University Institute of Technology (UIT)
Silver Wood Estate, H. P. University Shimla-171005
(NAAC accredited "A" Grade University)

Revised Syllabus
Bachelor of Technology

In
Information Technology
(Second Year)

Effective for batch 2019-2020 and onwards

		Scheme of Examination (Information Technology)											
		Third Semester (Information Technology)					*Exam Schedule (Marks)*		*Sess Schedule (Marks)*		Total	Credits
Course No.	**CAT**	**Subjects**	**L**	**T**	**P**	**Total**	**Theory**	**Sess.**	**Pract.**	**Sess.**		
IT- 3001	PCC	Computer Organization	3	1	-	4	100	50	-	-	150	3
IT –3002	PCC	Object Oriented Programming	3	1	-	4	100	50	-	-	150	3
IT –3003	PCC	Data Structures & Algorithms	3	1	-	4	100	50	-	-	150	3
IT –3004	PCC	Database Management System	3	1	-	4	100	50	-	-	150	3
ECE - 3003	PCC	Digital Electronics	3	1	-	4	100	50	-	-	150	3
HSMC - 3001	HSMC	Principles of Engineering Economics	2	1	-	3	100	50	-	-	150	2
		(Practical's / Drawing / Design)										
ECE - 3053	PCC	Digital Electronics Laboratory	-	-	2	2	-	-	50	50	100	1
IT –3051	PCC	Data Structure Laboratory	-	-	2	2	-	-	50	50	100	1
IT –3052	PCC	Object Oriented Programming Lab	-	-	2	2	-	-	50	50	100	1
IT -3053	PCC	DBMS Laboratory	-	-	2	2	-	-	50	50	100	1
		TOTAL	**17**	**6**	**8**	**31**	**600**	**300**	**200**	**200**	**1300**	**21**

L: Lecture (Theory)/perweek **T:Tutorial/perweek** **P: Practical/per week**

Sess.:Sessionals **Pract.: Practicals**

		Scheme of Examination (Information Technology)											
		Fourth Semester (Information Technology)					*Exam Schedule (Marks)*		*Sess Schedule (Marks)*		Total	Credits
Course No.		**Subjects**	**L**	**T**	**P**	**Total**	**Theory**	**Sess.**	**Pract.**	**Sess.**		
IT –4001	PCC	Operating System	3	1	-	4	100	50	-	-	150	3
IT –4002	PCC	Computer Networks	3	1	-	4	100	50	-	-	150	3
EC-4010	PCC	Digital and Data Communication	3	1	-	4	100	50	-	-	150	3
IT- 4003	PCC	Software Engineering	3	1	-	4	100	50	-	-	150	3
IT -4004	PCC	Python Programming	3	1	-	4	100	50	-	-	150	3
HSMC - 4001	HSMC	Organizational Behavior	2	1	-	3	100	50	-	-	150	2
		(Practical's / Drawing / Design)										
IT –4051	PCC	Operating System Lab	-	-	2	2	-	-	50	50	100	1
IT –4052	PCC	Computer Networks Lab	-	-	2	2	-	-	50	50	100	1
IT –4053	PCC	Python Programming Lab	-	-	2	2	-	-	50	50	100	1
EC –4011	PCC	Digital and Data Communication Lab	-	-	2	2	-	-	50	50	100	1
		TOTAL	**19**	**5**	**8**	**32**	**600**	**300**	**200**	**200**	**1300**	**21**

L: Lecture (Theory)/perweek **T: Tutorial/perweek** **P: Practical/per week**

Sess.: Sessionals **Pract.: Practicals** **Cat: Category**

Note: - Students to undergo six week Industrial/Vocational training before commencement of fifth semester . It will carry two credit in fifth semester.Seminar/viva for the same. be conducted in fifth semester.

Course Category and Definition:

Course Category	Definitions
BSC	Basic Science Courses
ESC	Engineering Science Courses
HSMC	Humanities and Social Sciences including Management courses
PCC	Professional core courses

SYLLABUS

OF

B.TECH.
(INFORMATION TECHNOLOGY)

SEMESTER - III

Computer Organization (IT -3001)

Course Code	**IT – 3001**	Credits : 3	L-3, T-1, P-0
Name of the Course	**Computer Organization**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

SECTION-A

BASICS: An introduction to computers with block diagram, Computers generation, Impact of technology. Flynn's Classification of computers (SIMD, MISD, MIMD).

LOGIC DESIGN TECHNIQUES : Designing combinations logic using Karnaugh-Maps with building blocks of basic gates , Multiplexers, de-multiplexer, decoders and encoders, arithmetic, logics units .Instruction codes Computers registers and instructions, timing and control, instruction cycle memory reference instruction, I –O interruption

Basic sequential logic blocks flip-flops, registers, shift registers and counters,

SECTIONS-B

COMPUTER ARITHMETIC: Adder and Subtraction circuits, Booth Multiplication algorithm Performance bench marks, Division Algorithm, Floating Point Arithmeticoperations.

CONTROL PATH DESIGN: Sequence counter method, Micro programmed controllers address sequencing Control Option.

SECTION-C:

CENTRAL PROCESSING UNIT: Registers general register origination, stack origination, Instruction formats, address instructions, addressing modes, data transfer and manipulations,CISC,programmed control RISC instruction set

design, applications of CISC &RISC three address instructions and arithmetic pipelines with example of floating point adder, instruction pipe lines, advanced pipe lining using instruction level parallelism,

SECTION –D

MEMORY ORGANISATION: Memory device characteristics, random access memory, serial access memory virtual memory associative memory cache memory, memory management hardware.

