John Wilson Education Society's

Wilson College (Autonomous)

Affiliated to the

UNIVERSITY OF MUMBAI

Syllabus for S.Y

Program: B.Sc.I.T

Semester-III and IV

Program Code: WSITC

Choice Based Credit System (CBCS) with effect from Academic year 2024-25

PROGRAM OUTLINE FOR SYIT 2024-2025(NEP-2020)

YEAR	SEMESTER	COURSE CODE	COURSE TITLE	CREDITS
SYIT	SEM-III			
	Major-1	WSITCMJ231 (Theory)	Data Structure and Algorithm	2
	Major-2	WSITCMJ232 (Theory)	Numerical & Statistical methods	2
	Major-1 (Practical)	WSITCMJ233 (Practical)	Database Management System Practical	2
	Minor-1	WSITCMN231 (Theory)	Wireless sensor	2
	Minor-2 (Practical)	WSITCMN232	Microprocessor and Architecture(Practical)	2
	OE/GE	(WSITCOE231) Theory	Introduction to computer networking	2
	SEC	WSITCSE231 (Practical)	Python Programming Practical	2
	OJT/FP/RP/CC/CEP	WSITRP231	Research Project I	2
	OJT/FP/RP/CC/CEP	WSITFP231	Field Project I	2

SYIT-	**SEM-IV**			
	Major-1	**WSITCMJ241 (Theory)**	**Introduction to Machine Learning**	**2**
	Major-2	**WSITCMJ242 (Theory)**	**Discrete Mathematics**	**2**
	Major-1 (Practical)	**WSITCMJ243 (Practical)**	**Core Java Practical**	**2**
	Minor-1	**WSITCMN241 (Theory)**	**Internet of Things**	**2**
	Minor-2 (Practical)	**WSITCMN242 (Practical)**	**Internet of Things Practical**	**2**
	OE/GE	**WSITCOE241 OE/GE**	**Introduction to 5G Technology**	**2**
	VSC	**WSITCVS241**	**Artificial Intelligence Practical**	**2**
	OJT/FP/RP/CC/CEP	**WSITRP241**	**Research Project II**	**2**
	OJT/FP/RP/CC/CEP	**WSITFP241**	**Field Project II**	**2**

PROGRAMME SPECIFIC OUTCOME (PSOs)

After completing two years course of in Information Technology, the learner will be able to:

1. Equip with the professional & technical skills essential for making a career in the Front-end Developer, Back-end Developer, Software Tester, Programmer, Network Administrator, Security Expert etc.
2. Students would demonstrate the ability to apply research principles in a variety of creative, organizational, professional venues.
3. Apply the knowledge of engineering and management principles to manage projects effectively in diverse environments as a member or a leader in the team
4. Learners will understand technology as a system of interrelated forces, including automation, Robotics, Big data analytics, Advance Programming, Networking, Security, Cyber law, Regulatory constraints, and ethical concerns.
5. Learners will be able to create and design technological products, including website, software, robots, RFID, Hardware Automation, Also, will be able to become Software Engineer, Tester and Pen tester

PREAMBLE:

With the introduction of Choice Based Credit System (CBCS) by the esteemed University of Mumbai from academic year 2016-17, the existing syllabus of FYBSCIT is restructured according to the CBCS pattern.

In the last two decades, the technology has made a paradigm shift in the way society functions. Media, being the important segment of the society plays a pivotal role in the political, sociological, psychological, and economical aspects in society. In addition to the knowledge of the technical skills of mass media, the current syllabus orients to the theoretical framework relating to media-audience relationship.

The first year of BSCIT course introduces the students to various fields available under the umbrella of mass Programming, Mathematics, Communication Skills, Software's, Database, and

Website Design. The fundamentals of Information Technology prepare the students for advanced theoretical and practical related to filed introduced. In the second year of BSCIT, followed by the elaboration on

Information Technology research concepts and methodologies. Inclusion of field-based learning begins in the third year of BSCIT, with specialization in Information Technology.

PROGRAM(s): SYBSCIT		SEMESTER: III			
Course: Data Structure & Algorithm(Theory)		Course Code: WSITCMJ231			
Teaching Scheme					Evaluation Scheme
Lectures (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credits	Continuous Internal Assessment (CIA-I & II) (Marks-20+20=40)	Semester End Examination (Marks- 60)
			2	40	60

Learning Objectives:

1. 1. To impart the basic concepts of data structures and algorithms.
2. 2. To understand concepts about searching and sorting techniques.
3. 3. To understand basic concepts about stacks, queues, lists trees and graphs.
4. 4. To understand writing algorithms and step by step approach in solving problems with the help of fundamental data structures.

Course Outcomes:

After the end of the course, the learner will be able to:

1. Ability to analyze algorithms and algorithm correctness.
2. Ability to summarize searching and sorting techniques.
3. Ability to describe stack, queues and linked list operation.
4. Ability to have knowledge of tree and graphs concepts.

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I		**Introduction of Data Structure**	
	1.1	Introduction: Data and Information, Data Structure, Classification of Data Structures, Primitive Data Types, Abstract Data Types, Data structure vs. File Organization, Operations on Data Structure, Algorithm, Importance of Algorithm Analysis, Complexity of an Algorithm, Asymptotic	4

		Analysis and Notations, Big O Notation, Big Omega Notation, Big Theta Notation, Rate of Growth and Big O Notation.	
	1.2	Array: Introduction, One Dimensional Array, Memory Representation of One Dimensional Array, Traversing, Insertion, Deletion, Searching, Sorting, Merging of Arrays, Multidimensional Arrays, Memory Representation of Two Dimensional Arrays, General Multidimensional Arrays, Sparse Arrays, Sparse Matrix, Memory Representation of Special kind of Matrices, Advantages and Limitations of Arrays	3
II		**Stack & Queue**	
	2.1	Introduction, Operations on the Stack Memory Representation of Stack, Array Representation of Stack, Applications of Stack, Evaluation of Arithmetic Expression, Matching Parenthesis, infix and postfix operations, Recursion.	4
	2.2	Introduction, Queue, Operations on the Queue, Memory Representation of Queue, Array representation of queue, Linked List Representation of Queue, Circular Queue, Some special kinds of queues, Deque, Priority Queue, Application of Priority Queue, Applications of Queues	4
III		**Linked List and Sorting Techniques**	
	3.1	Linked List: Linked List, One-way Linked List, Traversal of Linked List, Searching, Memory Allocation and Deallocation, Insertion in Linked List, Deletion from Linked List, Copying a List into Another List, Merging Two Linked Lists, Splitting a List into Two Lists, Reversing One way linked List, Circular Linked List, Applications of Circular Linked List, Header Linked List, Applications of the Linked list, Representation of Polynomials, Storage of Sparse Arrays, Implementing other Data Structures.	4
	3.2	Sorting and Searching Techniques, Selection, Insertion, Merge Sort. Searching: Binary, Indexed Sequential Searches, Binary Search.	3
IV		**Tree and Graph**	
	4.1	Tree: Tree, Binary Tree, Properties of Binary Tree, Memory Representation of Binary Tree, Operations Performed on Binary Tree, Reconstruction of Binary Tree from its Traversals, Huffman Algorithm, Binary Search Tree, Operations on Binary Search Tree, Heap, Memory Representation of Heap, Operation on Heap, Heap Sort.	4

