List of New Course(s) Introduced

Department : Information Technology

Programme Name : B.Tech.

Academic Year : 2023-24

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
01.	ITUCTK2	SOFTWARE ENGINEERING
02.	ITUCTK3	MULTIMEDIA SYSTEM DESIGN
03.	ITUCTO1	COMPUTER ORGANIZATION & ARCHITECTURE
04.	ITUDTT1	PYTHON FOR DATA SCIENCE
05.	ITUDLT1	PYTHON FOR DATA SCIENCE LAB
06.	ITUDTK2	DIGITAL SIGNAL PROCESSING
07.	ITUDTK3	COMPUTER APPLICATION IN SOCIAL SCIENCES
08.	ITUDTO1	COMPUTER NETWORK
09.	ITUDTO2	FUNDAMENTALS OF PYTHON PROGRAMMING

Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2023-24

School : School of Studies – Engineering & Technology

Department : Information Technology

Date and Time : 07-10-2023, 02:30PM

Venue : Smart Class Room – G-14 [Hybrid Modes]

Minutes of Meeting Dated 07/10/2023

A Meeting of BoS in Information Technology was held today on 07/10/2023 PM. The Following Members have attended the meeting.

1. Dr. Rohit Raja, BoS Chairman, Dept. of Information Technology, S GGV.
2. Prof. Apurva Desai, Professor, Veer Narmad Sauth Gujrat University
3. Ms. Ashwini Jha, Software Developer, Persistent
4. Mr. Pankaj Chandra, Member, BoS, Dept. of IT, SoS-E&T, GGV.
5. Dr. Santosh Soni, Invited Member
6. Dr. Rajesh Mahule, Invited Member
7. Mr. Abhishek Jain, Invited Member
8. Mr. Agnivesh Pandey, Invited Member
9. Mr. Suhel Ahamed, Invited Member
10. Mr. Deepak Kant Netam, Invited Member
11. Mr. Anand Prakash Rawal, Invited Member
12. Mrs. Akanksha Gupta, Invited Member
13. Dr. Amit Kumar Dewangan, Invited Member
14. Mrs. Aradhana Soni, Invited Member

The Head of Department welcomed all members of BoS in the meeting and t following agenda was discussed in the meeting.

1. The Scheme and Syllabus of B.Tech. IT – 2nd Year NEP (3rd and 4th Se 2023-24 has been discussed and approved.
2. Scheme and Syllabus of of B.Tech. IT – 1st Year (2nd Semester) (it is approved, only one subject proposed by ECE department is to be chang been discussed and approved.
3. The subject code can be changes as per university regulation/ policy time t
4. The open elective subjects depends on the syllabus approved by other depa so if there will be any changes that will be incorporated.

The following courses were revised in the B.Tech. IT – 2nd Year (3rd and 4th Sem B.Tech. IT – 2nd Semester:

- DATA STRUCTURE LAB (ITUCLT1) - B.Tech. 3rd Semester
- OBJECT ORIENTED PROGRAMMING WITH C++ LAB (ITUCLT2) - B.

- INTRODUCTION TO ELECTRONICS & COMMUNICATION ENGIN (ECUBTE7) – B.Tech. 2nd Semester

The following new courses were introduced in B.Tech. IT – 2nd Year (3rd Semester):

- SOFTWARE ENGINEERING (ITUCTK2)
- MULTIMEDIA SYSTEM DESIGN (ITUCTK3)
- PYTHON FOR DATA SCIENCE (ITUDTT1)
- PYTHON FOR DATA SCIENCE LAB (ITUDLT1)
- COMPUTER ORGANIZATION & ARCHITECTURE - INSTITUTE CORE (ITU
- DIGITAL SIGNAL PROCESSING (ITUDTK2)
- COMPUTER APPLICATION IN SOCIAL SCIENCES (ITUDTK3)
- COMPUTER NETWORK - INSTITUTE CORE (ITUDTO1)
- FUNDAMENTALS OF PYTHON PROGRAMMING - INSTITUTE CORE (ITU
- MINI PROJECT-I (ITUDPV1)

The meeting ended with a vote of thanks by Head of the Department.

