Book 2
Lecture-18	Ambiguity in context-free Grammars,	Book 1 & Book 2
Lecture-19	Simplification of context-free Grammars, Elimination of useless symbols or reduction of grammar.	Book 1 & Book 2
Lecture-20	Elimination of unit productions.	Book 1 & Book 2
Lecture-21	Elimination of null productions.	Book 1 & Book 2

Lecture-22	Normal forms for context-free Grammars – Chomsky normal form and Greiback normal form	Book 1 & Book 2
Lecture-23	Conversion of CFG to CNF	Book 1 & Book 2
Lecture-24	Conversion of CFG to GNF	Book 1 & Book 2
Lecture-25	Pushdown Automata: Definitions – Moves – Instantaneous descriptions –	Book 1 & Book 2
Lecture-26	Deterministic pushdown automata & non deterministic pushdown automata	Book 1 & Book 2
Lecture-27	Pushdown automata and CFL.	Book 1 & Book 2
Lecture-28	Designing of PDA	Book 1 & Book 2
Lecture-29	Designing of PDA	Book 1 & Book 2
Lecture-30	PDA corresponding to given CFG.	Book 1 & Book 2
Lecture-31	CFG corresponding to a given PDA.	Book 1 & Book 2
Lecture-32	Pumping Lemma for context-free Languages.	Book 1 & Book 2
Lecture-33	Closure properties of CFL's.	Book 1 & Book 2
Lecture-34	Introduction of TM, TM model Representation of Turing machines.	Book 1 & Book 2
Lecture-35	Languages acceptability of TM,	Book 1 & Book 2
Lecture-36	Design of TM	Book 1 & Book 2
Lecture-37	Design of TM	Book 1 & Book 2
Lecture-38	Universal TM & Other modification,	Book 1 & Book 2
Lecture-39	Church's hypothesis, Properties of recursive and Recursively enumerable languages.	Book 1 & Book 2
Lecture-40	Tractable and Untractable Problems: P, NP, NP complete and NP hard problems	Book 1 & Book 2

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Course Code: CSI501

Course Name: Design & Analysis of Algorithms

Credit Equivalent: 02 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 be able to carry out the Analysis of various Algorithms for mainly Time and Space Complexity.

• develop efficient algorithms for simple computational tasks and reasoning about the correctness of them. Through the complexity measures, different range of behaviours of algorithms and the notion of tractable and intractable problems will be understood

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%

i)	Assignments	5%
ii)	Class participation	5%
iii)	Class tests	10%
iv)	Quiz	5%

Course Contents:

Unit I **(4 Hours)**

Algorithms, Designing algorithms, analyzing algorithms, asymptotic notations, Introduction to divide and conquer technique, analysis, design and comparison of various algorithms based on this technique, example binary search, merge sort, quick sort, strassen's matrix multiplication.

Unit II **(4 Hours)**

Study of Greedy strategy, examples of greedy method like optimal merge patterns, Huffman coding, minimum spanning trees, knapsack problem, job sequencing with deadlines, single source shortest path algorithm

Unit III **(4 Hours)**

Concept of dynamic programming, problems based on this approach such as 0/1 knapsack, multistage graph, reliability design, Floyd-Warshall algorithm.

Unit IV **(4 Hours)**

Backtracking concept and its examples like 8 queen's problem, Hamiltonian cycle, Graph coloring problem etc. Introduction to branch & bound method, examples of branch and bound method like travelling salesman problem etc. Meaning of lower bound theory and its use in solving algebraic problem.

Unit V **(4 Hours)**

Binary search trees, height balanced trees, 2-3 trees, B-trees, basic search and traversal techniques for trees and graphs (In order, preorder, postorder, DFS, BFS), NP-completeness.

Prescribed Text Book:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms/C++—, 2nd Edition, Universities Press, 2007.

Suggested Additional Reading:

1. Cormen, T.H., Leiserson, C.E., Rivest, R.L. and Stein, C., —Introduction to Algorithms—, 2nd Edition, Prentice Hall of India Pvt. Ltd, 2003.

2. Aho, A.V., Hopcroft J.E. and Ullman, J.D., —The Design and Analysis of Computer Algorithms—, Pearson Education, 1999.

3. Sara Baase and Allen Van Gelder, —Computer Algorithms, Introduction to Design and Analysis—, 3rd Edition, Pearson Education, 2009.

