SY SEM-I

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem III
Course Code	
Course Name	Probability and Statistics
Desired Requisites:	Engineering Maths

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	2 Hrs/week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 2**			

Course Objectives

1	To understand the basic concepts of probability and statistics for mathematical estimations.
2	To study different mathematical models based on statistical.
3	To analyze statistical and fuzzy systems.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Apply knowledge of statistical design for engineering problem	Apply
CO2	Modify real life problems into mathematical model	Apply
CO3	Analyze the statistic and distribution of data	Analyze

Module	**Module Contents**	**Hours**
I	**Random Variable:** Discrete random variable, Continuous random variable, probability mass function, cumulative distribution function, bivariate discrete random variable, joint probability distribution, joint distribution function of two dimensional discrete random variable.	4
II	**Probability Distribution :** Gaussian distribution, Exponential distribution, Uniform distribution.	4
III	**Statistical Methods:** Measure of Central tendency, Measure of dispersion, Range, Quartile deviation, Mean deviation, variance, Standard deviation, Coefficient of variance, moments, Symmetry, Skewness, Kurtosis, and Types of Kurtosis.	5
IV	**Population and Sample:** Introduction, Types of Characteristics: Attributes and variables, Collection and Organization of data, Population and sample, Methods of sampling.	3
V	**Exact Sampling Distribution:** Chi- square distribution: definition and its properties, Student t- distribution: definition and its properties.	4
VI	**Test of Hypothesis** Random samples, parameter, statistic, standard error of statistic, null and alternative hypothesis, critical region, level of significance, Types of error, large sample test, Small sample test	6

Text Books

1	Gupta and Kapoor, *"Fundamental of Mathematical Statistics",* Sultan Chand & Sons, 1st edition, 2018
2	Vijay Rohatgi, *"An Introduction to probability and statistics",* Willey, 2nd edition, 2000

References

1	S.Ross, *"Probability and Statistics for Engineers and Scientists",* Academic Press, 5th edition, 2014

Useful Links	
1	https://nptel.ac.in/courses/111/105/111105041/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1												1	
CO2	2				2									
CO3					3									

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	T1	T2	Lab ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	**20**
Apply	10	5	15	**30**
Analyze	5	5	15	**25**
Evaluate		5	15	**20**
Create			5	**5**
Total	**20**	**20**	**60**	**100**

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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem III
Course Code	
Course Name	Discrete Mathematics
Desired Requisites:	Fundamentals of algebra and calculus.

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To provide students with an overview of sets and function relations
2	To introduce the concepts use graphs and trees data structures
3	To discuss the basics of Boolean algebraic properties

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Apply the operations of sets and proposition to solve applied problems	Apply
CO2	Apply recursive functions and solve recurrent function	Apply
CO3	Construct trees and graph to modulate real-time problem	Analyze

Module	**Module Contents**	**Hours**
I	**Sets and Proposition:** Introduction, Combinations of Sets, Finite and Infinite Sets, Uncountably Infinite Sets, Mathematical Induction, Principle of Inclusion and Exclusion, Multisets. Propositions, Logical Connectives, Conditional and Biconditionals, Well-Formed Formulas, Tautologies, Logical Equivalences, Theory of Inference for Statement Calculus, Predicate Calculus, The Statement Function, Variable and Quantifiers, Free and Bound Variable, Inference Theory of Predicate Calculus, Methods of Proof, Euclidean Algorithm.	7
II	**Relation and Functions:** Introduction, A Relational Model for Data Bases, Properties of Binary Relation, Warshall's Algorithm, Equivalence Relation and Partition, Partial Ordering Relation and Lattices, Chain and Antichains, A Job-Scheduling Problem, Compatible Relation, Functions, Composition of Functions, Invertible Functions.	6
III	**Graphs and Planar Graphs:** Introduction, Basic Terminologies, Multigraphs and Weighted Graphs, Digraphs and Relation, Representation of Graphs, Operations on Graphs, Paths and Circuits, Graph Traversal, Shortest Path in Weighted Graphs, Eulerian Paths and Circuits, Hamiltonian Paths and Circuits, Traveling Salesperson Problem, Factors of Graph, Planar Graph, Graph Colouring.	7
IV	**Trees and Cut-Sets:** Trees, Rooted Trees, Path Length in Rooted Trees, Prefix Codes, Binary Search Tree, Spanning Trees and Cut-Sets, Minimum Spanning Trees, Krushkal's Algorithm, Prim's Algorithms, Transport Network.	7
V	**Algebraic Structures:** Introduction, Groups, Subgroups, Generators and Evaluation of Powers, Cosets and Lagrange's Theorem, Permutation Groups, Codes and Group Codes, Isomorphisms and Automorphisms, Homomorphisms and Normal Subgroups, Rings, Integral Domains, and Fields, Ring Homomorphisms, Polynomial Rings and Cyclic Codes.	7

VI	**Boolean Algebras:** Lattices and Algebraic Systems, Principle of Duality, Basic Properties of Algebraic System Defined by Lattices, Distributive and Complemented Lattices, Boolean Lattices and Boolean Algebras, Uniqueness of Finite Boolean /expressions	6

Text Books	
1	C. L. Liu, D P Mohapatra, *"Elements of Discrete Mathematics: A Computer Oriented Approach"*, TMG, 3rd Edition, 2011.
2	J.P. Tremblay &R. Manohar*,"Discrete Mathematical structure with applications to computer"*,TMG, 1st Edition, 1997
3	Kenneth H. Rosen*," Discrete Mathematics and Its Application"*, TMG, 7th Edition, 2011

References	
1	K.D. Joshi, *"Foundation of Discrete Mathematics",* 2019
2	Lipschutz, Marc Lipson *,"Discrete mathematics",* Schaum'soutline series,3rd Edition, 2007

Useful Links	
1	https://nptel.ac.in/courses/106/106/106106183/
2	https://nptel.ac.in/courses/106/106/106106094/
3	https://nptel.ac.in/courses/111/107/111107058/

CO-PO Mapping

	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1												1	
CO2	2				2									
CO3					3									

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	**T1**	**T2**	**Lab ESE**	**Total**
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	**20**
Apply	10	5	15	**30**
Analyze	5	5	15	**25**
Evaluate		5	15	**20**
Create			5	**5**
Total	**20**	**20**	**60**	**100**

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Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem III
Course Code	
Course Name	Data Structures
Desired Requisites:	Programming in C including pointers and File Handling

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To introduce the concepts of structures and pointer
2	To define the basic operation of link list, stack, queue etc
3	To discuss use of data structures for solving real time applications

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Describe the fundamental concepts of structure for dynamic memory allocation	Understand
CO2	Experiment the use of linear and non-linear data structures	Apply
CO3	Identify need of recursion and execute recursive algorithms	Analyze