	4.2	Graph: Introduction, Graph, Graph Terminology, Memory Representation of Graph, Adjacency Matrix Representation of Graph, Adjacency List or Linked Representation of Graph, Operations Performed on Graph, Graph Traversal, Applications of the Graph, Reachability, Shortest Path Problems, Spanning Trees.	4

References:

1. https://www.geeksforgeeks.org/html5-introduction/
2. An Introduction to Data Structure with Applications by Jean – Paul Tremblay and Paul Sorenson
3. Data Structure and Algorithm Maria Rukadikar SPD 1st 2017

PROGRAM: SYBSCIT		**SEMESTER: III**			
Course: Numerical and Statistical Methods (Theory)		**Course Code: WSITCMJ232**			
Teaching Scheme					**Evaluation Scheme**
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA-I & II) (Marks- 20+20=40)**	**Semester End Examination (Marks- 60)**

Learning Objectives:

1. to provide relevant pedagogies and motivations;
2. to provide in-depth analysis and the sense of appreciation of Mathematical concepts;
3. to foster scientific temper and encourage rational thinking;
4. to provide right-based education specially to disadvantaged groups;
5. to equip the students with skills for employability in the fields of both Industry and Academia.

Course Outcomes:

At the end of the course, the learner will be able to:

1. pursue higher studies in different branches of Mathematics, along with related areas like Computer Science and Statistics;
2. develop a strong sense of logical reasoning;

3. model and solve real life problems using the subject knowledge;
4. Present Mathematics clearly and precisely by making vague ideas precise by formulating them in the language of Mathematics.
5. Join teaching profession in primary and secondary schools.
6. Be employable for Government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits 2
I			
	1.1	**Approximations and Round-Off Errors:** Significant Figures, Accuracy and Precision, Error Definitions, Round-Off Errors	4
	1.2	**Truncation Errors and the Taylor Series:** The Taylor Series, Error Propagation, Total Numerical Errors, Formulation Errors and Data Uncertainty	3
II			
	2.1	**Solutions of Algebraic and Transcendental Equations**: The Bisection Method, The Newton-Raphson Method, The Regula-falsi method,	4
	2.2	**Interpolation:** Forward Difference, Backward Difference, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation.	4
III			
	3.1	**Solution of simultaneous algebraic equations (linear) using iterative methods**: Gauss-Jordan Method, Gauss-Seidel Method.	2
	3.2	**Numerical differentiation and Integration:** Numerical differentiation, Numerical integration using Trapezoidal Rule, Simpson's 1/3rd and 3/8th rules.	3
	3.3	**Numerical solution of 1st and 2nd order differential equations:**Modified Euler's Method, Runge-Kutta Method.	3
IV			

	4.1	**i)Least-Squares Regression:** Linear Regression, Polynomial Regression, Multiple Linear Regression, General Linear Least Squares, Nonlinear Regression **Linear Programming:** Linear optimization problem, Formulation and Graphical solution.	3
	4.2	**ii) Random variables:** Discrete and Continuous random variables, Probability density function, Probability distribution of random variables, Expected value, Variance. iii)Distributions: Discrete distributions: Uniform, Continuous distributions: uniform distributions, exponential, (derivation of mean and variance only and state other properties and discuss their applications) Distributions:- Uniform and Poisson,Continuous Distribution.	4

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Introductory Methods of Numerical Methods	S. S. Shastri	PHI	Vol – 2	
2.	Numerical Methods for Engineers	Steven C. Chapra, Raymond P. Canale	Tata Mc Graw Hill	6th	2010

3.	Numerical Analysis	Richard L. Burden, J. Douglas Faires	Cengage Learning	9th	2011
4.	Fundamentals of Mathematical Statistics	S. C. Gupta, V. K. Kapoor			
5.	Elements of Applied Mathematics	P.N.Wartikar and J.N.Wartikar	A. V. Griha, Pune	Volume 1 and 2	

Wilson College

B. Sc. (Information Technology)		**Semester – III NEP**	
Course Name: Database Management System (Practical)		**Course Code: WSITCMJ233**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**

	Internal	**--**	**--**
List of Practical			**Credits** **2**
1.	**SQL Statements – 1**		
a.	Writing Basic SQL SELECT Statements		
b.	Restricting and Sorting Data		
c.	Single-Row Functions		
2.	**SQL Statements – 2**		
a.	Displaying Data from Multiple Tables		
b.	Aggregating Data Using Group Functions		
c.	Sub queries		
3.	**Manipulating Data**		
a.	Using INSERT statement		
b.	Using DELETE statement		

c.	Using UPDATE statement	
4.	**Creating and Managing Tables**	
a.	Creating and Managing Tables	
b.	Including Constraints	
5.	**Creating and Managing other database objects**	
a.	Creating Views	
b.	Other Database Objects	
c.	Controlling User Access	
6.	**Using SET operators, Date/Time Functions, GROUP BY clause (advanced features) and advanced sub queries**	
a.	Using SET Operators	
b.	Date time Functions	
c.	Enhancements to the GROUP BY Clause	

d.	Advanced sub queries	
7.	**PL/SQL Basics**	
a.	Declaring Variables	
b.	Writing Executable Statements	
c.	Interacting with the Oracle Server	
d.	Writing Control Structures	
8	**Composite data types, cursors and exceptions.**	
a	Working with Composite Data Types	
b	Writing Explicit Cursors	
c	Handling Exceptions	
9	**Procedures and Functions**	
a	Creating Procedures	
b	Creating Functions	

c	Managing Subprograms	
d	Creating Packages	

PROGRAM(s): SYBSCIT		**SEMESTER: III**			
Course: Wireless Sensor (Theory)		**Course Code: WSITCMN231**			
Teaching Scheme					**Evaluation Scheme**
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA-I & II) (Marks- 20+20=40)**	**Semester End Examination (Marks- 60)**
		-	**2**	**40**	**60**

Learning Objectives:

1. Understand the basic WSN technology and supporting protocols,
2. Understand the different sensor network stack in terms of layers and their role, operations and challenges,
3. Understand and appreciate sensor fusion and data aggregation techniques as means for achieving accurate sensing and efficient data capture and transport,
4. Learn the different layers of the sensor network stack in terms of their role, operations and challenges,
5. Learn how Graph Signal Processing is emerging as a new domain of signal processing for analyzing the dynamics and topology of large scale sensor networks.

