Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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ક્રમાંક : એસ/પરિપત્ર/સિલેબસ/૫૦૩૩/૨૦૨૪
તા.૦૭/૦૩/૨૦૨૪

પ્રતિ,
વડાશ્રી,
જે.પી.દાવર ઈન્સ્ટીટયૂટ ઓફ ઈન્ફોર્મેશન
સાયન્સ એન્ડ ટેકનોલોજી,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષય :– બી.એસસી. (આઈ.ટી.) સેમે.–૩ અને ૪ ના સ્ટ્રકચર અને અભ્યાસક્રમ બાબત.

મહાશય,

સવિનય જણાવવાનું કે, NEP-2020 અંતર્ગત શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર B.Sc.(IT)Sem.-3 & 4નું સ્ટ્રકચર અને અભ્યાસ સમિતિ દ્વારા નિયુકત પેટાસમિતિ દ્વારા તૈયાર કરવામાં આવેલ Major, Minor, MDC અને SEC ના અભ્યાસક્રમ સંદર્ભે ઈન્ફોર્મેશન ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૨/૦૨/૨૦૨૪ની સભાના ઠરાવ ક્રમાંક :૨અન્વયે નીચે મુજબ કરેલ ભલામણ કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિદ્યાશાખા વતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૦૧/૦૩/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ ૦૪ થી મંજુર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

ઈન્ફોર્મેશન ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૨/૦૨/૨૦૨૪ ની સભાના ઠરાવ ક્રમાંકઃ૨

:: આથી ઠરાવવામાં આવે છે કે,NEP-2020 અંતર્ગત શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર બી.એસસી.(આઈ.ટી) સેમેસ્ટર–૩ અને ૪ નું સ્ટ્રકચર અને પેટાસમિતિ દ્વારા તૈયાર કરવામાં આવેલ Major, Minor, MDC અને SEC નો અભ્યાસક્રમ સર્વાનુમતે મંજૂર કરી કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૧/૦૩/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ ૦૪

:: આથી ઠરાવવામાં આવે છે કે, NEP-2020 અંતર્ગત શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર B.Sc.(IT) Sem.-3 & 4 નું સ્ટ્રકચર અને અભ્યાસ સમિતિ દ્વારા નિયુકત પેટાસમિતિ દ્વારા તૈયાર કરવામાં આવેલ Major, Minor, MDC અને SEC ના અભ્યાસક્રમ સંદર્ભે ઈન્ફોર્મેશન ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૨/૦૨/૨૦૨૪ ની સભાના ઠરાવ ક્રમાંક :૨ અન્વયે નીચે મુજબ કરેલ ભલામણ કોમ્પ્યુટર સાયન્સ એન્ડઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિદ્યાશાખા વતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ સ્વીકારી મંજૂર કરવામાં આવે છે.

બિડાણઃ ઉપર મુજબ

કુલસચિવ

પ્રતિ,
૧) અધ્યક્ષશ્રી, કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા.
૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

...તરફ જાણ તેમજ અમલ સારૂ.

Veer Narmad South Gujarat University, Surat

Program Structure: S. Y. B. Sc. (I. T.) / M. Sc. (I .T.) (SEM – 3 and SEM – 4)

(w.e.f. Academic Year June, 2024-2025)

Bachelor of Science in Information Technology (B. Sc. (I. T.)) – Three Year Program

Bachelor of Science in Information Technology (B.Sc. (I.T.) (Hon.)) – Four Year Integrated Program

Master of Science in Information Technology (M.Sc. (I.T.)) – Five Year Integrated Program

Name of Program	Master of Science (Information Technology)
Abbreviation	M.Sc. (I.T.)
Eligibility	H S C / Equivalent Examination from Science Stream (A / B / AB Group) or Vocational Stream or General Stream (Commerce) with English as one of the subject.
Objective of Program	The objective of the program is to transform students into I.T. professionals by providing them advanced technical knowledge and outstanding placement in reputed I.T. companies.
Program Outcome	**PO1 : Fundamental Knowledge Enrichment** Program trains students with the core computer science and Information Technology (IT) knowledge domains. It also makes students capable of using core concepts in the conceptualization of domain specific application development. **PO2 : Critical Thinking Development** The program develops the skills of critical thinking, problem solving, evaluative learning of various techniques, and understanding the essence of the problem. **PO3 : Advanced Emerging Technology Awareness** The program trains students with the latest technologies that is being used in the industry. The continuous syllabi review adds value to the program for the outgoing students and make them ready to face challenging demands of the industry. **PO4 : Advanced Tools Usage** The program teaches the students to apply the advanced tools to solve real world problems. **PO5 : Nurturing Project Planning and Management Capabilities** The program trains students for designing and conceptualizing the software architecture, planning and managing the product development process of complex and live software projects. It also makes students understand the decision making for selection of an appropriate project management capabilities. **PO6 : Real World Problem / Project Development** Real world project provides the candidates exposure to work in the challenging and demanding environment of the industry. The project development training makes students employable and industry ready. **PO7 : Team Work and Leadership Development** Trains students to work in a team and also to take leadership of the of the project management team.
Program Specific Outcomes	**PSO1**: Students will learn to develop and strengthen the fundamental concepts that are required to solve complex programming problems. **PSO2**: Students will develop the ability to identify, formulate and design solutions to face computational challenges. **PSO3**: Students will be able to apply software engineering concepts to solve real world problems. **PSO4**: Students will be able to learn emerging technologies and apply them for the development of Web applications, Mobile application, Desktop application, etc. **PSO5**: Students will develop necessary Entrepreneur and Technical skills to start their own business in I.T domain.
Mapping between POs and PSOs	
Medium of Instruction	English
Program Passing Rules	**As per University rules**