Module	**Module Contents**	**Hours**
I	**Introduction:** Basic Concepts: Algorithm, Pseudo-code, ADT, Data Structure, Algorithmic Efficiency, Recursion: Direct and Indirect recursion, analysis of recursive functions e.g. Towers of Hanoi, Ackerman's function, Introduction to Painters, Arrays and Structures.	6
II	**Linked Lists:** Concept of linked organization, Singly linked list, doubly linked list and dynamic storage management, circular linked list, Operations such as insertion, deletion, inversion, concatenation, computation of length, traversal on linked list, Representation and manipulations of polynomials using linked lists	6
III	**Stacks and Queues:** Fundamentals stack and queue as ADT, Representation and Implementation of stack and queue using sequential and linked organization, Circular queue: representation and implementation, Application of stack for expression evaluation and for expression conversion, Backtracking, Stacks and Recursion, Priority queue Doubly Ended Queue.	7
IV	**Trees:** Basic terminology, binary trees and its representation, binary tree traversals (recursive and nonrecursive), operations such as copy, equal on binary tree, expression trees, General Trees, Binary Search Trees, Heaps and its operations.	7
V	**Graphs:** Terminology and Representation of graphs using adjacency matrix, adjacency list and adjacency Multi-list, Traversals Depth First and Breadth First, Minimum Spanning Tree	5

VI	**Searching & Sorting Technique:** **Search:** Importance of searching, Sequential, Binary, Fibonacci search algorithms, Sorting: Internal and External Sorts, Insertion, Shell, Heap, Quick sort, Merge sort, Radix sort, Two-way merge sort **Hashing:** Hashing functions, overflow handling with and without chaining, open addressing: linear, quadratic, double, rehashing, Indexing Techniques: hashed indexes, Tree indexing – Btrees (concept only implementation not expected), File Handling.	8

Text Books	
1	Richard F. Gilberg, Behrouz A. Forouzan, "*Data Structures, A Pseudocode Approach With C*", Cengage Learning, 2nd Edition, 2005
2	S. Lipschutz, "*Data Structures with C*", Schaum's Outlines Series, Tata McGraw-Hill, 1st edition, 2010
3	Narsimha Karumanchi "Data Structure and algorithms", Careermonk 5th edition, 2011

References	
1	Yashavant Kanetkar, "*Understanding pointers in C*", 3rdedition, BPB Publication
2	Brian W. Kernighan and Dennis M. Ritchie, "*The C Programming Language*", 2ndEdition, Prentice Hall of India

Useful Links	
1	https://nptel.ac.in/courses/106/102/106102064/
2	https://nptel.ac.in/courses/106/106/106106127/
3	https://nptel.ac.in/courses/106/103/106103069/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2				1									
CO2		3											1	
CO3		1			2								1	

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	T1	T2	Lab ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	**20**
Apply	10	5	15	**30**
Analyze	5	5	15	**25**
Evaluate		5	15	**20**
Create			5	**5**
Total	**20**	**20**	**60**	**100**

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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem III
Course Code	
Course Name	Microprocessors
Desired Requisites:	First year Information Technology Basic Electronics course.

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To introduce the fundamental principles of logic design
2	To discuss the various operations of microprocessors
3	To instruct the designing of assembly language programs

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Discuss the concepts of digital logic to scheme the circuits	Understand
CO2	Utilize the architecture of microprocessors with instruction set	Apply
CO3	Study memory and input/output interface	Analyze

Module	**Module Contents**	**Hours**
I	**Digital Electronics:** Combinational logic & sequential logic design, excitation table, state transition diagram, system design.	6
II	**Processor basics & 8085 microprocessor:** CPU organization, Introduction to processor technology, microprocessor architecture, single chip microcomputer, microcomputer systems. The 8085 MPU, parametric considerations, internal architecture, introduction to 8085 assembly language programming, 8085 instructions.	7
III	**Programming techniques & interfacing:** Writing assembly language programs, debugging, looping, counting, indexing, arithmetic operations related to memory, counters & delays, stacks, Interrupts, I/O (USB) interface, data communication.	7
IV	**Introduction to 8086:** Functional & architectural comparison of 8085 & 8086, programming, implementing standard programming structures in 8086, string, procedure & macros.	6
V	**Introduction to 80386:** Features & architecture of 80836, Pin description, 80836 register set, special 80386 registers, 80386 Real mode memory segmentation, data types used in real mode, instruction format, addressing modes of 80386.	6
VI	**80386 Memory Segmentation:** Memory management through segmentation, address translation, protection in segmentation, introduction to protected mode	7

Text Books

1	M. Morris Mano & Michael D. Ciletti,"*Digital Design*", Pearson Prentice Hall publication, 4th Edition, 2008
2	Ramesh S. Gaonkar, "*Microprocessor architecture, programming & applications*", New Age International publication,5th edition, 2015

3	A K Ray & K M Bhurchandi, "*Advanced microprocessors & peripherals*", second edition, Tata McGraw-Hill education private limited, 2ndedition, 2012.
References	
1	Floyd & Jain, "*Digital fundamentals*", Pearson education, eighth edition, 2007.
2	James Turley, "*Advanced 80386 programming techniques*", Tata McGraw-Hill, second edition, 2005.
Useful Links	
1	https://nptel.ac.in/courses/106/108/106108100/
2	https://nptel.ac.in/courses/108/107/108107029/
3	https://nptel.ac.in/courses/108/105/108105102/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1			2		1									
CO2		1											2	
CO3			1										1	

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	T1	T2	Lab ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	**20**
Apply	10	5	15	**30**
Analyze	5	5	15	**25**
Evaluate		5	15	**20**
Create			5	**5**
Total	**20**	**20**	**60**	**100**

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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem III
Course Code	
Course Name	Data Communication
Desired Requisites:	Basics of communication

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To define the concepts of data communication system
2	To instruct multiplexing and encoding schemes in data communication
3	To impart circuit and packet switching techniques

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Summarize the components involved in data communication system	Understand
CO2	Identify different encoding schemes	Analyze
CO3	Differentiate packet switching and circuit switching techniques in data communication	Analyze

