Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)



Course Contents (Syllabus) for

Second Year B. Tech. (Information Technology) Sem - III to IV

AY 2020-21

Syllabus for SY IT SEM III

Professional Core (Theory)

| Title of | f the C | Course | : Prob | ability | and S | Statisti | ics 5M | A201 | | | L | Т | Р | Cr |
|---|----------|-----------------|-----------|----------|----------|----------|----------|----------------|----------|-----------|---------|----------|----------|--------|
| | | | | | | | | | | | 2 | 0 | 0 | 2 |
| Pre-Requisite Courses: Engineering Maths | | | | | | | | | | | | | | |
| Textbooks: | | | | | | | | | | | | | | |
| 1. Fundamental of Mathematical Statistics by Gupta and Kapoor | | | | | | | | | | | | | | |
| 2. An Introduction to probability and statistics by Vijay Rohatgi | | | | | | | | | | | | | | |
| References: Drobability and Statistics for Engineers and Scientists by S. Pass | | | | | | | | | | | | | | |
| Probability and Statistics for Engineers and Scientists by S.Ross Course Objectives : | | | | | | | | | | | | | | |
| Course Objectives : 1 To understand the basic concepts of probability and statistics for mathematical estin | | | | | | | | | | | | | estimat | ions |
| To understand the basic concepts of probability and statistics for mathematical estimination. To study different mathematical models based on statistical. | | | | | | | | | | | | ostiinu | | |
| 3. To analyze statistical and fuzzy systems. | | | | | | | | | | | | | | |
| Course Learning Outcomes: | | | | | | | | | | | | | | |
| CO After the completion of the course the student should be able Bloom's Cogni | | | | | | | | | | | | Cogniti | ve | |
| | to | | | | | | | | | | lev | el [| Descript | or |
| CO1 | Apply | v knowl | edge of | statisti | cal desi | gn for e | ngineer | ing pro | blem. | | Ι | II | Apply | ing |
| CO2 | Form | ulate fev | w real li | ife prob | lems us | ing the | models | | | | Γ | V | Analyz | zing |
| CO3 Solve and analyze problems for better results. IV Analy | | | | | | | | | | | | Analyz | zing | |
| CO-PO Mapping : | | | | | | | | | | | | | | |
| PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 1 | | | | - | | | | | | | | 1 | |
| CO2 | 2 | | | | 2 | | | | | | | | | |
| COS | | | | | 3 | | | | | | | | | |
| Assessi | ments | : | | | | | | | | | | | | |
| Teache | er Asse | essmen | nt: | | - 1 | | | | | | | | | |
| Two co | mpone | ents of | In Ser | nester | Evalu | ation (. | ISE), (| One M | 1d Sen | iester E | xamina | ation (I | MSE) a | nd one |
| | mester | Exam | Ination | I (ESE |) navir | ig 20% | 0, 30% | and St Mort | J% we | ignts rea | spectry | ery. | | |
| ISE 1 | sincin | | | | | | | 10 | \$5 | | | | | |
| MSE | | | | | | | | 30 | | | | | | |
| ISE 2 | | | | | | | | 10 | | | | | | |
| ESE | | | | | | | | 50 | | | | | | |
| ISE 1 | and IS | E 2 are | e basec | l on as | signmo | ent/dec | clared t | est/qu | iz/sem | inar etc. | | | | |
| MSE: | Assess | sment | is base | d on 5 | 0% of | course | conte | nt (No | rmally | first thr | ee mo | dules) | | |
| ESE: | Asses | sment | is bas | ed on | 100% | course | e conte | nt wit | h 70-8 | 0% wei | ghtage | for co | ourse co | ontent |
| (norm | ally las | st three | emodu | iles) co | overed | after N | ASE. | | | | | | | |
| Modu | le 1 · F | ents: Pandoi | m Var | iahle | | | | | | | | | Н | re |
| Discre | te ran | dom | variabl | e. Co | ntinuo | us ran | dom v | variabl | e. pro | bability | mass | funct | ion. | 15. |
| cumul | ative of | listribi | ution f | unctio | n biva | ariate | discret | e rand | om va | riable | ioint r | orobabi | lity 4 | |
| distrib | oution | ioint d | listribu | tion fu | nction | of two | o dime | nsiona | l discre | ete rand | om vai | riable | | |
| Modu | le 2: P | Probab | oility E |)istrib | ution | 01 01 | | | | | 0111 | | Н | rs. |
| Gauss | ian dis | tributi | on, Ex | ponent | ial dis | tributio | on, Un | iform o | distribu | ation. | | | 4 | |
| Modu | le 3: S | statisti | cal M | ethods | | | - | | | | | | H | lrs. |

| | Measure of Central tendency, Measure of dispersion, Range, Quartile deviation, Mean | |
|---|---|------|
| | deviation, variance, Standard deviation, Coefficient of variance, moments, Symmetry, | 5 |
| | Skewness, Kurtosis, and Types of Kurtosis. | |
| | Module 4: Population and Sample | Hrs. |
| | Introduction, Types of Characteristics: Attributes and variables, Collection and Organization of data Population and sample Methods of sampling | 3 |
| | Organization of data, ropulation and sample, Methods of sampling. | |
| | Module 5: Exact Sampling Distribution | Hrs. |
| | Chi- square distribution: definition and its properties, Student t- distribution: definition | 1 |
| | and its properties. | 7 |
| | Module 6: Test of Hypothesis | Hrs. |
| | Random samples, parameter, statistic, standard error of statistic, null and alternative | |
| | hypothesis, critical region, level of significance, Types of error, large sample test, Small | 6 |
| | sample test | |
| | Module wise Measurable Students Learning Outcomes : | |
| | After the completion of the course the student should be able to: | |
| - | · · · · · | |

| Title o | f the C | Course | : Discr | ete M | athem | atics 5 | 5IT201 | | | | L | Т | Р | Cr |
|--|---|----------|-----------------------------|----------------|---------------------|--------------|----------|------------|----------|----------|---------------|--------------------|------------|---------|
| | | | | | | | | | | | 3 | 1 | 0 | 4 |
| Pre-Re | equisit | e Cou | rses: I | Fundar | nentals | ofalg | gebra a | nd calo | culus. | | | | | |
| Textbooks: | | | | | | | | | | | | | | |
| 3. | C. L. I | Liu, D | P Moh | apatra | , "Eler | nents o | of Disc | rete M | lathem | atics: A | Comp | outer (| Driented | |
| 4 | Appro | ach", [| ГMG, í | 3^{10} Edi | tion, 2 | .011. | | <i>.</i> . | 1 / | , · | .1 1 | | , | |
| 4. | J.P. 11 | embla | y & R. | Manol | har, D | iscrete | Mathe | ematica | al struc | ture wi | th app | licatio | ns to | |
| 5 | Compt Kenne | th H | MG, I Rosen ³ | Editi Disci | IOII, 19 rete Mi | 97 athem: | atics ar | d Ite / | Annlie | ation" " | гм <i>с</i> ′ | 7 th Ed | ition 20 | 11 |
| J. Refere | nces. | un 11. 1 | XUSCII, | Disc | | | ancs ar | iu its r | тррпса | | 110, | / Lu | 111011, 20 | 11 |
| 4. | K.D. J | oshi, " | Found | ation of | of Disc | rete M | lathem | atics". | 2019 | | | | | |
| 5. | Lipsch | nutz, M | larc Li | , pson | Discre | ete ma | themat | ics", Ś | chaum | 'soutlir | ne serie | es,3rd | Edition, | 2007 |
| Cours | e Obje | ctives | : | | | | | | | | | | | |
| 1. | To im | part lo | gical th | ninking | g and it | ts appl | ication | to cor | nputer | science | e. | | | |
| 2. | To inc | ulcate | ability | to rea | ason ar | nd abil | ity to j | presen | t a coh | erent a | nd mat | hemat | tically ac | curate |
| 2 | argum | ent. | ha kna | wlada | a and a | abilla d | abtaina | d to it | wastia | ata and | salva | 0 100 | ioty of d | isorata |
| 5. | nathe | matica | l nrohl | ems | | SKIIIS (| Jutame | u to n | ivestig | ale allu | SOIVE | a val | lety of u | |
| Cours | e Lear | ning C |)utcom | enis. ies: | | | | | | | | | | |
| CO | After | the c | omple | tion of | f the c | ourse | the stu | ıdent | should | be ab | le Blo | om's | Cognitiv | ve |
| | to | | | | | | | | | | | | | |
| C01 | CO1 Discuss the fundamental mathematical concents in Discrete | | | | | | | | | | | | | |
| COI | Math | ematic | s to co | mputi | ng con | cepts. | | oncep | 15 111 | District | | Ι | Unders | tand |
| CO2 | Appl | y conc | epts of | f set tl | neory, | graph | theory | , algel | braic s | tructure | es T | | | 1 |
| | to sol | ve a va | ariety o | of prob | olems. | 0 1 | 5 | , C | | | 1 | 11 | App | ly |
| CO3 | Estim | nate the | e optin | nized s | olutior | ns for v | various | proble | ems. | | Ι | V | Analy | /ze |
| CO-PO |) Map | ping : | 1 | | 1 | 1 | 1 | 1 | 1 | | | 1 | | |
| PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| <u>CO1</u> | 1 | | | | 2 | | | | | | | | 1 | |
| CO2 | 2 | | | | 2 | | | | | | | | | |
| COS | | | | | 3 | | | | | | | | | |
| Assess | ments | : | | | | | | | | | | | | |
| Teach | er Asse | essmen | nt: | | | | | | | | | | | |
| Two co | ompone | ents of | In Ser | nester | Evalua | ation (| ISE), (| Dne M | id Sen | nester E | xamina | ation (| (MSE) a | nd one |
| End Se | emester | Exam | inatior | i (ESE |) havir | ng 20% | 6, 30% | and 50 | J% we | ights re | spectiv | vely. | | |
| Asses | sment | | | | | | | | KS | | | | | |
| MSF | | | | | | | | 30 | | | | | | |
| ISE 2 | | | | | | | | 10 | | | | | | |
| ESE | | | | | | | | 50 | | | | | | |
| ISE 1 | and IS | E 2 ar | e basec | l on as | signme | ent/dec | clared t | est/qu | iz/sem | inar etc | | | | |
| MSE: Assessment is based on 50% of course content (Normally first three modules) | | | | | | | | | | | | | | |
| ESE: | Assess | sment | is base | d on 1 | 00% c | ourse o | content | with 7 | 70-80% | 6 weigh | tage fo | or cou | rse conte | ent |
| (norm | hally las | st three | e modu | lles) co | overed | after M | MSE. | | | | | | | |

| Course Contents: | |
|---|-------|
| Module 1: Sets and Proposition | Hrs. |
| 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, | 7 |
| Predicate Calculus, The Statement Function, Variable and Quantifiers, Free and Bound | |
| Variable, Inference Theory of Predicate Calculus, Methods of Proof, Euclidean | |
| Algorithm. | |
| Module 2: Relation and Functions | Hrs. |
| Introduction, A Relational Model for Data Bases, Properties of Binary Relation, | |
| Warshall's Algorithm, Equivalence Relation and Partition, Partial Ordering Relation | 6 |
| and Lattices, Chain and Antichains, A Job-Scheduling Problem, Compatible Relation, | U |
| Functions, Composition of Functions, Invertible Functions. | |
| Module 3: Graphs and Planar Graphs | Hrs. |
| 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 | 7 |
| Paths and Circuits, Traveling Salesperson Problem, Factors of Graph, Planar Graph, | |
| Graph Colouring. | |
| Module 4: Trees and Cut-Sets | Hrs. |
| 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 | 7 |
| Algorithms, Transport Network. | |
| Module 5: Algebraic Structures | Hrs. |
| Introduction, Groups, Subgroups, Generators and Evaluation of Powers, Cosets and | |
| Lagrange's Theorem, Permutation Groups, Codes and Group Codes, Isomorphisms and | 7 |
| Automorphisms, Homomorphisms and Normal Subgroups, Rings, Integral Domains, | , |
| and Fields, Ring Homomorphisms, Polynomial Rings and Cyclic Codes. | |
| Module 6: Boolean Algebras | Hrs. |
| Lattices and Algebraic Systems, Principle of Duality, Basic Properties of Algebraic | |
| System Defined by Lattices, Distributive and Complemented Lattices, Boolean Lattices | 6 |
| and Boolean Algebras, Uniqueness of Finite Boolean /expressions | |
| Module wise Measurable Students Learning Outcomes : | |
| After the completion of the course the student should be able to: | |
| Module 1: Understand the basics of mathematical set theory and propositions. | |
| Module 2: Will have the concrete ability in the concepts of mathematical relation and funct | ions. |
| Module 3: Identifying and solving real-world problems using graphs | |
| Module 4: Will have a better understanding of a tree, a special type of graph. | |
| Module 5: Apply and analyse the basics of algebraic structures like Groups and Rings. | |
| Module 6: Analyse Boolean algebra from computing point of view. | |
| Tutorial: | |
| 1. Problems on set theory. | |
| 2. Problems on propositional logic. | |
| 3. Problems on predicate calculus. | |
| 4. Problems on relation. | |
| 5. Problems on functions. | |

- 6. Problems on graph.
 7. Problems on planar graphs.
 8. Problems on tree, a special graph.
 9. Problems on minimum spanning trees.
 10. Problems on groups.
 11. Problems on rings.
 12. Problems on Boolean lattices.
 13. Problems on Boolean algebra

- 13. Problems on Boolean algebra.

