Government College of Engineering, Karad
Second Year B. Tech.
IT301: Applied Mathematics-III

Teaching Scheme   **Examination Scheme**

Lectures	3Hrs/week	**CT1**	15
Tutorial	1Hr/week	**CT2**	15
Total Credits:	4	**TA**	10
		ESE	60

Course Objectives:
To Provide :

1. Students skills to learn regression analysis.
2. To learn Fourier series and Fourier transform techniques which would enable students to devise engineering solution for given situations.
3. To learn concepts of probability distribution and linear programming techniques.
4. To learn transportation problems and its solutions.

Course Contents

		Hours
Unit I	**Regression Analysis**	**8**

Fitting of Curves by method of Least-squares, Fitting of Straight Lines Fitting of exponential curves, Fitting of Parabolic curves.

Unit II	**Fourier series**	**6**

Definition, Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, change of interval, Expansion of odd and even periodic functions, Half range series, Harmonic Analysis.

Unit III	**Fourier Transforms**	**6**

Fourier Transforms, Fourier Sine and Cosine transforms, Complex form of Fourier Integral, Finite Fourier Sine and Cosine transforms.

Unit IV	**Probability**	**6**

Baye's theorem, Random Variables: discrete and random variables, Moments, moment generating function Probability distribution: Binomial Distribution, Poisson distribution, Normal Distribution

Unit V	**Linear Programming Problem**	**6**

Introduction and formulation of LPP, Simplex Method Big-M Method

Unit VI   **Transportation and Assignment Problems**   **10**
Definition, Balanced and unbalanced transportation problem, least cost and VAM methods of Initial solution, Modified distribution method of optimum solution, Definition, Balanced and Unbalanced assignment problems, Hungarian method of solving balanced and unbalanced assignment problems, Travelling salesmen problem

Course Outcome (CO):

1. Students will be able to solve problems on regression analysis.

2. Students will be able to solve problems on Fourier series and Fourier transform.

3. Students will be able to solve problems on probability distribution and linear programming techniques.

4. Students will be able to apply knowledge of transportation problems in real life.

Text Books:
1. J. N. Wartikar & P. N. Wartikar, "A text book of Applied Mathematics: Vol. I, II and III", Vidyarthi Griha Prakashan, Pune.
2. Kanti B. Datta, "Mathematical Methods of Science and Engineering (Aided with MATLAB)", Cengage Learning.
3. Erwin Kreyszing, "Advanced Engineering Mathematics", Wiley Eastern Ltd. Mumbai, 8th Edition

References:
1. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publication, New Delhi.
2. S. D. Sharma, "Operations Research", Kedar Nath Ram Nath and Co., Meerut.
3. Peter O Neil, "Advanced Engineering Mathematics", Cengage Publications.
4. Merle C Potter, "Advanced Engineering Mathematics", Oxford University Press.
5. James L. Johnson, "Probability and Statistics for Computer science", Wiley Student Edition
6. H.K. Dass, Rajnish Verma,"Higher Engineering Mathematics", 2012, S. Chand Publication, New Delhi, 2nd Edition
7. Bandaru Ramana, "Higher Engineering Mathematics", Mcgraw Hill Education

Useful Links:
1. http://nptel.ac.in/111105035/27 Prof. Jitendra Kumar, IIT Kharagpur
2. http://nptel.ac.in//111105035/32 Prof. Somesh Kumar, IIT Kharagpur
3. http://nptel.ac.in/111105035/30 Prof. Jitendra Kumar, IIT Kharagpur
4. www.ocw.mit.edu

List of Submission:
      1   Total 8-10 number of tutorials should be conducted based on above syllabus.

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	3	1	-	-	-	-	1	1	1	1	1
CO2	3	1	1	3	1	-	-	-	-	1	1	1	1	1
CO3	3	1	1	3	1	-	-	-	-	1	1	1	1	1
CO4	3	1	1	3	1	-	-	-	-	1	1	1	1	1

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	2	15
Understand	5	5	2	10
Apply	-	-	2	10
Analyze	-	-	1	5
Evaluate	5	5	2	15
Create	-	-	1	5
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech.
IT302: Data Structures and Applications

Teaching Scheme		**Examination Scheme**	
Lectures	4Hrs/week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits:	4	**TA**	10
		ESE	60

Course Objectives:

1 To understand the concept of algorithms, its Pseudo code representation and analysis.

2 To gain the knowledge of abstract data type and its application in implementing linear and Non Linear Data Structures.

3 To perform carious operations on Data Structures like searching, sorting and their complexities.

4 To understand techniques to analyze a problem, select and design the appropriate data structure and algorithms for the problem.

Course Contents

		Hours
Unit I	**Algorithm Basics and Recursion**	**7**
	Algorithms, Its Pseudo Code Representation, Abstract Data type, Data Structures, Algorithm Efficiency, Recursion, Designing Recursive Algorithms, (**Self Study:** Recursive Examples)	
Unit II	**Sequential Representation of Linear Data Structures**	**6**
	Stack, Operations on Stack, Applications of Stack, Queue, Operations on Queue, Applications of Queue, Priority Queues	
Unit III	**Linked Representation of Linear Data Structures**	**7**
	Limitations of static memory allocation. Dynamic memory allocation, Singly, doubly and circular linked list, stack using linked list, Linear and circular queue using linked list, Operations like insertion, deletion, traversal. (**Self-Study:** Other operations on these data structures).	
Unit IV	**Nonlinear Data Structures: (TREES)**	**8**
	Basic Concept and Terminology, Data structure for binary trees. Algorithms for tree traversals, Heaps, Binary search trees (BST), algorithms on BST and applications, AVL tree. B and B++ trees (Theoretical aspects only).	

Unit V	**Non Linear Data Structures (Graphs)**	**8**

Concepts and terminology of graph, Representation of graph using adjacency matrix and adjacency list, Graph traversal Techniques (Depth first and Breath first search), Applications of Graphs as Minimum Spanning Tree and shortest path algorithm.

Unit VI	**Searching and Sorting Techniques:**	**11**

Need of sorting and searching, Sequential Search, Binary Search, Analysis of Searching Techniques (Best, Average and worst case)., Hashing Techniques, Types of Hash Functions, Collision resolution techniques, open and closed hashing, Bubble sort, insertion sort, selection sort, heap sort, Merge sort, quick sort, (**Self Study:** Analysis of sorting Techniques (Best, Average and worst case)).

Course Outcome (CO):

1 To write algorithms, its Pseudo code representation and analysis.
2 To implement linear and non linear Data Structures.
3 To perform various operations on Data Structures like searching, sorting and their complexities.
4 To analyze problem Techniques, select and design the appropriate Data structure and Algorithms for the problem.

Text Books:

1 Richard Gilberg & Behrouz Forouzan, "Data structures A Pseudocode Approach with C", Cengage Learning (For Unit:1,2,3,4,5)
2 Semour Lipschutz," Data structures with C", Schaum Series (TMH) (For Unit:6)

References:

1 E. Horowitz, S.Sahani, S. Anderson- Freed, "Fundamentals of Data Structures in C".
2 Yashwant Kanetkar, "Data Structures through C", BPB Publication
3 Aaron Tenenbaum, Yedidyah Langsam, "Data structure using C", LPE, Pearson education
4 Mark allen weiss, "Data structure and algorithm analysis in C", Pearson education, 2nd edition.

Useful Links:

1 http://nptel.ac.in/courses/106106130/ IIT Madras
2 http://nptel.ac.in/courses/106103069/ IIT Guwahati
3 http://nptel.ac.in/courses/106106127/ Prof. Shankar Balachandran, IIT Madras

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	-	1	-	-	-	-	-	-	-	1	1
CO2	2	2	2	1	2	-	-	-	-	-	-	-	1	1
CO3	2	2	2	2	2	-	-	-	-	-	-	-	1	1
CO4	-	1	3	2	3	-	-	-	-	-	-	-	1	1

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	-	5	3	20
Apply	5	5	3	10
Analyze	-	-	-	-
Evaluate	5	-	1	10
Create	-	-	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech.
IT303: Digital Systems

Teaching Scheme		Examination Scheme	
Lectures	4 Hrs/week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits	4	**TA**	10
		ESE	60

Course Objectives:

1. To provide knowledge of basic arithmetic and logical operations in digital systems.
2. To understand basics of sequential & combinational logics.
3. To develop designing and implementation skills of combinational logic circuits and sequential circuits by using logic gates.
4. To train the students to lay a strong foundation for digital systems.