Module	**Module Contents**	**Hours**
I	**Introduction to data communication:** Data Communications and Networking for Today's Enterprise, A Communications Model, Data Communications, Networks, and The Internet-An Example Configuration.	6
II	**Data Transmission:** Data communication Concepts and Terminology: Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity. Media:- Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission	6
III	**Encoding techniques:** Digital Data- Digital Signals, Digital Data- Analog Signals, Analog Data-Digital Signals, Analog Data- Analog Signals. Digital data communication techniques:- Asynchronous and Synchronous Transmission, Types of Errors, Error Detection and Correction, Hamming Code, CRC, Checksum, Line Configurations.	7
IV	**Multiplexing:** Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing, Asymmetric Digital Subscriber Line, xDSL. Spread Spectrum:- The Concept of Spread Spectrum, Frequency-Hopping Spread Spectrum, Direct Sequence Spread Spectrum, Code Division Multiple Access.	7
V	**Telephone Network:** Telephone network for data transmission, Modems, Latest telephone communication and interfacing techniques.	5
VI	**Switching techniques:** Switched Communication Networks, Circuit-Switching Networks, Circuit-Switching Concepts, Soft switch Architecture, Packet-Switching Principles	8

Text Books

1	William Stallings, "*Data and Computer Communications*", PHI, 9th Edition, 2011.
2	Behrouz A. Forouzan, "*Data communication and Networking*", TMGH, 5th Edition, 2013.
3	Wayne Tomasi, "*Introduction to Data Communication and Networking*", Pearson, 2007
References	
1	Achyut S Godbole and Atul Kahate, "*Data Communications and Networks*", TMGH, 2nd Edition, 2008.
2	Simon Haykin ,"*Digital Communication Systems*", Wiley, 1st Edition,2014.
3	Simon Haykin and Michael Moher, *" Introduction to Analog and Digital Communications "*, Wiley, 2nd Edition 2007
Useful Links	
1	https://nptel.ac.in/courses/106/105/106105082/
2	https://nptel.ac.in/courses/106/108/106108098/
3	https://nptel.ac.in/courses/106/105/106105080/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1			3											
CO2		2			1									
CO3							3		2		2			

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	T1	T2	Lab ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	**20**
Apply	10	5	15	**30**
Analyze	5	5	15	**25**
Evaluate		5	15	**20**
Create			5	**5**
Total	**20**	**20**	**60**	**100**

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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem III
Course Code	
Course Name	Data Structures Lab
Desired Requisites:	Programming in C including pointers and File Handling

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/Week				
Interaction	-	**Credits: 1**			

Course Objectives

1	To develop skills in programming and preparing the students for advanced computer science courses.
2	To clear up the concept of ADT and to use appropriate data structure for modelling given problem.
3	To clarify concept of recursion, various searching and sorting algorithms with their performance comparisons.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Illustrate various data structures	Apply
CO2	Implement operation on various data structures	Apply
CO3	Design solution to problem using various data structures	Create

List of Experiments / Lab Activities

List of Experiments:

1. Program based on structures and pointers in C
2. Program based on arrays and pointers in C
3. File handling and command line arguments
4. Implementation of recursion
5. Developing ADT for singly linked list and its applications
6. Developing ADT for Doubly linked list and its applications
7. Developing ADT for circular linked list and its applications
8. Developing ADT for stack and queue and their applications
9. Implementation of double ended queue
10. Implementation of recursive and non-recursive tree traversals
11. Binary search tree and application
12. Implementation of graph, DFS, BFS
13. Implementation of searching : linear search, binary search, Fibonacci search
14. Sorting Methods: Insertion sort, shell sort, heap sort, quick sort, merge sort, radix sort etc.
15. Implementation of hashing

Text Books

1	Richard F. Gilberg, Behrouz A. Forouzan, "*Data Structures, A Pseudocode Approach With C*", Cengage Learning, 2nd Edition, 2005
2	S. Lipschutz, "*Data Structures with C*", Schaum's Outlines Series, Tata McGraw-Hill, 1st edition, 2010
3	Narsimha Karumanchi "Data Structure and algorithms", Careermonk 5th edition, 2011

References	
1	Yashavant Kanetkar, "*Understanding pointers in C*", 3rdedition, BPB Publication
2	Brian W. Kernighan and Dennis M. Ritchie, "*The C Programming Language*", 2ndEdition, Prentice Hall of India

Useful Links	
1	https://nptel.ac.in/courses/106/102/106102064/
2	https://nptel.ac.in/courses/106/106/106106127/
3	https://nptel.ac.in/courses/106/103/106103069/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1		1	2											
CO2				3	2									
CO3				2									2	

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.

Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**

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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem III
Course Code	
Course Name	Microprocessors Lab
Desired Requisites:	First year Information Technology Basic Electronics course.

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/Week				
Interaction	-	**Credits: 1**			

Course Objectives

1	To demonstrate the fundamental principles of logic design
2	To explain the basic operations of microprocessors
3	To give hands on assembly language programs

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Classify the concepts of combinational and sequential logic	Apply
CO2	Use instruction sets & form structured microprocessor programs in assembly language	Apply
CO3	Test and debug microprocessor programs	Analyze

List of Experiments / Lab Activities

List of Experiments:

1. Designing of a circuit using Combinational logic.
2. Designing of a combinational circuit using MUX & DEMUX
3. Study Half Adder & Subtractor, Full Adder & Subtractor
4. Implement below addressing modes & perform Addition, subtraction of two 8 – bit Numbers with 16 – bit answer. Register addressing mode. Immediate Addressing Mode. Direct Addressing mode. Indirect Addressing mode.
5. Study 8085 kit & design a program of Block Transfer & Block Exchange.
6. Implement LHLD & DAD instruction & analyze the program of Addition & subtraction of two 16 – bit numbers.
7. Implement repetitive addition & subtraction algorithms for 8 bit multiplication & 8 bit division.
8. Assembly level program to calculate sum of series of numbers.
9. Assembly level program to find smallest & largest number from series of numbers.
10. Use subroutines & arrange a series of Numbers in ascending & descending order.
11. Design a program for Conversion HEX to Binary number.
12. Solve programs listed above using 8085 simulator.
13. Solve programs listed above using 8086 & 80386 instruction set in MASM

Text Books

1	M. Morris Mano & Michael D. Ciletti,"*Digital Design*", Pearson Prentice Hall publication, 4th Edition, 2008
2	Ramesh S. Gaonkar, "*Microprocessor architecture, programming & applications*", New Age International publication,5th edition, 2015
3	A K Ray & K M Bhurchandi, "*Advanced microprocessors & peripherals*", second edition, Tata McGraw-Hill education private limited, 2ndedition, 2012.

References

1	Floyd & Jain, "*Digital fundamentals*", Pearson education, eighth edition, 2007.
2	James Turley, "*Advanced 80386 programming techniques*", Tata McGraw-Hill, second edition, 2005.

Useful Links	
1	https://nptel.ac.in/courses/106/108/106108100/
2	https://nptel.ac.in/courses/108/107/108107029/
3	https://nptel.ac.in/courses/108/105/108105102/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1				2										
CO2			1										2	
CO3					2				1					

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.

Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem III
Course Code	
Course Name	C and CPP Programming Laboratory
Desired Requisites:	C Programming

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/week				
Interaction	1 Hr/Week	**Credits: 2**			

Course Objectives

1	To introduce basic paradigm of CPP
2	To define basic concepts of OOP
3	To discuss file handling and templates in CPP

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Implement the object-oriented programming concept using C++	Apply
CO2	Demonstrate file handling using C++	Apply
CO3	Analyse virtual and pure virtual function & complex programming situations	Analyze

Module	**Module Contents**	**Hours**
I	**C++ Programming basics:** What is object oriented programming? Why do we need object oriented. Programming characteristics of object-oriented languages C and C++.Output using cout. Directives. Input with cin. Type bool. The setw manipulator. Type conversions. Returning values from functions. Reference arguments. Overloaded function. Inline function. Default arguments. Returning by reference.	2
II	**Object and Classes** : Introduction Creating a class and objects Defining member functions inside and outside class definition Nesting of member functions Private member functions Arrays within a class Memory allocation of objects Static data members and static member functions Array of objects ,Objects as function arguments Friend functions Returning objects Constructors Types of constructor Destructors	6
III	**Polymorphism:** Overloading unary operations. Overloading binary operators, data conversion, pitfalls of operators overloading and conversion keywords. Explicit and Mutable.	4
IV	**Inheritance-I:** Concept of inheritance. Derived class and based class. Derived class constructors, member function, inheritance in the English distance class, class hierarchies, inheritance and graphics shapes, public and private inheritance, aggregation: Classes within classes, inheritance and program development.	4
V	**Inheritance-II:** Multiple Inheritance, Multilevel Inheritance, Multilevel inheritance, Hybrid inheritance, Virtual Base class, Abstract classes	4
VI	**Templates:** Class Templates, Function templates, File read write in c++	6

List of Experiments / Lab Activities

1. Program on input/output stream
2. Program on class and objects.
3. Program on Inline/Friend functions.
4. Program on Constructor/Destructors.
5. Program static variables/class/functions.
6. Program on polymorphism.
7. Program on different types of inheritance.
8. Program on operator overloading.
9. Program on File Operations.
10. Program on Templates.

Text Books	
1	E.Balguruswamy, *"Object Oriented Programming C++"*, Tata McGraw Hill, 3rd Edition, 2006.
2	Bjarne Stroustrup, *"The C++ Programming language",* Third edition, Pearson Education.
References	
1	Robert Laffore, *"Object Oriented Programming in c++",* SAMS publication, 4thEdition,2008.
Useful Links	
1	https://nptel.ac.in/courses/106/105/106105151/
2	https://nptel.ac.in/courses/106/101/106101208/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1				2										
CO2		2			3								2	
CO3			3		3								2	1

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.

Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**LA1**	**LA2**	**Lab ESE**	**Total**
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli
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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem III
Course Code	
Course Name	Python Programming Lab
Desired Requisites:	Computer Programming

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/week				
Interaction	1 Hr/week	**Credits: 2**			

Course Objectives

1	To define the significance of Python in programming
2	To discuss the programming paradigms in Python
3	To make use of the different libraries of Python

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Implement the programming constructs in Python	Apply
CO2	Analyse built in model in Python programming	Analyse
CO3	Design application using Python libraries	Create

Module	**Module Contents**	**Hours**
I	**Introduction to Python:** The basic elements of python, Branching Programs, Control Structures, Strings and Input, Iteration, Functions and scoping, Specifications, Recursion, Global variables.	4
II	**Advanced features of Python:** Modules, Files, System Functions and Parameters, Strings, Tuples, Lists and Dictionaries, Lists and Mutability, Functions as Objects.	4
III	**Classes and Object-Oriented Programming:** Abstract Data Types and Classes, Inheritance, Encapsulation and Information Hiding.	4
IV	**Python-Numpy and Pandas:** **NumPy:** Introduction, Numpy array, Numpy array indexing, Numpy operations. **Pandas:** Series, Data frames, managing missing data, groupby, merging & concatenation, operations, data input and data output.	6
V	**Python for Data Visualization:** Data Visualization through libraries like: Matplotlib, Seaborn, Plotly and Cufflinks, Geographical Plotting.	4
VI	**Text mining modelling using NLTK:** Text Corpus, Sentence Tokenization, Word Tokenization, Removing special Characters, Expanding contractions, Removing Stopwords, Correcting words: repeated characters, Stemming & lemmatization, Part of Speech Tagging, Feature Extraction, Bag of words model, TF-IDF model, Text classification problem	6

List of Experiments / Lab Activities

1. Problem solving using core Python functionality like strings, variables, functions.
2. Problem solving using core Python functionality like tuples, dictionary, list, objects
3. Problem solving using Class & object concepts.
4. Problem statement on inheritance in classes
5. Problem based on encapsulation in classes
6. Problem statement on array
7. Problem statement on NumPy libraries with different operations
8. Problem statement on Pandas libraries with different operations
9. Problem statement on data visualization using Matplot Libraries.
10. Problem statement on data visualization using Seaborn Libraries.
11. Problem statement on text mining application using NLTK

Text Books	
1	R. Nageswara Rao, "*Core Python Programming*", Dreamtech Press, 2nd Edition, 2017
2	Chun, J Wesley, "*Core Python Programming*", Pearson, 2nd Edition, 2007 Reprint 2010
References	
1	Barry, Paul, Head *First Python*, O Rielly,2nd Edition, 2010
2	Lutz, Mark, *Learning Python*, O Rielly, 4th Edition, 2009
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc19_mg47/preview
2	https://docs.python.org/3/tutorial/
3	https://www.learnpython.org/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1			2										3	
CO2				2	3							2		3
CO3									1			2		3

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.

Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**LA1**	**LA2**	**Lab ESE**	**Total**
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**

SY SEM-II

Walchand College of Engineering, Sangli
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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Theory of Computation
Desired Requisites:	Discrete Mathematics

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To discuss fundamentals of computer mathematics
2	To describe grammar, languages and their relationships
3	To impart automata designs as language descriptors and recognizers

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Outline problem formulation with relevant solving approaches.	Understand
CO2	Distinguish language-based problems into suitable classes.	Analyze
CO3	Design abstract machines for language recognition and applications.	Create