	PSO1	PSO2	PSO3	PSO4	PSO5
PO1	■				
PO2	■	■			
PO3				■	■
PO4				■	■
PO5			■		■
PO6			■		■
PO7			■		■

Veer Narmad South Gujarat University, Surat

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(w.e.f. Academic Year June, 2024-2025)

Bachelor of Science in Information Technology (B. Sc. (I. T.)) – Three Year Program

Bachelor of Science in Information Technology (B.Sc. (I.T.) (Hon.)) – Four Year Integrated Program

Master of Science in Information Technology (M.Sc. (I.T.)) – Five Year Integrated Program

SEMESTER – 3

Course Code	Course Title	Course Category	Level of Course	Course Credits	Teaching Hours/week		University Exam Type	Exam Duration	External Marks	Internal Marks	Total Marks
				Th. + Pra.	Theory	Practical/ Fieldwork /Project/ Internship					
301	IT Business Communication - I	Ability Enhancement Course	200-299 Intermediate	2	2	0	Theory/ Written	1 Hrs	25	25	50
302	Fundamental of Electronics	Multi-Disciplinary Course	200-299 Intermediate	4	4	0	Theory/ Written	2 Hrs	50	50	100
303	Data Structures	Major Course	200-299 Intermediate	4	4	0	Theory/ Written	2 Hrs	50	50	100
304	Object Oriented Programming	Major Course	200-299 Intermediate	4	4	0	Theory/ Written	2 Hrs	50	50	100
305	Practical – 3	Major Course	200-299 Intermediate	4	0	8	Practical	4 Hrs	50	50	100
306	Computer Network (SEC-3)	Skill Enhancement Course	-	2	2	0	Theory/ Written	1 Hrs	25	25	50
307	Value Added Course – 3	Value Added Course	-	2	2	0	As per need of the course	1 Hrs	25	25	50
Total				**22**	**18**	**8**					**550**

Veer Narmad South Gujarat University, Surat

Program Structure: S. Y. B. Sc. (I. T.) / M. Sc. (I .T.) (SEM – 3 and SEM – 4)

(w.e.f. Academic Year June, 2024-2025)

Bachelor of Science in Information Technology (B. Sc. (I. T.)) – Three Year Program

Bachelor of Science in Information Technology (B.Sc. (I.T.) (Hon.)) – Four Year Integrated Program

Master of Science in Information Technology (M.Sc. (I.T.)) – Five Year Integrated Program

SEMESTER – 4

Course Code	Course Title	Course Category	Level of Course	Course Credits	Teaching Hours/week		University Exam Type	Exam Duration	External Marks	Internal Marks	Total Marks
				Th. + Pra.	Theory	Practical/ Fieldwork /Project/ Internship					
401	IT Business Communication - II	Ability Enhancement Course	200-299 Intermediate	2	2	0	Theory/ Written	1 Hrs	25	25	50
402	Fundamental of Embedded Systems and IoT	Minor Course	200-299 Intermediate	4	4	0	Theory/ Written	2 Hrs	50	50	100
403	C#.NET	Major Course	200-299 Intermediate	4	4	0	Theory/ Written	2 Hrs	50	50	100
404	RDBMS and NoSQL Databases	Major Course	200-299 Intermediate	4	4	0	Theory/ Written	2 Hrs	50	50	100
405	Practical - 4	Major Course	200-299 Intermediate	4	0	8	Practical	4 Hrs	50	50	100
406	Web Development using JavaScript (SEC-4)	Skill Enhancement Course	-	2	2	0	Practical	1 Hrs	25	25	50
407	Value Added Course – 4	Value Added Course	-	2	2	0	As per need of the course	1 Hrs	25	25	50
Total				**22**	**18**	**8**					**550**
408	Summer Internship	Applicable only to student seeking exit after second year	---------	4	----	-------	---------	---------	--	---	--

Veer Narmad South Gujarat University, Surat

Program Structure: S. Y. B. Sc. (I. T.) / M. Sc. (I .T.) (SEM – 3 and SEM – 4)

(w.e.f. Academic Year June, 2024-2025)

Bachelor of Science in Information Technology (B. Sc. (I. T.)) – Three Year Program

Bachelor of Science in Information Technology (B.Sc. (I.T.) (Hon.)) – Four Year Integrated Program

Master of Science in Information Technology (M.Sc. (I.T.)) – Five Year Integrated Program

Practical:

- Batch Size – 30 Maximum (Desirable). Maximum 45 students can be accommodated in a batch. Separate batches should be considered if the student strength exceeds 45 numbers.

Summer Internship: A student who wishes to exit after successfully completion of Second year (Semester-1 to Semester-4) without any backlog is required to obtain 4 credits at the end of the year through the 2 months summer internship. For summer training, the Institute/college will grant the permission and evaluate the training outcomes. Based on satisfactory completion of the summer training, the Institute head will recommend to the university to grant four credits for summer training.

Skill Enhancement Course: As per NEP (National Education Policy-2020), it is mandatory for students to select a 2 credit skill enhancement course out of the choices given by the college/institute.

Value Added Course: As per NEP (National Education Policy-2020), it is mandatory for students to select a 2 credit Value Added Course out of the choices given by the college/institute.