Course Contents

		Hours
Unit I	**Number Systems** Binary Numbers, Number-Base Conversions, Octal and Hexadecimal number system, Complements of numbers, Signed Binary Numbers.	7
Unit II	**Boolean Algebra** Introduction, Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard forms, Digital Logic Gates	8
Unit III	**Gate-Level Minimization** Introduction, The Map Method, Four-Variable K-Map, Product of Sum Simplification, Don't-Care Conditions, NAND and NOR Implementation.	8
Unit IV	**Combinational Logic** Introduction, Combinational Circuits, Binary Adder-Subtractor, (**Self Study:** Decimal Adder), Binary Multiplier, Decoders, Encoders, Multiplexers, Demultiplexers.	7

Unit V	**Sequential Logic**	**8**

Introduction, Sequential Circuits, (**Self-study:** Difference between combinational circuits and sequential circuits), memory element - latch, flip- flops: Design, truth table, excitation table of Master Slave SR, JK level triggered, D, T flip flops.

Unit VI	**Registers and Counters**	**8**

A) Registers:
Buffer register, shift register types - SISO, SIPO, PISO & PIPO, applications of shift registers - ring counter, twisted ring counter.
B) Counters:
Asynchronous, synchronous and modulo counters study of modulus n counter ICs- 7490, 74191 & their applications to implement mod counters.

Course Outcome (CO):

1. To apply knowledge of basic arithmetic and logical operations in digital systems.
2. To design combinational logic circuits and sequential circuits.
3. To develop, designing and implementation skills of combinational logic circuits and sequential circuits by using logic gates.

Text Books:

1. M Morris Mano, "Digital Design", Prentice Hall, 2001, 3rd Edition
2. R.P. Jain, "Modern Digital Electronics", Tata McGraw-Hill, 2003, 3rd Edition
3. A.P. Malvino, D. P. Leach and G. Saha, "Digital Principles and Applications", McGraw Hill, 2010, 7th Edition.

References:

1. Wakerly Pearon, "Digital Design: Principles and Practices", Pearson Education, 2004, 3rd edition, 4th reprint.
2. Anand Kumar, "Fundamentals of digital circuits", PHI publication, 2001, 1st Edition.
3. Mark Bach, "Complete Digital Design", Tata McGraw Hill, 2005.
4. James Bignell, Robert Donavan, "Digital Electronics", 5th Edition
5. Ronald Tocci and Neal S. Widme, "Digital systems, principles and applications", Pearson Education, 9th Edition.

Useful Links:

1. http://nptel.ac.in/courses/117105080/Prof. D. Roychoudhury IIT Kharagpur
2. http://nptel.ac.in/courses/117106086/Prof. S. Srinivasan IIT Madras

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	-	-	-	-	-	-	-	-	-	1	2
CO2	2	2	2	-	2	-	-	-	-	-	-	-	1	2
CO3	1	-	1	-	-	-	-	-	-	-	-	-	1	1

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	-	5	3	20
Apply	5	5	3	10
Analyze	-	-	-	0
Evaluate	5	-	1	10
Create	-	-	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech.
IT309: Discrete Mathematics (w.e.f. AY 2017-18)

Teaching Scheme		Examination Scheme	
Lectures	4Hrs/week	**CT1**	15
Tutorial	1Hr/week	**CT2**	15
Total Credits	5	**TA**	10
		ESE	60

Course Objectives:
1. To understand Mathematical Logic.
2. To understand basics of Set theory.
3. To gain the knowledge of permutation, combination and discrete probability.
4. To understand the concepts of Relation and Function
5. To understand Graph theory and its applications
6. To understand Algebraic systems and its applications.

Course Contents

		Hours
Unit I	**Mathematical Logic**	**8**
	Introduction, statement and notation, connectives, statement formulas and truth tables, well-formed formulas, tautologies, equivalence of formulas, Tautological equivalence, Inference of Theory for statement Calculus.	
Unit II	**Sets and Combinatory**	**8**
	Set theory, Venn diagram, set operations, algebra of set Principle of Inclusion and exclusion, Rule of sum and product, Permutations, combinations, Discrete Probability, Applications.	
Unit III	**Relations and Functions**	**8**
	Relations, Properties of binary relations, Relation matrix and graph of relation, closure of relations, Equivalence Relations, Partial ordering relations and Hasse diagram, Functions, composition of functions, inverse function.	

Unit IV	**Graph Theory**	**8**

Basic Terminology, Multi graph and weighted graphs, Adjacency and incidence, Representation of graphs, Paths and circuits, Eulerian and Hamiltonian Paths and Circuits, planar graph, Graph coloring, Applications.

Unit V	**Groups and Rings**	**7**

Algebraic Systems, Semi Groups, Groups, Monoid, Abelian Groups, subgroups, Isomorphism, Automorphisms and Homomorphism group, Rings, Integral Domain and Fields.

Unit VI	**Lattices and Algebraic Systems**	**7**

Lattices and Algebraic Systems, Principle of duality, Properties of Algebraic system defined by Lattices, Boolean Lattices and Boolean Algebras, (**Self Study:** Boolean functions and Boolean Expressions, Normal Forms).

Course Outcome (CO):
1. Construct Mathematical Logical proofs.
2. Describe basics of Set theory.
3. Solve problems of permutation, combination and discrete probability.
4. Solve problems of Relation and Function
5. Solve problems of Graph theory and its applications
6. Describe Algebraic systems and its applications.

Text Books:
1. J. P. Tremblay & R. Manohar, "Discrete Mathematical Structures with Application to Computer Science", MGH Publication
2. C. L. Liu, "Elements of Discrete Mathematics", TMH Publication
3. G. Shanker Rao," Discrete Mathematical Structures", New Age International, 2002.

References:
1. Semyour Lipschutz, Marc Lipson (MGH), "Discrete Mathematics", Schaum's outline Series.
2. Kenneth H. Rosen, "Discrete mathematics and its applications", McGraw-Hill Publication
3. B. Kolman, R. Busby, S. Ross, "Discrete Mathematical Structures", Pearson Education, 4th Edition.
4. Eric Gossett, "Discrete Mathematics with Proof", Wiley India Ltd., 2nd Edition

Useful Links:

1 http://nptel.ac.in/courses/106106094/ Dr. Kamala Krithivasan, IIT Madras

List of Submission:

1 Total 8-10 number of tutorials should be conducted based on above syllabus.

Course Articulation Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	-	-	-	-	1	-	-	-	-	2	1
CO2	3	1	-	-	-	-	-	1	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	1	-	-	-	-	2	1
CO4	3	1	-	-	-	-	-	1	-	-	-	-	-	-
CO5	3	1	-	-	-	-	-	1	-	-	-	-	1	2
CO6	3	1	-	-	-	-	-	1	-	-	-	-	-	-

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	5	5	4	20
Apply	5	5	3	10
Analyze	-	-	-	-
Evaluate	-	-	-	10
Create	-	-	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech.
IT305: Object Oriented Programming with C++

Teaching Scheme		Examination Scheme	
Lectures	4 Hrs/week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits	4	**TA**	10
		ESE	60

Course Objectives:

1. To understand limitations of Procedural programming and Benefits of Object Oriented Programming
2. To describe OOPs concepts like Class, Objects, Data hiding, Data Encapsulation, Data Abstraction, Inheritance and polymorphism and their implementation using C++.
3. To use advanced features like Generic programming using Templates, STL and Exception Handling

Course Contents

		Hours
Unit I	**Object Oriented Programming** Object Oriented Programming Paradigm, Concepts of object-oriented programming. Applications of OOP. Beginning with C++: simple program and its structure, Basic Types, variables, constants, storage class, operators, expression, control statements, loop statements, functions, inline function, Array, string, pointers, structure	10
Unit II	**Classes and Objects** Defining Class, data members, member functions, Access specifiers – public, private, protected, constructor, parameterized constructor, destructor, array of objects, passing objects to functions, returning object.	6
Unit III	**Inheritance** Need of Inheritance, Concept, public, private, protected inheritance, Single inheritance, Multiple and multilevel inheritance, Abstract class, Hybrid Inheritance, Virtual base class, overriding of member functions, static variable, static function, friend function, friend class.	6

Unit IV	**Pointers and Polymorphism**	**10**

Pointers basics of memory management, New and delete operators, Pointer to object, Pointer to data members, this pointer. Need of Polymorphism, concept, Compile time polymorphism or early binding: function over loading and operator overloading, overloading - unary, binary, arithmetic operators, relational operators, overloading new and delete operators, insertion and extraction operators, run time polymorphism or late binding using Virtual function, pure virtual function.