Module	**Module Contents**	**Hours**
I	**Proofs and Regular Languages** Types of Proofs, Mathematical Induction and Recursive definitions, Regular expressions & Regular languages, Operations on Regular languages	6
II	**Finite State Machines** Deterministic Finite Automata (DFA) representation, DFA design examples, Nondeterministic finite automata (NFA), NFA with Null (^) transitions, Equivalence of DFAs, NFAs and NFA-^s. Kleene's Theorem & Proofs, Minimization of DFA	8
III	**Grammars & Languages** Definition and Types of grammars and languages, Derivation trees and ambiguity, Context Free Languages (CFL) & Non CFL's., Union, Concatenation and Kleene's operations, Intersection and complements of CFLs, Pumping Lemma.	6
IV	**Push Down Automata (PDA)** Definition, Deterministic PDA, Types of acceptance and conversions to each other, PDA design examples, CFGs & PDAs., Top-Down, & Bottom-up parsing	7
V	**Chomsky Normal Form (CNF)** Context Free Grammar (CFG) & CNF notations, eliminating ^ production and unit productions from a CFG, Eliminating useless variables from CFG, CNF Significance, Applications	4
VI	**Turing Machines (TM)** Models of Computation, definition of TM as Language Acceptor, Combining TMs, Turing computable functions, TM design examples, Variations in TM, nondeterministic TM, and Universal TM.	8

Text Books

1	John C. Martin, *"Introduction to Languages & Theory of Computation",* TMH, 4th Ed. 2010
2	John E. Hopcraft, Rajeev Motwani, Jeffrey D. Ullman, *"Introduction to Automata Theory, Languages and Computations",* Pearson Edu. 3rd Ed. 2008

References	
1	J. P. Tremblay & R. Manohar, *"Discrete Mathematical Structures with Applications to Computer Science"*, TMH, 2008
2	Michael Sipser, *"Introduction to Theory of Computations",* Thomson Brooks/Cole, 3rd Ed. 2014
3	K.L.P. Mishra & N. Chandrasekaran, *"Theory of Computer Science",* PHI, 3rd Ed. 2006
Useful Links	
1	https://nptel.ac.in/courses/106/104/106104028/
2	https://cglab.ca/~michiel/TheoryOfComputation/TheoryOfComputation.pdf
3	https://www.geeksforgeeks.org/introduction-of-theory-of-computation/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	3			3									
CO2		2			1									
CO3			3										1	

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	T1	T2	ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	**20**
Apply	10	5	15	**30**
Analyze	5	5	15	**25**
Evaluate		5	15	**20**
Create			5	**5**
Total	**20**	**20**	**60**	**100**

Walchand College of Engineering, Sangli
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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Computer Architectures
Desired Requisites:	Digital Electronics, Microprocessor

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To provide fundamental knowledge of processors architecture
2	To introduce the memory organization architecture
3	To instruct the basic concepts of execution speedup by pipelining

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Discuss various design issues in computer architecture	Understand
CO2	Solve the problems for optimization of computer operations	Apply
CO3	Evaluate the performance metrics for computer architecture	Evaluate

Module	**Module Contents**	**Hours**
I	**Machine instructions and program execution** Memory locations & addresses, memory operations, instructions & instruction sequencing, addressing modes, subroutines, encoding of machine instructions.	4
II	**Arithmetic design** Design of signed multiplication, Booth's algorithm, bit-pair recording, division, floating point numbers and operations, guard bits and rounding.	5
III	**Control design** Execution of a complete instruction, sequencing of control signals, micro programmed control, microinstruction format, microinstruction sequencing, and bit slice concept	4
IV	**Memory hierarchy** Computer memory organization, RAM/main/primary memories, Read-Only memories, cache memories, mapping functions, replacement algorithms, performance consideration: Multimodal memories & interleaving, hit rate & miss penalty, multilevel cache organization, virtual memories, address translation, memory management requirement.	5
V	**I/O interface** Input-output organization, I/O mapped I/O and memory mapped I/O, Direct Memory Access (DMA), interrupts and interrupts handling mechanisms, device identification, vectored interrupts, interrupt nesting, I/O interfaces, synchronous vs. asynchronous data transfer, I/O channels	4
VI	**Pipelining** Basic concepts in pipelining, data hazards, instruction hazards, influence of pipelining on instruction set, data-path & control considerations, performance considerations, and Fyn's classification of computer architectures.	4

Text Books

1	J. Hayes , "Computer Architecture and Organization", McGraw Hill, 3rd edition, 2017
2	C. Hamacher et. al, *"Computer Organization"*, 5th edition, 2010

References	
1	D. Patterson, Morgan Kaufmann "*Computer Architecture*", 6th edition, 2017
2	
Useful Links	
1	https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/
2	https://www.coursera.org/learn/comparch#syllabus
3	https://www.javatpoint.com/computer-organization-and-architecture-tutorial

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3		1											
CO2			2											
CO3	2	3											1	

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	T1	T2	ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	**20**
Apply	10	5	15	**30**
Analyze	5	5	15	**25**
Evaluate		5	15	**20**
Create			5	**5**
Total	**20**	**20**	**60**	**100**

Walchand College of Engineering, Sangli
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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Computer Networks
Desired Requisites:	Data Communication and Networking

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To provide fundamental knowledge of Computer networks
2	To instruct the transport and application layer services
3	To compare wireless and mobile technologies

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Explain fundamentals of computer networks	Understand
CO2	Utilize functions of various layers and protocols for network services	Apply
CO3	Differentiate wired and wireless technologies in computer network	Analyze

Module	**Module Contents**	**Hours**
I	**Data link layer** Framing, error control, flow control, The Channel Allocation Problem: Static & Dynamic Allocation, Multiple Access Protocols- ALOHA, CSMA, CSMA/CD. Ethernet Cabling, Coding, MAC Protocol, Frame structure, Binary exponential Back-Off Algorithm.	7
II	**Network Layer** Network Layer Design issues- Packet Switching, Services to transport layer, implementation of connection oriented & connectionless services, Routing- Static &Dynamic routing, flooding, Fragmentation. Congestion Control AlgorithmsPrinciples, Prevention Policies, Jitter & Load shedding. The Network Layer in the Internet- Address, Internet Control Protocols- SPF, BGP, IP operations, Subnetting , IP4, IPv6.	7
III	**Transport Layer** Elements of transport protocol- Addressing, connection establishment, release, flow control, buffering, multiplexing, crash recovery. UDP, RPC, RTP.	6
IV	**Transport Layer Protocol** TCP service model, TCP protocol, TCP segment header, TCP connection establishment, Release, congestion control in TCP, timer management.	6
V	**Application Layer** DNS—The Domain Name System-name space, resource records, name servers. Electronic Mail- architecture and service, user agent, message format and transfer final delivery. The World Wide Web-architecture overview, Application layer protocol: HTTP, FTP, SMTP.	7
VI	**Wireless and Mobile Technologies** Mobile technologies: GSM/GPRS, Introduction, Fundamentals of Satellite systems, Broadband satellite Networks.	6