Course Outcomes:

1. Understand the basis of Sensors with its applications
2. To learn the architecture and placement strategies of Sensors
3. To analyze routing and congestion algorithms
4. To design, develop , and carry out performance analysis of sensors on specific applications
5. To explore and implement solutions to real world problems using sensor devices, enumerating its principles of working

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I			
	1.1	Introduction and Overview of Wireless Sensor Networks: Basic Sensor Network Architectural Elements, Advantage and challenges, Applications, Sensor Node Technology, Sensor Taxonomy, WN Operating Environment, Radio Technology,	4

		Network architecture, Optimization goals and figures of merit, Design principles for WSNs, Service interfaces of WSNs, Gateway concepts.	
II			
	2.1	Wireless Sensor Network Operating Systems and Ad-hoc Networks: Overview of Wireless Sensor Network Operating Systems, Examples of WSN Operating Systems Ad- hoc Networks in Wireless Sensor Networks, Characteristics and Challenges of Ad-hoc Networks in WSNs, Energy Efficiency Considerations in Ad-hoc Networks, Security and Privacy in Ad-hoc Networks, Examples of WSN OS, Ad-hoc Network	5
	2.2	Medium Access Control Protocol: Fundamentals of MAC Protocols, Sensor-MAC Case Study	4
III			
	3.1	Routing in WSN: Routing Challenges and Design Issues in Wireless Sensor Networks, IEEE 802.15.4 LR-WPANs Standard Case Study, Routing Strategies in Wireless Sensor Networks	4
	3.2	Transport Control Protocol: Traditional Transport Control Protocols, Transport Protocol Design Issues, WSN Middleware Architecture	4
IV			
	4.1	Wireless Transmission: Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems.	4
	4.2	Telecommunication, Satellite and Broadcast Systems: Satellite and Broadcast Systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization And Calling, Handover, security, New data services; DECT: System architecture, Protocol architecture; ETRA, UMTS and IMT- 2000. Satellite Systems: History, Applications, Basics:GEO, LEO, MEO; Routing, Localization, Handover	5

Textbook(s):
1. Wireless Sensor Networks Technology, Protocols, and Applications ,Kazem Sohraby, Daniel Minoli and TaiebZnati, John Wiley & Sons, 2017
2. Protocols and Architectures for Wireless Sensor Network, Holger Kerl, Andreas Willig, John Wiley and Sons, 2015

Additional Reference(s):
1. Fundamentals of Wireless Sensor Networks, Theory and Practice, Waltenegus Dargie, Christian Poellabauer , Wiley Series on wireless Communication and Mobile Computing, 2011
2. Networking Wireless Sensors, Bhaskar Krishnamachari , Cambridge University Press, 2005

B. Sc. (Information Technology)		**Semester – III**	
Course Name: Microprocessor Architecture Practical		**Course Code: WSITCMN232**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

	List of Microprocessor Architecture Practicals	Credits 2
1.	**Perform the following Operations related to memory locations.**	
a.	Store the data byte 32H into memory location 4000H.	
b.	Exchange the contents of memory locations 2000H and 4000H	
2.	**Simple assembly language programs.**	
a.	Subtract the contents of memory location 4001H from the memory location 2000H and place the result in memory location 4002H.	
b.	Subtract two 8-bit numbers.	
c.	Add the 16-bit number in memory locations 4000H and 4001H to the 16-bit number in memory locations 4002H and 4003H. The most significant eight bits of the two numbers to be added are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.	
d.	Add the contents of memory locations 40001H and 4001H and place the result in the memory locations 4002Hand 4003H.	

e.	Subtract the 16-bit number in memory locations 4002H and 4003H from the 16-bit number in memory locations 4000H and 4001H. The most significant eight bits of the two numbers are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.	
f.	Find the l's complement of the number stored at memory location 4400H and store the complemented number at memory location 4300H.	
g.	Find the 2's complement of the number stored at memory location 4200H and store the complemented number at memory location 4300H.	
3.	**Packing and unpacking operations.**	
a.	Pack the two unpacked BCD numbers stored in memory locations 4200H and 4201H and store result in memory location 4300H. Assume the least significant digit is stored at 4200H.	
b.	Two digit BCD number is stored in memory location 4200H. Unpack the BCD number and store the two digits in memory locations 4300H and 4301H such that memory location 4300H will have lower BCD digit.	
4.	**Register Operations.**	
a.	Write a program to shift an eight bit data four bits right. Assume that data is in register C.	
b.	Program to shift a 16-bit data 1 bit left. Assume data is in the HL register pair	

c.	Write a set of instructions to alter the contents of flag register in 8085.	
d.	Write a program to count number of l's in the contents of D register and store the count in the B register.	
5.	**Multiple memory locations.**	
a.	Calculate the sum of series of numbers. The length of the series is in memory location 4200H and the series begins from memory location 4201H. a. Consider the sum to be 8 bit number. So, ignore carries. Store the sum at memory location 4300H. Consider the sum to be 16 bit number. Store the sum at memory locations 4300H and 4301H	
b.	Multiply two 8-bit numbers stored in memory locations 2200H and 2201H by repetitive addition and store the result in memory locations 2300H and 2301H.	
c.	Divide 16 bit number stored in memory locations 2200H and 2201H by the 8 bit number stored at memory location 2202H. Store the quotient in memory locations 2300H and 2301H and remainder in memory locations 2302H and 2303H.	
d.	Find the number of negative elements (most significant bit 1) in a block of data. The length of the block is in memory location 2200H and the block itself begins in memory location 2201H. Store the number of negative elements in memory location 2300H	
e.	Find the largest number in a block of data. The length of the block is in memory location 2200H and the block itself starts from memory location 2201H. Store the maximum number in memory location 2300H. Assume that the numbers in the block are all 8 bit unsigned binary numbers.	