4 . Dasgupta; algorithms; TMH

5. Michael T Goodrich, Robarto Tamassia, Algorithm Design, Wiely India

LECTURE PLAN

Lectures	Topics	Prescribed Text Book
Lecture-1	Algorithms, Designing algorithms, analyzing algorithms	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-2	asymptotic notations	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-3	Introduction to divide and conquer technique, analysis, design and comparison of various algorithms based on this technique.	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-4	Binary search, merge sort, quick sort, strassen's matrix multiplication.	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-5	Study of Greedy strategy, examples of greedy method like optimal merge patterns	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-6	Huffman coding	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-7	minimum spanning trees, knapsack problem,	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-8	job sequencing with deadlines, single source shortest path algorithm	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-9	Concept of dynamic programming, problems based on this approach such as 0/1 knapsack,	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-10	multistage graph,	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-11	reliability design,	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-12	Floyd-Warshall algorithm.	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-13	Backtracking concept and its examples like 8 queen's problem,	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-14	Hamiltonian cycle, Graph coloring problem	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-15	Introduction to branch & bound method, examples of branch and bound method like travelling salesman problem	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-16	Meaning of lower bound theory and its use in solving algebraic problem.	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-17	Binary search trees, height balanced trees	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-18	2-3 trees, B-trees	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-19	basic search and traversal techniques for trees and graphs (In order, preorder, postorder, DFS, BFS)	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms
Lecture-20	NP-completeness	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Computer Algorithms

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

Course Code: CSI 401

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:

10. Mid Term Examination: 25%

11. End Term Examination: 50%

12. Continuous Internal Assessment: 25%

i) Assignment 20%

ii) Class Participation 5%

Course Contents

Unit-I:

Programming Tools- Problem analysis, Program constructs (sequential, decision, loops), Algorithm, Flowchart, Pseudo code, Decision table, Modular programming, Top Down and Bottom up approaches, Concept of High Level Languages, Low Level Languages, Assembly Languages, Assembler, Compiler, Interpreter, Type of errors.

Overview of C- 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:

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, Programming examples to illustrate the use of these control 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:

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:

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:

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

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.

4. Byron Gottfried, "Programming with C", Schaum's Outlines, Tata McGraw Hill.
5. Herbert Schildt, C: The complete reference, Tata mcCgraw hill

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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:

13. Mid Term Examination: 25%
14. End Term Examination: 50%
15. Continuous Internal Assessment: 25%

iii) Lab Assignment 20%
ii) Class Participation 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

LECTURE PLAN

Lectures	Topics	Prescribed Text Book	Chapter No.
Lecture-1	algorithm, flowcharts	Book 3	8
Lecture-2	Pseudo code and Decision table. General Structure of C Program, C compilers, Editing, Compiling & , Running of a C program Data types	Book 3	8
Lecture-3	Constants and Variables, Operators and Different types of expressions and their Evaluation	Book1	2,3
Lecture-4	Conditional Expression, Assignment statement ,Storage Classes	Book1	2,3 & notes
Lecture-5	Enumerated data type, Redefining/ Creating data types, Library functions, Type casting.	Book1	2,3, Notes
Lecture-6	**Input/Output**- Unformatted and formatted I/O Functions.	Book1	4
Lecture-7	Decision making using if, if-else, elseif and switch statements	Book1	5
Lecture-8	Looping using for, while and do-while statements, Transferring Program controlling break and continue statements	Book1	6
Lecture-9	Defining a function, Local variables, return statement, invoking a Function, specifying	Book1	9
Lecture-10	Passing arguments to a function, Functions returning non Integer, External, static, and register variable, block structure, initialization and recursion.	Book1	9
Lecture-11	Introduction to arrays, Declaring arrays, Initializing, arrays, Processing arrays	Book1	8
Lecture-12	Pointers to arrays, Passing arrays as arguments to functions,	Book1	8

	Introduction to strings, Pointers to strings		
Lecture-13	Passing strings and Arrays of strings as arguments to a function, Programming examples to illustrate the use of arrays and strings.	Book1	8
Lecture-14	Definition, Need of pointers, declaring Pointers, Accessing Values via Pointers, Pointer arithmetic, Types of pointers	Book1	11
Lecture-15	Programming examples to illustrate the use of pointers.	Book1	11
Lecture-16	Declaring a structure type, Declaring Variables of structure type, Initializing Structures, Accessing Elements of structures	Book1	10
Lecture-17	Arrays of structures, nested structures.	Book1	10
Lecture-18	Pointers to structures Programming examples to illustrate the use of Structures.	Book1	10
Lecture-19	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,	Book1	12
Lecture-20	Programming examples to illustratethe use of Data Files	Book1	12