| Title of the Course: Data Structures 5IT 202 | Ι | | Т | Р | Cr | | | | | | | |
|---|-------------------------------|----------|----------|-----------|--------|--|--|--|--|--|--|--|
| | | 3 | 0 | 0 | 3 | | | | | | | |
| Pre-Requisite Courses: Programming in C including pointers and H | File Handlir | ng | | | | | | | | | | |
| Textbooks: | | | | | | | | | | | | |
| 1. Richard F. Gilberg, Behrouz A. Forouzan, "Data Stri | uctures, A P | Pseudo | code A | pproach | With | | | | | | | |
| C'', Cengage Learning, 2 nd Edition, 2005 | 1 ¹ 0 ¹ | т (| MO | TT'11 | 1 St | | | | | | | |
| 2. S. Lipschutz, "Data Structures with C", Schaum's Ou | itlines Serie | s, Tata | a McGi | aw-Hill, | 1 | | | | | | | |
| 3 Narsimha Karumanchi "Data Structure and algorithm | s" Careern | nonk ' | 5th edit | tion 201 | 1 | | | | | | | |
| References: | | | | | | | | | | | | |
| 1. YashavantKanetkar, "Understanding pointers in C", 3 rd edition, BPB Publication | | | | | | | | | | | | |
| 2. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2 nd Edition, | | | | | | | | | | | | |
| Prentice Hall of India | | | | | | | | | | | | |
| Course Objectives : | | | | | | | | | | | | |
| 1. To improve skins for programming in a systematic w | 'ay. Int | | | | | | | | | | | |
| 3 To familiarize linear and non-linear data structures ar | nd the algor | ithms | | | | | | | | | | |
| Course Learning Outcomes: | ia ine aiger | | | | | | | | | | | |
| CO After the completion of the course the student should be | able to | Blo | om's (| Cognitive | e | | | | | | | |
| level Descriptor | | | | | | | | | | | | |
| CO1 Describe the fundamental concepts of structuring, main argumentation of the data for efficient access and manipulation | naging and | 1 | II | Understa | inding | | | | | | | |
| CO2 Experiment the use of linear and non-linear data structures | | T | п | Annly | ing | | | | | | | |
| CO3 Identify need of recursion and execute recursive algorithms | | I | V | Analyz | zing | | | | | | | |
| CO-PO Mapping : | | | | | 0 | | | | | | | |
| PO PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 | PO10 P | 011 | PO12 | PSO1 PS | SO2 | | | | | | | |
| CO1 2 1 | | | | | | | | | | | | |
| CO2 3 | | | | 1 | | | | | | | | |
| CO3 1 2 | | | | 1 | | | | | | | | |
| Assessments : | | | | | | | | | | | | |
| Teacher Assessment: | | | | | | | | | | | | |
| Two components of In Semester Evaluation (ISE), One Mid Sem | lester Exam | inatio | n (MS | E) and o | ne End | | | | | | | |
| Semester Examination (ESE) having 20%, 30% and 50% weights re | spectively. | | | | | | | | | | | |
| Assessment Marks | | | | | | | | | | | | |
| 15E 1 10 MSE 20 | | | | | | | | | | | | |
| ISE 2 10 | | | | | | | | | | | | |
| ISE 2 10 FSE 50 | | | | | | | | | | | | |
| ISE 1 and ISE 2 are based on assignment/declared test/quiz/semina | r etc | | | | | | | | | | | |
| MSE: Assessment is based on 50% of course content (Normally first three modules) | | | | | | | | | | | | |
| ESE: Assessment is based on 100% course content with 70-80% w | veightage fo | or cour | se cont | ent (norr | nally | | | | | | | |
| last three modules) covered after MSE. | | | | | | | | | | | | |
| Course Contents: | | | | | | | | | | | | |
| Module 1 : Introduction | | | | | Hrs. | | | | | | | |

| 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 |
|---|------|
| Module 2 : Linked Lists | Hrs. |
| 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 |
| Module 3 : Stacks and Queues | Hrs. |
| 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 |
| Module 4 : Trees | Hrs. |
| Basic terminology, binary trees and its representation, binary tree traversals (recursive and non-recursive), operations such as copy, equal on binary tree, expression trees, General Trees, Binary Search Trees, Heaps and its operations. | 7 |
| Module 5 : Graphs | Hrs. |
| Terminology and Representation of graphs using adjacency matrix, adjacency list and adjacency Multi-list, Traversals Depth First and Breadth First, Minimum Spanning Tree | 5 |
| Module 6 : Searching & Sorting Technique | Hrs. |
| 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 - B-trees (concept only implementation not expected), File Handling. | 8 |
| Module wise Measurable Students Learning Outcomes : | |
| After the completion of the course the student should be able to: | |
| Module 1: Explain the logic to solve the problems and writing recursive algorithmsModule 2: Discuss the concept of linked list and use of ADTs to solve the problemModule 3: Analyze data structures like stacks and queues | |
| Module 4: Apply nonlinear data structure tree and its basic operations to solve engineering probModule 5: Identify various representations of graphs and manipulate data for real applicationsExplain and compare various searching, sorting and hashing techniques. | lems |

| Title of | f the C | ourse | : Micr | oproce | essors | 5IT20 | 3 | | | | | L | Т | Р | Cr |
|--|--|------------------|-------------------------------|------------------|-------------------|----------------------|-----------|----------|--------------------|--------------------------------|----------|---------------|-------|-------|--------|
| | | | | | | | | | | | | 3 | 0 | 0 | 3 |
| Pre-Re | Pre-Requisite Courses: First year Information Technology Basic Electronics course. | | | | | | | | | | | | | | |
| Textbo | Textbooks: | | | | | | | | | | | | | | |
| | 1. M. pu | Morri blicati | is Man on, 4 th | o & M Edition | ichael n, 2008 | D. Cile 3 | etti,"D | igital I | Design' | ', Pears | son Pre | ntice | Hall | | |
| | 2. Ra | mesh s | S. Gao | nkar, " | Micro | proces | sor arc | hitectu | re, pro | gramm | ing & | applic | ation | s", I | New |
| | Ag | ge Inter | rnation | al pub | lication | 1,5 th ec | lition, i | 2015 | | 0 | | 1 | | 1 | |
| | 3. A | K Ray | & K N Fata M | /I Bhur cGraw | chand | l, "Adv ducatio | anced | microj | process process | sors & nd editic | periphe | erals'', 2 | seco | ond | |
| Refere | References: | | | | | | | | | | | | | | |
| ittitt | 1. Flo | ovd & | Jain. " | Digital | funda | mental | ls". Pe | arson e | ducatio | on, eigl | hth edit | tion. 2 | 007. | | |
| | 2. Jar | nes Tu | irley, " | Advan | ced 80 | 386 pi | ogram | ming t | echniq | ues", T | 'ata Mo | Graw | -Hill | , sec | ond |
| | ed | ition, 2 | 2005. | | | 1 | e | U | | | | | | · | |
| Course | e Obje | ctives | : | | | | | | | | | | | | |
| | 1. To | introd | luce the | e funda | amenta | l princ | iples c | of logic | design | 1. | | | | | |
| | 2. To | demo | nstrate | the ba | sic bui | lding l | olocks | and op | eration | ns of 8/ | 16/32 ł | oit mi | cropr | oces | sors |
| | & | concep | ot mult | iple pr | ocesso | r syste | ms. | | | | | | | | |
| ~ | <u>3. To</u> | inculo | eate the | abilit | y to de | sign as | ssembl | y langı | lage pi | ogram | S. | | | | |
| Course | e Leari | ning () | outcom | les: | 0.01 | | | | | | DI | , , | •,• | | |
| | CO After the completion of the course the student should be Bloom's Cognitive | | | | | | | | | | | | | | |
| | able | 10 | | | | | | | | | level | De | scrip | tor | |
| CO1 | Discu | iss the | conce | ots of c | ligital | logic to | o desig | n the c | circuits | | II | Ur | derst | andi | ng |
| CO2 | Utiliz | the the | archite | ecture | and or | ganiza | tion o | f micro | oproce | ssors | III | Ap | plyin | ıg | |
| | with | instruc | tion se | t to de | sign as | sembl | y langı | lage pr | ogram | s. | | | | | |
| CO3 | Study | / simpl | le merr | nory an | d inpu | t/outpi | it inter | face | | | IV | Ar | alyzi | ng | |
| CO-PC |) Map | ping : | 1 | 1 | 1 | 1 | 1 | 1 | 1 | I | 1 | | | | |
| PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS | 501 | PSO2 |
| CO1 | | | 2 | | 1 | | | | | | | | | | |
| <u>CO2</u> | | 1 | | | | | | | | | | | 2 | | |
| CO3 | | | 1 | | | | | | | | | | 1 | | |
| Assess | ments | : | | | | | | | | | | | | | |
| Teache | er Asse | ssmen | nt: | | | | | | | | | | | | |
| Two co | ompone | ents of | In Sei | nester | Evalu | ation (| ISE), (| One M | id Sen | nester I | Examin | ation | (MSI | E) aı | nd one |
| End Se | mester | Exam | ination | (ESE) |) havin | g 20% | , 30% | and 50 | % wei | ghts re | spectiv | ely. | | | |
| Asses | sment | | | | | | | Mark | S | | | | | | |
| ISE 1 | | | | | | | | 10 | | | | | | | |
| MSE | | | | | | | | 30 | | | | | | | |
| ISE 2 | | | | | | | | 10 | | | | | | | |
| ESE 50 | | | | | | | | | | | | | | | |
| ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc. | | | | | | | | | | | | | | | |
| MSE: Assessment is based on 50% of course content (Normally first three modules) | | | | | | | | | | | | | | | |
| ESE: Assessment is based on 100% course content with 70-80% weightage for course content | | | | | | | | | | | | | | | |
| Course Contents: | | | | | | | | | | | | | | | |
| Course | e Cont | ents: | | | | | | | | | | | | | |

| Module 1: Digital ElectronicsHrs.Combinational logic & sequential logic design, excitation table, state transition diagram, system design.6Module 2: Processor basics & 8085 microprocessorHrs.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 |
|---|
| Combinational logic & sequential logic design, excitation table, state transition diagram, system design.6Module 2: Processor basics & 8085 microprocessorHrs.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 |
| system design.0Module 2: Processor basics & 8085 microprocessorHrs.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.07 |
| Module 2: Processor basics & 8085 microprocessorHrs.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 |
| 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. |
| single chip microcomputer, microcomputer systems. The 8085 MPU, parametric considerations, internal architecture, introduction to 8085 assembly language programming, 8085 instructions. |
| considerations, internal architecture, introduction to 8085 assembly language / programming, 8085 instructions. |
| programming, 8085 instructions. |
| |
| Module 3: Programming techniques & interfacingHrs. |
| Writing assembly language programs, debugging, looping, counting, indexing, arithmetic |
| operations related to memory, counters & delays, stacks, Interrupts, I/O (USB) interface, 7 |
| data communication. |
| Module 4: Introduction to 8086Hrs. |
| Functional & architectural comparison of 8085 & 8086, programming, implementing |
| standard programming structures in 8086, string, procedure & macros. |
| Module 5: Introduction to 80386Hrs. |
| Features & architecture of 80836, Pin description, 80836 register set, special 80386 |
| registers, 80386 Real mode memory segmentation, data types used in real mode, 6 |
| instruction format, addressing modes of 80386. |
| Module 6: 80386 Memory SegmentationHrs. |
| Memory management through segmentation, address translation, protection in 7 |
| segmentation, introduction to protected mode |
| Module wise Measurable Students Learning Outcomes : |
| After the completion of the course the student should be able to: |
| Module 1: Explain the combinational logic design & sequential logic design. |
| Module 2: Explain the CPU organization, the 8085 MPU, parametric considerations. |
| Module 3: Apply programming techniques regarding interrupts, I/O interface, serial I/O etc. |
| Module 4: Classify functional & architectural concepts of 8085 & 8086 |
| Module 5: Identify and apply Teatures & architecture of 80836 |