I/O ORGANISATION: I/O interface asynchronous data transfer DMA interrupt, I/Oprocessor

TEXT BOOKS:

1. M. Moris Mano , Computer System &ArchitecturePHI
2. Hayes J. P Computer Architecture &Organization.
3. M. Morris & Charles R .Kire , Logic and Computer Design Fundamental– PHI 1995

Object Oriented Programming (IT –3002)

Course Code	**IT – 3002**	Credits : 3	L-3, T-1, P-0
Name of the Course	**Object Oriented Programming**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

SECTION-A

Introduction to object oriented concepts : Overview, Abstract data type :Object , Modularization , classes, creating and destroying objects, garbage collection strategies , overloading , dynamic binding, polymorphism , constants.
Inheritance: class inheritance, inheriting instance variable inheriting methods, meta classes , object inheritance , multiple and multilevel inheritance

SECTION B

C++ programming language: overview: programming paradigm support for data abstraction and object oriented programming , declaration and constant , expression and statements , functions andfiles
Classes and objects : Definitions of class declaration , data numbers class function definition , member function definition scope resolution operator , private and public member function, nesting of member function , creating objects , accessing class data member functions , array of objects, objects as function arguments
Operator overloading :Operator function, user defined typed conversion large objects, assignment and initialization and subscripting and functions call, referencing, increment and decrement, a string class, friends and members.

SECTION –C

Inheritance thorough extending classes: Base and drive classes, visibility modes, single inheritance , protect member and inheritance , multilevel inheritance , nesting of classes .
Streams templates and design of libraries .output, input, formatting files and streams, C-I/O , Design of libraries.

SECTION –D

Objected oriented analysis and design: Object oriented analysis and system design , objected design , semantic and entity relationship modeling , contrasting design for data bases and OOA,OOD.

Text Books:

1. The C++ programming language , BjarneStroustrup,Addison Wesley , 2000.
2. ObejctingMoudling and design, James ,Rumbaugh, Michel Blha , William Premerlani,Fredetrick Eddy and William Lorence ,PHI-1998
3. Object oriented programming in turbo C++ ,RobbetLofre, Galgotia Publication Pvt Ltd.1994.
4. Object oriented Programming with C++ ,Balaguruswamy, Tata Mcgraw Hill Publication Co. Ltd2000.
5. Programming with C++, D. Ravichandern, Tata Mcgraw Hill1996..

Data Structures& Algorithms (IT –3003)

Course Code	**IT – 3003**	**Credits: 3**	**L-3, T-1, P-0**
Name oftheCourse	**Data Structures & Algorithms**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

SECTION – A

INTRODUCTION: Basic concepts and notions, data structures and data structure operation, mathematical notation and functions algorithm complexity, running time ofprogram.

Development of Algorithms: Storage Structure of Array, Stack and Queues.

Linked List: Singly Linked List, Linked Stacks and Queues, doubly linked list, circularly Linked list.

SECTION – B

TREES: Definitions and basic concept, linked tree representation, representations in contiguous storage, binary trees, binary tree traversal, searching insertion and deletion in binary trees, heap trees, heap sort algorithm, height balanced trees and AVLtrees.

SECTION – C

GRAPHS: Graphs and application, sequential and linked representation of graph, adjacency matrix, operation on graph, traversing a graph, Dijkstra's algorithm for shortest distance. Tables, searching sequential tables Hash tables and symboltables.

SECTION - D

Searching and sorting: Use of various data structure for searching and sorting, linear and binary search, insertion sort, selection sort, Merge sort, Radix sort and

Bubble sort, Heap Sort, Comparing the Complexities of Different searching and sorting Algorithm.

Text Books:

1. Tenebaum , A. Lanhgsam Y and Augensatein , A. J: Data structures using C , Prentice Hall ofIndia.
2.Seymour Lipschutg : Theory an practice of Data structure , Mc. Graw Hill1998.
3.Horowitz E and Sahni S: Data structure with Pascal 3rdedition , Galgotia1991.

DATABASE MANAGEMENT SYSTEM (IT -3004)

Course Code	**IT– 3004**	Credits: 3	L-3, T-1, P-0
Name of the Course	**DATABASE MANAGEMENT SYSTEM**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%,Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

For Paper Setters: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Section A :

Overview of DBMS, Components of DBMS: (users, language, structure, data-dictionary, data manager, DBA, etc.). File Oriented approach versus Database Oriented approach, SPARC 3-level architecture. A brief overview of data models (hierarchical mode, network model, relational model, E-R model, Object Oriented Model), Overview of types of databases (Centralized, Parallel, Client-Server, Distributed).

Section B:

Entity-Relationalship model as a tool for conceptual design, Converting ER-Model into relational schema. Properties of relational model { Codd's 12 rules (integrity rules (concept of keys))}Relational algebra (select, project, cross product, joins (theta-join, equi-join, natural-join, outer join)),

Section C:

Functional Dependencies, Multi-valued Dependencies, Normalization (up to 5^{th}level), Structured Query language (DDL, DML), INSERT, DELETE, UPDATE, VIEW definitions, Select Statement, integrity constraints: (not null, unique check, primary key, foreign key references),
file organization: (Sequential file, index sequential files, Direct files, Hashing, B-trees, index files).

Section D:

Transaction Processing & Concurrency Control: Transaction Concepts, Recovery in centralized DBMS, Serializability, Locking schemes (two phase locking, tree-locking protocol), granularity of locking.

Query processing (Introduction, steps in Query processing, General Processing Strategies, Query Optimisation). and security.

Text Books :

1. C.J. Date, " An introduction to data base System", 7th ed. Addison Wesly, 2000.
   Abraham Silberschataz, Henry F. Korth S.Sudershan,The McGraw Hill Companies, Inc.,1997.
2. Naveen prakash ,"Introduction to Database managementsystems",Tata McGraw hill .
   Bipin C desai ,An introduction to database management system.
3. Database Systems Cocept, design and applications, S.K Singh, Pearson education

Digital Electronics **(ECE –3003)**

Course Code	**ECE – 3003**	Credits : 3	L-3, T-1, P-0
Name of the Course	**Digital Electronics**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one section from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

SECTION-A

Number Systems And Boolean Algebra: Number systems,Addition, Subtraction using 1's & 2's complements and using 9's&10's complements, Binary codes, Error detecting and Correcting codes, Theorems of Boolean algebra, Canonical forms, Logic gates.