Unit V	**Files and Streams**	**8**

Concept of Streams, concept of File, opening and closing a file, detecting end-of-file, file modes, file pointer, reading and writing characters, strings and objects to the file, operations to move file pointers i.e seekg, seekp, tellg, tellp.

Unit VI	**Advanced C++ features**	**6**

Exception handling: Introduction, syntax for exception handling code: try-catch-throw, Multiple Exceptions, Exceptions with arguments, (**Self Study:** Templates: Function template and class template, Standard Template Library (STL), containers, iterators and algorithms)

Course Outcome (CO):

1. To identify basic characteristics of Object oriented programming languages.
2. To apply concept of reusability using inheritance.
3. To determine need and applications of polymorphism.
4. To test and validate exceptions and other advance features of C++ Language.

Text Books:

1. E Balguruswamy, "Object Oriented Programming with C++",McGraw-Hill publication, 4thEdition
2. Herbert Schildt, "C++: The Complete Reference", McGraw-Hill, 4th Edition

References:

1. Bjarne Stroustrup, "C++ Programming with language", AT & T
2. R. Lafore, "Object Oriented Programming in C++", Galgotia Publications, 3rd Edition
3. Cay Horstmann, Timothy Budd, "BIG C++", Wiley India
4. Yashvant Kanetkar, "Let us C++", BPB publication, 2nd Edition
5. K Venugopal, Raj Buyya, "MASTERING C++", McGraw Hill Education

Useful Links:

1. http://www.spoken-tutorial.org   NMEICT Project of Govt. Of India.
2. http://nptel.ac.in/courses/106106127/41 Prof. Shankar Balachandran, IITMadras

Course Articulation Matrix

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	2	1	2	-	-	-	-	-	-	2	2	2
CO2	-	-	3	1	-	-	-	-	-	-	-	2	3	2
CO3	-	-	3	-	-	-	-	-	-	-	-	1	3	2
CO4	-	-	3	1	2	-	-	-	-	-	-	-	2	2

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	2	10
Understand	-	-	-	-
Apply	5	10	4	30
Analyze	5	-	3	10
Evaluate	-	-	1	10
Create	-	-	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech.
IT306: Data Structures and Applications Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	50
Total Credits	1	**ESE**	25

Course Objectives:

1 Analyze algorithm in implementing linear &nonlinear data structure

2 Knowledge of various operation on data structure like searching & sorting

3 Knowledge of various traversal operation

Course Contents

Experiment 1   Implement stack and queue as an ADT using array.

Experiment 2   Implement Stack as an ADT to perform expression Conversion and evaluation (infix to postfix, infix to prefix, prefix to infix, prefix to postfix, postfix to infix and postfix to prefix).

Experiment 3   Create a program to perform following operations on singly linked list/Circular linked list/ Doubly linked list: Create, Insert – Start, end, In Between, Search & delete, Display etc.

Experiment 4   Create a program to perform Operations like Insert, Delete, finding front and rear element, display for Circular Queue using Linked List.

Experiment 5   Creation of binary search tree and perform recursive and non-recursive in order, preorder and post order Traversals.

Experiment 6   Implement a program to represent a given graph using adjacency list and perform DFS and BFS.

Experiment 7   Implement Sorting Methods using functions- Bubble Sort, Selection Sort, Insertion Sort.

Experiment 8   Implement Sorting Methods using recursion- Quick Sort and Merge Sort.

Experiment 9   Implement Sorting Methods using functions- Heap Sort.

Experiment 10   Implementation of Hashing.

List of Submission:

    1   Total number of Experiments: 10

Additional Information
Course Outcome(CO):

    1   Describe analysis and design notation of algorithm
    2   Implement sequential and linked representation of linear data structure.
    3   Implement non linear data structure like tress and graph.
    4   Solve the searching and sorting techniques in systematic way

Course Articulation Matrix:

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2
CO1	2	2	-	3	2	-	-	-	-	-	-	-	1	1
CO2	2	2	-	1	2	-	-	-	-	-	-	-	1	1
CO3	2	1	-	-	2	-	-	-	-	-	-	-	1	1
CO4	-	1	-	-	-	-	-	-	-	-	-	-	1	1

Assessment Pattern:

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	CA 50	ESE 25
Assembling												
Testing												
Observing/ implementing	√	√	√	√	√	√	√	√	√	√	25	
Analyzing	√	√	√	√	√	√	√	√	√	√	25	
Interpreting												
Designing												
Creating												
Deducing conclusions												

Government College of Engineering, Karad
Second Year B. Tech.
IT307: Digital Systems Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	50
Total Credits	1	**ESE**	--

Course Objectives:

1. To study of basic gates & Boolean algebra.
2. To gain the knowledge of combinational circuit.
3. To gain the knowledge of sequential circuit.

Course Contents

Experiment 1   Study of Basic gates

Experiment 2   Study of Universal Gates Using NAND & NOR only

Experiment 3   De Morgan's theorem using gates

Experiment 4   Study of Boolean Algebra

Experiment 5   Study of K-map

Experiment 6   Study of Adders using basic & universal gates

Experiment 7   Study of Subtractors using basic & universal gates

Experiment 8   Study of MUX/DEMUX

Experiment 9   Study of RS & D Flip Flop

Experiment 10   Study of JK Flip Flop

List of Submission:

1. Total number of Experiments: 10

Additional Information
Course Outcome(CO):

1 Implement basic gates & Boolean algebra.
2 To design combinational circuit.
3 To design sequential circuit.

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3	1	-	2	2	-	-	-	-	-	-	-	1	2
CO2	2	2	-	2	2	-	-	-	-	-	-	-	1	2
CO3	2	2	2	2	-	-	-	-	-	-	-	-	1	2

Assessment Pattern:

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	CA 50	ESE
Assembling												
Testing												
Observing/ implementing	√	√	√	√	√	√	√	√	√	√	25	
Analyzing	√	√	√	√	√	√	√	√	√	√	25	
Interpreting												
Designing												
Creating												
Deducing conclusions												

Government College of Engineering, Karad
Second Year B. Tech.
IT308: Object Oriented Programming with C++ Lab

Laboratory Scheme		Examination Scheme	
Practical	2 Hrs/week	**CA**	50
Total Credits	1	**ESE**	25

Course Objectives:

1. To understand limitations of Procedural programming and Benefits of Object Oriented Programming

2. To describe OOPs concepts like Class, Objects, Data hiding, Data Encapsulation, Data Abstraction, Inheritance and polymorphism and their implementation using C++.

3. To use advanced features like Generic programming using Templates, STL and Exception Handling

Course Contents

Experiment 1   Implementation of Array, string and structure

Experiment 2   Implementation of Class Objects, Constructor, destructor, constructor overloading.

Experiment 3   Implementation of array of object passing as an argument to a function

Experiment 4   Implementation of Multiple and multilevel inheritance with function overriding.

Experiment 5   Implementation of Virtual base class and Virtual function

Experiment 6   Implementation of static variable and static function.

Experiment 7   Implementation of friend function and friend class.

Experiment 8   Implementation of function over loading and operator overloading.

Experiment 9   Implementation of dynamic memory allocation using New and delete operators

Experiment 10   Implementation of Virtual function and pure virtual function

Experiment 11   Implementation of random access file.

Experiment 12   Implementation of exception handling.

Experiment 13   Study of standard template library containers, iterators and algorithms

List of Submission:
      1   Total number of Experiments: 13

Additional Information
Course Outcome(CO):
      1   To implement basic C++ programming concepts like inheritance, polymorphism, encapsulation.
      2   To implement, test and validate exceptions and other advance features of C++ Language.
      3   To analyze errors and program behaviour for different set of inputs.