Dr. Rohit Raja
BoS Chairman

(Consent Taken Through Mail)
Prof. Apurva Desai Professor
Veer Narmad Sauth Gujrat University

(Consent Taken Throu Mail)
Ms. Ashwini Jha
Software Developer
Persistent

Mr. Pankaj Chandra
Member, BoS

Dr. Santosh Soni
Invited Member

Dr. Rajesh Mahule
Invited Member

Mr. Abhishek Jain
Invited Member

Mr. Agnivesh Pandey
Invited Member

Mr. Suhel Ahamed
Invited Member

Mr. Deepak Kant Netam
Invited Member

Mr. Anand Prakash Rawal
Invited Member

Mrs. Akanksha Gupta
Invited Member

Dr. Amit Kumar Dewangan
Invited Member

Mrs. Aradhana Soni
Invited Member

Scheme and Syllabus

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
SECOND YEAR, INFORMATION TECHNOLOGY
SEMESTER III
EFFECTIVE FROM SESSION 2023-24 (NEP)

SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/ WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	ITUCTT1	DATA STRUCTURE & ALGORITHMS	3	0	0	40	60	100	3
2	ITUCTT2	OBJECT ORIENTED PROGRAMMING	3	1	0	40	60	100	4
3	ITUCTT3	DIGITAL ELECTRONICS	3	0	0	40	60	100	3
4	ITUCTE1	MATHEMATICS-III	3	0	0	40	60	100	3
5	ITUCTKX	DEPARTMENT ELECTIVE-I	3	0	0	40	60	100	3
6		INSTITUTE CORE-I	3	0	0	40	60	100	3
PRACTICAL									
1	ITUCLT1	DATA STRUCTURE LAB	0	0	3	25	25	50	1.5
2	ITUCLT2	OBJECT ORIENTED PROGRAMMING WITH C++ LAB	0	0	3	25	25	50	1.5
TOTAL CREDITS									**22**
IA- INTERNAL ASSESSMENT, ESE-END SEMESTER EXAMINATION, L-LECTURE, T-TUTORIAL, P-PRACTICAL									

LIST OF DEPARTMENT ELECTIVE-I

1	ITUCTK1	COMPUTER ORGANIZATION & ARCHITECTURE
2	ITUCTK2	SOFTWARE ENGINEERING
3.	ITUCTK3	MULTIMEDIA SYSTEM DESIGN

LIST OF INSTITUTE CORE-I

1	ITUCTO1	COMPUTER ORGANIZATION & ARCHITECTURE (Not for IT)
2	CSUCTO1	DATA STRUCTURE WITH C++
3	ECUCTO1	DATA COMMUNICATION
4	CEUCTO1	GREEN BUILDINGS
5	CHUCTO1	ENGINEERING MATERIALS
6	MEUCTO1	INTRODUCTION TO THERMODYNAMICS
7	IPUCTO1	I.C. ENGINE

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
SECOND YEAR, INFORMATION TECHNOLOGY
SEMESTER IV
EFFECTIVE FROM SESSION 2023-24 (NEP)

SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/ WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	ITUDTT1	PYTHON FOR DATA SCIENCE	3	1	0	40	60	100	4
2	ITUDTT2	OPERATING SYSTEMS	3	0	0	40	60	100	3
3	ITUDTT3	DISCRETE MATHEMATICS	3	0	0	40	60	100	3
4	ITUDTKX	DEPARTMENT ELECTIVE-II	3	0	0	40	60	100	3
5		INSTITUTE CORE-II	3	0	0	40	60	100	3
PRACTICAL									
1	ITUDLT1	PYTHON FOR DATA SCIENCE LAB	0	0	3	25	25	50	1.5
2	ITUDLT2	OPERATING SYSTEMS LAB	0	0	3	25	25	50	1.5
3	ITUDPV1	MINI PROJECT	0	0	4	50	50	100	2
TOTAL CREDITS									**21**
IA- INTERNAL ASSESSMENT, ESE-END SEMESTER EXAMINATION, L-LECTURE, T-TUTORIAL, P-PRACTICAL									