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:

16. Mid Term Examination: 25%
17. End Term Examination: 50%
18. Continuous Internal Assessment: 25%
    - iv) Lab Assignment 20%
    - ii) Class Participation 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:

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

Suggested Additional Reading:

11. Yashwant Kanetakar, "Let us C" BPB.
12. Kerninghan B.W. & Ritchie D.M. "The C Programming Language" Prentice-Hall.
13. Mullish Cooper, "The Spirit of C" Jaico Publishing House.
14. Byron Gottfried, "Programming with C", Schaum's Outlines, Tata McGraw Hill.
15. Herbert Schildt, C: The complete reference, Tata mcCgraw hill

LECTURE PLAN

Lectures	Topics	Prescribed Text Book	Chapter No.
Lecture-1	algorithm, flowcharts	Book 3	8
Lecture-2	Pseudo code and Decision table. General Structure of C Program, C compilers, Editing, Compiling & , Running of a C program Data types	Book 3	8
Lecture-3	Constants and Variables, Operators and Different types of expressions and their Evaluation	Book1	2,3
Lecture-4	Conditional Expression, Assignment statement ,Storage Classes	Book1	2,3 & notes
Lecture-5	Enumerated data type, Redefining/ Creating data types, Library functions, Type casting.	Book1	2,3, Notes
Lecture-6	**Input/Output**- Unformatted and formatted I/O Functions.	Book1	4
Lecture-7	Decision making using if, if-else, elseif and switch statements	Book1	5
Lecture-8	Looping using for, while and do-while statements, Transferring Program controlling break and continue statements	Book1	6
Lecture-9	Defining a function, Local variables, return statement, invoking a Function, specifying	Book1	9
Lecture-10	Passing arguments to a function, Functions returning non Integer, External, static, and register variable, block structure, initialization and recursion.	Book1	9
Lecture-11	Introduction to arrays, Declaring arrays, Initializing, arrays, Processing arrays	Book1	8
Lecture-12	Pointers to arrays, Passing arrays as arguments to functions, Introduction to strings, Pointers to strings	Book1	8
Lecture-13	Passing strings and Arrays of strings as arguments to a function, Programming examples to illustrate the use of arrays and strings.	Book1	8
Lecture-14	Definition, Need of pointers, declaring Pointers, Accessing	Book1	11

	Values via Pointers, Pointer arithmetic, Types of pointers		
Lecture-15	Programming examples to illustrate the use of pointers.	Book1	11
Lecture-16	Declaring a structure type, Declaring Variables of structure type, Initializing Structures, Accessing Elements of structures	Book1	10
Lecture-17	Arrays of structures, nested structures.	Book1	10
Lecture-18	Pointers to structures Programming examples to illustrate the use of Structures.	Book1	10
Lecture-19	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,	Book1	12
Lecture-20	Programming examples to illustratethe use of Data Files	Book1	12

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

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Course Code: CSI-410

Course Name: Object Oriented Programming Using 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

This module will acquaint the student with the fundamental concepts of software construction in an object-oriented framework and develop basic competence in applying those concepts.

It will introduce inheritance and software structuring concepts that provide the object-oriented approach to software development with much of its power.

Students' programming capability will be enhanced through substantial practical work and increased knowledge of software development methodology.

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:

19. Mid Term Examination: 25%

20. End Term Examination: 50%

21. Continuous Internal Assessment: 25%

v)	Assignment	20%
ii)	Class Participation	5%

Course Contents

Unit-1 **[4 hours]**

Basic concepts of Object Oriented programming - Object, Classes, Inheritance, Encapsulation, Polymorphism and Overloading. C++ Programming Basics-program construction, input/outputs, preprocessor directives, comments, declaration and definitions of variables, manipulators, tokens, expressions, control structures.

Arrays - defining, accessing elements, initialization.

Structures - basic concepts and usage, defining of structure variable, accessing structure members, other features of structure.

Functions- declaration, calling and definition, passing arguments- call by value/reference. Returning values from function.

Managing console input output operations.

Unit-2 **[4 hours]**

Objects and Classes- specifying class, creating objects, accessing class members, defining member function, static data members, static member functions, arrays of objects, object as function arguments, friend functions, returning objects, function overloading.

Constructer and destructor.