SECTION-B

Combinational Circuits: Representation of logic functions, Simplification using Karnaugh map, Tabulation method, Implementation of combinational logic using standard logic gates, Multiplexers and Demultiplexers, Encoders and Decoders, Code Converters, Adders, Subtractors, Parity Checker and Magnitude Comparator.

SECTION-C

Sequential Circuits: Flip flops - SR, JK, D and T flip flops - Level triggering and edge triggering, Excitation tables - Counters - Asynchronous and synchronous type Modulo counters, ~~design with state equation state diagram,~~ Shift registers, type of registers, ~~circuit diagrams~~

Digital Logic Families: Introduction to bipolar Logic families: RTL, DCTL, DTL, TTL, ECL and
MOS Logic families: NMOS, PMOS, CMOS, Details of TTL logic family - Totem pole, open collector outputs, TTL subfamilies, Comparison of different logic families.

SECTION-D

D/A And A/D Converters: Weighted resistor type D/A Converter, Binary ladder D/A converter, Steady state accuracy test, D/A accuracy and resolution, Parallel A/D Converter, counter type A/D converter, Successive approximation A/D converter, Single and Dual slope A/D converter, A/D accuracy and resolution.

Semiconductor Memories: Memory organization, Classification, and characteristics of memories, Sequential memories, ROMs,

R/W memories, Content Addressable memories, Charged-Coupled Device memory, PLA, PAL,PROM and Gate Array.

TEXT BOOKS:

1. Digital Principles& Applications	Malvino andLeach	: TMH
2. DigitalIntegratedElectronics	TaubandSchilling	: TMH
3. Digital Circuits andLogicDesign	SamuelCLee	: PHI
4. Pulse, Digital and Switching Waveforms	MillmanandTaub.	:TMH
5. ModernDigitalElectronics	R.P.Jain	:TMH
6. DigitalFundamentals	Floydd	:Pearson Edu.

Recommended Books

1. Mano M. Morris, "Digital Design", 3rd edition, Pearson Education 2006.
2. Jain R. P. "Modern Digital Electronics", 3rd edition, Tata McGraw-Hill 2003.
3. Malvino and Leach "Digital principles and Applications", 5th edition, Tata McGraw Hill, 2003.
4. James W. Bignell and Robert Donovan, "Digital Electronics", 5th edition, Delmar Publishers, 2007.
5. Flecther "An Engineering Approach to Digital Design", 1st edition, PHI, 2009.

Principles of Engineering Economics

Name of the Course	Principles of Engineering Economics		
Course Code	HSMC – 3001	Credits: 2	L-2, T-1, P-0
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		Max. Marks: 50	

INSTRUCTIONS

For Paper Setters: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non- programmable calculators is allowed.

Section A

Introduction to Engineering Economics: Definitions, Nature and Scope of Economics; Difference between Microeconomics and Macroeconomics; Concepts of Engineering Economics- Engineering Efficiency and Economic Efficiency.

Consumer Demand Analysis: Meaning, Features and Determinants of demand; Law of Demand and its Exceptions; Reasons for Law of Demand; Importance of Law of Demand; Elasticity of Demand.

Section B

Supply Analysis: Meaning, Supply Function, Law of Supply, Determinants of Supply, Fluctuation of supply; Elasticity of supply and its measurement.

Section C

Theory of Production: Production Function, Factors of Production; Law of Variable Proportions; Law of returns to scale Cost, Revenue and Profit Analysis: Cost Classifications for Predicting Cost Behavior; Concept of Profit, Gross Profit and Net Profit; Break Even Point (BEP).

Section D

National Income: Circular Flow of Income, Meaning and Concept of National Income: GNP/GNI, NNP/NNI, Personal Income and Disposable Income; Methods of Computing National Income -Production Method, Income Method, Expenditure Method.

Economic Stabilization: Monetary Policy- Meaning, Objectives, Tools; Fiscal Policy-Meaning, Objectives, Tools.

TEXT BOOKS RECOMMENDED:

C S Park, “Contemporary Engineering Economics”, Pearson Education, 2002.

J S Chandan, “Statistics for Business and Economics”, Vikas Publishing.

H. L. Ahuja, “Principles of Microeconomics”, S. Chand (G/L) & Company Ltd, 2002.

D. N. Dwivedi, “Macroeconomics Theory and Policy”, Tata McGraw-Hill Publishing Company, 2010.

S Damodaran, “Managerial Economics”, Oxford University Press, 2010.

DIGITAL ELECTRONICS LAB (EC –3053)

Course Code	**EC – 3053**	Credits : 1	L-0, T-0, P-2
Name of the Course	**Digital Electronics Lab**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks: 25**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).

ii) Viva-voice examination (25marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

Laboratory examination will consist of two parts:

(i) Performing a practical exercises assigned by the examiner (25marks).

(ii) Viva-voce examination (25marks)

Viva-voce examination will be related to the practical performed / project executed by the candidate related to the paper during the course of the semester.

1. Design and verification of the truth tables of Half and Full adder circuits.
2. Design and verification of the truth tables of Half and Full subtractor circuits.
3. Design and implementation of 4 bit binary Adder/ Subtractor and BCD adder using IC7483.
4. Design and implementation of code converters using logic gates (i) BCD to excess-3 code (ii) Binary to gray code

v. Verification of the truth table of the Multiplexer using IC 74150.

vi. Verification of the truth table of the De-Multiplexer using IC 74154.

vii. Design and test of an SR flip-flop using NOR/NAND gates.

viii. Verify the truth table of a D flip-flop (7474) and JK flip-flop (7476).

ix. Design and implementation of 3-bit synchronous up/down counter.

x. Construction and verification of 4 bit ripple counter and Mod-10 / Mod-12 Ripple counters using JK flip-flop.

xi. Operate the counters 7490, 7493. Verify the frequency division at each stage and with a low frequency clock (say 1 Hz) display the count on LEDs.

xii. Operate the universal shift register 74194.

xiii. Verify the truth table of decoder driver 7447/7448. Hence operate a 7 segment LED display through a counter using a low frequency clock.

xiv. Design and test D/A converter using R-2R Ladder Network

1. Measurement ofacceleration.
2. Construct a memory using TTL Circuits. Read and write data onto a memory frombus.
3. Construct a security latch that can be operated by an identity card.