LIST OF DEPARTMENT ELECTIVE-II

1	ITUDTK1	DESIGN & ANALYSIS OF ALGORITHMS
2	ITUDTK2	DIGITAL SIGNAL PROCESSING
3	ITUDTK3	COMPUTER APPLICATION IN SOCIAL SCIENCES

LIST OF INSTITUTE CORE-II

1	ITUDTO1	COMPUTER NETWORK (Not for IT)
2	ITUDTO2	FUNDAMENTALS OF PYTHON PROGRAMMING (Not for IT)
3	CSUDTO1	INTRODUCTION TO INFORMATION SCIENCE
4	ECUDTO1	ELECTRONICS DEVICES AND CIRCUITS
5	CEUDTO1	REMOTE SENSING & GIS
6	CHUDTO1	ENERGY AND ENVIRONMENT ENGINEERING
7	ESUDTO1	EFFECTIVE TECHNICAL COMMUNICATION
8	MEUDTO1	INTRODUCTION TO FLUID MECHANICS
9	IPUDTO1	AUTOMOBILE ENGINEERING

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
ITUCTK1	3	0	0	3 HOURS	40	60	3

COMPUTER ORGANIZATION & ARCHITECTURE

Course Objectives:

1. Conceptualize the basics of organizational and architectural,
2. Learn about various basic arithmetic operation
3. Learn about various control unit design and Input-output subsystems
4. Understand the basics pipeline.
5. Understand the basics Memory organization and their basic working.

UNIT 1

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.

UNIT 2

Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.

UNIT 3

Introduction to x86 architecture. CPU control unit design: hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU. Memory system design: semiconductor memory technologies, memory organization. Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB

UNIT 4

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards. Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.

UNIT 5

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.

Suggested books:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

Suggested reference books:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

Course Outcomes:

After the course the students are expected to be able to

1. Demonstrate computer organization and architecture concepts of a computer system
2. Describe the Computer arithmetic operation algorithm and hardware
3. Understand the basics of hardwired and micro-programmed control of the CPU, Memory, I/O system
4. Describe fundamentals concepts of pipeline and issues
5. Describe the memory hierarchy and related function.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
ITUCTK2	3	0	0	3 HOURS	40	60	3

SOFTWARE ENGINEERING

Course Objective

1. To provide the idea of decomposing the given problem into Analysis, Desing, Implementation, Testing and Maintenance phases.
2. To provide an idea of using various process models in the software industry according to given circumstances.
3. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

UNIT I Software Engineering – What is software, Characteristics of software, Application of software, Software Development Life Cycle, Software Process Models - Linear Sequential model, Prototype model, RAD model, Incremental model, Component Based Development Model, Fourth Generation Techniques.

UNIT II . Software Requirement Specification-Problem Analysis, Requirement Specification, Validation, metrics, monitoring and control.

UNIT III System Design - Problem portioning, abstraction, top-down and bottom-up design, Structured approach, Coupling and Cohesion,Functional versus Object oriented approach, design specification and verification, metrics.

UNIT IV Coding: Top–down and bottom-up structured programming, information hiding, programming style, internal documentation,verification. Metrics, Monitoring and Control.

UNIT V Software testing – Software Testing fundamentals, Black Box Testing, White box testing, Basics path testing, A strategic Issues, Types of Testing-Unit testing, Integration testing, validation testing, System Testingsoftware metrics, software evaluation, software maintenance & reliability.

List of Books:

1. Software Engg, Pressmen
2. Software Engg, Pankaj Jalote
3. Software Engg, Shaum's Outline Series
4. Fundamentals of Software Engineering, Rajib Mal.