| Title o | f the C | Course | : Data | Com | munic | ation | 5IT204 | 4 | | | L | Т | Р | Cr |
|-------------|---|---------|----------|--------------|---------|--------------|----------|---------|---------|-----------|---------|----------|------------|-----------|
| | | | | | | | | | | | 2 | 1 | 0 | 3 |
| Pre-Re | Pre-Requisite Courses: Basics of communication | | | | | | | | | | | | | |
| Textbo | Textbooks: | | | | | | | | | | | | | |
| 1. | Willia | m Stal | lings, ' | 'Data | and Co | mpute | er Com | munic | ations' | ', PHI, 9 | th Edi | ition, 2 | 2011. | |
| 2. | Behro | uz A. I | Forouz | an ,"D | ata co | mmun | ication | and N | etwork | ang", T | MGH, | 5th E | dition, 2 | 2013. |
| J. | Wayn | e Iom | ası, "T | ntrodu | ction t | o Data | Comn | nunica | tion an | d Netwo | orking | , Pea | irson, 2 | 007 |
| Kelere 1 | A chya | it S Go | dhole | and Δ | tul Kal | nate " | Data C | ommu | nicatio | ins and I | Vetwo | rke"] | IMGH | 2^{nd} |
| 1. | Editio | n 200 | 8 | | ui ixai | late, 1 | Data C | ommu | meatro | | NCLWO | 1K5,1 | i wittii, | 2 |
| 2. | Simor | n Havk | in ,"Di | gital C | Commi | inicatio | on Sys | tems". | Wilev | . 1st Edi | ition.2 | 014. | | |
| 3. | 3. Simon Haykin and Michael Moher, "Introduction to Analog and Digital Communications", | | | | | | | | | | | | | |
| | Wiley, 2nd Edition 2007 | | | | | | | | | | | | | |
| Course | e Obje | ctives | : | | | | | | | | | | | |
| 1. | To dis | cuss th | ne conc | epts o | f data | comm | unicati | on sys | tem. | | | | | |
| 2. | To ins | truct n | nultiple | exing a | and end | coding | schem | les. | | | | | | |
| 3. | 10 im | the co | rcuit ai | nd pac | the cou | itching | g techni | iques. | uld ba | abla to | Dlo | om'a | Comiti | 1/0 |
| | Alter | | mpieu | 011 01 1 | | | e stude | III SHO | | | DIC | Join S | Cogiiiti | ve |
| | level Descriptor | | | | | | | | | | | | or | |
| CO1 | CO1 Summarize the components involved in data communication II Understanding | | | | | | | | | | | | anding | |
| | system. | | | | | | | | | | | | | |
| CO2 | CO2Identify different encoding schemes.IVAnalyzing | | | | | | | | | | | | zing | |
| CO3 | CO3Discuss packet switching and circuit switching techniquesVEvaluating | | | | | | | | | | | | | ating |
| | | | | | | | | | | | | | | 0 |
| CO-PC |) Map | ping : | | | | | | | | | | | | |
| PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | | | 3 | | | | | | | | | | | |
| <u>CO2</u> | | 2 | | | 1 | | | | _ | | | | | <u> </u> |
| CO3 | | | | | | | 3 | | 2 | | 2 | | | |
| Assess | ments | : | | | | | | | | | | | | |
| Teach | er Asso | essmer | nt: | | - 1 | | | ~ | | | | | | |
| Two co | ompon | ents of | In Ser | nester | Evalu | ation (| ISE), (| Jne M | 1d Sen | tester Ex | kamin | ation (| MSE) a | and one |
| | emester | Exam | Ination | 1 (ESE |) navn | 1g 20% | 0, 30% | and S | 0% we | ignts res | spectry | /ery. | | |
| Asses | smem | | | | | | | 10 | IKS | | | | | |
| MSF | | | | | | | | 30 | | | | | | |
| ISE 2 | | | | | | | | 10 | | | | | | |
| ESE | | | | | | | | 50 | | | | | | |
| ISE 1 | and IS | E 2 ar | e based | l on as | signm | ent/deo | clared 1 | test/qu | iz/sem | inar etc. | | | | |
| MSE: | Asses | sment | is base | d on 5 | 0% of | course | e conte | nt (No | rmally | first thr | ee mo | dules) | | |
| ESE: | Asses | sment | is base | ed on | 100% | course | conter | nt with | n 70-80 |)% weig | htage | for co | urse co | ntent (no |
| last th | ree mo | odules) | cover | ed afte | r MSE | · · | | | | | | | | |
| Course | e Cont | ents: | | | | | | | | | | | | |
| Modu | <u>le 1: </u> | Introd | uction | to da | ta con | <u>imuni</u> | cation | | | | ~ | | <u> </u>] | Hrs. |
| Data | Comm | unicat | ions a | nd Ne | etwork | ing fo | r Toda | ay's E | nterpri | ise, A (| Comm | unicat | ions | 3 |

| Model, Data Communications, Networks, and The Internet-An Example Configuration. | |
|---|--------------------|
| Module 2: Data Transmission | Hrs. |
| 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 | 5 |
| Module 3 : Encoding techniques | Hrs. |
| 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. | 5 |
| Module 4 : Multiplexing | Hrs. |
| 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. | 6 |
| Module 5 : Telephone Network | Hrs. |
| Telephone network for data transmission, Modems, Latest telephone communication and interfacing techniques. | 3 |
| Module 6 : Switching techniques | Hrs. |
| Switched Communication Networks, Circuit-Switching Networks, Circuit-Switching Concepts, Soft switch Architecture, Packet-Switching Principles | 4 |
| Module wise Measurable Students Learning Outcomes : | |
| After the completion of the course the student should be able to: Module 1: Explain the fundamental concepts of data communication system. Module 2: Distinguish between analog and digital signals and understand their character Module 3: Study different encoding schemes Module 4: Compare and analyze bandwidth utilization in different multiplexing technic | eristics. ques. |
| Module 5: Understand telephone network. | |
| Module 6: Explain the principles of circuit and packet switching. | |
| Tutorial Content: Tutorial can be conducted as12 Assignments based on module 1 to 6 | |

| Title of | f the Co | ourse: (| C and C | PP Pro | gramm | ing 5IT | 205 | | | _ | L | Γ | | P | Cr |
|---|---------------------|--------------------|----------|----------|------------|--------------|------------|--------------------------|----------|-------------|-------|-------|-------|---------------|-----------|
| D D | ••• | G | | | | | | | | | 2 | 0 |) | 0 | 2 |
| Pre-Re | quisite | Cours | es: | | | | | | | | | | | | |
| Tartha | | C Prog | rammir | ıg | | | | | | | | | | | |
| 1 extbo | OKS: E Dala | 1711011/01 | my Oh | iaat Ori | ontad D | raaram | mina | $T \rightarrow T \alpha$ | to MaG | row U | ;11 2 | rd E | 1;;;; | m 20 | 06 |
| 1. 2 | E.Daigi Riarne | lluSwai Stroust | my, 00 | The C+ | \pm Prom | rogramin | a langu | iane Th | ird edi | tion D | m, J | n Et | duc | n,20 ation | ,00. N |
| ∠. Refere | nces: | Silousi | rup, — | | + 110gi | <u>annin</u> | g langu | lage, 11 | | uon, 1 | carse | ЛЦ | uuca | 111011 | 1. |
| 1 | Robert | Laffore | e "Ohie | ect Orie | nted Pr | ooramn | ning in | c++" § | SAMS r | ublica | tion | 4th | | | |
| 1. | Edition | .2008. | , ooje | | iiicu i i | ogramm | inng m | •••, | 111101 | Juoneu | | 1011 | | | |
| Course | Course Objectives : | | | | | | | | | | | | | | |
| 1. To learn the fundamental programming concepts and methodologies which are essential to | | | | | | | | | | | | | | | |
| building good C/C++ programs | | | | | | | | | | | | | | | |
| 2. To practice the fundamental programming methodologies in the C/C++ programming | | | | | | | | | | | | | | | |
| | languag | ge via la | aborator | ry expe | riences | | | | | | | | | | |
| Course Learning Outcomes: | | | | | | | | | | | | | | | |
| CO | After t | the com | pletion | of the c | ourse tl | ne stude | ent shou | ld be al | ole to | Bloor | n's C | Cogni | itive | : | |
| level Descriptor | | | | | | | | | | | | | | | |
| CO1 Define the object-oriented programming approach in II Understanding | | | | | | | | | | | | | | | |
| connection with C++ | | | | | | | | | | | | | | | |
| CO2 | Apply | the con | ncepts c | of objec | t-orient | ed prog | grammi | ng | | III | ; | appl | ying | 2 | |
| CO2 | Analy | ze vir | tual ar | nd pui | re virt | ual fu | nction | & co | mplex | IV | | Ana | lyzı | ng | |
| CO DO | progra | imming | situatio | ons | | | | | | | | | | | |
| CO-PC | Napp | ng : | DO3 | DO4 | DO5 | DO(| DO7 | DOQ | DOD | DO10 | DC | 11 | DC | 12 | |
| CO1 | PUI | POZ | P03 | PO4 | P05 | PUo | PO/ | PUð | P09 | POIU | PU | /11 | PU | 112 | |
| CO2 | | 2 | | 2 | 3 | | | | | | 2 | | | | |
| CO3 | | - | 3 | | 3 | | | | | | 2 | | 1 | | |
| | | 1 | | | 1 | | 1 | | 1 1 | | | | | | |
| Assessi | ments : | | | | | | | | | | | | | | |
| Teache | er Asses | sment | : | | | | | | | | | | | | |
| Two co | mpone | nts of I | n Seme | ster Ev | aluatior | n (ISE), | One M | Iid Sem | lester E | xamin | atior | n (M | SE) | and | one |
| End Se | mester] | Examin | ation (I | ESE) ha | wing 20 | 0%, 30% | % and 5 | 50% we | ights re | spectiv | vely. | | | | |
| Assess | sment | | | | | | Ma | arks | | | | | | | |
| ISE 1 | | | | | | | 10 | | | | | | | | |
| MSE | | | | | | | 30 | | | | | | | | |
| ISE 2 | | | | | | | 10 | | | | | | | | |
| ESE | | | | | | | 50 | | | | | | | | |
| ISE 1 | and ISE | E 2 are l | based of | n assigi | nment/c | leclared | l test/qı | uiz/semi | inar etc | | | | | | |
| MSE: | Assessi | ment is | based of | on 50% | of cour | rse cont | ent (No | ormally | first th | ree mo | dule | s) | | | |
| ESE: | Assess | ment is | based | on 100 | % cour | se cont | ent wit | h 70-80 | % wei | ghtage | for | cour | se c | onte | ent |
| (normally last three modules) covered after MSE. | | | | | | | | | | | | | | | |
| Course | Course Contents: | | | | | | | | | | | | | | |
| Modu | le 1: C- | ++ Prog | grammi | ng basi | cs | | | | | 1 - | | | | Hrs | |
| What | is objec | t orient | ted prog | grammi | ng? Wł | iy do w | re need | object | orientee | 1. Prog | ram | ming | 5 | 2 | |

| 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. | |
| Module 2: Object and Classes : | Hrs. |
| 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 | 6 |
| member functions Array of objects ,Objects as function arguments Friend functions | |
| Returning objects Constructors Types of constructor Destructors | |
| Module 3: : : Polymorphism | Hrs. |
| Overloading unary operations. Overloading binary operators, data conversion, pitfalls | 1 |
| of operators overloading and conversion keywords. Explicit and Mutable. | 4 |
| Module 4 Inheritance-I | Hrs. |
| Concept of inheritance. Derived class and based class. Derived class constructors, | |
| member function, inheritance in the English distance class, class hierarchies, | 1 |
| inheritance and graphics shapes, public and private inheritance, aggregation: Classes | T |
| within classes, inheritance and program development. | |
| Module 5: : Inheritance-II | Hrs. |
| Multiple Inheritance, Multilevel Inheritance, Multilevel inheritance, Hybrid | 4 |
| inheritance, Virtual Base class, Abstract classes | т |
| Module 6: Templates | Hrs. |
| Class Templates, Function templates, File read write in c++ | 6 |
| Module wise Measurable Students Learning Outcomes : | |
| Module 1: Explain the features of the object oriented language | |
| Module 2: Design and apply OOP principles for effective programming | |
| Module 3: Develop programming application using object oriented programming | |
| Module 4: Percept the utility and applicability of OOP | |
| Module 5: Understand how to apply the major object-oriented concepts to implement | object |
| oriented programs in C++, encapsulation, inheritance | |
| Module 6: Understand advanced features of C++ specifically stream I/O, templates | |
| | |

Professional Core (Lab)

| Title o | Title of the Course: Data Structures Laboratory 5IT 252 | | | | | | | | | | Ĺ | Т |] | P | Cr | |
|---|---|---|--|-----------------|----------|---------|--------------|--------------------|-----------|-------------|---------------|-------|--------|---------|---------|-----------------|
| | | | | | | | | | | (| 0 | 0 | 4 | 2 | 1 | |
| Pre-R | equisit | e Cou | rses: | | | | | | | | | | | I | | |
| | | Prog | rammi | ing in (| C inclu | uding p | pointer | rs and] | File Ha | andling | 5 | | | | | |
| Textbo | ooks: | | | | | | | | | | | | | | | |
| | 1. | Rob | ert Kr | use, C | C. L. ' | Tondo | , Breu | uce Le | eung, | Shashil | Moga | ılla, | "Dat | a Str | ucture | & |
| | | Prog | ram D | esign | in C", | Pearso | on, 3^{rd} | edition | | | | | | | | |
| | 2. | Rich | ard F | . Gilb | erg, l | Behrou | ız A. | Forou | ızan, | "Data | Strue | cture | es, A | Pseu | ido co | ode |
| | - | App | roach | With C | C", Cer | ngage | Learni | ng, 2 ^m | Editio | on, 200 | 5 | _ | | ~ | | - nd |
| | 3. | S. L | ipschu | tz, "D | ata St | ructure | es", So | chaum' | s Out | lines Se | eries, | Ta | ta Mc | Graw | -H1ll, | 2 nd |
| D 4 | | editi | on, 20 | 00 | | | | | | | | | | | | |
| Refere | ences: | Vaal | | Variat | 1 | Indone | tandin | ~ ~ | tana in | C" 4th | aditi | ~ ~ | ומתם | D.,1,1; | ation | |
| 1. I asnavani Kaneikar, Understanding pointers in C ² , 4 ²² edition, BPB Public 2 Brian W Kernighan and Dennis M Ritchie "The C Programming I | | | | | | | | | | | | | | ation | | |
| | ۷. | Prentice Hall of India, 2 nd edition, 1988 | | | | | | | | | | | | | nguag | ,e, |
| Cours | e Obie | ctives | ves : | | | | | | | | | | | | | |
| | 1. | To d | levelop | skills | in pro | ogrami | ning a | nd pre | paring | the stu | dent | s foi | r adva | nced | compu | ıter |
| | | scier | nce coi | irses. | - | - | - | | | | | | | | - | |
| | 2. | To c | 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 | | | | | | | | | | | | neir | | | | |
| performance comparisons. | | | | | | | | | | | | | | | | |
| Cours | <u>e Lear</u> | ning (| Outcor | nes: | | | | | | | | | | | | |
| CO | After | r the o | comple | etion (| of the | course | e the s | tuden | t shou | ld be a | ble | Blo | oom's | Cogn | itive | |
| | to | | | | | | | | | | | lev | el | Desc | riptor | |
| C01 | Imple | ement | vario | us data | a struct | tures | | | | | |] | III | Ap | plying | ; |
| CO2 | Dem | onstra | te the | use | of var | ious c | lata st | ructure | es in a | applicat | tion | I | Ш | Ap | plving | Ē |
| | prog | rams | | | | | | | | | | | | r | | , |
| <u>CO3</u> | Com | pare v | arious | data s | tructur | es | | | | | | | V | Ana | ılyzıng | 7 |
| | U Map | ping : | DO2 | DO4 | DO5 | DO(| DO7 | DOQ | DOD | DO10 | DOI | | DO11 | DCO | | 22 |
| <u>F0</u> C01 | POI | 1 1 | 2 2 | r04 | P05 | PU0 | PU/ | PUð | PU9 | POIU | PU | | PUIZ | PSU. | I PSC | <u>J</u> 2 |
| CO2 | | - | _ | 3 | 2 | | | | | | | | | | | |
| CO3 | | | | 2 | | | | | | | | | | 2 | | |
| | | | | | | | | | | | | | | | | |
| Lah As | ssessme | nt · | | | | | | | | | | | | | | |
| There a | re four | compo | onents o | of lab a | ssessm | ent LA | .1. LA2 | 2. LA3 | and La | b ESE | | | | | | |
| IMP: L | ab ESE | is a se | parate | head of | f passir | ng | , | , | | | | | | | | |
| Asses | sment | Base | d on | | | Cond | lucted | by | Conc | luction | aı | nd | Mar | ks N | larks | |
| | | | | | | | | | Subr | nission | | | | | | |
| LA1 | | Lab activities, | | | | By | (| Course | Duri | ng wee | k 1 | to | week | 4 2: | 5 | |
| | | attend | dance, j | ournal | | Facu | lty | | subm | ussion a | it the | end | ot we | ek | | |
| 1 4 2 | | Lah | | anti | vities | Bu | | |) Duri | 10 1100 | k 5 | to | wool | 8 2 | 5 | l |
| LAZ | | atten | lance i | auti iournal | villes, | Eacul | ltv | Jourse | subr | ission a | n J It the | end | of we | f week | | |
| | | untern | aunoo, j | Journal | | | Subil | 1.551011 0 | ii illo | viiu | 01 100 | vir | | 1 | | |