NOTE:-Record to be maintained both electronically and hard copy forevaluation

Data Structure Laboratory (IT-3051)

Course Code	**IT – 3051**	Credits : 1	L-0, T-0, P-2
Name of the Course	**Data Structures Laboratory**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks: 25**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25marks).

ii) Viva-voce examination (25marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

1. Write a program to search an element in a two-dimensional array using linearsearch.
2. Using iteration & recursion concept write programs for finding the element in the array using Binary SearchMethod.
3. Write a program to perform following operations on tables using functions only
   a) Addition b) Subtraction c) Multiplication d)Transpose
4. Using iteration & recursion concept write the program for Quick Sort Technique.
5. Write a program to implement the various operations on string such as length of string , string concatenation, reverse of a string & copy of a string to another.
6. Write a program for swapping of two numbers using ‘call by value’ and ‘call by reference’strategies.
7. Write a program to implement Binary search tree. (Insertion & deletion in binary searchtree)
8. Write a program for implementation of a file and performing operations such as insert, delete and update a record in afile.
9. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the linklist.
10. Create a linked list and perform the following operation onit
    a) Addanode b) Delete a node c) Count no. of nodes d) Sum ofnodes
11. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000elements.
12. Write a program to simulate the various graph traversingalgorithms.

13. Write a program, which simulates the various tree traversalalgorithms.
14. Circular double linkedlist
15. Sorting
    a)Bubble sort
    b)Merge sort
    c)Insertion sort
    d)Selection sort
16. Write down a program to implement polynomial equation addition in single linkedlist
17. Stack implementationusing
    a)Array b) Linkedlist
18. Queue implementationusing
    a)Array b) Linkedlist

Note: At least 5 to 10 more exercises to be given by the teacher concerned.

Object Oriented Programming Lab (IT-3052)

Course Code	IT-3052		**Credits-1**	**L-0, T-0, P-2**
Name of the Course	**Object Oriented Programming Lab**			
Lectures to be delivered	**26 hours of Lab Work**			
Semester End Examination	Max. Time: 3 hrs.	**Max. Marks: 50**		**Min. Pass Marks: 25**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**		**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

1. Performing a practical examination assigned by the examiner (25marks).
2. Viva-voce examination (25marks).

Viva-voce examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

Laboratory Exercise:

1. Raising a number n to a power of p is the same as multiplying n by itself p times. Write a function called power( ) that takes a double value for an int value for p and returns the result as double value . Use a default argument of 2 of p, so that if this argument is omitted, the number will be squared. Write a main( ) function that gets values from the user to test this function.
2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example (4,5) represents point 4 unit to the right of origin along the X axis and 5 units up the y-axis . The sum of the two points can be defined as new point whose X and Ycoordinates.

   Write a program that uses a structure called point to model a point . Define three points and have the user input values to two of them. Than set the third point equal to the sum of the other two. And display the value of new points. Interaction with the program might look like this.

   Enter CoordinateofP1: 3 4
   Enter CoordinateofP2: 5 7
   Coordinates of P1+P2are: 8 11
3. Create the equivalent of four function calculator . The program should request the to user to enter a number , an operator and another number . It should carry out the specified arithmetical operation: adding, subtracting, multiplying ,or dividing the two numbers. (it should use a switch statement to select the operation) finally it should be display theresult.

   When it finishes the calculation , the program should ask if the user want to do another calculation. The response can be 'Y' or 'N' . Some sample interaction with the program might look likethis.

   Enter first number ,operators and second number 12+100

Answer =112

Do another (Y/N)?N

4. A phone no. such as (212)767-8900 , can be thought of as having three parts area code(212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of phone both no. separately . Call the structure phone . create two structure Enter your area code Exchange and number : 415 5551212

   My number is (415)555-1212

5. Create two classes DM and DB which stores the value of distances DM stores distance in meters and centimeters and DB in feet and inches . Write a program that can read value for the classes objects and add one object of DM with another objectDB.

   Use a friend function to carry out the addition operation .The object that stores the result may be a Dm object or DB object depending on the units in which result are required .

   The display should be in the format of feet and inches or meters and centimeters depending on the object on display.

6. Create a class rational which represents numerical value by two double value NUMERATOR &DENOMENATOR . Include the following public memberfunctions:
   - Constructor with noarguments.(defaults)
   - Constructor with twoarguments.
   - Voidreduce( ) that reduce the rational number by eliminating the highest common factor between the numerator and denominator.
   - Overload +operator to add two rationalnumber
   - Overload operator >> operator to be enabled input throughcin
   - Overload <<operator to be enabled input throughcount.

   Write a main ( ) to test all the functions in theclass

7. Consider the following class definition class father{

   Protected : intage;

   Public:

   Father (int x){age = x;}

   Virtual void iam ()

   {

   {cout<<"I AM THE FATHER , my age is ",<<age<<endl;}

   };

   Derive the two classes son and daughter from the above classes and for each define iam() to write our similar but appropriate message .You should also define suitable constructors for these classes

   Now write a main ( ) that creates objects of three classes and then call iam( ) them .Declare pointer to father , successively assign addresses of object of the two derived classes to this pointer and in each case , call iam( ) through the pointer to demonstrate polymorphism in action.

8. Write a program that create a binary files by reading the data from the students from the terminal. The data of each student consist of roll no, name(a string of 30 or lesser no. of character) andmarks.