Course Outcome

1. Students will be able to decompose the given project in various phases of a lifecycle.
2. Students will be able to choose appropriate process model depending on the user requirements.
3. Students will be able perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
4. Students will be able to know various processes used in all the phases of the product.
5. Students can apply the knowledge, techniques, and skills in the development of a software product.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
ITUCTK3	3	0	0	3 HOURS	40	60	3

MULTIMEDIA SYSTEM DESIGN

Course Objectives:

The major goals of this course are:

1. Learn how learning theories influence the development of multimedia product.
2. Develop competencies in designing and creating interactive multimedia applications by explaining how elements of these applications reflect a theory of how learning will occur.
3. Work with all aspects of text, audio, images and video;
4. Learn the phases involved in multimedia planning, design and production.
5. Be able to use various multimedia authoring tools.
6. Be able to design and create interactive multimedia products.

UNIT 1: Introduction to Multimedia System: An overview of multimedia system and media streams architecture and components, synchronization & quality of service (QOS).

UNIT 2: Audio and Speech: Data acquisition, sampling and quantization, human speech, digital model of speech production, analysis and synthesis, psychoacoustics, low bit rate speech compression, MPEG audio compression.

UNIT 3: Images and Video: Image acquisition and representation, bi-level image compression standards: ITU (formerly CCITT) Group III and IV standards, JPEG image compression standards, MPEG, H.264/AVC video compression standards, Transcoding.

UNIT 4: Multimedia Communication: Fundamentals of data communication and networking, Bandwidth requirements of different media, Real time constraints: latency, video data rate, multimedia over LAN and WAN, Multimedia conferencing, video-on-demand broadcasting issues.

UNIT 5: Hypermedia Presentation: Authoring and publishing, Linear and non-linear presentation, Structuring Information, Different approaches of authoring hypermedia documents, Hyper-media data models and standards.

Text Books:

1. Jerry D. Gibson, Toby Berger, Tom Lookabaugh, Dave Lindergh and Richard L. Baker Digital Compression for Multimedia: Principles and Standards Elsevier, 2006.
2. Ralf Steinmetz and Klara Nahrstedt, Multimedia: Computing, Communications, and Application, Prentice Hall, 1995.
3. Khalid Sayood Introduction to Data Compression 3rd Edition, Elsevier, 2006.
4. Asit Dan and Dinkar Sitaram Multimedia Servers Elsevier, 2006.

Course Outcomes :

Upon successful completion of the course, students should be able to: Knowledge and understanding:

1. Understand the concepts and processes which underpin the design and development of multimedia products.
2. Understand the techniques and technologies used in the development of multimedia solutions. Intellectual / cognitive skills.
3. Plan the development of an idea into the realization of a product.
4. Design and implement multimedia solutions. Practical, research and independent learning skills.
5. Use appropriate tools for the design, development and creation of digital media arte facts.
6. Learn how to be proactive and reflective Transferable / key skills.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
ITUDTT1	3	1	0	4 HOURS	40	60	4

PYTHON FOR DATA SCIENCE

Course Objectives:

1. To read and write simple Python programs.
2. To develop Python programs with conditions, loops and functions.
3. To create and work with files in python.
4. To develop OOP programs in python.
5. To create and work on Numpy arrays.
6. To handle data in python using pandas.

UNIT 1: INTRODUCTION TO DATA SCIENCE AND PYTHON PROGRAMMING

Introduction to Data Science - Why Python? - Essential Python libraries - Python Introduction- Features, Identifiers, Reserved words, Indentation, Comments, Built-in Data types and their Methods: Strings, List, Tuples, Dictionary, Set - Type Conversion- Operators.

Decision Making- Looping- Loop Control statement- Math and Random number functions. User defined functions - function arguments & its types.

UNIT 2: FILE, EXCEPTION HANDLING AND OOP

User defined Modules and Packages in Python- Files: File manipulations, File and Directory related methods- Python Exception Handling.

OOPs Concepts -Class and Objects, Constructors – Data hiding- Data Abstraction- Inheritance.

UNIT 3: INTRODUCTION TO NUMPY

NumPy Basics: Arrays and Vectorized Computation - The NumPy nd array- Creating ndarrays- Data Types for ndarrays- Arithmetic with NumPy Arrays- Basic Indexing and Slicing - Boolean Indexing- Transposing Arrays and Swapping Axes.