Course Articulation Matrix:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	3	1	-	-	-	-	-	-	-	2	3	2
CO2	-	-	3	1	2	-	-	-	-	-	-	1	3	2
CO3	-	-	3	2	1	-	-	-	-	-	-	2	2	2

Assessment Pattern:

Skill Level	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8	Ex 9	Ex 10	Ex 11	Ex 12	Ex 13	CA 50	ESE 25
Assembling															
Testing															
implementing	√	√	√	√	√	√	√	√	√	√	√	√		√	√
Analyzing	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Interpreting															
Designing															
Creating															
Deducing conclusions															

Government College of Engineering Karad
Second Year B. Tech.
CC 301: Environmental Studies

Teaching Scheme		Examination Scheme	
Lectures	3Hrs/week	**CT1**	15
Laboratory	-	**CT2**	15
Total Credits	0 (Audit)	**TA**	10
		ESE	60

Course Objectives:

1. To learn key concepts from Economic and Social analysis as they pertain to design and evaluation of environmental policies and institutions.
2. To learn concepts and methods from ecological and physical sciences and their applications in environmental problem solving.
3. To study the ethical, cross cultural and historical context of environmental issues and the links between human and natural systems.

Course Contents

		Hours
Unit I	**Natural Resources and Associated Problems:**	**8**

Nature of Environmental Studies**:** Definition, scope and importance.
Multidisciplinary nature of environmental studies
Need for public awareness.
a) Environment resources: Use and over-exploitation, deforestation, dams and their effects on forests and tribal people.
b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
c) Mineral resources: Usage and exploitation. Environmental effects of extracting and using mineral resources.
d) Food resources: World food problem, changes caused by agriculture effect of modern agriculture, fertilizer-pesticide problems.
e) Energy resources: Growing energy needs, renewable and nonrenewable energy resources, use of alternate energy sources. Solar energy, Biomass energy, Nuclear energy.
f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Unit II	**Ecosystems:**	**6**

Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristics features,

structure and function of the following ecosystem :-
a) Forest ecosystem, b) Grassland ecosystem, c) Desert ecosystem,
d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit III	**Biodiversity and its conservation :**	**6**

Introduction- Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega- diversity nation. Western Ghat as a biodiversity region. Hot-spot of biodiversity. Threats to biodiversity habitat loss, poaching of wildlife, man- wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit IV	**Environmental Pollution:**	**6**

Definition: Causes, effects and control measures of: Air pollution, Water pollution, soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards.
Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of a individual in prevention of pollution.

Unit V	**Social Issue and Environment:**	

Disaster management: floods, earthquake, cyclone, tsunami and **8** landslides. Urban problems related to energy Water conservation, rain water harvesting, watershed management Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, Social Environment, sustainability nuclear accidents and holocaust. Wasteland exclamation.
Consumerism and waste products.

Unit VI	**Environmental Protection :**	**8**

From Unsustainable to Sustainable development. Environmental Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Population Growth and Human Health, Human Rights, Environment Impact Assessment, Green Tribunals.

Field Work :

Visit to a local area to document environmental assets-
river/Forest/Grassland/Hill/Mountain.
OR
Visit to a local polluted site - Urban / Rural / Industrial /Agricultural.
OR

Study of common plants, insects, birds.
OR
Study of simple ecosystems - ponds, river, hill slopes, *etc*.

Course Outcome:

1 Students will explain key concepts from Economic, and Social analysis as they pertain to design and evaluation of environmental policies and institutions.
2 Student will appreciate concepts and methods from ecological and physical sciences and their applications in environmental problem solving.
3 Student will appreciate the ethical, cross cultural and historical context of environmental issues and the links between human and natural systems.
4 Student will reflect critically about their roles and identities as citizens, consumers, environmental actors in a complex and interconnected world.

Text Books:

1 Text Book of Environmental Studies by Dr. P.D. Raut from Shivaji University. (Edition 2013)
2 Concise Environmental Studies by Dr. Madhukar Bachulkar, B.V. Kulkarni, Sharvil A. Shah. R.K. Publications. (Edition 2014)
3 Miller T.G. Jr., Environmental Science. Wadsworth Publications Co. (Edition 2007)
4 Townsend C., Harper, J. and Michael Begon, Essentials of Ecology, Blackwell Science. (Edition 2012)
5 Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno- Science Publications. (Edition 2010)

References:

1 Agarwal, K.C.2001, Environmental Biology, Nidi Pub. Ltd., Bikaner. (Edition 2011)
2 BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380013, India, Email:mapin@icenet.net (Edition 2008)
3 Cunningham, W.P. Cooper, T.H.Gorhani, E. & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Pub. Mumbai, 1196p (Edition 2010)
4 De A.K., Environmental Chemistry, Wiley Wastern Ltd. (Edition 2014)
5 Down to Earth , Centre for Science and Environment , New Delhi. (Edition 2011)
6 Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, vol. I and II, Environmental Media. (Edition 2014)
7 The Water (Prevention and Control of Pollution) Act, 1974
8 The Air (Prevention and Control of Pollution) Act, 1981
9 The Environment (Protection) Act, 1986
10 Hazardous Wastes (Management and Handling) Rules, 1989

11   The Forest (Conservation) Act, 1980

12   The Wildlife Protection Act, 1972

13   The National Environment Tribunal Act, 1995

14   The Noise Pollution Act, 1974

Mapping of CO and PO

	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		√	√	√	√	√	√		√	√	√	√		
CO2	√		√	√	√	√	√		√		√			
CO3		√		√	√	√	√		√	√	√	√		
CO4	√	√	√	√	√	√	√			√		√		

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyze	3	3	2	12
Evaluate	3	3	2	12
Total	15	15	10	60

Government College of Engineering Karad
Second Year B. Tech
IT401: Systems Software

Teaching Scheme   **Examination Scheme**

Lectures   3Hrs/week   **CT1**   15
Tutorial   **CT2**   15
Total Credits   3   **TA**   10
                                              ESE   60

Course Objectives:

1   To provide information of system software in a computer systems & language processing activities.
2   To understand basics of assemblers and macro preprocessors.
3   To provide knowledge of linkers, loaders, compilers and interpreters.
4   To differentiate between language processors.
5   To understand language processors and various language processing activities.
6   To analyze and use different open sources software.

Course Contents

		Hours
Unit I	**Introduction and Overview of Language Processors** System software, Goals, System programs and System programming, Views of System Software, Programming languages and Language Processors, Language processing activities, Fundamentals of language processing.	**3**
Unit II	**Assemblers** Elements of assembly language programming, a simple assembly scheme, Pass structure of assemblers, Design of a two pass assembler	**6**
Unit III	**Macros and Macro Preprocessor** Introduction, Macro definition and call, Macro Expansion, Nested macro calls, Advanced macro facilities, Design of macro preprocessor	**8**
Unit IV	**Compiler – Lexical Analysis and Syntax Analysis** Language processor, the structure of a compiler, Lexical Analysis: The role of the lexical analyzer, input buffering, Specification of tokens, recognition of tokens, Syntax Analysis: Introduction, Context-free grammars, Writing a grammar, Top-down parsing	**8**

| **Unit V** | **Compiler – Intermediate-Code Generation and Code Generation** | **7** |

Variants of syntax tree, Three-address code, Code Generation: Issues in the design of code generator, The target language, Address in the target code

| **Unit VI** | **Linkers and Loaders** | **7** |

Introduction, Relocation and linking concepts, Design of a linker, Self-relocating programs, linking in MS DOS, Linking of overlay structured programs, Dynamic linking, Loaders Open Source Software: GCC, (**Self-Study:** GDB, DDD)

Course Outcome (CO):
1 To understand semantic gap and bridging it using system software
2 To describe language processors and various language processing activities.
3 To demonstrate use of different open sources software
4 To identify and explore different compiler phases

Text Books:
1 D.M. Dhamdhere, "Systems Programming", McGraw Hill, 1st Edition
2 Alfred V. Aho, "Compilers principles, techniques, & tools", Pearson Education., 2nd Edition.

References:
1 J. J. Donovan, "System Programming", Tata Mc-Graw Hill.

2 Steven S. Muchnick, "Advanced Compiler Design Implementation", Morgan Kaufmann Publication
3 Dhamdhere, D.M., "Introduction to Systems Software", Tata Mc-Graw Hill 1996.
4 Srimanta Pal, "System Programming", Oxford University Press.