6.	**Calculations with respect to memory locations.**	
a.	Write a program to sort given 10 numbers from memory location 2200H in the ascending order.	
b.	Calculate the sum of series of even numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 8 bit number so you can ignore carries and store the sum at memory location 2Sample problem:	
c.	Calculate the sum of series of odd numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 16-bit. Store the sum at memory locations 2300H and 2301H.	
d.	Find the square of the given numbers from memory location 6100H and store the result from memory location 7000H	
e.	Search the given byte in the list of 50 numbers stored in the consecutive memory locations and store the address of memory location in the memory locations 2200H and 2201H. Assume byte is in the C register and starting address of the list is 2000H. If byte is not found store 00 at 2200H and 2201H	
f.	Two decimal numbers six digits each are stored in BCD package form. Each number occupies a sequence of byte in the memory. The starting address of first number is 6000H Write an assembly language program that adds these two numbers and stores the sum in the same format starting from memory location 6200H	
g.	Add 2 arrays having ten 8-bit numbers each and generate a third array of result. It is necessary to add the first element of array 1 with the first element of array-2 and so on. The starting addresses of array l, array2 and array3 are 2200H, 2300H and 2400H, respectively	

7.	**Assembly programs on memory locations.**	
a.	Write an assembly language program to separate even numbers from the given list of 50 numbers and store them in the another list starting from 2300H. Assume starting address of 50 number list is 2200H	
b.	Write assembly language program with proper comments for the following: A block of data consisting of 256 bytes is stored in memory starting at 3000H. This block is to be shifted (relocated) in memory from 3050H onwards. Do not shift the block or part of the block anywhere else in the memory.	
c.	Add even parity to a string of 7-bit ASCII characters. The length of the string is in memory location 2040H and the string itself begins in memory location 2041H. Place even parity in the most significant bit of each character.	
d.	A list of 50 numbers is stored in memory, starting at 6000H. Find number of negative, zero and positive numbers from this list and store these results in memory locations 7000H, 7001H, and 7002H respectively	
e.	Write an assembly language program to generate Fibonacci number.	
f.	Program to calculate the factorial of a number between 0 to 8.	
8.	**String operations in assembly programs.**	

a.	Write an 8085 assembly language program to insert a string of four characters from the tenth location in the given array of 50 characters	
b.	Write an 8085 assembly language program to delete a string of 4 characters from the tenth location in the given array of 50 characters.	
c.	Multiply the 8-bit unsigned number in memory location 2200H by the 8-bit unsigned number in memory location 2201H. Store the 8 least significant bits of the result in memory location 2300H and the 8 most significant bits in memory location 2301H.	
d.	Divide the 16-bit unsigned number in memory locations 2200H and 2201H (most significant bits in 2201H) by the B-bit unsigned number in memory location 2300H store the quotient in memory location 2400H and remainder in 2401H	
e.	DAA instruction is not present. Write a sub routine which will perform the same task as DAA.	
9.	**Calculations on memory locations.**	
a.	To test RAM by writing '1' and reading it back and later writing '0' (zero) and reading it back. RAM addresses to be checked are 40FFH to 40FFH. In case of any error, it is indicated by writing 01H at port 10	
b.	Arrange an array of 8 bit unsigned no in descending order	
c.	Transfer ten bytes of data from one memory to another memory block. Source memory block starts from memory location 2200H whereas destination memory block starts from memory location 2300H	

d.	Write a program to find the Square Root of an 8 bit binary number. The binary number is stored in memory location 4200H and store the square root in 4201H.	
e.	Write a simple program to Split a HEX data into two nibbles and store it in memory	
10.	**Operations on BCD numbers.**	
a.	Add two 4 digits BCD numbers in HL and DE register pairs and store result in memory locations, 2300H and 2301H. Ignore carry after 16 bit.	
b.	Subtract the BCD number stored in E register from the number stored in the register	
c.	Write an assembly language program to multiply 2 BCD numbers	

Books and References:

Title	Author/s	Publisher	Edition	Year
Microprocessors Architecture, Programming and Applications with the 8085.	Ramesh Gaonkar	PENRAM	Fifth	2012
8080A/8085 Assembly Language Programming	Lance A. Leventhel	Osborne		1978

PROGRAM: SYBSCIT	SEMESTER: III				
Course: Introduction to Networking (OE)	**Course Code: WSITCOE231**				
Teaching Scheme					**Evaluation Scheme**
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA-I & II) (Marks- 20+20=40)**	**Semester End Examination (Marks- 60)**
5	**2**	**_**	**2**	**40**	**60**

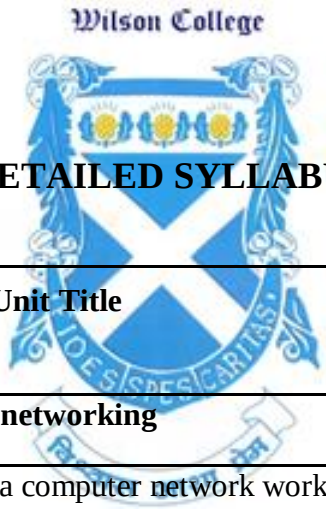
Learning Objectives:

1. To introduce the concept, terminologies, and technologies used in modern data communication and computer networking.
2. To identify importance of OSI and TCP/IP models.
3. To make students to get familiarized with different protocols and network components.
4. Able to analyze the concept of local area networks, their topologies, protocols and applications.
5. Be able to evaluate the performance of competing network technologies and protocols.

Course Outcomes:

After the end of the course, the learner will be able to:

1. Illustrate the working principle of different protocols at different layers.
2. The student installs and configures workstations, servers and networked printers, internetworking devices such as switches and routers.
3. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
4. Practice and building the skills of sub netting and routing mechanisms.
5. Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols.



DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I		**computer networking**	
	1.1	How does a computer network work? What do computer networks do? What are the types of computer network architecture?	4
II		**Network Topology**	4
	2.1	LAN, MAN, WAN, SAN, PAN	4
III		Enterprise Computer Networks	**4**
	3.1	AWS computer networking services use AWS networking services	4

IV		Accessing AWS services	**3**
	4.1	AWS Management Console AWS Command Line Interface Software Development Kits	3

References:

1. **CCNA 2018**
2. **CCNA 2024**
3. **CCNP 2024**

B. Sc. (Information Technology)		**Semester – III**	
Course Name: Python Programming (Practical)		**Course Code: WSITCSE231 (Practical)**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

1	Write the program for the following: a. Create a program that asks the user to enter their name and their age. Print out a message addressed to them that tells them the year that they will turn 100 years

	Old.
2	Enter the number from the user and depending on whether the number is even or Odd, print out an appropriate message to the user.
3	Write a program to generate the Fibonacci series.
4	Write a function that reverses the user defined value.
5	Write a function to check the input value is Armstrong and also write the Function for Palindrome.
6	Write a recursive function to print the factorial for a given number.
7	Write a function that takes a character (i.e. a string of length 1) and returns True If it is a vowel, False otherwise.
8	Define a function that computes the length of a given list or string.
9	Define a procedure histogram() that takes a list of integers and prints a Histogram to the screen. For example, histogram([4, 9, 7]) should print the following: **** ********* *******
10	A pangram is a sentence that contains all the letters of the English alphabet at least Once, for example: The quick brown fox jumps over the lazy dog. Your task here is to write a function to check a sentence to see if it is a pangram or not.
11	Take a list, say for example this one: a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89] And write a program that prints out all the elements of the list that are less than 5.
12	Write a Python script to concatenate following dictionaries to create a new one. Sample Dictionary : dic1={1:10, 2:20} dic2={3:30, 4:40} dic3={5:50,6:60} Expected Result : {1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60}

13	Write a Python program to clone or copy a list
14	Write a Python program to sum all the items in a dictionary.
15	Create a class called Numbers, which has a single class attribute called MULTIPLIER, and a constructor which takes the parameters x and y (these should All be numbers). i. Write a method called add which returns the sum of the attributes x and y. ii. Write a class method called multiply, which takes a single number Parameter and returns the product of a MULTIPLIER. iii. Write a static method called subtract, which takes two number parameters, b And c, and returns b - c. iv. Write a method called value which returns a tuple containing the values of x and y. Make this method into a property, and write a setter and a delete for Manipulating the values of x and y.