| | | | | 8 | |
|------------------|---------------------------------|----------------|-------------|------------------------------------|--------------|
| LA3 | Lab activities, | By | Course | During week 10 to week 14 | 25 |
| | attendance, journal | Faculty | | submission at the end of week | |
| | | | ~ | 14 | |
| Lab ESE | Lab performance and | By Examitar | Course | During week 15 to week 18 | 25 |
| | related documentation | Faculty | | 18 | |
| Week 1 indicat | tes starting week of the sem | ester | | | 11 |
| Lab activities s | shall include performing exp | periments, 1 | mini-proj | ect, presentations, drawing, progr | ramming and |
| other suitable a | activities as per the nature of | f lab course | • | | |
| The experimen | tal lab shall have typically 8 | 8-10 exper | iments | | |
| Course Con | itents: | | | | |
| 1. P | Program based on structur | es and poir | nters in C | | |
| 2. P | Program based on arrays a | nd pointer | s in C | | |
| 3. F | ile handling and comman | d line argu | iments | | |
| 4. I | mplementation of recursion | on | | | |
| 5. E | Developing ADT for singl | y linked lis | st and its | applications | |
| 6. I | Developing ADT for Doub | oly linked l | list and it | s applications | |
| 7. I | Developing ADT for circu | lar linked | list and i | ts applications | |
| 8. E | Developing ADT for stack | and queue | e and the | ir applications | |
| 9. I | mplementation of double | ended que | ue | | |
| 10. I | mplementation of recursiv | ve and non | -recursiv | e tree traversals | |
| 11. E | Binary search tree and app | lication | | | |
| 12. It | mplementation of graph, 1 | DFS, BFS | | | |
| 13. I | mplementation of searching | ng : linear | search, b | inary search, Fibonacci search | l |
| 14. S | orting Methods: Insertior | n sort, shel | l sort, he | ap sort, quick sort, merge sort | , radix sort |
| e | tc. | | | | |
| 15. It | mplementation of hashing | 5 | | | |
| | | | | | |
| | | | | | |

| Title of | f the C | Course | : Micr | oproc | essors | s Laboi | ratory | 5IT2 | 53 | | | L | Т | Р | Cr |
|--|---|------------|---------------------|----------|---------|--|---------|-------------------------------|-----------|----------|---------|-----------|-------|---|------|
| | | | | | | | | | | | | 0 | 0 | 2 | 1 |
| Pre-Re | equisit | e Cou | rses: | First y | ear In | formati | on Tec | hnolc | ogy Bas | ic Elect | tronics | cour | rse. | | |
| Textbo | oks: | | | | | | | | | | | | | | |
| | 1. M | . Morr | is Man | 0 & M | lichae | l D. Cil | etti,"D | igital | Design | ", Pear | son Pr | entico | e Ha | 11 | |
| | pu | blicati | on, 4 th | Editio | n, 200 |)8 | | | | | | | | | |
| | 2. Ra | mesh | S. Gao | nkar, ʻ | 'Micro | oproces | sor are | chitect | ture, pro | ogramn | ning & | appl | icati | ons", | New |
| | Ag | ge Inter | rnation | al pub | licatio | 5^{m} e | dition, | 2015 | | _ | | | | | |
| | 3. A | K Ray | & K N | A Bhu | rchan | di, "Ad | vanced | micr | oproces | sors & | periph | erals | ", se | cond | |
| Df | References: | | | | | | | | | | | | | | |
| Reterences: 1. Flovd & Jain. "Digital fundamentals". Pearson education eighth edition 2007 | | | | | | | | | | | | | | | |
| Floyd & Jain, "Digital fundamentals", Pearson education, eighth edition, 2007. James Turley "Advanced 80386 programming techniques" Tata McGraw-Hill 2nd | | | | | | | | | | | | | | | |
| | 2. James Turley, "Advanced 80386 programming techniques", Tata McGraw-Hill, 2 nd edition 2005 | | | | | | | | | | | | | | |
| Course | e Ohie | ctives | | | | | | | | | | | | | |
| 1. To demonstrate the fundamental principles of logic design. | | | | | | | | | | | | | | | |
| 2. | To show & explain the basic building blocks and operations of 8/16/32 bit microprocessors | | | | | | | | | | | | | | |
| | & concept multiple processor systems. | | | | | | | | | | | | | | |
| 3. To make students to be able to design assembly language programs. | | | | | | | | | | | | | | | |
| Course Learning Outcomes: | | | | | | | | | | | | | | | |
| CO | CO After the completion of the course the student should be able Bloom's Cognitive | | | | | | | | | | | | | | |
| | to | | | | | | | | | | lex | vel | De | script | or |
| CO1 | Class | ifv the | e conc | epts o | f con | binatio | nal an | d sea | uential | logic 1 | to | | 20 | <u>, , , , , , , , , , , , , , , , , , , </u> | |
| 001 | desig | n real | life app | olicatio | ons ci | rcuits & | z analy | ze it. | | 10,010 | | II | | App | ly |
| CO2 | Use i | nstruc | tion se | ts & f | orm s | tructure | ed mic | ropro | cessor p | orogran | 1S I | п | | A | 1 |
| | in ass | sembly | langu | age. | | | | | - | | 1 | 11 | | App | ly |
| CO3 | Test | and de | bug mi | icropro | cesso | r progr | ams. | | | | | V | | Analy | /ze |
| CO-PC |) Map | ping : | | I | I | T | 1 | I | | | | 1 | | | |
| PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | POI | 12 | PSO1 | PSO2 |
| <u>CO1</u> | | | | 2 | | _ | | | | | | | | | |
| <u>CO2</u> | | | l | | 2 | | | | 1 | | | | 4 | 2 | |
| <u>CO3</u> | | | | | 2 | | | | 1 | | | | | | |
| Assess | ments | : | | | | | | | | | | | | | |
| Lab As | sessme | nt | | | | | | | | | | | | | |
| There a | re four | component. | nents of | f lab as | sessm | ent LA1 | , LA2, | LA3 a | ind Lab | ESE | | | | | |
| IMP: La | ab ESE | 1s a sep | barate h | lead of | passin | Condu | natad h | | Condu | ation | and | Ма | mbra | Mar | lia |
| Assess | sment | Daseu | ON | | | Conducted by Conduction and Submission | | | | | | IVIA | ITKS | Mar | KS |
| LA1 | Lab activities, | | | | By | Co | ourse | During | week | 1 to | weel | κ 4 | 25 | | |
| | attendance, journal | | | | , | Facult | у | | submis | sion at | the end | of w | veek | | |
| | | | | | | | | | 5 | | | | | | |
| LA2 | LA2 Lab activities, | | | | ities, | By Course During week 5 | | | | | 5 to | week 8 25 | | | |
| | attendance, journal | | | | Facult | у | | submis | sion at | ine end | OI W | eek | | | |
| LA3 | | Lab | | activ | ities | Bv | Co | ourse | During | week | 10 to | week | 14 | 25 | |
| | attendance, journal | | | | | Facult | y | submission at the end of week | | | | | | | |

| | | | | | <u> </u> | | | | | | | |
|---|--|-------------------|----------------|--|-----------|------|--|--|--|--|--|--|
| | | | ~ | 14 | | | | | | | | |
| Lab ESE | Lab performance and | By | Course | During week 15 to week 18 | 25 | | | | | | | |
| | related documentation | Faculty | | submission at the end of week | | | | | | | | |
| | | | | 18 | | | | | | | | |
| Week 1 indic | ates starting week of the sem | ester | | | | | | | | | | |
| Lab activitie | shall include performing ex | periments, | mini-proj | ect, presentations, drawing, prog | ramming a | and | | | | | | |
| other suitable | activities as per the nature of | f lab course | . . | | | | | | | | | |
| The experim | The experimental lab shall have typically 8-10 experiments | | | | | | | | | | | |
| Course Co | itents: | | | | | | | | | | | |
| List of Expe | priments | | | | | | | | | | | |
| 1. Des | gning of a circuit using Co | mbination | al logic. | | | | | | | | | |
| 2. Dest | gning of a combinational c | ircuit usin | g MUX & | & DEMUX | | | | | | | | |
| 3. Study Half Adder & Subtractor, Full Adder & Subtractor | | | | | | | | | | | | |
| 4. Imp | ement below addressing | modes & | perform | n Addition, subtraction of ty | wo 8 - | bit | | | | | | |
| Nun | bers with 16 – bit answe | r. Register | r address | sing mode. Immediate Addres | ssing Mo | de. | | | | | | |
| Dire | ct Addressing mode. Indire | ect Address | sing mod | e. | e | | | | | | | |
| 5. Stuc | y 8085 kit & design a prog | ram of Blo | ock Trans | sfer & Block Exchange. | | | | | | | | |
| 6. Imp | ement LHLD & DAD ins | truction & | analyze | the program of Addition & su | btraction | of | | | | | | |
| two | 16 – bit numbers. | | J | 1 0 | | | | | | | | |
| 7 Imp | ement repetitive addition | & subtrac | ction alg | orithms for 8 bit multiplicati | on & 8 | bit | | | | | | |
| divis | ion | | | •••••••••••••••••••••••••••••••••••••• | | 0.10 | | | | | | |
| 8 Asse | mbly level program to cal | culate sum | of series | of numbers | | | | | | | | |
| 9. Asse | mbly level program to find | l smallest | & largest | number from series of numbe | rs. | | | | | | | |
| 10 Use | subroutines & arrange a se | ries of Nu | mbers in | ascending & descending order | • | | | | | | | |
| 11 Desi | on a program for Conversi | on HEX to | Binary | number | • | | | | | | | |
| 12 Solv | e programs listed above us | ing 8085 s | imulator | | | | | | | | | |
| 12. Solv | e programs listed above us | ing 8086 8 | 8 80386 | instruction set in MASM | | | | | | | | |
| 15. 501 | e programs instea above us | nig 0000 c | x 00500 | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Title of | f the C | Course: (| C and C | PP Prog | gramm | ing Lab | oratory | y 5IT255 | 5 | _ | L | T | | P 2 | Cr |
|----------------|--|---------------------|---|--------------|-------------------|----------|------------|--------------|----------|----------|--------------------|------------------|-------|--------|-----|
| Pre-Re | anisit | e Cours | 66. | | | | | | | | 0 | 0 | | 2 | 1 |
| 11 . -M | quisit | C Prog | rammir | ıø | | | | | | | | | | | |
| Textbo | ooks: | 0 110 5 | <u>, , , , , , , , , , , , , , , , , , , </u> | -8 | | | | | | | | | | | |
| 3. | E.Bal | guruswa | my, Ob | ject Orie | ented P | rogram | nming (| C++, Ta | ta McG | araw Hi | 11, 31 | rd Ed | ition | .20 | 06. |
| 4. | Bjarne | Stroust | rup, — | , The C+⊣ | + Prog | rammin | ig langi | iage, Th | nird edi | tion, Pe | earso | n Ed | lucat | ion | |
| Refere | nces: | | | | | | | | | | | | | | |
| 2. | Rober | t Laffore | e, "Obje | ect Orier | nted Pr | ogramr | ning in | c++", S | SAMS | publicat | tion, | 4^{th} | | | |
| | Editio | n,2008. | | | | | | | | | | | | | |
| Course | e Obje | ctives : | | | | | | | | | | | | | |
| 3. | To lea | rn the fu | indame | ntal prog | gramm | ing con | ncepts a | ind meth | nodolog | gies wh | ich a | re es | ssent | ial | to |
| - | buildi | ng good | C/C++ | progran | ns | | | | | ~ / ~ | | | | | |
| 4. | To pra | actice the | e fundai | mental p | orogran | nmıng ı | method | ologies | in the (| C/C++ | prog | ramı | ming | , | |
| 0 | langua | ige via la | aborato: | ry exper | iences | | | | | | | | | | |
| Course | e Lear | ning Ou | tcomes | : | | ho at | | | -l. 4- | Dlaar | $\dot{\gamma}_{a}$ | 0.000 | tirra | | |
| CO | Atter | the com | pletion | of the co | ourse th | ne stude | ent snot | iid be ai | Die to | Bloon | nsc | ogni | live | | |
| | | level Descriptor | | | | | | | | | | | | | |
| CO1 | Defi | ne the | obiec | t-oriente | ed pr | ogram | ming | approad | ch in | П | 1 | Unde | ersta | ndir | ۱g |
| | conn | connection with C++ | | | | | | | | | | | | | |
| CO2 | Appl | v the co | ncepts c | of object | -orient | ted prog | grammi | ing | | III | 6 | apply | ving | | |
| CO2 | Anal | yze vir | tual a | nd pure | e virt | ual fu | nction | & co | mplex | IV | 1 | Anal | yzin | g | |
| | prog | ramming | , situatio | ons | | | | | 1 | | | | | 2 | |
| CO-PC |) Map | ping : | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO |)11 | PO1 | 2 | |
| CO1 | | _ | | 2 | | | | | | | | | | | |
| <u>CO2</u> | | 2 | | | 3 | | | | | | 2 | | | | |
| CO3 | | | 3 | | 3 | | | | | | 2 | | 1 | | |
| | | | | | | | | | | | | | | | |
| Assess | ments | : | | | | | | | | | | | | | |
| Lab As | sessme | nt | nts of la | haccost | mont I | A1 T A7 |) T ^ 2 ' | and Lab | ESE | | | | | | |
| IMP Is | ab ESE | is a sena | rate hea | d of nass | ing | AI, LA2 | 2, LA3 i | | LOL | | | | | | |
| Assess | sment | Based of | n | a or puss | Con | ducted | bv | Condu | ction | and | Мя | rks | Ma | rks | 7 |
| | | | | Submission | | | | | | | | | | | |
| LA1 | | Lab | 6 | activities, | , By | (| Course | During | week | 1 to | week | week 4 25 | | | 1 |
| | | attendar | nce, jour | nal | Facu | ulty | | submis | sion at | the end | of w | eek | | | |
| 1.4.2 | | Lab | | otivition | Der | | Course |) Durin - | wool- | 5 to | | , 0 | 25 | | 4 |
| LAZ | | Lau attendar | ace iour | nal | , р Бу Баст | ultv | Course | submis | sion at | J 10 | of w | eek | 23 | | |
| | | attenual | 100, jour | | 8 | | | | | | | | | | |
| LA3 | 3 Lab activities By Course During week | | | | | | week | 10 to x | veek | 14 | 25 | | 1 | | |