5 D.M. Dhamdhere, "System Programming and operating systems", TMGH, 2nd Edition.
6 Doug Brown, John Levine, Tony Mason, "Lex & Yacc", O'Reilly Media, 2nd Edition.

Useful Links:
1 gcc.gnu.org
2 www.gnu.org/s/gdb/
3 www.gnu.org/software/ddd/

Course Articulation Matrix:

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	1	1	-	-	-	-	-	-	-	-	2	1
CO3	-	-	-	1	3	-	-	-	-	-	-	-	2	1
CO4	-	-	-	1	3	-	-	-	-	-	-	-	2	1

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	-	10
Understand	10	5	5	35
Apply	-	-	-	-
Analyze	-	5	5	15
Evaluate	-	-	-	-
Create	-	-	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
IT402: Database Management Systems

Teaching Scheme		Examination Scheme	
Lectures	3Hrs/week	CT1	15
Tutorial	--	CT2	15
Total Credits	3	TA	10
		ESE	60

Course Objectives:

1 To understand the fundamental concepts of database management.
2 To study the physical and logical database designs, database modeling and relational models.
3 To study the SQL, PL/SQL and concurrency control in Database.
4 To understand the security and authorization used in database.

Course Contents

		Hours
Unit I	**Introduction**	**5**

Early information systems – problems, Advantages of DBMS over file-processing systems, Organization of Database, Components of Database Management Systems, Data Models, Database Architecture, Schema.

Unit II	**Relational Model**	**8**

Entity Relation model, Structure of Relational Databases, the Relational Algebra, Tuple Relational Calculus, Structured Query Language (SQL), PL/SQL- Stored Procedures, functions, trigger, cursor.

Unit III	**Integrity Constraints and Design**	**8**

Domain Constraints, Referential Integrity, Functional Dependencies, Closure of set of Functional Dependencies, Pitfalls in Relational Database Design, Decomposition, Desirable Properties of Decomposition, Normalization using Functional Dependencies (1NF, 2NF, BCNF, 3NF).

Unit IV	**File and Index Structure**	**7**

Physical storage media, Storage access, File Organization, Organization of Records in Files, Data Dictionary Storage, Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing, Comparison of Indexing & Hashing

Unit V		7
	Concurrency Control and Crash Recovery	

Transaction concept, Transaction state, Concurrent Executions, Serializability, Recoverability, testing for Serializability, Lock-Based Protocols, Graph based Protocols, Time-Stamp Based Protocols, Validation based protocols, (**Self Study:** Recovery and Atomicity, Log based recovery).

Unit VI	Database Security and Authorization	4

Access Control, Discretionary Access Control, Mandatory access control, Additional issues Related to security.

Course Outcome (CO):

1. Differentiate database systems from file systems by enumerating the features provided by database systems
2. Demonstrate and understanding of the relational data model.
3. Master the basics of SQL and construct queries using SQL, PL/SQL
4. Design and implement a database schema for a given problem-domain
5. Applying security and authorization to database

Text Books:

1. Henry F. Korth, Abraham Silberschatz, Sudarshan, "Database System Concept", McGrawHill Inc.,4thEdition onwards
2. Elmasri & Navathe, "Fundamentals of Database System", Addison Wesely Publication. (2006), 5th Edition
3. RamKrishnan, Gehrke, "Database Management System",McGraw Hill Inc., 3rdEdition

References:

1. J.D. Ullman, "Principles of DataBase Systems", Galgotia Publications
2. Wiederhold, "Database Design", McGraw Hill Inc.
3. Jeffrey D Ullman & Jennifer Widom, "A first course in Database System", 2nd Edition, 2007
4. C. J. Date., "An Introduction to Database System", Pearson Publication, 8th Edition

Useful Links:

1. http://nptel.ac.in/courses/106106093/ Prof. D. Janakiram, IIT Madras
2. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-830-database-systems-fall-2010/lecture-notes/
3. https://www.cse.iitb.ac.in/~sudarsha/db-book/slide-dir/
4. http://www.tutorialspoint.com/dbms/

Course Articulation Matrix:

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	3	2	1	-	-	-	-	-	-	1	2	2
CO2	-	-	2	2		-	-	-	-	-	-	1	2	1
CO3	-	-	3	2	2	-	-	-	-	-	-	2	3	2
CO4	-	-	3	2	1	-	-	-	-	-	-	-	3	2
CO5	-	-	3	1	1	-	-	-	-	-	-	1	2	1

. **Assessment Pattern:**

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	-	-	3	20
Apply	5	5	3	10
Analyze	-	-	-	-
Evaluate	-	-	1	10
Create	5	5	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
IT403: Data Communication

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits:	3	**TA**	10
		ESE	60

Course Objectives:

1. To understand the basic concepts of Data Communication
2. To study data and signals
3. To study data encoding
4. To study multiplexing and switching
5. To study network models
6. To study network components

Course Contents

		Hours
Unit I	**Data Communication Fundamentals**	**7**
	Data Communication– Components, Data representation, Data Flow, Networks – Definition, Uses, Topologies, Categories, Protocols, Standards, Standards Organizations **(Self-Study:** Internet – History, ISP hierarchy)	
Unit II	**Data & Signals**	**6**
	Analog and Digital, Periodic Analog Signals, Digital signals, Transmission Impairments, Data Rate Limits **(Self-Study:** Performance)	
Unit III	**Data Encoding**	**8**
	Digital Transmission: Digital-to-Digital conversion, –Line coding, Block coding, scrambling, Analog-to-Digital conversion – Pulse code modulation, delta modulation, Transmission Modes, Analog Transmission: Digital-to-Analog conversion – ASK, FSK, PSK, **(Self-Study:** Analog-to-Analog conversion – AM, FM, PM)	

Unit IV	**Multiplexing & Switching**	7

Multiplexing – Frequency-Division, Wavelength-Division, Time-division, switching – Circuit switched, Packet switched, Message switched (**Self Study:** Structure of switches)

Unit V	**Network Models**	7

Layered tasks, the OSI reference model, TCP/IP protocol suit, Addressing, Wireless Networks: Bluetooth, Cellular Telephone, Satellite Network (**Self Study:** ATM model)

Unit VI	**Networking Components**	7

Transmission Media, Guided Transmission Media – Twisted pair, Coaxial, OFC, Unguided Transmission Media –Propagation Modes, Radio Waves, Microwave Infrared Connecting devices: Connectors, Transceivers and Media Converters, Repeaters, Hubs, (**Self Study:** NICs, Bridges and Switches)

Course Outcome (CO):
1 Define basic data communication system
2 Understand data and signals
3 Explain data encoding techniques
4 Explain multiplexing and switching
5 Define and Analyze network models
6 Apply standard practices in network building.

Text Books:
1 Behrouz A. Forouzan, "Data communications and Networking", McGraw-Hill Publications, 4th Edition
2 William Stallings, "Data and computer communication", Pearson Education

References:
1 Andrew S.Tanenbaum, "Computer Networks", Prentice Hall India, 3rd Edition
2 Shanmugam K, "Digital and Analog Communication Systems", John Wiley & Sons (Asia) Pvt. Ltd. ISBN 9971-51-146-0
3 Gupta P, "Data Communications", PHI, 2004, ISBN 81 - 203 - 1118 – 3
4 Wayne Tomasi, "Introduction to Data Communications and Networking", Pearson Education, 2007, ISBN 81-317-0930-2
5 Godbole, "Data Communications and Networks", Tata McGraw-Hill Publications, 2002,0 - 07 - 047297 – 1

Useful Links :

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	-	-	-	-	-	-	-	-	3	-
CO2	3	2	2	2	-	2	2	-	-	-	-	-	3	1
CO3	-	3	3	1	-	1	-	-	-	-	-	-	1	2
CO4	-	3	3	2	-	1	-	-	-	-	-	-	2	3
CO5	3	2	2	3	-	3	2	1	-	-	-	-	1	3
CO6	2	1	1	-	-	-	-	-	-	-	-	-	2	3

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	5	5	3	20
Apply	-	-	3	10
Analyze	-	-	-	-
Evaluate	5		1	10
Create	-	-	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
IT404: Theory of Computer Science

Teaching Scheme		Examination Scheme	
Lectures	3Hrs/week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits	3	**TA**	10
		ESE	60

Course Objectives:

1 Model of Language acceptors like Finite Automata for Regular Language and Push Down Automata for Context Free Language
2 Understand formal languages like Regular Language and Context Free Language
3 Interpret Grammar, Languages and their relationships.
4 Design of Automata as language descriptors and recognizers

Course Contents

		Hours
Unit I	**Finite Automata**	**8**

Automata Theory, Inductive Proofs, The Central Concepts of Automata Theory, Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata with Epsilon-Transitions, Equivalence of FAs-NFA to DFA, Epsilon-NFA to NFA, Epsilon-NFA to DFA. (**Self-Study:** An application – Text Search)

Unit II	**Regular Expressions and Languages**	**7**

Regular Expressions, Finite Automata and Regular Expressions: DFA to RE, DFA to RE by Eliminating States, RE to FA, Proving Languages Not to Be Regular, Closure Properties of Regular Languages, Minimization of DFA's, (**Self Study:** Applications of Regular Expressions)

Unit III	**Context-Free Grammars and Languages**	**7**

Context-Free Grammars- Definition, Derivations, Leftmost and Rightmost Derivations, Language of a Grammar, Sentential Forms, BNF and CNF notations, Parse Trees, Ambiguity in Grammars and Languages

Unit IV	**Push Down Automata**	**7**

Definition, The Language of PDA, Equivalence of PDA's and CFG- CFG to PDA, PDA to CFG, Deterministic PDA

Unit V	**Properties of Context-Free Languages**	**6**

Normal Forms for CFGs-Eliminating Useless Symbols, Reachable Symbols, eliminating Null-Productions, Eliminating Unit Productions, CNF, Closure Properties of CFLs

Unit VI	**Introduction to Turing Machines**	**5**

Problems That Computers Cannot Solve, The Turing Machine, Programming Techniques for Turing Machines, Extensions to the Basic Turing Machine - Multitape, Nondeterministic Turing Machines, Semi-infinite Tapes, Universal, (**Self Study:** Turing Machines and Computers)

Course Outcome (CO):

1. Formulate language based problem
2. Classify problems with suitable complexity classes
3. Design abstract machines for system applications

Text Books:

1. Hopcroft, Motwani, Ullman, "Introduction to Automata Theory, Languages, and Computation", Pearson Publication, 3rd Edition,
2. John.C.martin, "Introduction to the Languages and the Theory of Computation", , Tata McGraw Hill, 2003, 3rd Edition

References:

1. Peter Linz, "An Introduction to Formal Language and Automata", Narosa Publishing house, 2006, 4th Edition
2. Michael Sipser, "Introduction to the Theory of Computation", Thomson Learning, 1997
3. K.L.P.Mishra, "Theory of Computer Science: Automata, Languages and Computation", PHI, 3rd Edition

Useful Links:

1. http://nptel.ac.in/courses/106103070/Dr.Diganta Goswami, IIT Guwahati
2. https://www.coursera.org/course/automata Jeff Ullman, Stanford

Course Articulation Matrix:

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	3	2	2	2	-	-	-	-	-	-	-	-	2	-
CO 2	-	3	-	-	-	-	-	-	-	-	-	-	-	1
CO 3	-	-	3	3	1	-	-	1	1	-	-	1	-	2

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	-	15
Understand	5	5	5	20
Apply	-	-	-	-
Analyze	-	-	-	-
Evaluate	-	-	-	-
Create	5	5	5	25
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
IT405: Computer Organization and Architecture

Teaching Scheme		Examination Scheme	
Lectures	3Hrs/week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits	3	**TA**	10
		ESE	60

Course Objectives

1 To study CPU Organization and fundamentals
2 To study organization of memory in the system.
3 To understand the basic concepts Parallel processing
4 To understand organization of Pentium processor.

Course Contents

		Hours
Unit I	**Processor Basics**	7

CPU Organization: Fundamentals, Study of design and architecture of a small accumulator based CPU, Architecture extensions, a typical CPU with general register organization, pipelining, RISC Machines: Organization of ARM6, CISC Machines: Organization of 68020,
Data representation: Fixed- Point Numbers, Floating Point Number- The IEEE 754 floating pointing numbers, Instruction Set: Instruction Formats, Addressing Modes, Self-Study: Instruction Types.

		Hours
Unit II	**Datapath Design**	7

Addition-Subtraction-High speed adders-- A 4-bit carry-lookahead adder, Design of a complete twos-complement adder- subtractor,
Multiplication: twos-complement multiplier, Robertson multiplication algorithm for twos–complement fractions, Booths multiplication algorithm,
Division: Non-restoring division algorithm for unsigned integers.

| **Unit III** | **Control Design** | **6** |
| | Hardwired Control: Design of DMA controller, Design Examples: Multiplier Control, Implementing a multiplier control unit, CPU control unit: Control unit design: Implementing a program control unit. | |

| **Unit IV** | **Memory Organization** | **7** |
| | Memory: Memory device Characteristics, Random access memories: A commercial 64Mb DRAM chip, Serial-Access Memories: A commercial magnetic hard-disk memory unit, Memory Systems: Multilevel memories, Address translation, Memory allocation, Caches: Cache organization, Cache operation, Address Mapping. | |

| **Unit V** | **Input / Output** | **5** |
| | External Devices, I/O modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels and Processors. Introduction to assembly and maintenance. | |

| **Unit VI** | **Parallel Processing** | **8** |
| | Parallel Computer Structures: Pipeline Computers, Array computers, Multiprocessor systems, performance of parallel computers, Dataflow and New concepts; Architectural Classification Schemes: Multiplicity of Instruction- Data streams, Serial vs Parallel processing, Parallelism vs pipelining; (**Self Study:** Pentium 4 Organization) | |

Course Outcome (CO):

1 To understand the computer architecture and organization, computer arithmetic, Memory and CPU structures & functions.
2 To learn more about different computer architectures and hardware.
3 To evaluate the system performance.

Text Books:

1 J. P. Hayes, "Computer Architecture & Organization", McGraw-Hill publication, 3rd Edition.
2 W. Stallings, "Computer Organization and Architecture: Designing for Performance", Pearson Education, 6th Edition,ISBN 81– 7808 -792 –8
3 Kai Hwang, "Computer Architecture and Parallel Processing", McGraw-Hill.

References:

1 Hamacher Zaky, "Computer Organization", McGraw-Hill Publication

2 Miles Murdocca, VincentHeuring, "Computer Architecture & Organization An Integrated Approach", Wiley India

3   Murdacca, "Computer Architecture and organization: An integrated Approach", Wiley India Limited.
4   A. Tanenbaum, "Structured Computer Organization", Prentice Hall of India, 1991 ISBN 81 – 203 – 1553 – 7, 4thEdition
5   B. Govindrajalu, "IBM PC and Clones", TMH Publication, 1991, ISBN: 0-07-460136-9

Useful Links:

1   http://nptel.ac.in/courses/106106134/   Prof. MadhuMatyam, IIT Madras
2   http://nptel.ac.in/courses/106102062/ Prof. Anshul Kumar, IIT Delhi

Course Articulation Matrix:

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	3	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	3	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	3	-	-	-	-	-	-	-	-	-	-	-
CO4	1	-	3	-	-	-	-	-	-	-	-	1	-	-

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	-	5	3	20
Apply	5	5	3	10
Analyze	-	-	-	-
Evaluate	5	-	1	10
Create	-	-	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
IT406: Systems Software Lab

Laboratory Scheme		Examination Scheme	
Practical	2 Hrs/week	**CA**	50
Total Credits	1	**ESE**	--

Course Objectives:

1. To understand phases of compilation
2. To describe the concept of LEX and YACC
3. To use debugger tools

Course Contents

Experiment 1 Symbol Table Generation for input *.c file

Experiment 2 Using Recursive Descent Parsing Method to Design a Syntax Analyzer for Simple Expression in C Language.

Experiment 3 Implement LEX program to count the number of vowels and consonants in given string.

Experiment 4 Implement LEX program to recognize a valid arithmetic expression and identify the identifiers and operators present. Print them separately.

Experiment 5 Use of LEX & YACC Tools to Design Simple Grammar to Perform Calculator Operation.

Experiment 6 Program to Create Intermediate Code Generator for Simple Expression in 3AC format using LEX & YACC.

Experiment 7 Program to Create Intermediate Code Generator for Assignment Expression in 3AC format using LEX & YACC.