PROGRAM: SYBSCIT		**SEMESTER: III**			
Course: Field Project		**Course Code: WSITFP231**			
Teaching Scheme					**Evaluation Scheme**
5	**2**	**_**	**2**	**-**	**50**

Learning Objectives:

1. To provide students with practical experience in applying theoretical concepts learned in the classroom to real-world situations.
2. To enhance students' problem-solving skills through hands-on fieldwork and project implementation.
3. To develop students' teamwork and collaboration abilities by working on a project with peers and possibly external stakeholders.

Course Outcomes:

After the end of the course, the learner will be able to:

1. Design and execute a comprehensive plan for a field project, including setting objectives, timelines, and resource requirements.

2. Apply relevant theories and methodologies to analyze problems encountered during the field project and propose effective solutions. 3. Demonstrate proficiency in collecting, interpreting, and synthesizing data gathered from fieldwork.

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures 2
I			
	1.1	Visit a College library/ search on internet Identify two Ideas for field Project based on information technology Domain knowledge, area of Interest, Subject knowledge, emerging technologies etc.	4
II			4
	2.1	Field Project idea must be a research/research based any real world Problem. Submit Field Project proposal to guide. (subject to approval)	4
III			**4**
	3.1	Requirement gathering and requirement analysis Conduct feasibility study and submit feasibility report	4
IV			**3**
	4.1	Project design. Submit documentation.	3

PROGRAM: SYBSCIT	SEMESTER: III
Course: Research Project-I	**Course Code: WSITRP232**
Teaching Scheme	**Evaluation Scheme**

Learning Objectives:

1. To develop students' understanding of research methodologies, techniques, and ethics.
2. To enable students to formulate clear research questions or hypotheses and design appropriate research methodologies to address them.
3. To cultivate students' analytical and critical thinking skills through the process of conducting research and analyzing data.

Course Outcomes:

After the end of the course, the learner will be able to:

1. Formulate a clear and focused research question or hypothesis based on a thorough review of existing literature and identified gaps.
2. Design and implement a research methodology appropriate to address the research question or hypothesis, including data collection and analysis techniques.
3. Demonstrate proficiency in conducting literature reviews, synthesizing research findings, and critically evaluating existing scholarship.

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures 2
I			
	1.1	Understanding Research and Research Process.	4
II			4
	2.1	Visit a College Library/Research Center/Internet, Collect five researchable topics and make a Research proposal on two topics., Submit two Research proposal to your guide	4
III			**4**
	3.1	Submit one final topic to your Incharge for Approval, Conduct literature review of 25-35, papers from referred Journals/Research thesis	4
IV			**3**
	4.1	Identify research gap, formulate objectives & identity Variables. Submit and Progress rep report gets approval.	3

John Wilson Education Society's
Wilson College
(Autonomous)

Template for log-book to be maintained by learners for Research Project / Field Project at UG level

Academic Year 2024-2025
Front Page

Nature of Project (RP/FP/OJT/CEP) = _____
Program: _____ Semester: _____
Name of Learner = _____
Roll Number: _____
College Email ID of student (if allotted): _____
Student's mobile Number: _____
Title of Project = _____

Name of Teacher-In-Charge: _____
Department of Teacher-in-Charge: _____

Details of the work completed (columns to be made in the log note-book by the students)
Date Duration Work Completed Signature of
Student with
Date

Signature of In-
Charge/ Teacher

With date'

SYIT 2024-2025(NEP-2020)

Modality of Assessment:-

Internal Assessment- 40%- 40 Marks per paper (CIA-I and CIA-II)

Sr. No.	Evaluation Type	Marks
1	**Written Objective Examination(CIA-I)**	**20**
2	**Assignment/ Case study/ field visit report/ presentation/ project/Industrial Visit(CIA-II)**	**20**
	Total-(Marks)	**40**

Practical Examination Pattern:

Course	**301**		**401**	Marks
practical	**50(External Practical Examination)**	**50**	**50(External Practical Examination)**	**50**

PRACTICAL BOOK/JOURNAL

1. The students are required to perform 75% of the Practical for the journal to be duly certified.
2. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

Regular External Examination:

1. Duration - These examinations shall be of **two hours** duration.

2. **Theory question paper pattern:**
3. There shall be --------- questions each of marks one on each unit.
4. All questions shall be compulsory with internal choice within the questions.

Q.1Attempt any THREE of the following? [15 Marks]

1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.2Attempt any THREE of the following? [15 Marks]

1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.3Attempt any THREE of the following? [15 Marks]

1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.4 Attempt any THREE of the following? [15Marks]

1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

<table>
<tr><td colspan="3">PROGRAM(s): SYBSCIT</td><td colspan="4">SEMESTER: IV</td></tr>
<tr><td colspan="3"></td><td colspan="4"></td></tr>
<tr><td colspan="3">Course: Introduction to Machine Learning
(Theory)</td><td colspan="4">Course Code: WSITCMJ241</td></tr>
<tr><td colspan="5">Teaching Scheme</td><td colspan="2">Evaluation Scheme</td></tr>
<tr><td>Lectures (Hours per week)</td><td>Practical (Hours per week)</td><td>Tutorial (Hours per week)</td><td>Credit</td><td>Continuous Assessment (CA) (Marks-40)</td><td colspan="2">Semester End Examination (Marks- 60)</td></tr>
<tr><td></td><td></td><td></td><td></td><td>40</td><td colspan="2">60</td></tr>
<tr><td colspan="7">Learning Objectives:</td></tr>
</table>

1. Understand the formulation of well-specified machine learning problems
2. Learn how to perform supervised and reinforcement learning, with images and temporal sequences.
3. Recognize the practical benefits of mastering machine learning
4. Understand the philosophy behind machine learning

Course Outcomes:

1. Learn the basics of learning problems with hypothesis and version spaces
2. Understand the features of machine learning to apply on real world problems
3. Characterize the machine learning algorithms as supervised learning and unsupervised learning and Apply and analyze the various algorithms of supervised and unsupervised learning
4. Analyze the concept of neural networks for learning linear and non-linear activation functions
5. Learn the concepts in Bayesian analysis from probability models and methods
6. Understand the fundamental concept

SEMESTER: IV

DETAILED SYLLABUS

Course Code/ Unit	Unit	Course/ Unit Title	Credits/ Lectures
I		**Introduction:**	
	1.1	Introduction to Machine learning, Supervised learning, Unsupervised learning, Reinforcement learning. Deep learning. **Feature Selection:** Filter, Wrapper, Embedded methods.	**3**

	1.2	**Feature Normalization:-** min-max normalization, z-score normalization, and constant factor normalization Introduction to Dimensionality Reduction: Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA)	4
II			
	2.1	**Supervised Learning – I** (Regression/Classification) Regression models: Simple Linear Regression, multiple linear Regressions. Cost Function, Gradient Descent, Performance Metrics: Mean Absolute Error(MAE),Mean Squared Error(MSE) R-Squared error, Adjusted R Square.	4
	2.2	**Classification models**: Decision Trees-ID3, CART, Naive Bayes, K-Nearest-Neighbors (KNN), Logistic Regression, Multinomial Logistic Regression Support Vector Machines (SVM) - Nonlinearity and Kernel Methods	4
III			
	3.1	**Supervised Learning – II (Neural Networks)** Neural Network Representation – Problems – Perceptrons, Activation Functions, Artificial Neural Networks (ANN) , Back Propagation Algorithm Convolutional Neural Networks - Convolution and Pooling layers, , Recurrent Neural Networks (RNN).	3
	3.2	Classification Metrics :Confusion Matrix, Precision, Recall, Accuracy, F-score, ROC Curves Model Validation in Classification: Cross Validation - Holdout Method, K-Fold, Stratified K-Fold, Leave-One-Out Cross Validation. Bias-Variance tradeoff, Regularization, Over fitting, Under fitting. Ensemble Methods: Boosting, Bagging, Random Forest.	4
IV			
	4.1	Unsupervised Learning: Clustering-K-means, K-Modes, K-Prototypes, Gaussian Mixture Models, Expectation-Maximization.	4

	4.2	Reinforcement Learning: Exploration and exploitation trade-offs, non-associative learning, Markov decision processes, Q-learning.	4

TEXT BOOKS:

1. Machine Learning –Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das,
2. Pearson
3. Foundations of Machine Learning, Mehryar Mohri, Afshin Rostamizadeh, Ameet
4. Talwalkar, MIT Press.
5. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press,2012

REFERENCE BOOKS:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer2009
2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer,2007.
3. Machine Learning Yearning, Andrew Ng.
4. Data Mining–Concepts and Techniques -Jiawei Han and Micheline Kamber,Morgan Kaufmann

PROGRAM: SYBSCIT		**SEMESTER: IV**			
Course: Discrete Mathematics (Theory)		**Course Code: WSITCMJ242**			
Teaching Scheme					**Evaluation Scheme**
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA-I & II) (Marks-20+20=40)**	**Semester End Examination (Marks- 60)**

		_	**2**	**40**	**60**

Learning Objectives:

1. Use mathematically correct terminology and notation.
2. Construct correct direct and indirect proofs.
3. Use division into cases in a proof.
4. Use counterexamples.
5. Apply logical reasoning to solve a variety of problems.

Course Outcomes:

At the end of the course, the learner will be able to:

1. Apply Knowledge of mathematics in truth tables and the rules of propositional and predicate calculus
2. symbolically with connectives and quantifiers to produce logically valid, correct and clear arguments
3. Solving elementary mathematical arguments and identify fallacious reasoning
4. Model and solve real-world problems using graphs, both quantitatively and qualitatively.

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I			
	1.1	Introduction: Variables, The Language of Sets, The Language of Relations and Function	2
	1.2	Set Theory: Definitions and the Element Method of Proof, Properties of Sets, Disproof's, Algebraic Proofs, Boolean Algebras, Russell's Paradox and the Halting Problem.	3
	1.3	The Logic of Compound Statements: Logical Form and Logical	2

		Equivalence, Conditional Statements, Valid and Invalid Arguments	
II			
	2.1	Quantified Statements: Predicates and Quantified Statements, Statements with Multiple Quantifiers, Arguments with Quantified Statements	4
	2.2	Elementary Number Theory and Methods of Proof: Introduction to Direct Proofs, Rational Numbers, Divisibility, Division into Cases and the Quotient-Remainder Theorem, Floor and Ceiling, Indirect Argument: Contradiction and Contraposition, Two Classical Theorems, Applications in algorithms.	4
III			
	3.1	Sequences, Mathematical Induction, and Recursion: Sequences, Mathematical Induction, Strong Mathematical Induction and the Well- Ordering Principle for the Integers, Correctness of algorithms, defining Sequences recursively, solving recurrence relations by iteration, Second order linear homogenous recurrence relations with constant Coefficients. General recursive definitions and structural induction.	4
	3.2	Functions: Functions Defined on General Sets, One-to-One and Onto, Inverse Functions, Composition of Functions, Cardinality with Applications to Computability	3
IV			
	4.1	Relations: Relations on Sets, Reflexivity, Symmetry, and Transitivity, Equivalence Relations, Partial Order Relations	2
	4.2	Graphs and Trees: Definitions and Basic Properties, Trails, Paths, and Circuits, Matrix Representations of Graphs, Isomorphism of Graphs, Trees, Rooted Trees, Isomorphism of Graphs, Spanning trees and shortest paths.	2
	4.3	Counting and Probability: Introduction, Possibility Trees and the Multiplication Rule, Possibility Trees and the Multiplication Rule, Counting Elements of Disjoint Sets: The Addition Rule, The Pigeonhole Principle, Counting Subsets of a Set: Combinations, r-Combinations with Repetition Allowed, Probability Axioms and Expected Value, Conditional Probability, Bayes' Formula, and Independent Events.	4

References:

Sussana S. Epp Cengage 4th 2010
Discrete Mathematics, Schaum's Outlines Series Seymour

B. Sc. (Information Technology)		**Semester – IV**	
Course Name: Core Java Practical's		**Course Code: WSITCMJ243**	
Periods per week ()		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course code WSITCMJ243	Core Java Practical's	Credits
	(UNIT 1 TO UNIT 4)	2
1.	Write a Java program that takes a number as input and prints its multiplication table upto 10.	
2	Write a Java program to display the following pattern. ***** **** *** ** *	

3	Write a Java program to print the area and perimeter of a circle.	
4	Write a Java program to reverse a string.	
5	Find the smallest and largest element from the array	
6	Designed a class SortData that contains the method asec() and desc().	
7	Write a java program to add two matrices and print the resultant matrix. c.	
8	Write a java program for multiplying two matrices and print the product for the same.	
9	Write a java program to implement exception handling.	
10	Write a java program to implement multithreading.	