LA3Lab
activities,
attendance, journalBy
FacultyCourse
Submission at the end of week
submission at the end of week
1425Lab ESELab performance and
related documentationBy
FacultyCourse
Submission at the end of week
1425Lab ESELab performance and
related documentationBy
FacultyCourse
Submission at the end of week
1425

Week 1 indicates starting week of the semester

Lab activities shall include performing experiments, mini-project, presentations, drawing, programming and other suitable activities as per the nature of lab course.

The experimental lab shall have typically 8-10 experiments

Course Content (Lab):

Assignment List:

- 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.

Syllabus for SY IT SEM IV

Professional Core (Theory)

| Title of | f the C | ourse | : Theo | ry of (| Compi | utation | n 5IT 2 | 221 | V | | [| Т | Р | Cr |
|--|---|---------|----------|---------|---------|----------|---------|-------------|-----------------|---------|---------|--------|-----------------------|--------|
| | | | | | | | | | | | 3 | 1 | 0 | 4 |
| Pre-Re | quisit | e Coui | rses: D | iscrete | e Math | ematic | s | | | | | | | |
| Textbo | oks: | | | | | | | | | | | | | |
| 1. | John C | C. Mart | tin, "In | troduc | tion to | Lang | uages d | & Theo | ory of C | Comput | tation | ', TMI | H, 4 th Ed | . 2010 |
| 2. | John E | E. Hop | craft, F | Rajeev | Motw | ani, Je | ffrey D |). Ullm | ian, "In | troduc | tion to | Auto | mata The | eory, |
| | Langu | ages a | nd Cor | nputat | ions", | Pearso | n Edu | 3^{rd} Ec | 1. 2008 | | | | | |
| References: | | | | | | | | | | | | | | |
| 1. J. P. Tremblay & R. Manohar, "Discrete Mathematical Structures with Applications to | | | | | | | | | | | | | | |
| | Computer Science", TMH, 2008 | | | | | | | | | | | | | |
| 2. | 2. Michael Sipser, "Introduction to Theory of Computations", Thomson Brooks/Cole, 3 rd Ed. | | | | | | | | | | | | | |
| | 2014 | | | | | | | | | | | | | |
| 3. | K.L.P. Mishra & N. Chandrasekaran, "Theory of Computer Science", PHI, 3 rd Ed. 2006 | | | | | | | | | | | | | |
| Course | se Objective: | | | | | | | | | | | | | |
| 1. | . To discuss fundamentals of computer mathematics. | | | | | | | | | | | | | |
| 2. | 2. Todescribe grammar, languages and their relationships. | | | | | | | | | | | | | |
| 3. To impart automata designs as language descriptors and recognizers. | | | | | | | | | | | | | | |
| Course Learning Outcomes: | | | | | | | | | | | | | | |
| CO | After | the co | omplet | tion of | the co | ourse t | the stu | dent s | hould | be able | e Blo | om's | Cognitiv | e |
| | to: | | | | | | | | | | lev | el 1 | Descripto | vr |
| | | | | | | | | | | | | | Jesenpu | /1 |
| CO1 | Outli | ne prol | blem fo | ormula | tion w | ith rele | evant s | olving | approa | aches. | II | I | Understa | nding |
| CO2 | Distir | nguish | langua | ige bas | sed pro | blems | into su | uitable | classes | 5. | IV | 1 | Analyzin | g |
| CO3 | Desig | gn ab | stract | mach | ines | for la | anguag | e rec | ognitio | n and | l VI | (| Creating | |
| | applic | cations | 5. | | | | | | - | | | | _ | |
| CO-PC |) Map | ping : | | | | | | | | | | | | |
| PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 2 | 3 | | | 3 | | | | | | | | | |
| CO2 | | 2 | | | 1 | | | | | | | | | |
| CO3 | | | 3 | | | | | | | | | | 1 | |
| | | | | | | | | | I | | | - | • | I |
| Assess | ments | : | | | | | | | | | | | | |
| Teacher Assessment: | | | | | | | | | | | | | | |
| Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one | | | | | | | | | | | | | | |
| End Se | mester | Exam | inatior | n (ESE |) havir | ng 20% | 6, 30% | and 50 |)% wei | ghts re | specti | vely. | | |

| Marks | | | | | | | | | | | |
|-------|--|--|--|--|--|--|--|--|--|--|--|
| 10 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 50 | | | | | | | | | | | |
| | | | | | | | | | | | |

ISE 1 and ISE 2 are based on assignment, oral, seminar, test (surprise/declared/quiz), and group discussion.[One assessment tool per ISE. The assessment tool used for ISE 1 shall not be used for ISE 2]

MSE: Assessment is based on 50% of course content (Normally first three modules) ESE: Assessment is based on 100% course content with70-80% weightage for course content (normally last three modules) covered after MSE.

| Course Contents: | |
|---|------|
| Module 1: Proofs and Regular Languages | Hrs. |
| Types of Proofs, Mathematical Induction and Recursive definitions, Regular | |
| expressions & Regular languages, Operations on Regular languages. | 6 |
| Module 2: Finite State Machines | Hrs. |
| 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 |
| Module 3: Grammars & Languages | Hrs. |
| 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 |
| Module 4: Push Down Automata (PDA) | Hrs. |
| Definition, Deterministic PDA, Types of acceptance and conversions to each other, PDA design examples, CFGs & PDAs., Top-Down, & Bottom-up parsing. | 7 |
| Module 5: Chomsky Normal Form (CNF) | Hrs. |
| Context Free Grammar (CFG) & CNF notations, Eliminating ^ production and unit productions from a CFG, Eliminating useless variables from CFG, CNF Significance, Applications. | 4 |
| Module 6: Turing Machines (TM) | Hrs. |
| 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 |
| After the completion of the course the student should be able to: Module 1: Discuss formulation of language defining symbols and their operations. Module 2: Interpret machine abstraction prepared towards application. Module 3: Classify languages according to grammar and operations. Module 4: Design of PDA and its equivalences. Module 5: Analyze and recommend language normal forms. Module 6: Propose Turing computable functions as problem solutions. Tutorial: Problems for solution based on: Mathematical Induction Regular Expression formulation and DFA Designs DFA-NFA-NFA-^ conversion, DFA Minimization Grammar and Language Descriptions CFG- PDA Designs, PDA Acceptance categories, CFG to CNF conversion TM numerical functions and designs | |

| Title o | f the C | ourse | : Com | nuter | Archit | ecture | e 5IT2 | 22 | | | L | Т | Р | Cr |
|--|-----------------|---------------|---------|---------|---------|---------|----------|---------|--------------------|----------------------|----------|----------|----------|--------|
| | | | | | | | | | | | 2 | 1 | | 3 |
| Pre-Re | equisite | e Cou | rses: I | Digital | Electro | onics, | Microp | process | sor. | | | | | |
| Textbooks: | | | | | | | | | | | | | | |
| 1. "Computer Architecture and Organization" by J. Hayes, McGraw Hill, 3 rd edition, 2017 | | | | | | | | | | | | | | |
| 2. "Computer Organization" by C. Hamacher et. al, McGraw Hill, 5 th edition, 2010 | | | | | | | | | | | | | | |
| References: | | | | | | | | | | | | | | |
| 1. "Computer Architecture" D. Patterson, Morgan Kaufmann, 6 ^{ut} edition, 2017 | | | | | | | | | | | | | | |
| Course Objectives : | | | | | | | | | | | | | | |
| Provide fundamental knowledge of processors architecture. Introduce the memory organization architecture. | | | | | | | | | | | | | | |
| 3. Instruct the basic concepts of execution speedup by pipelining. | | | | | | | | | | | | | | |
| Course Learning Outcomes: | | | | | | | | | | | | | | |
| CO After the completion of the course the student should be able Bloom's Cognitiv | | | | | | | | | | | /e | | | |
| to | | | | | | | | | | | | | | |
| level Descripto | | | | | | | | | | nding | | | | |
| CO1 Discuss the design issues in computer architecture. II Understan | | | | | | | | | | r | | | | |
| CO3 Estimate the performance metrics for computer architecture V Evaluating | | | | | | | | | | <u>,</u> ס | | | | |
| CO-PO Mapping : | | | | | | | | | | | 5 | | | |
| PO P01 P02 P03 P04 P05 P06 P07 P08 P09 P010 P011 P012 PS01 P | | | | | | | | | | | PSO2 | | | |
| C01 | 3 | | 1 | | | | | | | | | | | |
| CO2 | | | 2 | | | | | | | | | | | |
| CO3 | 2 | 3 | | | | | | | | | | | 1 | |
| Assess | ments | • | | | | | | | | | | | | |
| Teach | er Asse | essmen | nt: | | | | | | | | | | | |
| Two co | ompone | ents of | In Ser | nester | Evalua | ation (| ISE), (| One M | id Sen | nester E | xamina | ation (1 | MSE) a | nd one |
| End Se | emester | Exam | inatior | (ESE |) havir | ig 20% | 6, 30% | and 50 | 0% we | ights re | spectiv | vely. | , | |
| Asses | sment | | | | | | | Marl | KS | | | | | |
| ISE 1 | | | | | | | | 10 | | | | | | |
| MSE | | | | | | | | 30 | | | | | | |
| ISE 2 | | | | | | | | 10 | | | | | | |
| ESE ICE 1 | 1 10 | F 2 | 1 | 1 | • | 4/1 | 1 1 | 50 | • , | . , | | | | |
| ISE I | and IS | E 2 ar | e basec | l on as | signme | ent/dec | clared t | est/qu | IZ/Sem | inar etc | | dulaa) | | |
| ESE. | Asses | sment | is base | ed on | 100% | course | conte | nt wit | 1111a11y h 70_8 | 111St till 0% wei | ightage | for c | nurse co | ontent |
| (norm | nally las | st three | e modu | les) co | vered | after N | ЛSE | | II 70-0 | | igniage | | | mem |
| Cours | e Cont | ents: | 1110 40 | | | | 1021 | | | | | | | I |
| Modu | ile 1: N | Aachir | ne inst | ructio | ns and | prog | ram ex | ecutio | n | | | | | Hrs. |
| Memory locations & addresses, memory operations, instructions & instruction sequencing, | | | | | | | | | 4 | | | | | |
| addressing modes, subroutines, encoding of machine instructions. | | | | | | | | | 4 | | | | | |
| Module 2 Arithmetic design | | | | | | | | | | | Hrs. | | | |
| Desig | n of si | gned 1 | nultipl | icatior | n, Boo | th's al | gorithr | n, bit- | pair re | cording | g, divis | ion, fl | oating | 5 |
| point | numbe | rs and | operat | ions, g | uard b | its and | round | ing. | | | | | | |
| Modu | <u>ile 3: (</u> | <u>Contro</u> | ol desi | gn | | | <u> </u> | - | | | <u>.</u> | | | Hrs. |
| Execu | ition of | t a co | mplete | instru | iction, | seque | ncing | of cor | ntrol si | gnals, 1 | micro | progra | mmed | 4 |

| control, microinstruction format, microinstruction sequencing, and bit slice concept. | |
|---|--------|
| Module 4: Memory hierarchy | Hrs. |
| 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 |
| Module 5: I/O interface | Hrs. |
| 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 |
| Module 6: Pipelining | Hrs. |
| 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 |
| Module wise Measurable Students Learning Outcomes : | |
| After the completion of the course the student should be able to: | |
| Module 1: Understand the use of addressing modes & basics of program execution at har | dware |
| level. | |
| Module 2: Realize the design principles of ALU. | |
| Module 3: Apprehend the firmware operations. | |
| Module 4: Cognize the importance of memory hierarchy in performance optimization of the sy | ystem. |
| Module 5: Know the I/O interface principles of the computer systems. | |
| Module 6: Comprehend the effect of pipelining on the execution speed of the computer system | n. |
| Tutorial Content: | |
| Tutorial can be conducted as12 Assignments based on module 1 to 6. | |