Unit-3 **[4hours]**

Operator Overloading- Overloading unary operator, binary operator, data conversion-between basic types, between objects and basic data types, objects and different classes.

Inheritance-Concept of derived and base class, accessing base class members, Single inheritance, multiple inheritance, hierarchical inheritance, multilevel inheritance, hybrid inheritance, constructor in derived classes

Unit-4 **[4 hours]**

Pointers- pointer variables, accessing variables, Pointers and arrays, Pointers and functions, pointers to object, this pointer.

Virtual Functions-Functions accessed with pointers, virtual member functions accessing with pointers, late binding, pure virtual functions, abstract classes, virtual base classes.

Unit-5 **[4 hours]**

Exception handling.

Working with files- classes for file stream operations, opening and closing a file, detecting end-of-file, file modes, file pointers and their manipulations, sequential input and output operations, updating a file, error handling, command line arguments.

Prescribed Text Books:

1. Balabugusamy, E. "Object Oriented Programming with C++", Second Edition. Tata McGraw Hill.
2. Lafore, Robert, "Object Oriented Programming in Turbo C++", Galgotia Publications Pvt. Ltd. .

Suggested Additional Reading

1. Herbert Schildt, " C++ The Complete Reference " - TMH Publication ISBN 0-07-463880-7
2. R. Subburaj, " Object Oriented Programming With C++ ", Vikas Publishing House, New Delhi.isbn 81-259-1450-1
3. M Kumar " Programming In C++", TMH Publications
4. Ashok . N. Kamthane, " Object Oriented Programming with ANSI & Turbo C++", Pearson Education Publication, ISBN 81-7808-772-3

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PO BOX: 21, DHARAMSHALA, DISTRICT KANGRA – 176215, HIMACHAL PRADESH
www.cuhimachal.ac.in

Course Code: CSI-414 B

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

This module will acquaint the student with the fundamental concepts of software construction in an object-oriented framework and develop basic competence in applying those concepts.

It will introduce inheritance and software structuring concepts that provide the object-oriented approach to software development with much of its power.

Students' programming capability will be enhanced through substantial practical work and increased knowledge of software development methodology.

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:

22. Mid Term Examination: 25%

23. End Term Examination: 50%

24. Continuous Internal Assessment: 25%

vi) Assignment 20%

ii) Class Participation 5%

Course Contents

Unit-1 **[4 hours]**

Programming examples on basic concepts of Object Oriented programming - Object, Classes, Inheritance, Encapsulation, Polymorphism and Overloading. C++ Programming Basics-program construction, input/outputs, preprocessor directives, comments, declaration and definitions of variables, manipulators, tokens, expressions, control structures.

Programming examples on arrays - defining, accessing elements, initialization.

Programming examples on Structures - basic concepts and usage, defining of structure variable, accessing structure members, other features of structure.

Programming examples on Functions- declaration, calling and definition, passing arguments- call by value/reference. Returning values from function.

Programming examples on Managing console input output operations.

Unit-2 **[4 hours]**

Programming examples on Objects and Classes- specifying class, creating objects, accessing class members, defining member function, static data members, static member functions, arrays of objects, object as function arguments, friend functions, returning objects, function overloading.

Programming examples on Constructer and destructor.

Unit-3 **[4hours]**

Programming examples on Operator Overloading- Overloading unary operator, binary operator, data conversion-between basic types, between objects and basic data types, objects and different classes.

Programming examples on Inheritance-Concept of derived and base class, accessing base class members, Single inheritance, multiple inheritance, hierarchical inheritance, multilevel inheritance, hybrid inheritance, constructor in derived classes

Unit-4 **[4 hours]**

Programming examples on Pointers- pointer variables, accessing variables, Pointers and arrays, Pointers and functions, pointers to object, this pointer.

Programming examples on Virtual Functions-Functions accessed with pointers, virtual member functions accessing with pointers, late binding, pure virtual functions, abstract classes, virtual base classes.

Unit-5 **[4 hours]**

Programming examples on Exception handling.

Programming examples on Working with files- classes for file stream operations, opening and closing a file, detecting end-of-file, file modes, file pointers and their manipulations, sequential input and output operations, updating a file, error handling, command line arguments.

Prescribed Text Books:

3. Balabugusamy, E. "Object Oriented Programming with C++", Second Edition. Tata McGraw Hill.
4. Lafore, Robert, "Object Oriented Programming in Turbo C++", Galgotia Publications Pvt. Ltd. .