Text Books

1	Andrew S. Tannenbaum, *"Computer Networks",* PHI, 5thEdition, 2013

2	James F. Kurose, Keith W. Ross, *"Computer Networking: A Top-Down Approach",* 6th Edition, Pearson Publication
3	Behrouz A. Forouzan, *"Data Communication and Networking"* TMGH 4th edition., 2013
References	
1	Jochen Schiller *"Mobile Communications",* Pearson Education, 2nd Edition,2000
2	Theodore S. Rapport, "*Wireless communication (Principles and practice)",* Pearson Education, 2nd edition 2010
3	Dr. Sunilkumar Manavi and M. Kakkasageri, *"Wireless and mobile networks concepts and protocols"*, Wiley publication, 2nd edition, 2016
Useful Links	
1	https://www.coursera.org/learn/fundamentals-network-communications#syllabus
2	https://www.udacity.com/course/computer-networking--ud436
3	

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	1												
CO2		2	1		2									
CO3			3										2	

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	T1	T2	ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	**20**
Apply	10	5	15	**30**
Analyze	5	5	15	**25**
Evaluate		5	15	**20**
Create			5	**5**
Total	**20**	**20**	**60**	**100**

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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Software Engineering
Desired Requisites:	Object Oriented Language

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To introduce software development process
2	To comprehend the requirement gathering techniques using process model
3	To acquaint with object oriented design using the Unified Modeling Language (UML)

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Compare various process model for software development	Understand
CO2	Apply software engineering process model to engineering problems	Apply
CO3	Create object-oriented design for real-time applications	Create

Module	**Module Contents**	**Hours**
I	**Introduction & Software Processes** The S/W problem, the software Engineering Approach & Benefits. Software Process, Characteristics of a software process. Software requirements, problem Analysis, Requirements Specification. Cost estimation, project scheduling, staffing and personnel planning, Software Configuration Management plans, Quality Assurance plans, Project Monitoring Plans, Risk Management	7
II	**Software Design and Testing** Objective, Design principles, module level concepts, Design notation and specifications, Artifacts system design document & detailed design document, Structured Design methodology. Programming Practice, Metrics: Testing Fundamentals (manual and automated testing), Testing Levels, Functional testing, Structural testing, Testing object oriented Programs, Regression Testing, Types of testing tools	7
III	**Agile Processes** Agile Methodologies, Dynamic system development, Feature-driven Design, Crystal Agile Modelling.	5
IV	**Structural Modelling** Classes, Relationships, Common mechanisms. Diagrams, Class Diagrams, Interfaces, Types and Roles, Packages, Instances and Object Diagram	7
V	**Behavioral Modelling** Interactions, Use cases, Use case diagram, Interaction Diagrams and Activity diagrams, Events and signals, State Machines, Processes and Threads, Time and space, State chart diagrams.	6
VI	**Architectural Modelling** Components, Deployment, Collaboration, Patterns and Frame works, Component Diagrams and Deployment Diagrams	7

Text Books

1	Sommerville, "Software Engineering", Pearson Education India,New Delhi,1st Edition, 2006

2	Roger S Pressman, *"Software Engineering – A Practitioner's Approach",* McGraw Hill, USA, 7th Edition, 2007
3	Pankaj Jalote, *"An Integrated Approach to Software Engineering",* Narosa Publication, 3rd Edition, 2005
References	
1	Pfleeger, *"Software Engineering",* Pearson Education India, New Delhi, 3rd Edition,2009
2	Mike O'Docherty, *"Object-Oriented Analysis & Design: Understanding System Development with UML 2.0",* John Wiley & Sons Publication, 2nd Edition, 2005
3	Terry Quatrain,", *Visual Modeling with Rational Rose 2002 And UML*",Pearson,2006
Useful Links	
1	https://www.coursera.org/specializations/software-development-lifecycle#courses
2	https://www.udemy.com/course/sdlc-models/
3	

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2								3		3			
CO2	1	2			2									
CO3		3											2	

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	T1	T2	ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	**20**
Apply	10	5	15	**30**
Analyze	5	5	15	**25**
Evaluate		5	15	**20**
Create			5	**5**
Total	**20**	**20**	**60**	**100**

Walchand College of Engineering, Sangli
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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Computer Network Lab
Desired Requisites:	Data Communication and Networking

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/Week				
Interaction	-	**Credits: 1**			

Course Objectives

1	To classify the concept of wired and wireless networks
2	To demonstrate wired and wireless network scenario in simulator
3	To make students familiar to analyse the packets in standard engineering tool.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Implement wired and wireless networks scenario	Apply
CO2	Demonstrate data link and network layer protocols	Analyze
CO3	Inspect packet analysis and capturing in LAN	Analyze

List of Experiments / Lab Activities

List of Experiments:

1. Analyze different network devices on data link layer and design case study for all devices
2. Demonstrate half duplex and full duplex link in simulator and write the observations
3. Design different computer network topologies and evaluate its performance using network simulators
4. Demonstrate the communication through different topologies using TCP as an agent using network simulators
5. Demonstrate the communication through different topologies using UDP as an agent using network simulators
6. Evaluate performance of TCP and UDP with net centric computing parameters using network simulators
7. Create and simulate wired network scenario using NSG and configure the node
8. Create and simulate different wireless network scenario using NSG and configure the mobile nodes

Text Books

1	Andrew S. Tannenbaum, *"Computer Networks",* PHI, 5thEdition, 2013
2	James F. Kurose, Keith W. Ross, *"Computer Networking: A Top-Down Approach",* Pearson Publication, 5th Edition, 2012
3	

References

1	Behrouz A. Forouzan , *"Data Communication and Networking"* TMGH 4th edition, 2017
2	Theodore S. Rapport, *"Wireless communication (Principles and practice), Pearson education,"* 2nd Edition, 2010

Useful Links	
1	https://nptel.ac.in/courses/106/105/106105183/
2	https://onlinecourses.swayam2.ac.in/cec19_cs07/preview
3	https://www.coursera.org/browse/information-technology/networking

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2													
CO2		3											1	
CO3									2				2	

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.

Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli
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AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Software Engineering Lab
Desired Requisites:	Object Oriented Programming

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/Week				
Interaction	-	**Credits: 1**			

Course Objectives

1	To explain methods of capturing and visualizing software requirements
2	To comprehend the concepts and principles of software design
3	To instruct fundamentals of testing and software quality assurance

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Convert the requirements model into the design model	Understand
CO2	Use software project management tools in software development life cycle	Apply
CO3	Rehash software component in development life cycle	Analyze

List of Experiments / Lab Activities

List of Experiments:

1. To realize the phases in software development project, overview, need, coverage of topics
2. To assign the requirement engineering tasks
3. To perform the system analysis : Requirement analysis, SRS
4. To perform the function oriented diagram : DFD and Structured chart
5. To perform the user's view analysis : Use case diagram
6. To draw the structural view diagram : Class diagram, object diagram
7. To draw the behavioral view diagram : Sequence diagram, Collaboration diagram
8. To draw the behavioral view diagram : State-chart diagram, Activity diagram
9. To draw the implementation view diagram: Component diagram
10. To draw the environmental view diagram : Deployment diagram
11. To perform various testing using the testing tool unit testing, integration testing
12. To demonstrate the performance of server and web portal using modern engineering tools

Text Books

1	Sommerville, *"Software Engineering",* Pearson Education India,New Delhi,1st Edition, 2006
2	Roger S Pressman, *"Software Engineering – A Practitioner's Approach",* McGraw Hill, USA, 7th Edition, 2007
3	Pankaj Jalote, *"An Integrated Approach to Software Engineering",* Narosa Publication, 3rd Edition, 2005

References

1	Pfleeger, "*Software Engineering",* Pearson Education India, New Delhi, 3rd Edition,2009
2	Mike O'Docherty, "*Object-Oriented Analysis & Design: Understanding System Development with UML 2.0"*, John Wiley & Sons Publication, 2nd Edition, 2005
3	Terry Quatrain*,"Visual Modelling with Rational Rose 2002 And UML*",Pearson, 3rd Edition, 2006

Useful Links

1	https://onlinecourses.nptel.ac.in/noc19_cs69/preview
2	https://nptel.ac.in/courses/106/105/106105182/
3	https://www.coursera.org/specializations/software-development-lifecycle#courses

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1			3									
CO2		2									1			
CO3			3										2	
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High Each CO of the course must map to at least one PO.														

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.				
Assessment	**Based on**	**Conducted by**	**Typical Schedule (for 26-week Sem)**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40
Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.				

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**LA1**	**LA2**	**Lab ESE**	**Total**
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Java Programming Lab
Desired Requisites:	Object Oriented Programming

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/week				
Interaction	1 Hr/week	**Credits: 2**			

Course Objectives

1	To introduce the object-oriented concepts of Java
2	To inculcate the Java APIs like multithreading and socket programming
3	To instruct about various applications of the GUI packages of Java

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Demonstrate the object-oriented features	Apply
CO2	Analyze the concepts of event handling and multi-threading	Analyse
CO3	Create to design solution for using appropriate GUI	Create

Module	**Module Contents**	**Hours**
I	**Fundamental Programming in Java** Structure of Java Program, Java programming environment-JVM, JIT Compiler, Bytecode, A simple Java program, source file declaration rules, naming conventions, objects and classes – declaring classes and objects, declaring member variables, defining methods, constructors, using objects, this keyword, final and static keyword, garbage collection	3
II	**Inheritance and package** What is inheritance, types of inheritance, interfaces, super keyword, final classes and methods, packages – importing packages, naming a package, creating a package	2
III	**Exception Handling and I/O** Exception handling – what is exception? dealing with errors, hierarchy of exception, types of exceptions, IO stream classes	2
IV	**Event Handling, AWT and Swing** Event handling – basics of event handling, AWT hierarchy, types of events, AWT components, swing advanced components.	2
V	**Multithreading and Networking** Processes and threads, runnable interface, thread class, thread objects, thread states, thread priorities, socket programming	2
VI	**Database Handling and Collections Framework** Database – design of JDBC, the structured query language, JDBC types, Driver Manager - statement, connection, result-set, Collections - Collection framework	2

List of Experiments / Lab Activities

List of Experiments:

1. Program on input/output stream.
2. Program on class and objects.
3. Program on Constructor/Destructors.
4. Program static variables/class/functions.
5. Program on polymorphism.
6. Program on different types of inheritance and interface.
7. Program on exception handling objects.
8. Program on multithreading.
9. Program on TCP/UDP communication.
10. Program on Swing components.
11. Program on AWT components.
12. Program on Database Connectivity and operations for data handling.
13. Program on different collections like TreeSet, Set, HashMap, ArrayList, Date,etc.

Text Books	
1	Cay S. Horstmann, "*Core Java Volume I Fundamentals*", Prentice Hall, 11th Edition, 2018
2	Cay S. Horstmann, "*Core Java Volume II Advanced Features*", Prentice Hall, 11th Edition, 2019
References	
1	Herbert Schildt, "*Java: The Complete Reference*", McGraw Hill Education, 9th Edition, 2014
2	E. Balguruswamy, "*Programming with Java: A Primer*", McGraw Hill Education, 5th Edition, 2014
Useful Links	
1	https://www.coursera.org/specializations/object-oriented-programming
2	https://www.udemy.com/course/java-tutorial/
3	https://www.codecademy.com/learn/learn-java

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1		2		1										
CO2									2					
CO3					2									1

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.

Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**LA1**	**LA2**	**Lab ESE**	**Total**
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Android Programming Lab
Desired Requisites:	Object oriented programming concepts, Java Programming

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/week				
Interaction	1 Hr/week	**Credits: 2**			

Course Objectives

1	To introduce the android architecture and tools for developing Android applications
2	To impart current client side and server side web technologies on Android platform
3	To provide user interface application development

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Develop Android application using suitable tools and frameworks	Applying
CO2	Create graphical user interfaces using different advanced components	Analyzing
CO3	Design solution for user activities and handling database	Creating

Module	**Module Contents**	**Hours**
I	**Android Overview** Overview of Android, History, Android Versions, Android OS stack: Linux kernel, Native Libraries/DVM, Application Framework, Applications, Activity, Activity lifecycle, Fragments, Activity Back Stack, Process and Threads, Android SDK, Android Emulator.	2
II	**Intents and Layouts** XML, Android View Hierarchies, Linear Layouts, Relative Layout, Table Layout, Frame Layout Sliding, Using Padding and Margins with Layouts. What is Intent? Android Intent Messaging via Intent Objects, Types of Intents, Using Intents with Activities, Sending Intents (Telephony, SMS), Broadcast Receivers	2
III	**Input Controls, Input Events, Dialogs** Buttons, Text Fields, Checkboxes, Radio Buttons, Toggle Buttons, Spinners, Event Listeners, Event Handlers, Touch Mode, Handling Focus, Dialogs: Alerts, Popups, Toasts	3
IV	**Menus, Notification and ActionBar** Menus, Options menu, Context menu, Popup menu, Handling menu click events, Creating a Notification, Notification actions, Notification priority, Managing Notifications, Removing notifications	2
V	**Android Database** Installing SQLite plugin, DbHelper, The Database Schema and Its Creation, Four Major Operations, Cursors, Example, overview of other database used for Android	2
VI	**Android/ Flutter/ iOS** Flutter – user interface, data and back-end, accessibility, platform integration, packages and plugins, tools and features, Kotlin – Kotlin overview, multiplatform programming, platforms, standard library, official libraries, tools, iOS – SwiftUI Essentials, views, navigation and model presentation, passing data, state management, persistent, drawing - , etc.	2