Universal Functions: Fast Element-Wise Array Functions- Mathematical and Statistical Methods - Sorting-Unique and Other Set Logic.

UNIT 4: DATA MANIPULATION WITH PANDAS

Introduction to pandas Data Structures: Series, Data Frame, Essential Functionality: Dropping Entries- Indexing, Selection, and Filtering- Function Application and Mapping- Sorting and Ranking. Summarizing and Computing Descriptive Statistics- Unique Values, Value Counts, and Membership. Reading and Writing Data in Text Format.

UNIT 5: DATA CLEANING, PREPARATION AND VISUALIZATION

Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers- String Manipulation: Vectorized String Functions in pandas.

Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.

TEXT BOOKS

1. Y. Daniel Liang, “Introduction to Programming using Python”, Pearson, 2012.
2. Wes McKinney, “Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython”,O’Reilly, 2nd Edition,2018.
3. Jake VanderPlas, “Python Data Science Handbook: Essential Tools for Working with Data”, O’Reilly,2017.

4. Miller, Bradley, and David Ranum. Problem Solving with Algorithms and Data Structures Using Python. 2nd ed. Franklin, Beedle & Associates, 2011. ISBN: 9781590282571.

REFERENCES BOOKS

1. Wesley J. Chun, "Core Python Programming", Prentice Hall,2006.
2. Mark Lutz, "Learning Python", O'Reilly, 4th Edition, 2009.

E BOOKS

1. https://www.programmer-books.com/introducing-data-science-pdf/
2. https://www.cs.uky.edu/~keen/115/Haltermanpythonbook.pdf
3. http://math.ecnu.edu.cn/~lfzhou/seminar/[Joel_Grus]_Data_Science_from_Scratch_First_Princ.pdf

MOOC

1. https://www.edx.org/course/python-basics-for-data-science
2. https://www.edx.org/course/analyzing-data-with-python
3. https://www.coursera.org/learn/python-plotting?specialization=data-science-python

Course Outcomes:

Upon successful completion of the course, students will be able to

1. Introduce students to Python's history, installation, and basic usage, enabling them to write and execute simple Python programs.
2. Familiarize students with Python syntax, data types, variables, and fundamental operators to build a solid programming foundation.
3. Teach students how to make decisions and control program flow using conditional statements and loops in Python.
4. Equip students with essential skills for file handling, and exception handling, and introduce them to modules and libraries in Python for more advanced programming tasks.
5. Teach students data structures and data manipulation techniques for data analysis
6. Familiarize students for data preparation and visualization tasks

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
ITUDLT1	0	0	3	3 HOURS	25	25	1.5

PYTHON FOR DATA SCIENCE LAB

Course Objectives:
This course is designed to enable the students to:

1. To be able to introduce core programming basics and program design with functions using Python programming language.
2. To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
3. To understand the high-performance programs designed to strengthen the practical expertise.

S.No.	Experiments
1	Write a program to demonstrate different number data types in Python.
2	Write a program to perform different Arithmetic Operations on numbers in Python.
3	Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4	Write a python script to print the current date in the following format “Sun May 29 02:26:23 IST 2017”.
5	Write a program to create, append, and remove lists in python.
6	Write a program to demonstrate working with tuples in python.
7	Write a program to demonstrate working with dictionaries in python.
8	Write a python program to find largest of three numbers.
9	Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula : c/5 = f-32/9]
10	Write a Python script that prints prime numbers less than 20.
11	Write a python program to find factorial of a number using Recursion.
12	Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
13	Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
14	Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15	Write a python program to define a module and import a specific function in that module to another program.
16	Write a Python class to convert an integer to a roman numeral.
17	Write a Python class to implement pow(x, n).
18	Write a Python class to reverse a string word by word.

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

REFERENCES BOOKS:

1. Think Python, Allen Downey, Green Tea Press.
2. Introduction to Python, Kenneth A. Lambert, Cengage.

3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
4. Learning Python, Mark Lutz, O'Really.