Suggested Additional Reading

5. Herbert Schildt, " C++ The Complete Reference " - TMH Publication ISBN 0-07-463880-7
6. R. Subburaj, " Object Oriented Programming With C++ ", Vikas Publishing House, New Delhi.isbn 81-259-1450-1
7. M Kumar " Programming In C++", TMH Publications
8. Ashok . N. Kamthane, " Object Oriented Programming with ANSI & Turbo C++", Pearson Education Publication, ISBN 81-7808-772-3

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

www.cuhimachal.ac.in

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:

25. Mid Term Examination: 25%

26. End Term Examination: 50%

27. Continuous Internal Assessment: 25%

vii)	Assignment	15%
ii)	Class participation	5%
viii)	Class tests	5%

Course Contents:

Unit-I

Introduction: Computer Network: Goals and Applications of Networks, Network structure and architecture, The OSI Reference model, The TCP/IP Reference Model ,Types of computer Network :LAN,MAN,WAN, Wireless networks, Topologies, Transmission mode . Physical Layer: Transmission Media, Concept of data transmission, Switching Techniques, Digital Modulation and Demodulation Techniques.

Unit-II

Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

Unit - III

Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking -TCP / IP, IP packet, IP address, IPv6.

Unit - IV

Transport Layer: Transport Layer - Design issues, connection management, session Layer Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography.

Unit-V

Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application. Example Networks - Internet and Public Networks.

Prescribed Text Book:

10. Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw Hill Company.

Suggested Additional Reading:

16. Andrew S. Tanenbaum, "Computer Networks" 3rd Edition, Pearson Education.
17. Natalia Olifer & Victor Olifer, "Computer Networks", John Wiley & Sons Ltd.
18. William Stallings, "Data & Computer Communication", Pearson Education.

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PO BOX: 21, DHARAMSHALA, DISTRICT KANGRA – 176215, HIMACHAL PRADESH
Website: www.cuhimachal.ac.in

Course Code: CSI440

Course Name: Information Security and Cryptography

Credit Equivalent: 04 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 be able to carry out the Analysis of various Algorithms for mainly Time and Space Complexity.

• develop efficient algorithms for simple computational tasks and reasoning about the correctness of them. Through the complexity measures, different range of behaviours of algorithms and the notion of tractable and intractable problems will be understood

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:

28. Mid Term Examination: 25%

29. End Term Examination: 50%

30. Continuous Internal Assessment: 25%

v)	Assignments	5%
vi)	Class participation	5%
vii)	Class tests	10%
viii)	Quiz	5%

Course Contents:

UNIT-I

Classical Encryption Techniques: Symantec Cipher model, substitution Techniques, tranposition techniques, rotor machines, steganography.

Block Ciphers and the Data Encyption standards: Simplified DES, block cipher principles, the data encryption standard, the strength of DES, differential and linear cryptanalysis, blockcipher design principles, block cipher modes of operation.

Advanced Encryption Standard: Evaluation Criteria for AES, the AES cipher. Contemporary symmetric ciphers: Triple DES, blowfish.

Confidentiality using symmetric encryption: Placement of Encryption function, traffic confidentiality, key distribution, and random number generation.

UNIT-II

Public key Encryption and Hash functions : Prime numbers, Fermat's and Euler's Theorems, testing for primality, the chinese remainder theorem, discrete logarithms.

Public key cryptography and RSA: Principles of Public key cryptosystems, the RSA algorithm. Key Management other public key cryptosystems: Key management, diffie-Hallman key exchange, elliptic curve arithmetic, and elliptic curve cryptography.

UNIT-III

Message authentication and Hash function

: AuthenticationRequirements, Authentication functions, messageauthentication codes, hash functions, security of hash function and MACs.

Hash Algorithms: MD5 message digest algorithm, secure Hash algorithm, ripemd-160, HMAC. Digital Signature and Authentication protocols: Digital signatures, Authentication protocols, and digital signature standard.

Authentication Applications: Kerberos, X.509 Authenticationservice.

UNIT-IV

Electronic Mail Security: Pretty Good privacy, S /MIME.

IP Security: IP Security overview, IP security architecture,authentication header, encapsulating security payload, combining security associations, key management.

Web Security: Web security considerations, Secure sockets layer and transport layer security, secure electronic transaction.

UNIT-V

Part four system security: Intruders, intrusion detection, and password management. Malicious software: Viruses and related threats, virus countermeasures.

Firewalls: Firewall Design Principles, Trusted systems.