9. A hospital wants to create a database regarding its indoor patients. The information to storeinclude.

a) Name of thepatient
b) Date ofadmission
c) Disease
d) Date ofdischarge

Create a structure to store the data (year, month, date as its members). Create a base class to store the above information. The member function should include function to enter information and display a list of all the patients in database Create a drive class to store the age of patients. List the information about all to store the age of the patients. List the information about all the pediatric (less then twelve years inage)

10. Makes a class Employee with the name and salary . Makes a class managerinheritfromtheEmployeeAddaninstancevariablenamed :department, type : string. Supply a method to String that print the manager's name, department and salary. Make a class Executive inherit from information store in the manager super class object . Supply a test program that test these classes and methods.

11. Imagine a tollbooth with a class called Toll booth . The two data item are a type unsigned into to hold the total number of cars and type double to hold thetotalamountofmoneycollected.Aconstructorinitializesboththeseto 0. A member function called nopaycar( ). Increments the car total and adds 0.50 to the cash total. Another function, called nopaycar( ), increment the car total but adds nothing to the cash total. Finally , a member function called display the two totals . Include a program to test this class . This program should allow the user to push one key to count paying a car ,and another to count a non paying car . Pushing the ESC key should cause the program to print out the total cars and total cash and thanexit

12. Write a function called reverse it ( ) that reverses a string(an array of char) use a for loop that swap the first and last characters, then the second and next to last character and so on.
the string should be passed to reversesit ( ), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase , "Able was ere I saw Elba".

13. Create some objects of the string class, and put them in a Deque – some at the head of the Deque and some at the tail. Display the contents of the Deque using the for Each( ) function and a user written display function . Then search the Deque for a particular strings, using the first That ( ) Function and display any string that match, finally remove all the item from the date using the get left( ) Function and display each item. Not ice is the order in which the item are displayed: Using Get Left ( ), Those inserted on the left (head),of the Deque are removed in "last and first out" order while those put on the right side are removed in "first in first out" order. The opposite would be true if Get right ( ) wereused

14. Assume that a blank maintain two kinds of accounts for customer. One called as saving accounts and another is current account . The saving account provides compound interest and withdrawal facility but no cheque book facility, The current account provides cheque book facility but no interest Current account holders should also maintain a minimum balance and if the balance false below this level , a service charge isimposed.

    Create a class account that store customer name, account number and typeofaccount.Fromthisdrivetheclasses cur_acct and sav_account to make them more specific to their requirement. Include necessary member function in order to achieve the followingtask

    a) Accept deposit from a customer and update thebalance
    b) Display thebalance
    c) Compute and depositinterest
    d) Permit withdrawal and update thebalance
    e) Check for the minimum balance, impose penalty ,necessary and update thebalance.
    f) Do not use any constructor , use member function to initialize the classmembers

15. Create a base class called shape .Use this class to store two double type values that could be used to compute the area of figure, Derive to specific classes called triangle and rectangle from the base shape . Add to the base class, a member function get data ( ) to initialize base class data member and another member function display area ( ), To compute and display the area of figures make display area ( ) as virtual function and redefine this function in the derived classes to suit therequirements.

    Using this three classes design a program that will accept dimension of triangle or rectangle interactively and display the area

    Remember the two value given as input will be treated as length of two sides in the case of rectangle and as base and height in the case of triangle and used asfollows

    Area of rectangle = x * y
    Area of triangle =1/2 * x * y

    Programming of exercise in C++ in the form of project (based on “object oriented programming in TURBO C++”) , Robert lafore , Galgotia Publication Pvt. Ltd.1994 to be done in consultation with the facultyincharge for thecourse

    Note: Record to be maintained both electronically and hard copy of evaluation

DBMS LABORATORY **(IT –3053)**

Course Code	**IT – 3053**	Credits: 1	L-0, T-0, P-2
Name of the Course	**DBMS LABORATORY**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks : 50**	**Min. PassMarks: 25**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

Performing a practical examination assigned by the examiner (25 marks).

Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

List of experiments:

Familiarization with any RDBMS engine (Mysql/ORACLE/SQL Server) using PHP/VISUAL BASIC as front end) & developing a small application.

Create a database and write the programs to carry out the following operation:

Add a record in the database.
Delete a record in the database.
Modify the record in the database.
Generate queries.
Generate the report.
List all records of database in ascending order.

Develop a menu driven project management of database system:

Library information system
Engineering
MCA
Inventory controlsystem
(c) ComputerLab
(d) CollegeStore

(ii) Student InformationSystem
(e) Academic
(f) Finance

(iii) Time Table developmentsystem
(g) CSE, IT & MCADepartments.
(h) Electrical & MechanicalDepartments.

Usage of S/W:

PHP, VB, Mysql/Nosql

Note: At least 5 or 10 more exercises to be given by the teacher concerned.

Semester IV

OPERATING SYSTEM (IT-4001)

Course Code	IT-4001	Credits-3	L-3, T-1, P-0
Name of the Course	OPERATING SYSTEM		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.
2. **For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators isallowed.

Section A

What is an Operation System? Simple Batch Systems; Multiprogrammed Batched Systems; Time-Sharing System; Personal-Computer systems; Parallel System; Distributed System; Real-Time Operating Systems. System Components System Calls, System Programs; System Structure; Virtual Machines.

Process concept: Process Scheduling; Operation on processes, Interprocess Communication

CPU Scheduling fundamental concepts, Scheduling criteria; Scheduling Algorithms; Multi-processor Scheduling; Real Time Scheduling.

Threads: Overview; Multithreading

Process Synchronization, Critical section problem, synchronization hardware, Critical reasons, Automatic Transactions

Section B

Deadlock: System Model; Deadlock Characterization, Methods of Handling Deadlock, deadlock Prevention; Deadlock Avoidance; Deadlock Detection, Recovery from deadlock; Combined approach to deadlock handling

Protection: Goals of protection; Domain of protection; Access matrix and its implementation; Revocation of Access Right; Capability- Based Systems; Language Based Protection.

Security: The Security Problem; Authentication; One Time passwords program Threats, System Threats; Threat Monitoring; Encryption and decryption; Computer-Security Classification; An example Security Model: windows NT

Section C

Memory Management: Logical Versus Physical Address Space, Swapping, Contiguous Allocation; Paging; Segmentation; Segmentation with paging.