B.Sc. (I.T.) 3rd Semester

Course : 302 : Fundamental of Electronics

Course Code	302
Course Title	Fundamental of Electronics
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)
Last Review / Revision	June 2024
Purpose of Course	To impart knowledge of electronics devices in Information technology
Course Objective	An understanding of basics of electronic and digital circuits.
Course Outcomes	CO1 : Students will be able to learn about Electronics components and Application of Electronic circuits . CO2 : Students will be able to learn about Digital Electronics concepts and its application in digital Arithmetic circuitry. CO3 : Students will be able to learn about the Digital Sequential circuits and its application.
Mapping between COs with PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					

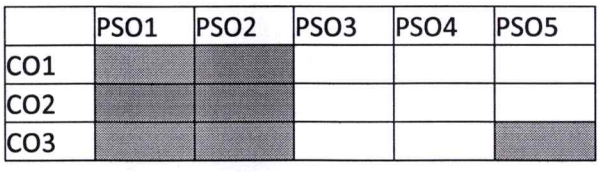
Pre-requisite	NIL
Course Content	**Unit : 1 : fundamental of electrical engineering** 1.1 Introduction of Voltage, Current, Power, Phase and Frequency 1.2 Ideal Volt source & Ideal current source, , 1.3 Ohm's Law & Kirchhoff's laws 1.4 Electromagnetism 1.4.1 Magnetic Flux, Flux density, Magnetic force and permeability 1.4.2 Electromagnetic Induction and transformer 1.4.3 Heating effect due to current and need of fuses **Unit : 2 : fundamental of electronics components and semiconductor physics** 2.1 Passive components and circuits 2.1.1 Introduction of Resistor, capacitor, Inductor 2.1.2 Series & parallel connection of resistors & capacitors 2.2 Active components 2.2.1 different type of Diodes 2.2.2 Transistors, FET and MOSFET

	2.3 Introduction of Electronics circuits 2.3.1 Power supply: rectifier and simple filter circuits 2.3.2 oscillator 2.3.3 voltage regulator 2.3.4 Amplifier, 2.3.5 switches and relay **Unit : 3 : fundamental of Digital Electronics** 3.1 Introduction of Different Logic gates, 3.2 Interchangeability bubbled gates, 3.3 Demorgan's theorem & Duality theorem, 3.4 Universal gates 3.5 product of sum and sum of product method 3.6 Karnaugh map & it's simplification. 3.7 NAND-NAND ckts and NOR - NOR circuits **Unit : 4 : Data processing and Arithmetic circuits** 4.1 Multiplexers and De-multiplexers 4.2 Decoders and Encoders 4.3 parity generator and checkers 4.4 Half adder, full adder , adder - subtracter circuits **Unit : 5 : Sequential circuits** 5.1 **FLIP FLOPS**: 5.1.1 Construction of flip flops using different gates 5.1.2 RS, D,J-K flip-flop, 5.1.3 JK master slave concept. 5.2 Shift Registers and counters: 5.2.1 study of shift Registers 5.2.2 Synchronous counter and Asynchronous counter Mod counters.
Reference Books	1. Principal of Electrical and Electronics by V.K. Mehta, S.Chand Limited,1998 2. Digital design, M. Morris Mano, Prentice Hall,2002 3. Basic Electronics by B.L.Theraja, S. Chand Limited,2007 4. Digital electronics, Anil Kumar Maini, Wiley,2007 5. Digital principals and applications by Donald P. Leach ,Albert Paul, Malvino,Tata McGraw-Hill,2010 6. Fundamental of Electronic Engineering by Rajendra Prasad, Cengage Learning,2012 7. Digital Electronics: A Practical Approach with VHDL, 9th edition, William Kleitz,pearson,2012 8. Basic Electronics, D P Kothari, I J Nagrath, McGraw-Hill Education,2013 9. Digital Electronics 1: Combinational Logic Circuits,Tertulien Ndjountche, Wiley-ISTE,2016 10. Digital Electronics 3: Finite-state Machines. Tertulien Ndjountche, Wiley-ISTE,2016 11. Digital Systems, 12th edition, Ronald J. Tocci, Neal S. Widmer, Greg Moss, pearson,2017 12. Digital Fundamentals, 11th edition,Thomas L Floyd,pearson,2017 13. Electronics: Principles and Applications, Charles Schuler, McGraw-Hill

	Education,2018 14. Electronic Circuits, Fundamentals and Applications, Mike Tooley CRC Press,2019 15. Fundamentals of Digital Electronics, Dhanasekharan Natarajan, Springer Nature Switzerland AG,2020 16. Electronic Principles, Albert Paul Malvino, David J. Bates, Patrick E. Hoppe,McGraw-Hill Education,2020 17. Grob's Basic Electronics, Mitchel E. Schultz,McGraw-Hill Education; 13thedition ,2020 Digital Electronics: Principles and Applications, Roger Tokheim and PatrickHoppe, McGraw-Hill Education,2021
Teaching Methodology	Lectures, Discussion, Self Study, Seminars, Case Study and Assignment