Course Outcomes:

At the end of this course the student can answer how to:

1. Student should be able to understand the basic concepts scripting and the contributions of scripting language.
2. Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
3. Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
ITUDTK2	3	0	0	3 HOURS	40	60	3

DIGITAL SIGNAL PROCESSING

Course Objective

1. Formulate engineering problems in terms of DSP tasks.
2. Analyze digital and analog signals and systems.
3. Analyze discrete time signals in frequency domain.
4. Design digital filters and Change sampling rate of the signal.
5. Conceptualize the need of adaptive filters in communication applications.

UNIT I

Analysis of Discrete Time Signals and Systems: Discrete Fourier analysis, Classification, Discrete Time Fourier Transform (DTFT) & its properties, Inverse DTFT. Discrete Fourier Transform (DFT) & its Properties, Inverse DFT. Fast Fourier Transform, Properties, Types of FFT, N-point Radix-2 FFT, Inverse FFT. Discrete Linear Convolution, Circular Convolution, Fast Convolution, Frequency Response of LTI system using Discrete Fourier Analysis. Discrete Cosine Transform.

UNIT II

Implementation of Discrete-time Systems: Structures for the Realization of discrete-time systems, Structures for FIR systems: Direct, Cascade, Frequency Sampling & Lattice structures. Structures for IIR systems: Direct, Signal Flow Graphs & Transposed, Cascade, Parallel, Lattice & Lattice-Ladder structures. State space system analysis and structures.

UNIT III

FIR Filter Design: Symmetric and Anti-symmetric FIR filters, FIR Filter design by window method (Rectangular, Bartlett, Hamming, Hanning, Blackman and Kaiser window), Frequency Sampling method, Optimum approximation of FIR filters, Design of FIR differentiators, Design of Hilbert transformers.

UNIT IV

IIR Filter Design: Design of Discrete-time IIR filters from Continuous-time Filters: Filter design by Impulse invariant and bilinear transformation method: Butterworth, Chebyshev& Elliptic approximation Filter, Frequency transformation.

UNIT V

Multirate Digital Signal Processing: Introduction, Decimation, Interpolation, Sampling rate conversion by rational factor, Filter design and implementation for sampling rate conversion: Direct form FIR digital filter structure, Polyphase filter structure, Time varying digital filter structure, Sampling rate conversion by an arbitrary factor.

Text Books:

1. Discrete Time Signal Processing by A.V. Oppenheim, R. W. Schafer, & John R. Buck, , 2nd Edition, Prentice Hall, 1999. (Unit I, Unit II, Unit III, Unit IV)
2. Digital Signal Processing: Principles, Algorithms and Applications by John G. Proakis& D.G. Manolakis, Prentice Hall, 1997. (Unit II, Unit III, Unit IV, Unit V)
3. Digital Signal Processing by S. K. Mitra, 3rd edition, McGraw-Hill, 2007. (Unit V)

Reference Books:

1. Signals and Systems by A. V. Oppenheim, A. S. Willsky& S. H. NAWAB, 2nd edition, Prentice Hall, 1996.
2. Digital Signal Processing by S. Salivahanan, A. Vallavaraj, C. Gnanapriya, Tata McGraw-Hill, 2000.
3. Digital Signal Processing by A. Anand Kumar, PHI Learning Pvt. Ltd, 2012.

SUB CODE	L	T	P	DURATION/WEEK	IA	ESE	CREDITS
ITUDTO1	3	0	0	3 HOURS	40	60	3

COMPUTER NETWORK (Not for IT)

Course Objective

1. Discuss the basic taxonomy and terminology of the computer networking.
2. Discuss the functionality of different layers of OSI Model.
3. Discuss different protocols of TCP/IP protocol suite.
4. Discuss the process of IP addressing and working of routing protocols.
5. Discuss the different challenges of Internetworking, Congestion control and Quality of services.