Experiment 8 Write a Program to Implement Code Generator from Quadruples.

Experiment 9 Study of Decompilation.

Experiment 10 Study of different debugger tools.

List of Submission:

      1   Total number of Experiments: 10

Additional Information
Course Outcome(CO):

      1   Implement the concept of syntax and semantic analysis
      2   Demonstrate the concept of debugger tools
      3   Design the application using LEX and YACC

Course Articulation Matrix:

CO /PO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	2	2	-	2	3	-	-	-	-	-	-	-	1	1
CO2	2	2	-	1	2	-	-	-	-	-	-	-	1	1
CO3	2	1	-	-	2	-	-	-	-	-	-	-	1	1

Assessment Pattern:

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	CA 50	ESE
Assembling												
Testing												
Observing/ implementing	√	√	√	√	√	√	√	√	√	√	25	
Analyzing	√	√	√	√	√	√	√	√	√	√	25	
Interpreting												
Designing												
Creating												
Deducing conclusions												

Government College of Engineering, Karad
Second Year B. Tech
IT407: Database Management Systems Lab

Laboratory Scheme   **Examination Scheme**
Practical   2 Hrs/week   **CA**   50
Total Credits 1   **ESE**   25

Course Objectives:
1 Design ER diagrams for the case studies.
2 Understand various queries and their execution.
3 Design data base and normalize data.
4 Acquire knowledge about SQL and PL/SQL.

Course Contents

Experiment 1   Study and design of ER diagram for given case study

Experiment 2   Implementation of DDL for given case study. (Create table with all constraints, Alter table, Drop table)

Experiment 3   Implementation of DML for given case study. (Basic SQL structure-select, from, where clause. Other DML clauses like insert, update, delete, in, between, etc.)

Experiment 4   Implementation of joins for given case study- (Natural Join, outer joins.)

Experiment 5   Study and Implementation of Views.

Experiment 6   Study and Use of String, Set operations, Order by clause. Queries based on above commands. Aggregate functions, Group by, Having clauses for given case study.

Experiment 7   Study and Implementation of Normalization & Normal forms for given case study.

Experiment 8   Study and implementation of PL/SQL- Stored Procedures, functions for given case study.

Experiment 9   Study and implementation of trigger and cursor.

Experiment 10   Study of DCL commands (Grant, Revoke) for given case study.

Experiment 11	Study and Implementation of B+ index file (creation, traversal, deletion operations)
Experiment 12	Study and Implementation of Static index structure.
Experiment 13	Simulation of Immediate Log based recovery scheme.
Experiment 14	Simulation of Deferred Log based recovery scheme.
Experiment 15	Study and Implementation of database connectivity using JDBC-ODBC for given case study.

List of Submission:
1 Total number of Experiments: 10

Additional Information
Course Outcome(CO):
1 Construct ER diagram for the case study.
2 Populate and query a database using SQL DML/DDL commands.
3 Normalize the database schema for real life problem.
4 Write PL/SQL program including stored procedures, stored functions, and cursors.

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	3	2	2	-	-	-	1	-	-	-	2	2
CO2	-	-	3	2	2	-	-	-	1	-	-	-	2	2
CO3	-	-	3	2	1	-	-	-	1	-	-	-	2	1
CO4	-	-	3	2	2	-	-	-	1	-	-	-	2	1

Assessment Pattern:

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	CA 50	ESE 25
Assembling												
Testing												
Observing/ Implementing		√	√	√	√	√	√	√	√	√	√	√
Analyzing	√	√	√	√	√	√	√	√	√	√	√	√
Interpreting												
Designing	√											
Creating												
Deducing conclusions												

Government College of Engineering, Karad
Second Year B. Tech
IT408: JAVA Programming Lab

Teaching Scheme		**Examination Scheme**	
Lectures	1Hrs/week	**CT1**	-
Laboratory Scheme		**CT2**	-
Practical	4 Hrs/week	**TA/ CA**	50
Total Credits:	3	**ESP**	25

Course Objectives:

1. To understand differences between C++ and JAVA
2. To understand fundamental concepts like objects, classes, interfaces and polymorphism and its implementation in JAVA
3. To understand robust GUI applications using event handling and Swing with proper exception handling
4. To understand I/O concepts, database connectivity and collections framework in JAVA

Course Contents

		Hours
Unit I	**Introduction to Java**	**3**
	Difference between C++ & Java, Data Types, Arrays, Command line Arguments	
	Classes: The Object class, Object Construction, Garbage Collection, Nested & Inner classes, String class, Wrapper classes	
Unit II	**Inheritance, Interface and Packaging**	**3**
	Inheritance: Member Access, Super keyword, final keyword, Abstract Classes, Access Protection,	
	Interfaces: Defining an Interface, Implementing an Interface,	
	Packages: Defining a package, searching packages and setting CLASSPATH	
Unit III	**Exception and I/O Streams**	**3**
	Exceptions: Dealing with Errors, Catching Exceptions,	
	I/O: Streams, Text Input and Output, Reading and Writing Binary data	
	Multi-Threading: What are threads? Interrupting threads, Thread states, Thread properties and synchronization	

Unit IV	**Graphics Programming and Working with Swing**	**2**
	Introducing AWT and Swing, Creating a Frame, Positioning a Frame, Displaying Information in a Component, Introduction to Layout Management, Text Input , Choice Components, Menus, Dialog Boxes	
	Event Handling:Basics of Event Handling, Mouse Events, the AWT Event Hierarchy	
Unit V	**Networking**	**2**
	Hierarchy of classes in NET package, Client server Programming, RMI package.	
Unit VI	**Collection and Database Programming**	**2**
	Collections: Collection Interfaces, Concrete Collections, Collections Framework	
	Database Programming: Design of JDBC, JDBC Configuration, Executing SQL statements	

Laboratory Contents

Experiment 1   Implement basic Java Programs

Experiment 2   Program for Class, Objects and Methods.

Experiment 3   Program for Constructor and Method overloading.

Experiment 4   Implement the concept of Inheritance

Experiment 5   Implement the concept of Interface.

Experiment 6   Implement the program for package.

Experiment 7   Implement the program for Exception handling

Experiment 8   Implement the concept of Multithreading

Experiment 9   Implement the concept of I/O Programming

Experiment 10   Implement program for Applet.

Experiment 11   Program for creation of Frame with AWT Controls

Experiment 12   Implement the Window concept using Swing

Experiment 13   Implement the concept of Layout managers

Experiment 14   Program to demonstrate Event handling concept.

Experiment 15   Implement a Client-Server Network programming.

Experiment 16   Program to demonstrate various methods of Collection class.

Experiment 17   Program for Database Programming.

List of Submission
    1   Total number of Experiments: 17

Course Outcome (CO):
    1   Implement object oriented features using java.
    2   Demonstrate client server application using networking.
    3   Implement GUI applications using event handling and Swing.

Text Books:
    1   Cay Horstmann and Gary Cornell, "Core Java- Volume I Fundamentals", Pearson Publication, 8th Edition.
    2   Herbert Schildt, "JAVA-The Complete Reference", McGraw Hill, 9th Edition.

References:
    1   Cay Horstmann and Gary Cornell, "Core Java- Volume II Advanced Features", Pearson Publication, 8th Edition.
    2   DeitelPaul, Deitel Harvey, "JAVA™ HOW TO PROGRAM", PHI Learning, 10th Edition.
    3   Khaleed Mughal and Rolf W.Rasmussen, "A Programmer's guide to JAVA SCJP Certification", Addison Wesley, 3rd Edition.
    4   E. Balagurusamy, "Programming with Java A Primer", TMH Publication, 4th Edition.
    5   Steven Holzner, "Java2 Programming Black Book", DreamTech Publication

Useful Links:
    1   http://nptel.ac.in/courses/106105084/1 Prof. I. Sengupta, IIT, Kharagpur

Course Articulation Matrix:

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	3	3	2	-	-	-	-	-	-	-	-	2	1
CO2	-	3	3	2	-	-	-	-	-	-	-	-	2	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	2	1

Assessment Pattern

Skill Level	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8	Ex 9	Ex 10	Ex 11	Ex 12	Ex 13	Ex 14	Ex 15	Ex 16	Ex 17	CA 50	ESP 25
Assembling																			
Testing implementing	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Analyzing	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Interpreting																			
Designing																		√	√
Creating																		√	√
Deducing conclusions																			

Government College of Engineering, Karad
Second Year B. Tech
IT409: Minor Project-I

Laboratory Scheme   **Examination Scheme**
Practical   2 Hrs/week   **CA**   50
Total Credits   1   **ESE**   --

Course Objectives:
1. To define and analyse the problem.
2. To design, develop and implement a group project.
3. To gain the presentation and communication skills.
4. To enhance the knowledge of writing a project report.