PROGRAM: SYBSCIT		**SEMESTER: IV**			
Course: Internet of Things (Theory)		**Course Code: WSITCMN241**			
Teaching Scheme					**Evaluation Scheme**
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA-I & II) (Marks-20+20=40)**	**Semester End Examination (Marks- 60)**

		_	**2**	**40**	**60**

Learning Outcomes:

1. Describe what IoT is and how it works in current environment
2. Recognize the factors that contributed to the emergence of IoT
3. Design and program IoT devices
4. Use real IoT protocols for communication

Course objectives:

1. Secure the elements of an IoT device
2. Design an IoT device to work with a Cloud Computing infrastructure.
3. Transfer IoT data to the cloud and in between cloud providers
4. Define the infrastructure for supporting IoT deployments

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I		**Introduction**	
	1.1	The Internet of Things: An Overview : The Flavour of the Internet of Things, The "Internet" of "Things", The Technology of the Internet of Things, Enchanted Objects,	4
	1.2	Who is Making the Internet of Things? Design Principles for Connected Devices: Calm and Ambient Technology, Magic as Metaphor, Privacy, Keeping Secrets, Who's Data Is It Anyway? Web Thinking for Connected Devices, Small Pieces, Loosely Joined, First-Class Citizens On The Internet, Graceful Degradation,	3
	1.3	Affordances Internet Principles: Internet Communications: An Overview, IP,TCP, The IP Protocol Suite (TCP/IP), UDP, IP Addresses, DNS, Static IP Address Assignment, Dynamic IP Address Assignment, IPv6, MAC Addresses, TCP and UDP Ports, An Example: HTTP Ports, Other Common Ports, Application Layer Protocols, HTTP, HTTPS: Encrypted HTTP, Other Application Layer Protocols	3

II			
	2.1	Thinking About Prototyping: Sketching, Familiarity, Costs versus Ease of Prototyping, Prototypes and Production, Changing Embedded Platform, Physical Prototypes and Mass Personalisation, Climbing into the Cloud, Open Source versus Closed Source, Why Closed? Why Open? Mixing Open and Closed Source, Closed Source for Mass Market Projects, Tapping into the Community. Prototyping Embedded Devices: Electronics, Sensors, Actuators, Scaling Up the Electronics, Embedded Computing Basics, Microcontrollers, System-on-Chips, Choosing Your Platform, Arduino, Developing on the Arduino, Some Notes on the Hardware, Openness, Raspberry Pi, Cases and Extension Boards, Developing on the Raspberry Pi, Some Notes on the Hardware, Openness.	8
III			
	3.1	Prototyping the Physical Design: Preparation, Sketch, Iterate, and Explore, Nondigital Methods, Laser Cutting, Choosing a Laser Cutter, Software, Hinges and Joints, 3D Printing, Types of 3D Printing, Software, CNC Milling, Repurposing/Recycling. Prototyping Online Components: Getting Started with an API, Mashing Up APIs, Scraping, Legalities, Writing a New API, Clockodillo, Security, Implementing the API, Using Curl to Test, Going Further, Real-Time Reactions, Polling, Comet, Other Protocols, MQ Telemetry Transport, Extensible Messaging and Presence Protocol, Constrained Application Protocol.	5
IV			
	4.1	Techniques for Writing Embedded Code: Memory Management, Types of Memory, Making the Most of Your RAM, Performance and Battery Life, Libraries, Debugging, Business Models: A Short History of Business Models, Space and Time, From Craft to Mass Production, The Long Tail of the Internet, Learning from History, The Business Model Canvas, Who Is the Business Model For? Models, Make Thing, Sell Thing, Subscriptions, Customisation, Be a Key Resource, Provide Infrastructure: Sensor Networks, Take a Percentage, Funding an Internet of Things Startup, Hobby Projects and Open Source, Venture	7

		Capital, Government Funding, Crowdfunding, Lean Startups.	

References:

1. Internet of Things – Architecture and Design Raj Kamal McGraw Hill First 2017
2. Getting Started with the Internet of Things Cuno Pfister O'Reilly Sixth 2018

B. Sc. (Information Technology)		**Semester – NEP**	
Course Name: IOT Practical's		**Course Code: WSITCMN242**	
Periods per week ()		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course code WSITCMN242	**IOT Practical's**	**Credits 2**
1.	Starting Raspbian OS, Familiarising with Raspberry Pi Components and interface, Connecting to ethernet, Monitor, USB.	
2.	Displaying different LED patterns with Raspberry Pi.	

3.	Displaying Time over 4-Digit 7-Segment Display using Raspberry Pi	
4.	Raspberry Pi Based Oscilloscope	
5.	Fingerprint Sensor interfacing with Raspberry Pi	
6.	Raspberry Pi GPS Module Interfacing	
7.	Visitor Monitoring with Raspberry Pi and Pi Camera	
8.	Interfacing Raspberry Pi with RFID. Building Google Assistant with Raspberry Pi.	

PROGRAM: SYBSCIT (OE)	**SEMESTER: IV**
Course: 5G Technology OE/GE	**Course Code: (WSITCOE241)**
Teaching Scheme	**Evaluation Scheme**

Lectures (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Semester End Examination (Marks- 60)
		–	2	30+30 Two assignments

Learning Objectives:

1. The course illuminates the pivotal role of the air interface in delineating mobile generations, spanning from 2G to 5G, tracing its shift from CDMA in 3G to OFDMA in 4G.
2. It dissects the nuances of 5G's air interface, spotlighting its features such as ultra-low latency, superior performance in congested areas, and support for cutting-edge technologies like virtual reality, along with enhanced reliability and security.
3. Additionally, it explores 5G's vision of connectivity, promising ubiquitous Quality of Service (QoS) and energy-efficient networks, poised to revolutionize diverse industries with their transformative potential.

Course Outcomes:

At the end of the course, the learner will be able to:

1. OUTCOMES Understand and explain the channel models of 5G and the use cases for 5G.
2. Explain 5G architecture, its components and functional criteria Understand device to device (D2D) communication and standardization.