List of Experiments / Lab Activities
List of Experiments: **1.** Installation of Android SDK, emulator, creating simple project and study of android project structure. **2.** Installing apk on mobile device/tablet, configuring mobile device/tablet in Android Studio with developer option and running app directly on mobile device/tablet. **3.** Write a program to use of different layouts.(Create Login form using Linear Layout and Relative Layout). **4.** Write a program to study Intents for switching between activities. - Create Registration Activity and Registration Layout **5.** Write a program to use of Intents for SMS and Telephony **6.** Write a program to study and demonstrate BroadcastReceiver **7.** Write a program to demonstrate Buttons, Text Fields, Checkboxes, Radio Buttons, and Toggle Buttons with their events handler (Create an app which will cover the different components, and try adding the components and different events henceforth so as to create a fully developed Android application) **8.** Write a program to demonstrate Spinners, Touch Mode, Alerts, Popups, and Toasts with their events handler **9.** Write a program to demonstrate Touch Mode, Menus with their events handler **10.** Write a program to demonstrate notification with their action **11.** Write a program to study and use of SQLite database **12.** Study of publishing app to the Android Market.

Text Books	
1	Beginning Android application development by Wei-Mag Lee
2	Learning Android by Marko Gargenta Publisher: O'Reilly Media
3	Android Apps for Absolute Beginners by Wallace Jackson 2nd Edition

References	
1	Reto Meier Publisher,"Professional Android 4 Application Development" Wiley India
2	Android in Action Third Edition W.Frank Ableson,Robi Sen, Chris King, C. Enrique Ortiz
3	The Android Developer's Cook book *"Building Applications with the Android SDK"* by James Steele

Useful Links	
1	https://developer.android.com/guide
2	https://www.classcentral.com/course/androidpart1-1178
3	https://www.udemy.com/topic/android-development/
4	https://kotlinlang.org/docs/home.html
5	https://developer.apple.com/tutorials/SwiftUI

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1		2		1										
CO2									2					
CO3					2									1

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.

Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks

LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40
Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.				

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**LA1**	**LA2**	**Lab ESE**	**Total**
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2021-22

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Mini Project-1
Desired Requisites:	Programming fundamentals

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/Week				
Interaction	-	**Credits: 1**			

Course Objectives

1	To provide guidance to select & build the ideas
2	To find real-world challenges by IT based Solution
3	To inculcate team spirit in students by project management

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Explore the concepts of programming languages, tools and technologies	Apply
CO2	Survey the real-world challenges to define problem statement	Evaluate
CO3	Design project modules to report solutions to various problems.	Create

List of Experiments / Lab Activities

Mini-project is to be carried out in a group of maximum 3 to 5 students.
Each group will carry out mini-project on developing any application software based on following areas.
1. C/C++/Python or any equivalent language.
2. Industry Problem Statement (Sponsored Project)
3. Problem statements based on current or previously learned Technology.

Project/Mini-Project group should submit workable project at the end of second semester.
Project report (pre-defined template) should be prepared using Latex/Word and submitted along with soft copy on CD/DVD (with code, PPT, PDF, Text report document & reference material) or on online Github.
Students should maintain a project log book containing weekly progress of the project.

Text Books

1	--

References

1	--

Useful Links

1	--

PO-PO Mapping

	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1		1			2								3	2
CO2											2		2	1
CO3					2					3				

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High Each CO of the course must map to at least one PO.

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.				
Assessment	**Based on**	**Conducted by**	**Typical Schedule (for 26-week Sem)**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40
Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.				

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**LA1**	**LA2**	**Lab ESE**	**Total**
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2020-21

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	
Course Name	Presentation and Report Writing
Desired Requisites:	

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	-				
Interaction	1 Hr/week	**Credits: 1**			

Course Objectives

1	To convey ethical guidelines during technical content preparation and presentation
2	To use various report writing tools
3	To provide various relevant practices of presentation and report/paper writing

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Use appropriate charts, tables and figures in presentation and report	Apply
CO2	Compare and identify suitable tools towards practicing write-up and presentation	Analyse
CO3	Create effective report and presentations of the technical work	Create

List of Experiments / Lab Activities

List of Experiments:

PART – A Technical Report Writing

1. Experiment 1: Writing technical reports using proper Tense and grammar.
2. Experiment 2: Study of various types of technical Reports
   Project report, Conference paper, Journal Paper, Intellectual Property Rights (IPR), Selection of paper type for possible publication.
3. Experiment 3: Study of technical report Structure - I
   Preamble, Abstract, Literature review/survey, Problem statement, Objectives
4. Experiment 4: Study of technical report Structure – II
   Methodologies, Results, Discussions, Conclusion, Acknowledgements
5. Experiment 4: Use of Bibliographies/references and proper citations in reports.
6. Experiment 5: Use of Citations, referring style and method of using citations.
7. Experiment 6: Study of Plagiarism
   a. Checking plagiarism, b. Minimizing plagiarism

PART – B Presentation

8. PPT's and Animations
9. Presentation structure, Number of slides and Time management
10. Presentation styles
11. Figures and Tables for data representations

Part –C Tools and Practices

12. MS Office, Open Office, Latex, Beamer, Flash, GNU Plot etc.
13. End Note; Mendeley, Grammarly, Ginger, 1 Checker, Turnitin etc.

Text Books

1	Kothari C. R, *"Research Methodology"*, 2nd Edition, New Age International, 1990
2	Chopra Deepak and Sondhi Neena, *"Research Methodology : Concepts and cases"*, 2nd Edition, Vikas Publishing House, New Delhi, 2015

References	
1	Melville Stuart and Goddard Wayne, *"Research Methodology: An Introduction For Science & Engineering Students"*, 1st Edition, Kenwyn Juta & Co. Ltd.,1996
2	G. Ramamurthy, *"Research Methodology"*, 2nd Edition, Dream Tech Press, New Delhi, 2015

Useful Links	
1	https://onlinecourses.swayam2.ac.in/ntr21_ed23/preview Academic Research & Report Writing
2	https://onlinecourses.swayam2.ac.in/cec21_ge18/preview Academic Writing
3	https://onlinecourses.nptel.ac.in/noc21_ge12/preview Qualitative Research Methods And Research Writing
4	https://onlinecourses.nptel.ac.in/noc21_hs44/preview Effective Writing

CO-PO Mapping

	Programme Outcomes (PO)												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1						1		3							
CO2					2								1		
CO3					1					3					

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.

Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5			**05**
Apply	20	20	20	**60**
Analyze	5	5	10	**20**
Evaluate		5	5	**10**
Create			5	**5**
Total	**30**	**30**	**40**	**100**