| Title of | Title of the Course: Computer Network 5IT 223 | | | | | | | | | L | Т | Р | Cr | |
|---|--|-----------------------------|------------------------------|------------------|------------------|-------------------|-------------------|-----------------|-----------------|----------------------|-------------------|-----------------|----------|-------|
| | | | | | | | | | | | 3 | 0 | 0 | 3 |
| Pre-Re | quisit | e Cour | rses: D | ata co | mmun | ication | & Net | tworki | ng | | | 1 | 1 | |
| Textbo | Textbooks: Andrew S. Tannenbaum, "Computer Networks", PHI, 5thEdition, 2013 James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6thEdition, Pearson Publication. Behrouz A. Forouzan, "Data Communication and Networking" TMGH 4th edition., 2013 | | | | | | | | | | | | | |
| Refere | References: | | | | | | | | | | | | | |
| Jochen Schiller "Mobile Communications", Pearson Education, 2nd Edition,2000 Theodore S. Rapport, Wireless communication (Principles and practice), Pearson Education, 2nd edition 2010 Dr. Sunilkumar Manavi and M. Kakkasageri, "Wireless and mobile networks concepts and protocols", Wiley publication, 2nd edition, 2016 | | | | | | | | | | | | | | |
| Course Objectives : 1. To provide fundamental knowledge of Computer networks. 2. To teach transport and application layer services. 3. To introduce wireless and mobile technologies. | | | | | | | | | | | | | | |
| Course Learning Outcomes: | | | | | | | | | | | | | | |
| CO | CO After the completion of the course the student should be able Bloom's Cognitive | | | | | | | | | | | | | |
| | to | | | | | | | | | | leve | el Des | criptor | |
| CO1 | Expla | in fun | damen | tals of | comp | uter ne | tworks | 5 | | | II | Un | derstand | ling |
| CO2 | Utiliz | e func | tions c | of varic | ous lay | ers and | l proto | cols | | | III | Ap | olying | |
| CO3 | Comp | bare w | vired an | nd wire | eless te | echnolo | ogies | | | | IV | Ana | alyzing | |
| CO-PC |) Map | ping : | | | | | | r | | | | | <u> </u> | |
| PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
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| CO2 | | 2 | 1 | | 2 | | | | | | | | | |
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| Asses | sment | | | | | | | Marl | KS | | | | | |
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| MSE | | | | | | | | 30 | | | | | | |
| ISE 2 | | | | | | | | 10 | | | | | | |
| ESE | 1.70 | | | | | . / 1 | | 50 | • , | • | | | | |
| ISE 1 | ISE I and ISE 2 are based on assignment/declared test/quiz/seminar etc. | | | | | | | | | | | | | |
| MSE: | Assess | sment | is base | a on 5 | U% 01 | course | conte | nt (Noi | rmally | 11rst thi | ee moo | iules) | | ntort |
| ESE: | Asses | sment | is das | eu on | 100% | course | conte | ni witi | u /0-8 | 0% We1 | gniage | 101° CO | urse co | ment |
| Course Contents: | | | | | | | | | | | | | | |
| Course | Cont | ents: | | | | | | | | | | | | |

| Module 1: Data link layer | Hrs. |
|---|--|
| Framing, error control, flow control, The Channel Allocation Problem: S | Static & |
| Dynamic Allocation, Multiple Access Protocols- ALOHA, CSMA, CSMA/CD. | Ethernet 7 |
| Cabling, Coding, MAC Protocol, Frame structure, Binary exponential B | Back-Off |
| Algorithm. | |
| Module 2: Network Layer | Hrs. |
| Network Layer Design issues- Packet Switching, Services to transpor implementation of connection oriented & connectionless services, Routing &Dynamic routing, flooding, Fragmentation. Congestion Control Algo Principles, Prevention Policies, Jitter & Load shedding. The Network Layer in the Internet- Address, Internet Control Protocols- SPF, I | t layer, ;- Static orithms- BGP, IP |
| operations, Subletting, IP4, IPv6. | |
| Module 3: Transport Layer | Hrs. |
| Elements of transport protocol- Addressing, connection establishment, releaded control, buffering, multiplexing, crash recovery. UDP, RPC, RTP. | ase,flow 6 |
| Module 4: Transport Layer Protocol | Hrs. |
| TCP service model, TCP protocol, TCP segment header, TCP connection establic Release, congestion control in TCP, timer management. | ishment, 6 |
| Module 5: Application Laver | Hrs. |
| DNS—The Domain Name System-name space, resource records, name Electronic Mail- architecture and service, user agent, message format and trans delivery. The World Wide Web-architecture overview, Application layer p HTTP, FTP, SMTP. | servers. fer final protocol: 7 |
| Module 6: Wireless and Mobile Technologies | Hrs. |
| Mobile technologies: GSM/GPRS, Introduction, Fundamentals of Satellite s Broadband satellite Networks. | systems, 6 |
| Module wise Measurable Students Learning Outcomes : | |
| After the completion of the course the student should be able to: | |
| Module 1: Explain the origin of computer network and medium of access. | |
| Module 2: Discuss various routing, addressing system at network layer | |
| Module 3: Classify transport layer services. | |
| Module 4: Analyse the transport layer protocol and relative functioning. | |
| Module 5: Describe various application layer protocols. | |
| Module 6: Identify and apply wireless and mobile technologies. | |
| | |

| Title of | f the C | Course | : Softv | vare E | ngine | ering 5 | 5IT224 | ļ | | | L | Т | | Р | Cr |
|-------------|---------------------|---------------------|----------------|----------------------|-----------------|----------|----------|---------|----------|-------|---------|---|-------|-----------|--------|
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| Pre-Re | equisit | e Cou | rses: | | | | | | | | | | | | |
| | | Obje | ct-orie | nted la | nguage | e | | | | | | | | | |
| Textbo | oks: | ••• | | - | | | | - 1 | | | | | st m | | |
| 1. S | ommei | rville, ` | Softw | are En | igineer | 1ng", I | earsor | 1 Educ | ation I | ndia, | New I | Jelhi, | I ~ E | dition, 2 | 2006 |
| 2. K | oger S | Pressi | man, "X | softwa | ire Eng | gineerii | ng – A | Practi | tioner | s Ap | proac | 1 [°] , М | cGra | tw Hill, | USA, |
| 2 D | Ealu onkoi l | on, 20 Iolata | 0/ "An In | toorot | nd Ann | raaah | to Sof | huara l | Ingino | oring | " No | oco D | uhli | action | rd |
| 5. F E | dition, | 2005 | All III | legrad | eu App | noach | 10 501 | | Engine | ermş | g , mai | osa r | uono | | 5 |
| Refere | nces: | | _ | | | - | | | | | | - rd | | | - |
| 1. P | fleeger | ; "Sof | tware I | ingine | ering" | , Pears | on Edu | ication | i India, | Nev | v Delh | 1, 3 ^{ru} | Editi | ion,2009 | 9 |
| 2. N | $1 \text{ ke } O^2$ | Doche | erty, "C | bject- | Orient | ed An | alysis o | X Desi | ign: Ur | iders | tandin | g Sys | tem | | |
| Dev 2 T | elopme | ent wit | h UMI | . 2.0 [~] , | John V | Wiley | & Sons | S Publi | cation, | 2 | | 1, 200 " Do | 15 | 2000 | |
| J. I | Obio | uaiiaii etivos | i, , v is • | | oueiiii | g with | Kation | ai Kos | e 2002 | , All | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | 11501 | 1,2000 | |
| | o intro | duce s | • oftwar | e deve | lonme | nt nroc | PACC | | | | | | | | |
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| 3. T | o acqu | aint w | ith obj | ect orio | ented d | lesign | using t | he Un | ified M | lode | ling La | ingua | ge (l | JML). | |
| Course | e Lear | ning C | Jutcom | les: | | 0 | 0 | | | | | 0 | | / | |
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| COI | devel | onmer | varic | Jus | proces | SS 11 | lodel | 101 | sonw | ale | 11 | | U | nuersta | liung |
| CO2 | Apply | v softv | vare ei | nginee | ring p | rocess | mode | l to er | gineer | ing | III | | A | pplving | |
| | probl | ems | | 0 | υr | | | | 0 | 0 | | | | FF 5 0 | |
| CO3 | Creat | e obje | ct orie | nted de | esign f | or soft | tware d | leveloj | oment | life | VI | | С | reating | |
| | cycle | | | | | | | | | | | | | | |
| CO-PC |) Map | ping : | | | | | | | | | | | | | |
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| CO2 | 1 | 2 | | | 2 | | | | | | | | | | |
| CO3 | | 3 | | | | | | | | | | | | 2 | |
| A 66066 | monte | • | | | | | | | | | | | | | |
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| End Se | mester | · Exam | ination | (ESE |) havir | 1g 20% | 6. 30% | and 50 | 0% we | ights | respe | ctivel | V. | (10L) u | |
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| ISE 1 | and IS | $E \overline{2} ar$ | e basec | l on as | signme | ent/dec | clared t | test/qu | iz/sem | inar | etc. | | | | |
| MSE: | Assess | sment | is base | d on 5 | 0% of | course | e conte | nt (No | rmally | first | three | modu | les) | | |

| (normally last three modules) covered after MSE.Course Contents:Module 1: Introduction & Software ProcessesHrs.The S/W problem, the software Engineering Approach & Benefits. Software Process, Characteristics of a software process.Hrs.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 Management7Module 2: Software Design and TestingHrs.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.7Module 3: Agile ProcessesHrs.Agile Methodologies Dynamic system development Feature-driven Design Crystal | |
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| Agile Methodologies Dynamic system development Feature-driven Design Crystal | |
| Tighe Methodologies, Dynamie system development, Feddale driven Design, Crystar | |
| Agile Modelling. | |
| Module 4: Structural ModellingHrs. | |
| Classes, Relationships, Common mechanisms. Diagrams, Class Diagrams, Interfaces, | |
| Types and Roles, Packages, Instances and Object Diagram | _ |
| Module 5: Behavioral ModellingHrs. | 4 |
| Interactions, Use cases, Use case diagram, Interaction Diagrams and Activity | |
| diagrams, Events and signals, State Machines, Processes and Threads, Time and space, 6 | |
| State chart diagrams. | |
| Module 6: Architectural Modelling Hrs. | |
| Components, Deployment, Collaboration, Patterns and Frame works, Component 7 | |
| Diagrams and Deployment Diagrams | |
| Module wise Measurable Students Learning Outcomes | |
| After the completion of the course the student should be able to: Madula 1: Vnow the software engineering process | |
| Module 1. Know the software engineering process. | |
| Module 3. Describe several agile methods for software development | |
| Module 4. Design object oriented schema for real-time use cases | |
| Module 5: Prepare the dynamic model using interaction diagrams | |
| Module 6: Build software architecture using component and deployment diagram | |

| Title of | f the Course: J | ava Pro | ogra | amı | nin | g 51 | [T2 | 25 | | | | | | | L | Т | Р | Cr |
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| Pre-Re | quisite Course | s: Objec | t O | rier | ted | Pro | ogra | mn | ning | 5 | | | | | | | | |
| Textbo | ooks: | | | | | | | | | | | | | | | | | |
| 1. 2. | Cay S. Horstma Cay S. Horstma 2019 | ann, "Co ann, "Co | ore J ore J | lava lava | ι Vo ι Vo | olum olum | ne I ne I | Fu I A | nda dva | me nc | enta ed F | s", F eatu | Prentic res",] | e Hal Prenti | l, 11 th ce Hal | ^t Edition Edition Edition Edition Edition Edites | on, 201 ' Editio | 8 n, |
| Refere | nces: | | | | | | | | | | | | | | | | | |
| 1. | Herbert Schildt | , "Java: | The | e Co | omp | olete | Re | efere | ence | e", | , Mc | Grav | v Hill | Educ | ation, | 9 th Ec | lition, 2 | 2014 |
| 2. | E. Balguruswar Edition, 2014 | ny, "Pro | gra | mm | ning | , wit | th J | ava | : A | Pr | rime | r", N | lcGra | w Hill | l Educ | ation, | 5 th | |
| Course | e Objectives: | | | | | | | | | | | | | | | | | |
| 1. | To introduce th | e object | -ori | ente | ed c | conc | ept | s of | Jav | /a | | | | | | | | |
| 2. | To demonstrate | the Jav | a A | PI's | s lik | te m | ulti | ithre | eadi | ing | g and | l soc | ket pr | ogran | nming | | | |
| 3. | To present varie | ous appl | icat | .10n | s of | the | Gl | JI p | ack | ag | ges c | fJav | /a | | | | | |
| Course | e Learning Out | comes: | | | | | 4 | | | | | | | | DI | , | <u>a :</u> , | . |
| CO | After the com | pletion | 011 | the | cou | irse | the | e sti | lde | nt | sho | uld I | be abl | e to | Blo | om's | Cognit | lve |
| | | | | | | | | | | | | | | | leve | el I | Descrip | tor |
| CO1 | Generalize the | basic k | nov | wlee | dge | of | obj | ect | orie | ent | tatio | n wi | th dif | ferent | 2 | J | Jnderst | an |
| | properties as w | vell as d | iffe | rent | fea | ature | es o | f Ja | va | | | | | | | ċ | ing | |
| CO2 | Demonstrate | the | con | cep | ts | of | S | sock | tet |] | prog | ramı | ning | and | 3 | A | Applyir | g |
| | multithreading | 1. | | | | OU | T | • . 1 | 1 . | 1 | | | ,• •, | | - | | | |
| CO3 | Implement the | applica | tion | us: | ing | GU | I W | ith (| data | iba | ase c | onne | ectivit | у | 3 | A | Applyir | g |
| СО-РС |) Mapping: | DO | | - | - | <u> </u> | | | I | 1 - | | 1 | | | 1 | | | |
| | | PO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 89 | 10 | 11 | 12 | _ | | | |
| | | CO1 | | | | 2 | 2 | | | | | | | | | | | |
| | | CO2 | | | | | 3 | | | | | | | | _ | | | |
| | | CO3 | | | | | 2 | | | | | | | | | | | |
| Assess | ments : | | | | | | | | | | | | | | | | | |
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| End Se | mester Examina | ition (ES | SE) | hav | ing | , 209 | /0, : | 30% | an | d . | <u>50%</u> | wei | ghts r | espect | tively. | | | |
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| MSE | | | | | | | | | 3 | 0 | | | | | | | | |
| ISE 2 | | | | | | | | | 1 | 0 | | | | | | | | |
| ESE | | | | | | | | | 5 | 0 | | | | | | | | |
| ISE 1 | and ISE 2 are b | ased on | assi | ignı | nen | nt/de | cla | red | test | t/q | uiz/ | semi | nar et | c. | | | | |
| MSE: | Assessment is b | pased on | n 50 | % (| ofco | ours | e co | onte | ent (| N | orm | ally | first tl | nree m | nodule | es) | | |
| ESE: | Assessment is | based o | n 1 | 00% | 6 C(| ours | se c | ont | ent | W | 1th 7 | 0-80 |)% we | eighta | ge for | cour | se cont | ent |
| (norm | ally last three m | iodules) | COV | /ere | a ai | iter | MS | ÞE. | | | | | | | | | | |
| Course | e Contents: | | | | | | | | | | | | | | | | | |