Virtual Memory: Demand Paging Performance of Demand Paging page Replacement Page Replacement Algorithms; Allocation of Frames Thrashing; Demand Segmentation;

Cache memory and implementation.

Secondary Storage Structure: Disk Structure; Disk Scheduling; Disk Management; Swap-space management; Disk Reliability; Stable-Storage Implementation.

Section D

File System Interface: File Concept; Access Methods; Directory Structure; Protection; Consistency Semantics;

File System Implementation: File System Structure; Allocation Methods, Free Space Management Directory Implementation; Efficiency and Performance; Recovery.

Text Books:

1. Abrahanm Silberschatz, Peter Baer Galvin, " Operating System Concepts " John Wiley & Sons, Inc., Vth Eduction,2000.
2. Detail H. M. "An Introduction to Operating System" Addison Wesley Publising Co.,1984

Computer Networks **(IT-4002)**

Course Code	IT-4002	Credits-3	L-3, T-1, P-0
Name of the Course	Computer Networks		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

3. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.
4. **For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators isallowed.

Section A

Introduction: Layered Network Architecture; ISO-OSI Model;

Data Communication Techniques: Pulse Code Modulation (PCM); Differential Pulse Code Modulation (DPCM), Delta Modulation (DM), Data Modems, Multiplexing Techniques – Frequency – Division, Statistical time – Division Multiplexing, Multiplexing Hierarchies, Transmission Media – Wires, Cables, Radio Links, Satellite Links, Fibre-optic Links, Error Detection: Parity Check Codes, Cyclic RedundancyCodes.

Section B

Data Link Protocols: Stop and Wait protocols: Noise free and Noisy Channels, Performance and Efficiency; Sliding Window protocols: Go Back and Selective Repeat ARQs, performance and Efficiency; Verification of Protocols using Finite State Machine; HDLC Data Link Protocol; Integrated Services Digital network; Interfaces, Devices; Channel Structure; Asynchronous Transfer Mode (ATM); ATM Cells, Header and Cell Formats, Layers in ATM, Class 1,2,3,4 Traffic.

Local Area Networks (LANs): IEEE 802.3, 802.4 and 802.5 Protocols; performance of Ethernet and Token ring Protocols; FDDI protocol; Distributed Queue Dual Bus (DQDB) protocol.

Section C

Network Layer protocols: Design Issues: Virtual Circuits and Datagrams; Routing Algorithms; Optimality principle, Shortest path routing – Dijkstra, Bellman-Ford and Floyd-Warshall Algorithms, Flooding and Broadcasting,

Distance Vector Routing, Link Stat Routing, Flow Based Routing, Multicasting Routing; Flow and Congestion Control; General Principles, Window Flow Control, Packet Discarding, Isarithmic Control, Traffic Shaping, Choke packets, RSVP; Dead Locks and their Avoidance; Network Layer in ATM; Interworking: Bridges, Routers and Gateways; Internet Architecture and Addressing.

Transport Layer Protocols: Design Issues: Quality of Services, Primitives; Connection Management: Addressing, Connection Establishment and Releases, Use of Timers, Flow Control and Bufferings, Multiplexing, Crash Recovery; Elements of TCP/IP Protocol: User Datagram protocol (UDP/TCP Layering, Segment Format, Checks Sum, Timeout, Connection Management, Finite State Machine.

Section D

Session Layer protocol: Dialog Management; Synchronization; OSI Session primitives; Connection Establishment.

Presentation and Application Layer protocols: Presentation Concepts; SNMP-abstract Syntax notation.1 (ASN. 1), Structure of Management, Management Information Base; Cryptography: substitution and Transposition Ciphers; Data Encryption Standards (DES), DES Chaining, Breaking DAS, Public Key Cryptography, Authentication Protocols; Electronic Mail; World Wide Web.

Text Books:

1. A. S. Tanenbaum, " Computer Networks", Second Ed., Prentice Hall,India.
2. J. F. Hayes, "Modelling and analysis of Computer Communication Networks", Plenum Press (Reprinted in India by KhanaPublishers).
3. D. Bertsekas and R. Gallager, " Data Networks", Second Ed., Prentice Hall, India.
4. D.E.Comer, " Internetworking with TCP/Ip", Vol. 1, Prentice Hall,India.
5. G. E. Keiser, " Local Area Networks", McGraw Hill, InternationalEdition.
6. W. Stalling, "Data & Computer Communication", MaxwellMacmillan International Edition.

SOFTWARE ENGINEERING **(IT - 4003)**

Course Code	**IT – 4003**	Credits: 3	L-3, T-1, P-0
Name of the Course	**SOFTWARE ENGINEERING**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

4. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
5. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION-A

Introduction: Need for software engineering, issue in the design of large software, software life cycle models, overview of software development process.

SECTION-B

Software Requirement Analysis and Specification- Requirements Engineering, Crucial process step, State of the practice, problem analysis, Data dictionaries, Entity relationship diagram, code object diagram, approaches to problem analysis, Structured requirements definition, structured analysis & design techniques, Software prototyping, Software requirements specification, Nature of SRS, characteristics of good SRS. Organization of the SRS, Specifying behavioral requirements, finite state machines, decision tables & tree, PDL

SECTION-C

Software Matrics: What and why: Definition, areas of applications, problems during implementation, size matrics, The basic information Flow Model, the more sophisticated information Flow Model, Metrics analysis using statistics for

Assessment, problems with metric data, The common of pool of data. A pattern for successful applications

SECTION-D

Software Project Planning: Cost estimation: Models , Static ,single variable model, Static multivariable model, The constructive cost model: Basic model, International model, Detailed COCOMO Model, The Putnam resource allocation model: The trade off- -of-time versus cost, development sub cycle,

Software Risk Management : what is Risk, typical software risks , Risk management Activities, Risk identification, Risk projection, Risk management activity

Text Books:

1. Software Engineering- A practitioner's Approach, RogerS. Pressmen
2. Software Engineering-K.K. Aggarwal&Yogesh
3. Software Engineering- A Systematic Approach by J.S. Dilawari, Paragon Publishers New Delhi

Python Programming **(IT-4004)**

Course Code	IT - 4004	Credits-3	L-3, T-1, P-0
Name of the Course	Python Programming		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters: The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory; it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates: Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators isallowed.