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I			
	1.1	UNIT 1 CHP 1 : INTRODUCTION : 3G and 4G(LTE) overview, Introduction to 5G, Evolving to 4G to 5G	4

	1.2	CHP 2 : 5G channel modeling and use cases : Modeling requirements and scenarios, Channel model requirements, Propagation scenarios, Relaying multi-hop and cooperative communications	4
II			
	2.1	UNIT 2 CHP 1 : The 5G architecture : Introduction, NFV and SDN, Basics about RAN architecture, High-level requirements for the 5G architecture, Enhanced Multi-RAT coordination features, Physical architecture and 5G deployment.	5
III			
	3.1	UNIT 3 CHP 1 : Device-to-device (D2D) communications : D2D: from 4G to 5G, D2D standardization, Multi-hop D2D communications for proximity Multi-hop D2D communications for proximity,	5
	3.2	CHP 2 : The 5G radio-access technologies : Access design principles for multi-user communications, Orthogonal multiple-access systems, Radio access for dense deployments, Radio access for massive machine type communication	5
IV			
	4.1	UNIT 4 CHP 1 : ENABLING TECHNOLOGIES FOR 5G Device-to-Device (D2D) Communication - 5G for Massive Machine Type Communication and Massive IoT-V2X Communication - Full Duplex and Green Communication - mm Wave Communications	7

Reference Books:

1. Saad Z. Asif, “5G Mobile Communications Concepts and Technologies, CRC Press, 1st Edition, 2019.
2. Erik Dahlman, Stefan Parkvall, Johan Skold “5G NR: The Next Generation Wireless Access Technology”, Academic Press, 1st Edition, 2018.
3. Jonathan Rodriguez, “Fundamentals 5G Mobile Networks”, John Wiley & Sons, 1st Edition, 2015.

4. Long Zhao, Hui Zhao, Kan Zheng, Wei Xiang, "Massive MIMO in 5G Networks: Selected Applications", Springer, 1st Edition, 2018.
5. Robert W. Heath Jr., Angel Lozano, "Foundations of MIMO Communication", Cambridge University Press, 1st Edition, 2019.
6. R. Vannithamby and S. Talwar, "Towards 5G: Applications, Requirements and Candidate Technologies", John Willey & Sons, 1st Edition, 2017

Course code WSITCVS241	**Introduction to Artificial Intelligence Practical's**	**Credits 2**
1.	Implementation of SWI Introduction	
2.	Implementation of family tree	
3.	Implementation of tower of Hanoi	
4.	Implementation of four queens problem	
5.	Implementation of Tic Tac Toe	
6.	Implementation of shuffling the cards	
7.	Implementation of DFS	
8.	Implementation of water jug problem	

PROGRAM: SYBSCIT	**SEMESTER: IV**
Course: Field Project II	**Course Code: WSITFP241**

Teaching Scheme					Evaluation Scheme
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA-I & II) (Marks- 20+20=40)**	**Semester End Examination (Marks- 60)**
5	**2**	**_**	**2**	**40**	**60**

Learning Objectives:

1. To encourage critical thinking and creativity in identifying solutions to challenges encountered during the field project.
2. To foster communication skills through presenting findings and outcomes of the field project effectively.

Course Outcomes:

After the end of the course, the learner will be able to:

1. Collaborate effectively with team members to achieve project goals, demonstrating adaptability and flexibility in the face of challenges.
2. Communicate project findings and outcomes clearly and persuasively through written reports, presentations, and other appropriate mediums.
3. Reflect critically on their learning experiences during the field project and identify areas for personal and professional growth.

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I			
	1.1	coding / Development Testing Submit test Reports.	4
II			4
	2.1	Implementation and uses acceptance-testing.	4

III			**4**
	3.1	Reflection and Iteration:- Reflect on project outcome and identify areas of improvement for further research.	4
IV			**3**
	4.1	Project Presentation. & Dissertation	3

PROGRAM: SYBSCIT	**SEMESTER: III**	
Course: Research Project-II	**Course Code: WSITRP232**	
Teaching Scheme		**Evaluation Scheme**

Lectures (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Continuous Internal Assessment (CIA-I & II) (Marks- 20+20=40)	Semester End Examination (Marks- 60)
5	2	_	2	40	60

Learning Objectives:

1. To enhance students' ability to locate, evaluate, and synthesize relevant literature and research findings.
2. To foster students' communication skills through the effective presentation of research findings in both written and oral formats.

Course Outcomes:

After the end of the course, the learner will be able to:

1. Collect, organize, and analyze data using appropriate statistical or qualitative methods, drawing valid conclusions based on the results.
2. Communicate research findings effectively through well-structured written reports and oral presentations, tailored to the intended audience.
3. Demonstrate awareness of ethical considerations in research, including issues related to data privacy, informed consent, and integrity in reporting findings.
4. Reflect critically on the research process, identifying strengths, limitations, and areas for further investigation or improvement.

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I			
	1.1	Construct hypothesis- at least two,Collect data through questioners/reports.	4
II			4
	2.1	Analyse data, finding and conclusion, Prepare your research paper & present in your class.	4

III			**4**
	3.1	Plagiarism checking and Presenting Papers at State/National/International Conference.	4
IV			**3**
	4.1	Submit Certificate & published paper code to your guide/supervisor.	3

John Wilson Education Society's
Wilson College
(Autonomous)

Template for log-book to be maintained by learners for Research Project / Field Project at UG level

Academic Year 2024-2025

Front Page

Nature of Project (RP/FP/OJT/CEP) = _____
Programme: _____ Semester: _____
Name of Learner = _____
Roll Number: _____
College Email ID of student (if allotted): _____
Student's mobile Number: _____
Title of Project = _____
Name of Teacher-In-Charge: _____
Department of Teacher-in-Charge: _____

Details of the work completed (columns to be made in the log note-book by the students)
Date Duration Work Completed Signature of
Student with
Date

Signature of In-
Charge/ Teacher

With date'

SYIT 2024-2025(NEP-2020)

Modality of Assessment:-

Internal Assessment- 40%- 40 Marks per paper (CIA-I and CIA-II)

Sr. No.	Evaluation Type	Marks
1	**Written Objective Examination(CIA-I)**	**20**
2	**Assignment/ Case study/ field visit report/ presentation/ project/ Industrial Visit (CIA-II)**	**20**
	Total-(Marks)	**40**

Practical Examination Pattern:

Course	**301**		**401**	Marks

practical	**50(External Practical Examination)**	**50**	**50(External Practical Examination)**	**50**

PRACTICAL BOOK/JOURNAL

1. The students are required to perform 75% of the Practical for the journal to be duly certified.
2. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

Regular External Examination:

1. Duration - These examinations shall be of **two hours** duration.
2. **Theory question paper pattern:**
3. There shall be questions each of marks one on each unit.
4. All questions shall be compulsory with internal choice within the questions.

Q.1Attempt any THREE of the following? [15 Marks]

1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.2Attempt any THREE of the following? [15 Marks]

1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.3Attempt any THREE of the following? [15 Marks]

1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.4 Attempt any THREE of the following? [15Marks]

1. **Q**
2. **Q**
3. **Q**
4. **Q**

5. **Q**
6. **Q**