Unit No.	Syllabus Content	No. of Hours
1	**Introduction:** **Data communications:** Components, Data representation, Direction of data flow (simplex, half duplex, full duplex). **Networks:** Distributed processing, Network criteria, Physical structure (type of connection, topology), categories of network (LAN, MAN,WAN); Internet: brief history, internet today, Protocols and standard. **Reference models:** OSI reference model, TCP/IP reference model, their comparative study. **Physical Layer:** Transmission technology.	10
2	**Data Link Layer:** Types of errors, Error detection & correction methods, Framing (character and bit stuffing), Flow control, Protocols: Stop & wait ARQ Go – Back – N ARQ, Selective repeat ARQ **Medium access sub layer:** Point to point protocol, Multiple Access Protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, Token ring, Reservation, Polling, FDMA, TDMA, CDMA.	10
3	**Network Layer:** **Internetworking devices**: Repeaters, Hubs, Bridges, Switches, Router, Gateway. **Addressing**: IP addressing, classful addressing, subnetting. **Routing**: Techniques, Static vs. Dynamic routing, Routing table for classful address, Flooding, Shortest path algorithm, Distance vector routing, Link state routing. **Protocols:** ARP, RARP, IP, ICMP, IPV6.	10
4	**Transport Layer:** Process to process delivery, UDP: Services and applications, TCP: Stream Oriented Service, Segment, Timers, Congestion control techniques: Avoidance and Detection.	8
5	**Application Layer:** DNS, SMTP, FTP, HTTP & WWW. **Security:** Cryptography, User authentication, Security protocols in internet, Firewalls. Recent research topic on networking.	7

Text Books:

1. Data Communications and Networking by B.A.Forouzan – TMH Publication.
2. Computer Networks by S. Tanenbaum – Pearson Education / PHI Publication.

Reference Books:

1. Internetworking with TCP/IP by Comer - Pearson Education/PHI by Publication.
2. Data and Computer Communications by W.Stallings – PHI Publication.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
ITUDTO2	3	0	0	3 HOURS	40	60	3

FUNDAMENTALS OF PYTHON PROGRAMMING (Not for IT)

Course Objectives:

1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To define Python functions and call them.
4. To use Python data structures –- lists, tuples, dictionaries.
5. To do input/output with files in Python.

UNIT-I

Introduction to Python: Introduction to Python and its historical background, Applications, Installation of Python, and development environments (IDLE, Jupyter), Writing and running Python programs, Understanding Python's syntax and code structure, Basic input and output operations.

UNIT II:

Data Types and Variables: Data types: integers, floats, strings, and Booleans, Variables and variable naming conventions, Type conversion, and typecasting, Python Operators: Arithmetic, comparison, logical, and assignment operators.

UNIT III:

Python Control Flow and Loops: Python decision-making with if, elif, and else statements, Python loops: while and for loops, Break and continue statements, Python control statements (pass, assert), String operations: concatenation, replication, slicing, and indexing.

UNIT IV:

Python Data Structures and Functions: Python sequences, lists, tuples, and range, Python collections, sets, dictionaries, Functions in Python: defining, calling, parameters, return. Work with various data structures and create functions for different tasks.

UNITV:

Advanced Topics and Modules: File handling in Python, Exception handling, Introduction to modules and libraries, Built-in modules in Python, Overview of Python libraries (e.g., math, random), Explore packages.

TEXT BOOKS / REFERENCES BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Think Python, Allen Downey, Green Tea Press.
3. Introduction to Python, Kenneth A. Lambert, Cengage.
4. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
5. Learning Python, Mark Lutz, O'Really.

Course Outcomes:

Upon successful completion of the course, students will be able to

1. Introduce students to Python's history, installation, and basic usage, enabling them to write and execute simple Python programs.
2. Familiarize students with Python syntax, data types, variables, and fundamental operators to build a solid programming foundation.
3. Teach students how to make decisions and control program flow using conditional statements and loops in Python.
4. Enable students to work with various data structures like lists, tuples, sets, dictionaries, and functions to manipulate data effectively.
5. Equip students with essential skills for file handling, and exception handling, and introduce them to modules and libraries in Python for more advanced programming tasks.