Section A

Parts of Python Programming Language, Identifiers, Keywords, Statements Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, The type() Function and Is Operator, Dynamic and Strongly Typed Language, Control Flow Statements, The if Decision Control Flow Statement, The if…else Decision Control Flow Statement, The if…elif…else Decision Control Statement, Nested if Statement, The while Loop, The for Loop, The continue and break Statements, Catching Exceptions Using try and except Statement, Functions, Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.

Section B

Strings, Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings, Lists, Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, The del Statement.

Dictionaries, Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, The del Statement, Tuples and Sets, Creating Tuples, Basic Tuple Operations, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Tuple Methods, Using zip() Function, Sets, Set Methods, Traversing of Sets, Frozenset.

Section C

Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules, Regular Expression Operations, Using Special Characters, Regular Expression Methods,

Named Groups in Python Regular Expressions, Regular Expression with glob Module.

Section D

Object-Oriented Programming, Classes and Objects, Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, The Polymorphism

Books:

TEXT BOOK

1. Gowrishankar S, Veena A, **"Introduction to Python Programming",** 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372

REFERENCE BOOKS / WEBLINKS:

Jake VanderPlas, **"Python Data Science Handbook: Essential Tools for Working with Data",** 1st Edition, O'Reilly Media, 2016. ISBN-13: 978-1491912058

1. AurelienGeron, **Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems",** 1st Edition,O'Reilly Media, 2017. ISBN – 13: 978-1491962299.
2. Wesley J Chun, **"Core Python Applications Programming",** 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365
3. Miguel Grinberg, **"Flask Web Development: Developing Web Applications with Python",** 2nd Edition, O'Reilly Media, 2018. ISBN-13: 978-1491991732.

Digital and Data Communication (EC –4010)

Course Code	EC – 4010	Credits-3	L-3, T-1, P-0
Name of the Course	Digital and Data Communication		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.
2. **For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators isallowed.

Section A

Introduction: A communications model, data communication networking – Standards – Making organizations – Data Transmission:Concepts and terminology – Analog and Digital Transmission – Transmission impairments – Transmission media.

Data Encoding:

Digital data,Digitalsignals:Encodingschemes:NRZ-L,NRZ-I,Manchester-Diff-Manchester-Encoding,Pseudoternary-Bipolar-AMI,B8ZS- HDB3 – Evaluation factors-Digital data, analog signals: Encoding Techniques –ASK-FSK-PSK-QPSK-Performance comparision-Analog data,digitalsignals:Quantization- Sampling theorm-PCM-Delta modulation-Errors- comparision- Analog Data, analog signals:Need for modulation -Modulation methods – Amplitude modulation- Angle modulation

Section B

Digital data communication techniques:

Asynchronous and synchronous transmission –Error Detection techniques : Parity checks – Cycle redundancy checks-Checksum-Error Correcting codes: Forwards and backward error corrections

DTE & DCE interface:

Characterstics of DTE-DCE interface.Interfaces: Rs-232-C , Rs-449/422,A/423-A.

Section C

Data link control

Need for data link control – Line configurations: Topology,duplexity and line discipline – flow control : effect of propagation delay and transmission rate – sliding window protocol-Error Control; Error detection –
ARQ – Bit oriented link control- Necessity – Protocols – HDLC,ADCC,LAP-B,SDLC – Character-oriented link control- Binary synchronous communications – Their categories-Limitations,serial Controller 85C30.
Multiplexing
Advantages – Types of Multiplexing – FDM – Synchronous TDM – Statistical TDM or Asynchronous TDM,Study of their characteristics and carrier systems.

Section D
Satellite Communication Systems:
Satellite parameters and configurations – Capacity allocation , Frequency Division FDMA ; Time Division TDMA- Fixed assigned multiple access(FAMA), Demand assign multiple access(DAMA) – The concept of spread spectrum : FHSS, DSSS – CDMA – Transmission and reception.

Text Books Recommended:

1. Proakin, “Digital Communications”,McGraw Hill.
2. W.Stalling, “Wireless Communication And Networks” Pearson.
Stallings, “Data & computer Communications”,PHI.
3.Forouzen, “Data Communication &Networking”,TataMcgraw Hill.
Pratt, “Satellite Communication”, John Wiuley.

HSMC – 4001

Name of the Course	Organizational Behavior		
Course Code	HSMC – 4001	Credits: 3	L-2, T-1, P-0
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	Max. Marks: 50		

INSTRUCTIONS

For Paper Setters: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non- programmable calculators is allowed.

Section A

OVERVIEW OF MANAGEMENT: Definition - Management - Role of managers - Evolution of Management thought- Organization and the environmental factors – Trends and Challenges of Management in Global Scenario.

PLANNING: Nature and purpose of planning - Planning process - Types of plans – Objectives - - Managing by objective (MBO) Strategies - Types of strategies - Policies - Decision Making - Types of decision - Decision Making Process - Rational Decision Making

Section B

ORGANIZING: Nature and purpose of organizing - Organization structure - Formal and informal groups Organization - Line and Staff authority - Departmentation - Span of control- Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - - Performance Appraisal.

Section C

DIRECTING: Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective

communication - Organization Culture - Elements and types of culture - Managing cultural diversity.

Section D
CONTROLLING: Process of controlling - Types of control - Budgetary and non-budgetary control Q techniques - Managing Productivity - Cost Control - Purchase Control – Maintenance Control - Quality Control - Planning operations.

TEXT BOOKS and REFERENCE BOOKS:
Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India, 8th edition.
Charles W L Hill, Steven L McShane, 'Principles of Management', Mcgraw Hill Education, Special Indian Edition, 2007.
3. Hellriegel, Slocum & Jackson, ' Management - A Competency Based Approach', Thomson South Western, 10th edition, 2007.