B.Sc. (I.T.) 3rd Semester

Course : 303 : Data Structures

Course Code	303
Course Title	Data Structures
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2024
Purpose of Course	To introduce the basic concepts of data structures and algorithms involving linear and non-linear data structures and their logical implementation.
Course Objective	To teach fundamental concepts of data structures including stack, queue, linked list, tree and various sorting, searching techniques. This course also entails practical aspect of applications of data structures.
Course Outcomes	CO1 : Students will be able to learn data structure techniques and algorithms used for solving complex problems CO2 : Students will be able to learn linear data structure and non-linear data structure algorithms CO3 : Students will be able to learn working of various sorting and searching algorithms
Mapping between COs with PSOs	
Pre-requisite	Fundamentals of Computer, C Programming Language
Course Content	**Unit : 1 : Introduction** 1.1 Definition and Classification 1.2 Importance of data structures 1.3 Data Structure Operations 1.4 Analysis of Algorithms, Algorithm Complexity 1.5 Time-Space Trade off, Big-O, omega and theta Notation 1.6 Best case Time Complexity, Average case Time Complexity, Worst case Time Complexity **Unit : 2 : Linear Data Structures** 2.1 Array: Storage, mapping and applications 2.2 Stack 2.2.1 Concept and Definition 2.2.2 Operations 2.2.3 Applications of stack 2.2.4 Polish Expression 2.2.5 Infix, Prefix and Postfix Notation 2.2.6 Converting Infix to Postfix Notation 2.2.7 Expression Evaluation

	2.2.8 Recursion and Tower of Hanoi Problem 2.3 Queue 2.3.1 Concept and Definition 2.3.2 Types of Queue 2.3.3 Simple Queue 2.3.4 Circular Queue 2.3.5 Double ended Queue 2.3.6 Priority Queue 2.3.7 Operations on all queues 2.3.8 Applications of queue 2.4 Linked List 2.4.1 Concept and Definition 2.4.2 Types of Linked list 2.4.3 Singly Linked List 2.4.4 Circular Linked List 2.4.5 Doubly Linked List 2.4.6 Circular Doubly Linked List 2.4.7 Header Linked List 2.4.8 Operations on linked list 2.4.9 Applications of linked list 2.4.10 Polynomial Manipulation **Unit : 3 : Non Linear Data Structures** 3.1 Tree 3.1.1 Introduction and Representation 3.1.2 General Tree 3.1.3 Binary Tree 3.1.4 Threaded and linked storage representation of Binary Tree 3.1.5 Operations on Binary Tree 3.1.6 Binary Tree Traversals 3.1.7 Binary Search Tree 3.1.8 Height-Balanced Tree: AVL tree 3.1.9 Splay Tree 3.1.10 Applications of tree: Expression Tree 3.1.11 Symbol table and Syntax Analysis **Unit : 4 : Searching Techniques** 4.1 Searching 4.1.1 Linear Search 4.1.2 Binary Search 4.1.3 Hashing 4.1.3.1 Hash Tables 4.1.3.2 Hash Functions and Hash Keys 4.1.3.3 Collision and Collision Resolution 4.1.3.4 Rehashing

	5.1 Sorting Techniques 5.1.1 Bubble sort 5.1.2 Selection sort 5.1.3 Insertion sort 5.1.4 Shell sort 5.1.5 Merge sort 5.1.6 Quick sort 5.1.7 Radix sort 5.1.8 Heap Sort
Reference Book	1. An Introduction to Data Structures with applications – Trembley, Sorenson – TMH 2. Theory and problems of data structures – Seymour Lipschutz – TMH 3. Data Structures and Algorithms in C++ - Michael T. Goodrich, Roberto Tamassai, David M. Mount – Wiley 4. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson-Freed - W. H. Freeman & Co. New York, NY, USA 5. Data Structures & Algorithms, A V Aho, J E Hopcroft, J D Ullman - Addison-Wesley Publishing 6. Data Structure & "C" Programming - Vanwyte C J - Addison Wesley. 7. Data Structures, Algorithms And Object Oriented Programming – TMH edition Geogory L. Heileman. 8. Data Structures using C & C++ - Y. Langsam Moshe J. Angensterin & A.M.Terenbanm
Teaching Methodology	Lectures, Discussion, Self Study, Seminars, Case Study and Assignment

B.Sc. (I.T.) 3rd Semester

Course : 304 : Object Oriented Programming

<table>
<tr><td>Course Code</td><td>304</td></tr>
<tr><td>Course Title</td><td>Object Oriented Programming</td></tr>
<tr><td>Credit</td><td>4</td></tr>
<tr><td>Teaching per Week</td><td>4 Hrs</td></tr>
<tr><td>Minimum weeks per Semester</td><td>15 (Including Class work, examination, preparation, holidays etc.)</td></tr>
<tr><td>Last Review / Revision</td><td>June 2024</td></tr>
<tr><td>Purpose of Course</td><td>To impart knowledge of object-oriented programming concepts</td></tr>
<tr><td>Course Objective</td><td>To make student learn the concepts of Object-Oriented Programming</td></tr>
<tr><td>Course Outcomes</td><td>CO1 : Students will be able to learn Object Oriented programming concepts.

CO2 : Students will be able to able to learn object oriented programming concepts like data abstraction, inheritance, polymorphism using C++

CO3 : Students will be able to learn I/O operation on files using IO streams and exception handling using C++.</td></tr>
<tr><td>Mapping between COs with PSOs</td><td>
<table>
<tr><th></th><th>PSO1</th><th>PSO2</th><th>PSO3</th><th>PSO4</th><th>PSO5</th></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Pre-requisite</td><td>C Programming</td></tr>
<tr><td>Course Content</td><td>
Unit : 1 : Basic concepts of object oriented of programming
1.1 Background
1.1.1 Procedure Oriented Programming Vs Object Oriented Programming
1.1.2 Basic Concepts of Object Oriented Programming
1.1.3 Benefits of Object Oriented Programming

1.2 Classes & Objects
1.2.1 Specifying a class
1.2.2 Defining member functions
1.2.3 Inline function
1.2.4 Nesting of member functions
1.2.5 Private member function
1.2.6 Static data members
1.2.7 Static member functions
1.2.8 Friend functions
1.2.9 Returning objects
1.2.10 Pointers to members
1.3 Constructors & Destructors
1.3.1 Constructors
1.3.2 Parameterized constructors
1.3.3 Multiple constructors in a class
1.3.4 Constructors with default arguments
</td></tr>
</table>