BOOKS

1. William Stallings "Cryptography and Network Security", 3 ed, Pearson Education. 2. W.Stallings " Network security Essential " Applications & Standards", Pearson ed. 3. Kanfren "Network Secirity : Private Communications in apublic world 2/e

4. Eric Maiwald " Network Secirity : A Preginner's Guide, second ed.", Tata Mcgraw Hill.

5. Roberta Bragg " Mark Rhodes, Ousley & Keith Strassberg Network Secirity : The Complete Reference " Tata McGraw Hill.

6. Eric Maiwald "Fundamentals of Network Security" Wiley India.

Central University of Himachal Pradesh
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PO BOX: 21, DHARAMSHALA, DISTRICT KANGRA – 176215, HIMACHAL PRADESH

Course Code: CSI 429
Course Name: IT Tools for Smart Work

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 main objective of this course is

To impart knowledge of various tools, techniques and technologies that facilitates smart work.

To make learns aware of various apps, websites that help them to handle their routine chores more efficiently.

To help students to have knowledge of extending such tools and develop their own tools.

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:

31. Mid Term Examination: 25%
32. End Term Examination: 50%
33. Continuous Internal Assessment: 25%
ix) Assignment/Surprise test/Seminar 20%
x) Class participation 5%

Course Contents

Unit 1: E-learning –what is learning, why e-learning, concept and definition, e-leaning basics, types of e-learning, computer based learning, internet based learning, completely online mode, the use of e-learning in education, advantages and disadvantages of e-learning, e-learning components, e-learning content, E-learning model-ADDIE model, MERRILL's principles of Instruction (MPI),GAGNE's nine events of instruction, E-Tutoring, E-Coaching, E-Mentoring, collaborative learning, virtual classroom, e-learning in India.

Unit 2: E-learning Tools and Technologies: Communication Tools: E-mail, Instant Messaging (IM), Chat, Blogging, Collaboration Tools: Wiki, Social Bookmarking, Social Networking sites, Web Conferencing, Content Creation Tools/Authoring Tools: Adapt, Learning Activity Management System (LAMS), Xerte, eXeLearning, Delivery and Distribution Tools: EPUB, Podcasting, Audio/Video streaming, Massive Open Online Course (MOOC), Flipped Learning, WebQuest, Learning Management System (LMS), Learning Content Management System (LCMS), E-learning Standards.

Unit-3: IT tools for smart work in education: ePathsala, National Mission on Education through ICT (NME-ICT), epgpathsala, Youtube, National Program on Technology Enhanced Learning (NPTEL), education apps for India, IT tool for data mining, Big data analysis, IT tools for academic research.

Unit-4: IT tools for smart work in professional life: Search engine, best search engines of world, search engine optimization, search engine optimization tools, email, best email servers of world, Video conferencing, examples of best video conference apps, Collaboration tools for remote teams, cloud storage services, tools for hard drive space analysis, time management apps, e marketing, online marketing tools.

Unit-5: IT tools for smart work in personal life: Money saving tools, tools for productivity enhancement, tools for creative time saving, quick tools for everyday task, video calling apps, social media sites, Note taking tools, Lecturer capture and recording tools, drawing tools, presentation tools.

Prescribed text book:

1. Hardy Bower," From Distance Education to E-Learning: Lessons Along the Way", John Wiley & Sons
2. Hossen Najan**,"** Distance Education and E Learning", lambert academic publishing.
3. Jiawei Han, Micheline Kamber , Jian Pei Professor," Data Mining: Concepts and Techniques", The Morgan Kaufmann Series

Suggested Additional Reading:

1 -https://www.dreamgrow.com/top-15-most-popular-social-networking-sites/

2 -https://zapier.com/blog/best-note-taking-apps/

3 -https://neilpatel.com/blog/10-online-marketing-tools-you-need-when-starting-a-business/

4 -http://epathshala.nic.in/

5 -http://epgp.inflibnet.ac.in/

6 -http://indiatoday.intoday.in/education/story/free-education/1/850896.html 7-https://indianceo.in/apps/top-10-education-apps-india/

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

Course Code: CSI 406A

Course Name: Fundamentals of ICT

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:

11. Pradeep K. Sinha, Priti Sinha, “Computer Fundamentals”, BPB Publications.

Suggested Additional Reading:

19. Rajaraman, V., “Fundamental of Computers”, Fifth Edition, Prentice Hall India, New Delhi.
20. E. Balagurusamy, “Introduction to Computers (Special Indian Edition)”, Tata McGraw Hill.