Operating System Lab **(IT-4051)**

Course Code	IT-4051	Credits-1	L-0, T-0, P-2
Name of the Course	Operating System Lab		
Lectures to be Delivered	26 Hrs. of Lab work (2hrs. each per week)		
Semester End Examination	Max Marks: 50	Min Pass Marks: 25	Maximum Time: 3 hrs
Continuous Assessment	Lab work 30%, Lab Record 25%, Viva 25% & Attendance 20%	Max Marks: 50	Min Pass Marks: 25

Instructions for paper setter / Candidates

Laboratory examination will consist of two parts:

1. Performing a practical examination assigned by the examiner. (25marks)
2. Viva-voce examination. (25marks)

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

CASE STUDIES on the following operating system to be done in consultation with the faculty incharge for the course:

1. Singal User System :MS-DOS andWindows98

2. Network Operating System: Windows 2000/WindowsNT

3. Multiuser System:Unix/Linux
4. Study the Linux operating system and implement various commands and shellscripting.
5. Implement the process synchronization usingsemaphores.
6. Write the program to mount the various devices (i.e. floppy, CD-Rometc)
7. Write a program do the followingthing…
    a. Find the attribute offile.
    b. To change the attribute offile.
    c. Create thedirectory.
    d. Delete thedirectory.
    e. Create thefile.
    f. Delete thefile.

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Computer Networks Lab **(IT-4052)**

Course Code	IT-4052	Credits-1	L-0, T-0, P-2
Name of the Course	Computer Networks Lab		
Lectures to be Delivered	26 Hrs. of Lab work (2hrs. each per week)		
Semester End Examination	Max Marks: 50	Min Pass Marks: 25	Maximum Time: 3 hrs
Continuous Assessment	Lab work 30%, Lab Record 25%, Viva 25% & Attendance 20%	Max Marks: 50	Min Pass Marks: 25

Instructions

Laboratory examination will consist of two parts:

1. Performing a practical examination assigned by the examiner. (25marks)
2. Viva-voce examination. (25marks)

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester

1 Implement the data link layer framing methodssuch as character, character stuffing and bitstuffing.
2 Implement on a data set of characters the threeCRC polynomials – CRC 12, CRC 16 and CRCCCIP
3 Implement Dijkstra‘s algorithm to computethe Shortest path thru a graph.
4 Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routingalgorithm
5 Take an example subnet of hosts. Obtainbroadcast tree forit.

6 Take a 64 bit playing text and encrypt the sameusing DESalgorithm.
7 Write a program to break the above DEScoding
8 Using RSA algorithm Encrypt a text data and Decrypt thesame

Python ProgrammingLab (IT-4053)

Course Code	IT-4053	Credits-1	L-, T-, P-2
Name of the Course	Python ProgrammingLab		
Lectures to be Delivered	26(1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 50	Min Pass Marks: 25	Maximum Time: 3 hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

Laboratory examination will consist of two parts:

1. Performing a practical examination assigned by the examiner. (25marks)
2. Viva-voce examination. (25marks)

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester

Programs Implementation Using Python Programming Language:

Write Program to print “HELLO PYTHON”.
2. Write a Program to get input from user and print it on screen.
3. Write a program to swap two numbers.
4. Write a Program to perform basic calculator operations.
5. Write a Program to check if string is palindrome or not.
6. Write a Program to illustrate common string operations in python.
7. Write a Program to print prime numbers.
8. Write a Program that uses ten different inbuilt Mathematical functions.
9. Write a Program to find factorial of given number.
10. Write a Program to reverse the string.
11. Write a Program to print Fibonacci series.
12. Write a Program to explain different types of loop control statements.
13. Write a Program to show different types of functions in Python.
14. Write a Program showing concept of ‘Scope of Variable’.
15. Write a Program to show use of five dictionary functions.
16. Write a Program to show types of inheritance in Python.
17. Write a Program to explain method overloading and method overriding.
18. Write a Program to show Exception Handling in Python.
19. Write a program to explain User-Defined Exception.
20. Write a Program to short the list entered by the user.
21. Write a Program to delete and update the element in list.
22. Write a Program the shows the use of mkdir(), chdir(), getcwd(), rmdir() function.
23. Write a Program to write “Hello Python” in file.
24. Write a Program to explain match and search functions. (Related to Regular Expressions)
25. Write a Program that works as chat application between client and server.
26. Write a Program to get following output using GUI.

Digital and Data Communication Lab (EC-4011)

Course Code	EC -4011	Credits-1	L-0, T-0, P-2
Name of the Course	Digital and Data Communication Lab		
Lectures to be Delivered	26 Hrs. of Lab work (2hrs. each per week)		
Semester End Examination	Max Marks: 50	Min Pass Mrks:25	Maximum Time: 3 hrs
Continuous Assessment	Lab work 30%, Lab Record 25%, Viva 25% & Attendance 20%	Max Marks: 50	Min Pass Marks: 25

Instructions for paper setter / Candidates

Laboratory examination will consist of two parts:

1. Performing a practical examination assigned by the examiner. (25marks)
2. Viva-voce examination. (25marks)

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester

1. To perform Amplitude modulation/demodulation andcalculate modulation index and percentage (%age)modulation.

2. Perform frequency modulation for calculating frequency deviation(DF) and modulationindex.

3. Prove and perform sampling theorem for various bit rates (eg.8kbps, 16kbps, 32kbps,64kbps).

4. Convert analog signal into digital using deltamodulation/demodulation.

5. Prove and perform “adaptive delta modulation/demodulation” to reduce the quantization voice.

6. Analyze the pulse code modulation (PCM) system and performA/D conversion using PCM.

7.Prove and perform multiplexing using time divisionmultiplexing technique.

8.Analyze and establish a PC TO PC Communication using RS-332 DTE-DCE interface.

9.Establish a transmitter and receiver link using opticalfiber.