1.3.5 Copy constructors
1.3.6 Dynamic constructors
1.3.7 Const objects
1.3.8 Destructors.

Unit : 2: Inheritance & Polymorphism

2.1 Inheritance
- 2.1.1 Defining derived class using single base class
- 2.1.2 Derivation using public
- 2.1.3 Private and protected access modifiers
- 2.1.4 The implementation of inheritance in the C++ object model
- 2.1.5 The multiple-inheritance, Abstract classes
- 2.1.6 Composite objects (container objects)

2.2 Compile Time Polymorphism
- 2.2.1 Function Overloading
- 2.2.2 Unary Operators
- 2.2.3 Binary Operators
- 2.2.4 Using Friends as operator functions
- 2.2.5 Overloading other Operators
- 2.2.6 User defined conversion
- 2.2.7 Four different cases of user defined conversions
- 2.2.8 Comparison of both the methods of conversion

2.3 Run Time Polymorphism
- 2.3.1 Pointers to objects
- 2.3.2 this pointer
- 2.3.3 Pointers to derived classes
- 2.3.4 Virtual functions
- 2.3.5 Pure virtual functions.

Unit : 3: I/O Streams and Files

3.1 I/O Streams
- 3.1.1 Introduction to stream
- 3.1.2 Advantages of using C++ I/O over C I/O
- 3.1.3 The C++ Predefined streams
- 3.2.4 Formatting I/O
- 3.1.5 Formatting using I/Os members
- 3.1.6 Manipulators, Creating our own manipulator

3.2 Data Files
- 3.2.1 Introduction to File I/O
- 3.2.2 Text and binary streams
- 3.2.3 Opening and closing files
- 3.2.4 Text files
- 3.2.5 Binary files
- 3.2.6 Providing Random Access using seek

3.3 I/O Modes Handling Errors

Unit 4: Exception Handling

4.1 Introduction
4.2 Basics of Exception Handling
4.3 Exception Handling Mechanism
4.4 Throwing Mechanism
4.5 Catching Mechanism
4.6 Rethrowing an Exception

	Unit : 5 Templates 5.1 Function Templates 5.2 Non Generic (Non Type) Parameters in Template functions 5.3 Template function and specialization 5.4 Overloading a template function 5.5 Using Default Arguments 5.6 Class Templates 5.7 Classes with multiple generic data types 5.8 Static data members 5.9 Primary and Partial Specialization 5.10 The Export Keyword. 5.11 Standard Template Library (STL) 5.11.1 Algorithms 5.11.2 Containers 5.11.3 Functions 5.11.4 Iterators
Reference Book	1. Object Oriented Programming with C++: Balagurusamy - TMH 2. OOP in Turbo C++: Robert Lafore - Galgotia Publication 3. C++ Primer :Lippman - Addison Wesley 4. Object Oriented Programming Fundamentals & Applications: Probal Sengupta - PHI 5. The Complete Reference: Schildt - Osborne 6. The C++ Programming Language: Stroustrup - Addison Wesley 7. Object Oriented Analysis & Design with Application, Grady Booch, LPE 8. Standard C++ with Object Oriented Programming, Paul S. Wang, Thomson
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment

B.Sc. (I.T.) 3rd Semester

Course : 305 : Practical 3

<table>
<tr><td>Course Code</td><td>305</td></tr>
<tr><td>Course Title</td><td>Practical 3</td></tr>
<tr><td>Credit</td><td>4</td></tr>
<tr><td>Teaching Per Week</td><td>8 Hrs</td></tr>
<tr><td>Minimum Weeks Per Semester</td><td>15 (Including Practical Work, Examination, Preparation, Holidays etc.)</td></tr>
<tr><td>Last Review/Revision</td><td>June 2024</td></tr>
<tr><td>Purpose of Course</td><td>To impart practical knowledge of implementation of data structures and OOP principles</td></tr>
<tr><td>Course Objective</td><td>To give practical knowledge on applications of data structures and usage of object oriented programming</td></tr>
<tr><td>Prerequisite</td><td>Basic knowledge of C programming language</td></tr>
<tr><td>Course Out comes</td><td>CO1 : Students will be able to develop programs of linear and nonlinear data structures.

CO2 : Students will be able to solve problems using object oriented programming with C++.

CO3 :Students will be able to write programs of data structures and programs of C++ with inheritance, polymorphism and other features.</td></tr>
<tr><td>Mapping between COs with PSOs</td><td><table><tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td></tr><tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>Pre-requisite</td><td>Basic knowledge of C programming</td></tr>
<tr><td>Course Content</td><td>Practical based on Paper No. 303 Data Structures and Paper No. 304 Object oriented programming

Weightage:
50% based on Paper No 303
50% based on Paper No 304</td></tr>
<tr><td>Reference Books</td><td>NIL</td></tr>
<tr><td>Teaching Methodology</td><td>Lab Work, Assignments</td></tr>
</table>

B.Sc. (I.T.) 3rd Semester
Skill Enhancement Course
Course : 306 : Computer Network

Course Code	306
Course Title	Computer Network
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)
Effective From	June 2024
Purpose of Course	To provide fundamental knowledge of Computer Network
Course Objective	To Impart fundamental Knowledge of Computer Network
Course Outcomes	CO1 : Students will be able to learn about how computers can connect with each other using networks. CO2 : Students will be able to learn about computer network communication layers. CO3 : Students will be able to learn about basics of computer network security.
Mapping between COs with PSOs	