| Module 1 – Fundamental Programming in Java | Hrs. |
|--|------------------|
| Structure of Java Program, Java programming environment-JVM, JIT C | ompiler, |
| Bytecode, A simple Java program, source file declaration rules, naming conv | ventions, |
| objects and classes - declaring classes and objects, declaring member v | ariables, 4 |
| defining methods, constructors, using objects, this keyword, final and static k | æyword, |
| garbage collection | |
| Module 2 – Inheritance and package | Hrs. |
| What is inheritance, types of inheritance, interfaces, super keyword, final class | sses and |
| methods, packages – importing packages, naming a package, creating a package | e 4 |
| Module 3 –Exception Handling and I/O | Hrs. |
| Exception handling – what is exception? dealing with errors, hierarchy of ex | ception, |
| types of exceptions, IO stream classes | 4 |
| Module 4 - Event Handling, AWT and Swing | Hrs. |
| Event handling - basics of event handling, AWT hierarchy, types of event | s, AWT _ |
| components, swing components | 5 |
| Module 5 – Multithreading and Networking | Hrs. |
| Processes and threads, runnable interface, thread class, thread objects, thread | d states, |
| thread priorities, socket programming. Database – design of JDBC, the structure | ed query 5 |
| language, JDBC types, Driver Manager - statement, connection, result-set, Colle | ections - |
| Collection framework | Ure |
| Introduction Ann Descurres Care Duilding Commonants Android Emulator | Andraid |
| First Ann. Widget Duttens, Custom Teast, Teasle Dutten, Checkber, Dadie | |
| Alart Dialag Day, List View, Data Dialag, Sorall View, Image Slider, Lawaut | Button, 4 |
| Alert Dialog Box, List View, Date Picker, Scioli View, Image Sinder, Layout | |
| Module wise Measurable Students Learning Outcomes: | |
| After the completion of the course the student should be able to: | |
| Module 1: Explain basic fundamentals of object-oriented programming Module 2: Explain and implement interfaces and packages | |
| Module 2: Explain and implement interfaces and packages Module 3: Handle exceptions in object-oriented programming language | |
| Module 4: Design a graphical user interface for java applications | |
| Module 5: Implement multithreading and socket programming and database | connectivity for |
| java-based applications | - |
| Module 6: Build Android Mobile App. | |

Professional Core (Lab)

| Title of | f the (| Course | : Com | puter | Netw | orks La | ab 5IT | | | L | Т | | Р | Cr | |
|------------|---|------------------|--------------------|-------------|---------------------|----------|----------|---------|-----------|-------------------|---------|---------|-------|--------|--------|
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| Pre-Re | equisit | e Coui | rses: | | | | | | | | | | | | |
| Textbo | oks: | | | | | | | | | | | | | | |
| | 1. A | ndrew | S. Tan | nenbau | ım, "(| Comput | er Net | works | ", PHI, | 5 th E | dition, | 2013 | | | |
| | 2. Ja | mes F. | Kuro | se. Ke | eith W | . Ross | . "Cor | npute | r Netw | orkiı | ng: A | Top-Do | own | Appr | oach". |
| | Pe | arson l | Publica | ation. 5 | 5 th Edi | tion. 20 | 012 | I | | | 0 | -1 | | r r | , |
| Refere | nces: | | | | | | - | | | | | | | | |
| | 1 Be | hrouz | A Fo | rouzai | n "T | Data Co | ommur | icatio | on and | Netv | vorkin | o" TM | GH | 4th e | dition |
| | 20 |)17 | 11. 10 | 10uzui | л, г | in co | Jiiiiiai | noutic | iii uiiu | 1,000 | vorking | 5 1101 | 011 | i un c | annon, |
| | 2 Tł | , i , veodore | - 2 1 | 2 annor | + W | ireless | comm | unica | tion (P | Princ | inles a | and pre | actic | e) P | earson |
| | 2. 11 ed | lucation | 2^{nd} | Edition | 2010 |) | comm | umea | (1 | THIC | ipics a | ina pro | actic | C), I | carson |
| Course | | ativos | <u>1, 2 1</u> • | Junion | , 2010 | , | | | | | | | | | |
| Course | | | • fytha | oonoor | t of u | virad or | d wiro | logg n | atwark | - | | | | | |
| | 1. $1(2)$ |) classi | ly the | and w | irology | notwo | rle goor | less II | | otor | | | | | |
| | $2.10 2 T_{\rm c}$ |) SHOW | willed | and w | ilion t | | TK SCEI | | ta in ata | aloi | danai | | tool | 1 | |
| C | 3. I(| | studer | | mart | o analy | se the | раске | ts m sta | nual | a engl | leening | 1001 | l. | |
| Course | e Lear | ning U | utcon | <u>1es:</u> | P 41 | | · • · | 1 4 | | | DI | • • | • , • | , | |
| CO | CO After the completion of the course the student should be Bloom's Cognitive | | | | | | | | | | | | | | |
| | able to level Descriptor | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| CO1 | I Implement wired and wireless networks scenario III Applying | | | | | | | | | | | | | | |
| CO2 | Dem | onstrat | e data | link an | d net | work la | yer pro | otocol | S | | Г | V | A | nalyz | ing |
| CO3 | Inspe | ect pacl | ket ana | lysis a | nd ca | pturing | in LA | N | | | Г | V | A | nalyz | ing |
| CO-PC |) Map | ping : | | | | | | | | | | | | | |
| PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 | 0 PO1 | 1 PO1 | 2 | PSO1 | PSO2 |
| CO1 | 2 | | | | | | | | | | | | | | |
| CO2 | | 3 | | | | | | | | | | | | 1 | |
| CO3 | | | | | | | | | 2 | | | | | 2 | |
| | 1 | | | 1 | | | | | | | | | | | |
| Assess | ments | : | | | | | | | | | | | | | |
| Lab As | sessme | ent | | | | | | | | | | | | | |
| There as | re four | compo | nents of | f lab as | sessm | ent LA1 | , LA2, | LA3 a | ind Lab | ESE | | | | | |
| IMP: La | ab ESE | is a sep | barate h | lead of | passin | g | | | | | | | | | |
| Assess | sment | Based | on | | | Condu | icted by | y C | onducti | on | and | Ma | rks | Mar | ks |
| | | | | | | | | S | ubmissio | on | | | | | |
| LA1 | | Lab | | activ | ities, | By | Cours | se D | uring v | veek | 1 tc | week | 4 | 25 | |
| | attendance, journal Faculty submission at the end of week 5 | | | | | | | | | | | | | | |
| LA2 | A2 Lab activities, By Course During week 5 to week 8 25 | | | | | | | | | | | | | | |
| | attendance, journal Faculty submission at the end of week 8 | | | | | | | | | | | | | | |
| LA3 | | Lab | | activ | ities, | By | Cours | se D | uring w | veek | 10 to | week | 14 | 25 | |
| | | attend | ance, jo | ournal | | Facult | У | sı | ibmissio | n at 1 | he end | of week | 14 | | |
| Lab ES | SE | Lab | perform | nance | and | By | Cours | se D | uring w | veek | 15 to | week | 18 | 25 | |
| | • •• | related | docur | nentatio | on | Facult | у | sı | ibmissio | n at t | he end | of week | 18 | | |

Week 1 indicates starting week of the semester

Lab activities shall include performing experiments, mini-project, presentations, drawing, programming and other suitable activities as per the nature of lab course.

The experimental lab shall have typically 8-10 experiments

Course Contents:

1. Data Link layer

- a. Analyze different network devices on data link layer and design case study for all devices
- b. Demonstrate half duplex and full duplex link in simulator and write the observations
- c. Design different computer network topologies and evaluate its performance using network simulators

2. Network Layer and Transport layer

- a. Demonstrate the communication through different topologies using TCP as an agent using network simulators
- b. Demonstrate the communication through different topologies using UDP as an agent using network simulators
- c. Evaluate performance of TCP and UDP with net centric computing parameters using network simulators

3. Network Scenario Generators (NSG2/NETSim)

- a. Create and simulate wired network scenario using NSG and configure the node
- b. Create and simulate different wireless network scenario using NSG and configure the mobile nodes

| Title of | f the C | Course | : Softv | vare E | Ingine | ering | Lab 5 | T274 | | | L | Т | Р | Cr | | | | | |
|---|---------------------|-----------|-----------|----------|-----------|----------|------------|-------------|---------------|------------------|-------------|------------------------|----------------------|-----------------|--|--|--|--|--|
| | | | | | - | 5 | | | | | 0 0 2 1 | | | | | | | | |
| Pre-Re | equisit | e Cou | rses: (|)bject | orien | ted pro | ogram | ming | | | | | | | | | | | |
| Textbo | oks: | | | | | | | | | | | | | | | | | | |
| 1. S | omme | rville, ' | "Softw | vare Er | nginee | ring", l | Pearso | n Edu | cation I | ndia,N | lew De | elhi,1 st I | Edition, | 2006 | | | | | |
| 2. R | oger S | Pressi | man, " | Softwa | are En | gineeri | ng – A | A Pract | itioner | 's App | roach" | , McGr | aw Hill. | USA, | | | | | |
| 7 | th Editi | on, 20 | 07 | | | e | U | | | 11 | | - | | , | | | | | |
| 3. P | ankai . | lalote. | "An Ir | ntegrat | ed Ap | proach | to Sof | ftware | Engine | ering' | '. Naro | sa Publ | ication. | 3 rd | | | | | |
| E | dition. | 2005 | | 0 | · · · · · | r | | | 0 | 0 | , | | , , , | | | | | | |
| Refere | nces: | | | | | | | | | | | | | | | | | | |
| 1. P | fleege | : "Sof | tware 1 | Engine | ering' | '. Pears | son Ed | ucatio | n India | . New | Delhi. | 3 rd Edi | tion.200 | 19 | | | | | |
| 2. N | 1ike O | 'Doche | ertv. "(| Object- | -Orier | ited An | alvsis | & Des | sign: U | nderst | anding | System | ····,- · · | - | | | | | |
| Dev | elopme | ent wit | h UMI | [20"] | John | Wilev | & Son | s Publ | lication | $2^{nd} F$ | dition | 2005 | | | | | | | |
| 3 T | erry O | uatrair | n" Vis | sual M | odelli | ng with | 1 Ratio | nal Ro | ose 200 | , 2 And | UML | ' Pearso | on 3 rd F | dition | | | | | |
| 2 | 006 | | -, , | | | | | | | | | , | , | | | | | | |
| Course | e Obie | ctives | : | | | | | | | | | | | | | | | | |
| | 1. To | Expla | in met | thods o | of capt | turing a | and vis | ualizi | ng softv | ware re | equirer | nents | | | | | | | |
| | 2. To | comp | rehend | the co | oncep | ts and r | orincip | les of | softwa | re desi | en | | | | | | | | |
| I o comprehend the concepts and principles of software design To instruct fundamentals of testing and software quality assurance | | | | | | | | | | | | | | | | | | | |
| Course | e Lear | ning (| Jutcon | nes: | | 2 | <u> </u> | | 1 | | | | | | | | | | |
| CO | After | the c | omple | tion o | f the o | course | the st | udent | should | l be | Bloom | 's Cogr | itive | | | | | | |
| | able | to | · · · | | | | | | | _ | | | | | | | | | |
| | | | | | | | | | | | level | De | scriptor | | | | | | |
| C01 | Conv | ert the | requi | ement | s mod | el into | the de | sign n | nodel | | Π | U | nderstar | nding | | | | | |
| CO2 | Use | softw | are p | roject | man | agemei | nt too | ols in | softv | vare | | | | | | | | | |
| | devel | opmer | nt life o | cycle | | | | | 20-11 | | III | | Applyı | ng | | | | | |
| CO3 | Reha | sh soft | ware c | ompor | nent in | n devel | opmen | t life o | cycle | | IV | | Analyz | ing | | | | | |
| CO-PC |) Map | ping : | | | | | • | | | | | | | | | | | | |
| PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | | | | | |
| <u>CO1</u> | 2 | 1 | | | 3 | | | | | | 1 | | | | | | | | |
| C02 | | 2 | 3 | | | | | | | | 1 | | 2 | | | | | | |
| 000 | | | 5 | | | | | | | | | | 2 | <u> </u> | | | | | |
| Assess | ments | : | | | | | | | | | | | | | | | | | |
| Lab As | sessme | nt | | | | | | | | | | | | | | | | | |
| There as | re four | compo | nents o | f lab as | sessm | ent LA | I, LA2, | LA3 a | and Lab | ESE | | | | | | | | | |
| IMP: La | ab ESE | is a sep | parate l | nead of | passin | g | | | | | | | | | | | | | |
| Assess | sment | Based | lon | | | Cond | ucted k | ру | Condu Subm | iction ission | and | Mar | ks Ma | rks | | | | | |
| LA1 | | Lah | | activ | vities | By | С | ourse | During | o weel | c = 1 + t c | week | 4 25 | | | | | | |