Course Contents

A batch of practical should be divided into minor project groups. Three or four students (Maximum) in a group will carry out a minor project. The faculty should guide the project group for selection of the topic and the work to be done. The minor project should consist of defining the problem, analyzing, designing the solution and implementing it using a suitable programming language or tool. A presentation and demonstration based on the above work is to be given by the group at the end of the semester. The work will be jointly assessed by a panel of teachers of the department. A hard copy of project report of the work done is to be submitted along with the softcopy of the project to the department.

Course Outcomes:
1. To analyse, design, develop and implement a project.
2. To able to work in a team.
3. To improve the presentation and communication skills.
4. To prepare detailed project report.

Course Articulation Matrix:

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	2	3	3	2	3	2	2	3	2	2	2	3	3	3
CO2	2	3	3	2	3	2	1	2	3	2	2	3	3	3
CO3	2	3	3	2	3	2	2	2	2	3	2	3	3	3
CO4	2	3	3	2	3	2	1	2	2	3	3	3	3	3

Assessment Pattern:

Skill Level	Minor Project - I	CA50	ESE
Assembling	√	√	-
Testing	√	√	-
Observing/ implementing	√	√	-
Analyzing	√	√	-
Interpreting	√	√	-
Designing	√	√	-
Creating	√	√	-
Deducing conclusions	√	√	-

Government College of Engineering Karad.
Second Year B. Tech
HS002: General Proficiency-II

Teaching Scheme   **Examination Scheme**
Lectures   2 Hrs/week   **CA**   50
Practical   2 Hrs/week
Total Credits   3

Course Objectives:

1   To introspect, develop a thorough understanding of oneself by identifying one's strengths & weakness
2   To map one's competence /employability skills & improve upon as per the same
3   To improve one's intrapersonal & interpersonal communication by mastering the art of listening & assert oneself while communicating for developing harmonious relationships
4   To identify latent talents and sharpen them into effective tools for success in career
5   To apply practical knowledge for self development focusing upon various skill sets as per industry requirement
6   To live up to the popular saying "the first impression is the last impression", the focus is on building a pleasing personality leading to positive branding of oneself
7   To keep oneself abreast with the social & professional etiquette by working on power dressing, elegant presentation & one's brand management
8   To map one's competence /employability skills & improve upon as per the same

Course Contents
Section I - Language Skills
Duration – 15 hrs

Unit I   **Domain:**   **Letter**   **Writing**

The domain letter writing is transacted based on the theme material possession. There are five modules under this domain. Each module has a specific outcome. Each module is dealt with the help of a linguistic tool that is interaction

Module 1   **Duration: 3 hrs**
Objective: Produce & role play a conversation
A trigger (picture/Image/video/ Audio/ Script) is used to initiate interaction through this the class arrives at a common theme. Understands the features of conversation & role play it.
- To read the text critically
- To track one's own reading process.
- To come out with graphical organisers.
- Constructing multiple texts from the given.

Module 2   **Duration: 3 hrs**
Objective: Reading an article
Based on the trigger (picture/Image/video/ Audio/ Script) related to the theme to process reading. Through this learners understand how to read a text effectively & understand the sensory perceptions and emotions involved. At the end of this process the learners come out with graphical organizers and there by construct multiple texts out of it.

Module 3   **Duration: 3 hrs**
Objective: Write a letter
To read the different forms of letter and identify the various features of a letter. Make the learners understand the correct way of writing letters through group editing.

Module 4   **Duration: 3 hrs**
Objective: Reading a news report
Based on the trigger (picture/Image/video/ Audio/ Script) related to the theme a text is given to process reading. The text given here is a news report. Through this learners understand the features of news report, learn to read a text critically & track their own reading process. At the end of this process the learners come out with graphical organizers and there by construct multiple texts out of it.

Module 5   **Duration: 3 hrs**
Objective: Writing a news report
Based on the trigger (picture/Image/video/ Audio/ Script) write a news report keeping all the features of a news report in mind. To present a news report orally and edit a news report.

Section II - Soft Skills
Duration – 24hrs

Unit II   Self-Awareness   Duration – 6 hrs
The module self awareness has three different topics that are**:**
- Personality Assessment
- Competency Mapping
- Self-Concept

This capsule focuses on the following:
- To introspect & develop a thorough understanding of one's personality.
- To Identifying the key traits in oneself comprising of attitude skill & knowledge
- To correlate the trait in oneself with the employability skill required for success
- To identify ones strength& weakness

To move from an imaginary self-concept to real self-concept

Unit III   Communication Skill   Duration – 6 hrs
The module communication skills has two different topics that are**:**
- Interpersonal Behavioral Styles
- Assertive Communication

This capsule focuses on the following:
- Being able to listen and use other appropriate communication techniques including an appreciation of non-verbal communication.
- To identify different behavioral styles & assert ones communication according to style.

Unit IV   Self Management   Duration – 6 hrs
The module self management has two different topics that are**:**
- Response Able Behaviour
- Beginning with End in Mind

This capsule focuses on the following:
- To develop skills and techniques to cope with daily challenges
- To gain practical solutions for day-to-day issues
- To set career goals to improve one's wellbeing and quality of life
- To understand how to calculate percentage of any numbers
- To understand how to calculate percentage of any numbers
- To develop and implement an action plan

Unit V   Image Management   Duration – 6 hrs
The module Image Management has two different topics that are**:**
- Presentation Skills
- Grooming and Etiquette

This capsule focuses on the following:
- To make the first impression always the best impression.
- To understand & follow the social norms in public.
- To know the importance of personal hygiene & grooming

Section III - Aptitude Skills
Duration-21 hrs

Unit VI   Basic concept 1   Duration – 3 hrs

The module basic concepts 1 has two different topics that are**:**
- Percentages
- Profit and loss

This module focuses on the following:
- To understand how to calculate percentage of any numbers
- To understand how to calculate percentage of any numbers
- To improve upon calculations
- To understand when & how to calculate profit% & loss%

Unit VII   Basic concept 2   Duration – 3 hrs

The module basic concept 2 has two different topics that are**:**
- Time and work

This module focuses on the following:
- To understand how to calculate efficiencies of the person's
- To understand when to take positive or negative work

Unit VIII Basic concept 3   Duration – 3 hrs

The module basic concepts 2 has two different topics that are**:**
- Time and distance
- Problems on trains

This module focuses on the following:
- To understand how to calculate Speed or Distance or Time when two unknown's are given
- To understand how to calculate Relative speed
- To understand how to calculate length of the train or bridge or platform

Unit IX   Reasoning 1   Duration – 3 hrs

The module reasoning 1 has the following topic:
- Puzzle test

This module focuses on the following:
- To understand & analyze the given information

Unit X   Reasoning 2   Duration – 3 hrs

The module reasoning 2 has two different topics that are**:**

- Directions sense
- Blood relations

This capsule focuses on the following:
- To understand how to calculate the direction and distance
- To understand how to say proper relations

Unit XI **Reasoning 3**   **Duration – 3 hrs**

The module reasoning 3 has the following topic:
- Coding & decoding

This capsule focuses on the following:
- To understand how to start depending on the different types of coding

Unit XII **Reasoning 4**   **Duration – 3 hrs**

The module reasoning 4 has the following topic:
- Number series
- Oddman out

This capsule focuses on the following:
- To understand how to calculate the series depending on the information
- To understand how to pick right answer from the given information

Course Outcome (CO):
1. To understanding of one's personality.
2. To Identifying the key traits in oneself comprising of attitude skill & knowledge
3. To correlate the trait in oneself with the employability skill required for success
4. To move from an imaginary self-concept to real self-concept
5. To identify different behavioral styles & assert ones communication according to style.
6. To set career goals to improve one's wellbeing and quality of life
7. To be responsible for ones actions
8. To make the first impression always the best impression.