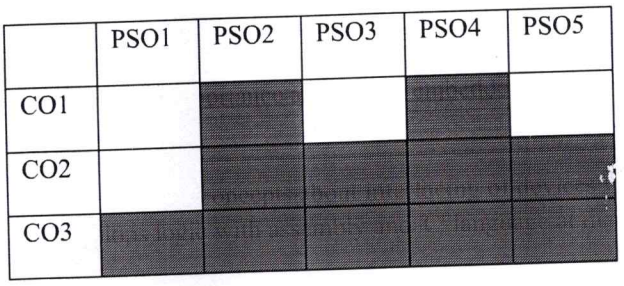
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					

Pre-requisite	Basic computer knowledge
Course Content	**Unit : 1 : Introduction to Networks** 1.1 Data Communications: components 1.2 Direction of data flow, 1.3 Networking – Concepts, 1.4 Need, Uses and advantages of Network, 1.5 Categories of networks, 1.6 Client, Servers and Peers based and Hybrid Networks, 1.7 Topologies, 1.8 Review of protocols, 1.9 Models and implementations 1.10 Transport and Internet protocols **Unit : 2 : Introduction to Network Model** 2.1 Introduction 2.1.1 Introduction to OSI Model 2.1.2 Introduction to TCP Model 2.1.3 The OSI Model layer functions 2.2 Introduction to Physical Layer 2.2.1 Data and Signals, 2.2.2 Digital Transmission,l 2.2.3 Analog transmission, 2.2.4 Bandwidth, 2.2.5 Transmission Media, 2.2.6 Switching, 2.2.7 IEEE 8.2 Standards 2.3 Data Link Layer 2.3.1 Functions of Data link layer, 2.3.2 Error detection and correction, 2.3.3 Error detection and correction codes, 2.3.4 Data link control and protocols, 2.3.5 Multiple access protocol: CSMA/CD, LAN: Ethernet, 2.3.6 Introduction : Wireless LAN, Connecting devices: Repeaters,

	Hubs, Bridges, switches, Concept of VLAN **Unit : 3 : Introduction to Network, Transport, Session, Application Layer** 3.1 Network Layer 3.1.1 Introduction to Network Layer 3.1.2 Connection-less service, 3.1.3 Connection oriented service, 3.1.4 Inter-networking, addressing, 3.1.5 Routing algorithms (Distance vector, Link state), 3.1.6 Introduction to Network layer in internet: Logical addressing, 3.1.7 IP protocol, IP address, 3.1.8 Classes of IP addresses, 3.1.9 Routers, Gateways 3.2 Transport Layer 3.2.1 Transport Service Primitives, 3.2.2 Addressing, connection establishment, flow control, 3.2.3 Multiplexing, 3.2.4 Introduction to transport layer protocols and their features. 3.3 Session Layer 3.3.1 Introduction to : Establishing Session, 3.3.2 Presentation with Content Encoding and Decoding, 3.3.3 Introduction to application layer protocols. 3.4 Application Layer 3.4.1 Introduction to application layer protocols, 3.5 Network Management commands **Unit : 4 : Network Security** 4.1 Various Types of security, 4.2 Security with certificates, 4.3 Planning a security approach, 4.4 Security problems and their consequences, 4.5 Introduction to firewalls, 4.6 Encryption and decryption standards, 4.7 Secure Socket Layer, 4.8 Virtual Private Networks
Reference Book	1. Data Communications and Networking, 4/e Behrouz A. Forouzan - DeAnza College 2. Computer Networks by A.S. Tanenbaum - PHI Publications 3. Computer Networks : A pragmatic Approach, C R Sharma, Jaico, 2005 4. Data and computer Communication, William stallings - Pearson Education, 5. MCSE: Networking Essentials Study Guide - TMH 6. Mastering Local Area Networks by Christa Anderson & Mark Minasi – BPB
Teaching Methodology	Class Room Teaching, Discussion and Assignment

B.Sc. (I.T.) 4th Semester

Course : 402 : Fundamental of Embedded System and IOT

Course Code	402
Course Title	Fundamental of Embedded System and IOT
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)
Last Review / Revision	June 2024
Purpose of Course	To understand importance and role of embedded system in Real world applications
Course Objective	This course gives concepts about interfacing of devices with microcontroller and develops logic with assembly and 'C' language at machine level.
Course Outcomes	CO1 : Students will be able to learn about Micro controllers. CO2 : Students will be able to learn about the Embedded System Development Process. CO3 : Students will be able to learn about the Embedded System Application in IOT.
Mapping between COs with PSOs	
Pre-requisite	Fundamentals of Digital Logic Design, 'C' language, microprocessor and Computer system
Course Content	**Unit : 1 : Introduction of Embedded System** 1.1 Trends in Embedded Systems 1.2 Challenges and Design Issues in Embedded Systems 1.3 Applications of embedded system 1.4 Embedded system development process. 1.5 Overview of different hardware development platform for embedded system **Unit : 2 : Introduction of Microcontrollers** 2.1 Introduction to 8-bit 8051 core Microcontroller Architecture and Organization 2.2 Introduction of ARM Microcontroller Architecture 2.3 input / Output Ports