| | | | Submission | |
|---------|-------------------------------------|----------------------|--|----|
| LA1 | Lab activities, attendance, journal | By Course Faculty | During week 1 to week 4 submission at the end of week 5 | 25 |
| LA2 | Lab activities, attendance, journal | By Course Faculty | During week 5 to week 8 submission at the end of week 8 | 25 |
| LA3 | Lab activities, attendance, journal | By Course Faculty | During week 10 to week 14 submission at the end of week 14 | 25 |
| Lab ESE | Lab performance and | By Course | During week 15 to week 18 | 25 |

| rela | ated documentation | Faculty | submission at the end of week | |
|----------------------|-----------------------------|----------------------|----------------------------------|------------|
| Week 1 indicates s | tarting week of the sem | ester | 10 | L |
| Lab activities shall | include performing ex | periments mini-proj | ect presentations drawing progr | amming and |
| other suitable activ | rities as per the nature of | f lab course. | , p, p | u |
| The experimental l | ab shall have typically a | 8-10 experiments | | |
| Course Contents | s: | | | |
| List of Experime | ents: | | | |
| 1. To realize | the phases in softwar | e development pro | iect. overview, need, coverage | of topics |
| 2 To assign | the requirement engin | neering tasks | ,,,,, | |
| 3 To perfor | m the system analysis | · Requirement ana | lysis SRS | |
| 4 To perfor | m the function oriente | ed diagram · DFD a | nd Structured chart | |
| 5 To perfor | m the user's view ana | lvsis · Use case dia | oram | |
| 6 To draw t | he structural view dia | oram · Class diaora | m object diagram | |
| 7 To draw t | he behavioral view di | agram : Sequence d | liagram Collaboration diagram | ı |
| 8 To draw t | he behavioral view di | agram : State-chart | diagram Activity diagram | 1 |
| 0. To draw t | he implementation vie | agrann : Diate-chart | onent diagram | |
| 10 To draw t | he environmental view | v diagram : Denlox | ment diagram | |
| 10. To utaw t | ne environmental view | w diagrafii . Deploy | nit testing integration testing | |
| | m various testing usin | | int testing, integration testing | • , 1 |
| 12. 10 demor | istrate the performance | e of server and wet | o portai using modern engineer | ing tools |

| Title of the C | Course: | Java Pro | ogr | am | ming | ; La | ab | 517 | [27: | 5 | | | | | L | Т | Р | Cr |
|--|---|--------------------------------------|--------------------|-----------------------|------------------------|--------------------|-------------------|--------------------|-----------------------|--------------------|----------------------|----------------------------|---------------|----------------|---------------|---------------------------------|--|-----------------|
| | ~ | 01. | | | | _ | | | | | | | | | 0 | 0 | 2 | 1 |
| Pre-Requisit | e Course | es: Objec | et O |)rier | nted | Pro | gra | amr | nınş | 5 | | | | | | | | |
| Textbooks: 1. Ca 20 2. Ca Ec | ay S. Hor 018 ay S. Hor lition, 20 | stmann, stmann, 19 | "Co "Co | ore | Java Java | Vo Vo | lur | ne ne | I Fu II A | ınd .dv | ame ance | ntals ³ d Fe | ", Pro | entic s", P | e Ha Prent | ull, 11 th ice Ha | ^h Edition ll, 11 th | n, |
| References: | | | | | | | | | | | | | | | | | | |
| 1. He 20 | erbert Scl 14 | hildt, "Ja | ava: | Th | e Co | mp | lete | e R | efer | en | ce", 1 | McG | raw | Hill | Edu | cation, | 9 th Edi | tion, |
| 2. E. Ec | Balgurus lition, 20 | swamy, ' 14 | "Pro | ogra | amm | ing | wi | ith . | Java | ı: A | A Pri | mer" | , Mc | Grav | v Hi | ll Eduo | cation, 5 | 5 th |
| Course Obje 1. To 2. To 3. To | ctives: introduc demons present | trate the ob trate the various | ojec Jav app | t-or va A olica | iente PI's tions | d c lik s of | one e n the | cep nult e G | ts o tithr UI j | f Ja eao pac | ava ding :kage | and s | socke Java | et pro | ogra | mming | 2 | |
| Course Lear | ning Ou r the cor | nnlotion | of | the | | rsa | th | 10.6 | tud | on | t ch | hlu | haa | hla | Blo | om's | Cooniti | ve |
| to | | iipietion | I UI | ιne | cou | 1 50 | ; U | ie s | iuu | en | ι 5110 | Julu | DE a | Die | DIC | Join S | Cogiiiti | vC |
| | to level Descriptor | | | | | | | | | | | | | | | | | |
| CO1 Defin | ne the ba | sic knov vell as d | wle iffe | dge | of o | obje | ect | or of Ja | ient ava | atio | on w | vith c | liffei | rent | II | Ur | nderstan | ding |
| CO2 Demo | onstrate threading | the c | onc | cept | s o | of | SO | cke | et | pro | ogran | nmir | ng i | and | III | Ap | oplying | |
| CO3 Imple | ement the | e applica | tion | n us | ing (| GUI | [w | ith | data | aba | ise co | onne | ctivit | y | III | Ap | oplying | |
| CO-PO Map | ping: | | | | | | | | | | | | | | _ | | | |
| | | PO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | | |
| | | CO1 | | | | 2 | 2 | | | | | | | | | | | |
| | | CO2 | | | | | | | | | | | | 3 | | | | |
| | | CO3 | | | | | 2 | | | | | | | 2 | | | | |
| Assessments Lab Assessme There are four IMP: Lab ESE | : ent component is a separ | nts of lab rate head | ass of p | essr | nent] | [LA] | 1, I | .A2 | , LA | A3 : | and I | .ab E | SE | | | | | |
| Assessment | Based of | n | | | Co | ond | uct | ed | by | | Co Sul | nduc omiss | tion sion | an | d | Marks | 6 Marl | KS |
| LA1 | Lab attendan | ac ce, journa | tivi al | ties, | By Fa | cult | ty | C | Cour | se | Dur sub 5 | ring missi | week on at | the o | to v end o | week 4 | 4 25 x | |
| LA2 | Lab attendan | ac ce, journ | tivi al | ties, | By Fa | cult | ty | C | Cour | se | Dur sub 8 | ring missi | week on at | x 5 the o | to v end o | week 8 of week | 3 25 x | |
| LA3 | Lab attendan | ac ce, journa | tivi al | ties, | By Fa | cult | ty | C | Cour | se | Dur sub 14 | ring missi | week on at | 10 the | to w end o | veek 14 of week | 4 25 x | |

| Lab ESE Week 1 indicat | Lab performance and related documentation tes starting week of the sem | By Faculty ester | Course | During week 15 to week 18 submission at the end of week 18 | 25 |
|---------------------------|--|------------------------|---------------|--|-------------|
| Lab activities s | shall include performing ex | periments, | mini-proj | ect, presentations, drawing, prog | ramming and |
| The experimen | tal lab shall have typically | 8-10 expe | c. riments | | |
| Course Cont | ents: | 0 10 C APC | Timents | | |
| | chtg. | | | | |
| Course Cont | ent(Lab): | | | | |
| Assignment | List: | | | | |
| 1. Progra | am on input/output stream | 1. | | | |
| 2. Progra | am on class and objects. | | | | |
| 3. Progra | am on Constructor/Destru | ictors. | | | |
| 4. Progra | am static variables/class/f | unctions. | | | |
| 5. Progra | am on polymorphism. | | | | |
| 6. Progra | am on different types of in | nheritance | e and inter | face. | |
| 7. Progra | am on exception handling | objects. | | | |
| 8. Progra | am on multithreading. | | | | |
| 9. Progra | am on TCP/UDP commun | nication. | | | |
| 10. Progra | am on Swing components | | | | |
| 11. Progra | am on AWT components. | | | | |
| 12. Progra | am on Database Connecti | vity and o | perations | for data handling. | |
| 13. Progra | am on different collection | s like Tre | eSet, Set, | HashMap, ArrayList, Date, etc | Э. |
| 14. Progra | am on Android App. | | | | |
| | | | | | |

| L T P Cr 0 0 2 1 | | | | | | | | | | | | | | | | |
|---|---|------------|--|----------------|-----------|-------------|--------------|--------|----------|-----------|----------|-------|-------|----------|--------|--|
| Dro Da | anicit | Cou | MGOGI | Drogra | mmin | a Euro | lomon | tola | | | | 0 | 0 | 2 | 1 | |
| Toythe | oks. | eCou | rses: | Flogia | 111111111 | g run | lamen | tais | | | | | | | | |
| Refere | References: - | | | | | | | | | | | | | | | |
| Course Objectives : | | | | | | | | | | | | | | | | |
| 1 | 1. To provide guidance to select & build the ideas. | | | | | | | | | | | | | | | |
| 2. | To help students to address real-world challenges by IT based Solution. | | | | | | | | | | | | | | | |
| To help students to address real-world channenges by 11 based Solution. To guide students to acquaint with team spirit. | | | | | | | | | | | | | | | | |
| Course Learning Outcomes: | | | | | | | | | | | | | | | | |
| COAfter the completion of the course the student should beBloom's Cognitive | | | | | | | | | | | | | | | | |
| | able to | | | | | | | | | | | | | | | |
| able to level Descriptor CO1 Exploit the concepts of Programming languages tools and Image: Concepts of Programming languages tools and Image: Concepts of Programming language: Concepts of Programing language: Concepts of Programmin | | | | | | | | | | | | | | | | |
| COI | CO1 Exploit the concepts of Programming languages, tools and III Applying | | | | | | | | | | | | | | | |
| technologies.IIIApplyingCO2Survey the real world challenges & try to address itVEvaluate | | | | | | | | | | | | | | | | |
| CO2Survey the real world challenges & try to address it.VEvaluateCO3Design project modules to report solutions to various | | | | | | | | | | | | | | | | |
| CO3Design project modules to report solutions to various problems.VICreating | | | | | | | | | | | | | | | | |
| problems. VI Cleaning CO-PO Manning : VI Cleaning | | | | | | | | | | | | | | | | |
| | O-PO Mapping : PO PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 | | | | | | | | | | | | | | | |
| 10 CO1 | 101 | 102 | PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 1 2 2 2 2 2 2 2 2 2 | | | | | | | | | | | | | |
| CO2 | | - | | - | | - | | | | | 2 | | | 2 | 1 | |
| CO3 | | | | | 2 | | | | | 3 | | | | | | |
| | | | | | | | | | | | | | | | | |
| Assess | ments | • | | | | | | | | | | | | | | |
| Lab As | sessme | ent | | | | | | | | | | | | | | |
| There a | re four | compo | onents o | of lab a | ssessm | ent LA | 1, LA2 | 2, LA3 | and La | b ESE | | | | | | |
| IMP: La | ab ESE | is a se | parate | head of | f passir | ng | | | | | | | | | | |
| Assess | sment | Base | d on | | | Cond | lucted | by | Conc | luction | and | N | larks | s Mai | rks | |
| T A 1 | | T 1 | | | •,• | D | | ~ | Subn | nission | 1 1 / | | 1 / | 1 25 | | |
| LAI | | Lab | domoo | acti Domort | vities, | By Ecoul |) tru/Cui | Jourse | Duri | ng wee | k l to |) WE | ek 4 | 1 25 | | |
| | | attent | uance, I | Report | | гасш | ty/Our | ue | Subin | lission a | t the en | | weer | • | | |
| LA2 | | Lab | | acti | vities | Bv | (| Course | Durir | ng wee | k 5 to |) WE | ek 8 | 3 25 | | |
| | | atten | dance,] | Report | , | Facul | ty/Gui | de | subm | ission a | t the en | d of | week | x =0 | | |
| | | | , | 1 | | | 5 | | 8 | | | | | | | |
| LA3 | | Lab | | acti | vities, | By | (| Course | Durir | ng week | c 10 to | wee | ek 14 | 1 25 | | |
| | | atten | dance, I | Report | | Facul | ty/Gui | de | subm | ission a | t the en | d of | week | K | | |
| T 1 7 | | T 1 | 0 | | 1 | | | ~ | 14 D | | 1.5 . | | 1 1 1 | 0.05 | | |
| Lab E | SE | Lab | perfor | mance | and | By E | ((C' | Jourse | Durin | ng week | c 15 to | wee | ek 18 | 8 25 | | |
| | | Repa | u do rt | cument | lation/ | Facul | uy/Gui | ue | subm | ussion a | i the en | a of | week | x | | |
| Week 1 | indica | tes star | ii ting w | pek of t | he com | ester | | | 10 | | | | | | | |
| Lab a | tivitie | co stal | l inch | ide n | erformi | ng ev | nerime | ents F | Project/ | mini_nr | niect | nrese | ntati | ons d | rawing | |

Lab activities shall include performing experiments, Project/mini-project, presentations, drawing, programming and other suitable activities as per the nature of lab course.

Course Contents:

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.