	2.4 interrupt handling 2.5 Timers and Counters **Unit : 3 : Microcontroller and Interfacing** 3.1 Introduction of Sensors and Analog to digital converter(ADC) 3.2 Introduction of UART BUS communication 3.3 Introduction of I2C BUS communication 3.4 Introduction of SPI BUS communication 3.5 Introduction of Actuators **Unit : 4 : Programming Concepts for Embedded system** 4.1 Basic concept of C-language, memory storage, pointer, Bit wise operator . 4.2 Basic programming concept for 8-bit microcontroller using c-language. 4.3 Introduction of programming for different educational arduino platform 4.4 Introduction to RTOS 4.5 Introduction of Robotic Operating System (ROS) 4.6 Introduction of different ROS plugins, simulator tools and services **Unit : 5 : Introduction of the Internet of the things** 5.1 Embedded system platforms and utilities in IOT, 5.2 Ethics requirements in Internet of Things. 5.3 Wired and Wireless distributed embedded system applications in IOT. 5.4 Overview of Near Field Communication (NFC- Bluetooth, RFID) and its applications for Embedded system and IoT. 5.5 Overview of development Tools for embedded system and IOT
Reference Books	1. Architecture high performance Embedded systems, jim ledin, pact publication, 2021 2. Matering ROS for robotics programming, letin joseph and jonathan cacace, pact publication,2021 3. Architectural pattern and techniques for developing IoT solutions, Jasbir singh Dhaliwal, pact publication,2023 4. Embedded system Architecture, danlete Lacamera, pact publication,2023 5. Practical Arduino Robotics,Likas Kaul, pact publication,2023 6. IoT and Edge computing for architects,perry lea, pact publication,2023 7. MICROPROCESSORS AND MICROCONTROLLERS, PABLO MARY ,Panda Jeebananda,PHI,2016

	8. The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBone Black, Donald Norris, McGraw-Hill Education, 2015 9. Embedded Systems: Concepts, Design and Programming, Himanshu B. Dave, Pearson, 2015 10. Designing The Internet of Things, Hakin Cassimally Adrian Mcewen,Willey, 2015 11. The Internet of Things: Key Applications and Protocols, David Boswarthick, Omar Elloumi Olivier Hersent,Wiley,2015 12. The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World,Michael Miller,pearson, 2015 13. The 8051 Microcontroller Based Embedded Systems, Manish K Patel,Tata McGraw-Hill,2014 14. AVR Microcontroller and Embedded Systems: Using Assembly and C, Muhammad Ali Mazidi,Pearson, 2013 15. Embedded Systems: Hardware, Design and Implementation, Krzysztof Iniewski, Willey,2012 16. Getting Started with the Internet of Things, Cuno P fister, Shroff, 2011 17. Microprocessor & Microcontroller, A.P.Godse, D.A.Godse, Technical Publications, Pune, 2010 18. ARM Assembly Language,William Hohl,CRC press,2009 19. C and the 8051, Thomas W Schultz, Wood Island Prints,2008 20. The 8051 microcontroller, kennith j. ayala,Thomson,2004
Teaching Methodology	Lectures, Discussion, Self Study, Seminars, Case Study and Assignment

B.Sc. (I.T.) 4th Semester

Course: 403: C#.NET

<table>
<tr><td>Course Code</td><td>403</td></tr>
<tr><td>Course Title</td><td>C#.NET</td></tr>
<tr><td>Credit</td><td>4</td></tr>
<tr><td>Teaching per Week</td><td>4 Hrs</td></tr>
<tr><td>Minimum weeks per Semester</td><td>15 (Including Classwork, examination, preparation, holidays etc.)</td></tr>
<tr><td>Effective From</td><td>June 2024</td></tr>
<tr><td>Purpose of Course</td><td>This course helps to learn basics programming of windows forms applications using C#.NET</td></tr>
<tr><td>Course Objective</td><td>The objective of the course is to impart basic introduction to Microsoft .NET technology and concepts of GUI applications.</td></tr>
<tr><td>Course Outcomes</td><td>CO1 : Students will be able to learn about Microsoft .NET Core Technology and the importance of Object Oriented Programming.

CO2 : Students will be able to learn about how to connect database by using ADO.NET and perform CRUD operations on database.

CO3 : Students will be able to develop windows form based applications using C#.NET.</td></tr>
<tr><td>Mapping between COs with PSOs</td><td><table><tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td></tr><tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>Pre-requisite</td><td>Knowledge of Programming, Object Oriented Programming and Database Management System</td></tr>
<tr><td>Course Content</td><td>Unit : 1 : C#.NET and the .NET Core
1.1 Overview of .NET Core
1.2 .NET Core Architecture
1.3 Common Language Runtime
1.4 Common Type System
1.5 Common Language Specification
1.6 Microsoft Intermediate Language
1.7 .NET Core Assemblies and Libraries
1.8 Namespaces
1.9 Class Libraries
1.10 Introduction of Visual Studio.Net – IDE
1.11 Appsettings.json
Unit : 2 : Programming in C#.Net Core
2.1 Data Type
2.2 Variables
2.3 Constants
2.4 Arrays
2.5 Control Array
2.6 Collections
2.7 Functions
2.8 Control Flow statements
Unit : 3 : WinForms Standard Controls with Properties, Events and Methods
3.1 Form
3.2 Textbox
3.3 Label</td></tr>
</table>

	3.4 Button 3.5 Listbox 3.6 Combobox 3.7 Checkbox 3.8 Picturebox 3.9 Radiobutton 3.10 Linklabel 3.11 Scrollbar 3.12 Timer 3.13 Panel 3.14 Listview 3.15 Treeview 3.16 Toolbar 3.17 StatusBar 3.18 Implementation of User Controls 3.19 Messagebox and Inputbox **Unit : 4 : Built-In Dialog Boxes, Containers and Menus** 4.1 OpenFileDialog 4.2 SaveFileDialog 4.3 FontDialog 4.4 ColorDialog 4.5 PrintDialog 4.6 MenuStrip 4.7 ToolStrip 4.8 StatusStrip 4.9 FlowLayoutPanel 4.10 GroupBoxPanel 4.11 SplitContainer 4.12 TabControl 4.13 TableLayoutPanel **Unit : 5 : Database Programming with ADO.NET** 5.1 ADO.NET Architecture 5.2 ADO.NET Components 5.3 Connection Object 5.4 Command Object 5.5 DataReader Object 5.6 DataAdepter Object 5.7 SQL Server .NET Data Provider 5.8 OLEDB .NET Data Provider 5.9 DataSet Object 5.10 DataGrid Object 5.11 Design time data binding 5.12 Runtime data binding 5.13 Working with Stored Procedures
Reference Book	1. C# 11 and .NET 7 by Mark J. Price, Packt Publishing Ltd., 2022 2. C# 7 and .NET Core Cookbook by Dirk Strauss, O'Reilly, 2017 3. C# 7 and .NET Core: Modern Cross-Platform Development by Mark J. Price, Packt Publishing Ltd., 2017 4. Windows Forms Programming in C# by Chris Sells, Addison-Wesley Professional, 2003 5. Visual C#.NET: Console Applications and Windows Forms by Fernando Almeida, 2018 6. Windows Forms in Action - Second Edition of Windows Forms Programming with C# by Erik Brown, Manning, 2006
Teaching Methodology	Class Room Teaching, Discussion and Assignment

B.Sc. (I.T.) 4th Semester

Course: 404: RDBMS and NoSQL Databases

Course Code	**404**
Course Title	**RDBMS and NoSQL Databases**
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)
Effective From	June 2024
Purpose of Course	To introduce the concepts of Relational Database design, relational algebra, functional dependency, normalization of relation and introduction to NoSQL database.
Course Objective	1. To acquaint the students with fundamental concepts of RDBMS and NoSQL 2. To make student understand process of normalization, functional dependency with case study. 3. To entail practical aspect of Structure Query Language (SQL) and NoSQL
Course Outcomes	CO1 : Students will be able to learn about Introduction to RDBMS, Relational database design CO2 : Students will be able to design a good database using normalization, decomposition and functional dependency. CO3 : Students will be able to perform practical on Relational database through DDL statements, DML statements and Structured Query Language; and operations on NoSQL DB
Mapping between COs with PSOs	
Pre-requisite	Basic Concepts of DBMS

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					

Course Content	**Unit : 1 : Relational Model and Extended ER diagram** 1.1 Enhanced ER Diagram 1.2 Structure of relational databases 1.3 ER and EER to Relational Mapping 1.2 Codd's rules 1.3 The relational algebra 1.3.1 Fundamental operations 1.3.1.1 Selection, projection, 1.3.1.2 Set Operations Union, intersection, difference, Cartesian Product 1.4 Relational database design case study **Unit : 2: Relational Database Design** 2.1 Functional Dependency 2.1.1 Definition

2.1.2 Trivial and non trivial FD
2.1.3 Inference Rules for FDs
2.1.4 Closure of FD set

2.2 Database Normalization
2.2 Definitions of Keys and Attributes Participating in Keys
2.3 Pitfalls in Relational-Database Design
2.4 First Normal Form
2.5 Second Normal Form
2.6 Third Normal Form
2.7 Boyce Codd Normal Form
2.8 MVD and Fourth Normal Form
2.8.De-normalization
2.9 Database Normalization with Case Study

Unit : 3 : Structured Query Language

3.1. Creating database structure
3.2 Creating table structure
3.3 DDL commands
3.4 DML commands
3.5 Queries
3.5.1 Simple queries
3.5.2 Search conditions
3.5.3 Defining constraints
3.5.3.1 Table level constraints
3.5.3.2 Column level constrains
3.5.3.3 Primary Key, Foreign key constraints
3.5.4 Operators
3.5.4.1 Logical operators: AND, OR, NOT
3.5.4.2 Special Operators: BETWEEN, IS NULL, LIKE, IN, EXISTS
3.5.5 Range searching and pattern matching
3.5.6 Aggregate functions
3.5.7 In built functions
3.5.7.1 Date functions
3.5.7.2 String functions
3.5.7.3 Conversion functions
3.5.8 Grouping
3.5.9 Sub Queries
3.5.10 Joins
3.5.10.1 Structure of Joins
3.5.10.2 types of joins
3.5.10.3 Using UNION, INTESECT, MINUS clause
3.5.11 Views
3.5.11.1 Definition
3.5.11.2 Creating view
3.5.11.3 Updating view
3.5.11.4 Destroying view

Unit : 4 : Query Processing and Optimization

4.1 Introduction
4.2 Evaluation of relational algebra expressions
4.3 Query Parsing
4.4 Query Equivalence
4.5 Measures of query cost
4.6 Query Optimization Algorithms

	Unit : 5 : NoSQL Databases 5.1 Introduction to NoSQL Databases 5.1.1 Distributed Databases: Sharding and Replication 5.1.2 Consistency 5.1.3 The CAP Theorem 5.1.4 NoSQL Data Models 5.1.5 RDBMS vs NoSQL 5.1.6 BASE 5.2 Introduction to Document Oriented Databases 5.2.1 MongoDB Introduction 5.2.2 MongoDB Shell 5.2.3 Create and Manage Databases and Collections 5.2.4 Methods to Insert, Update, Delete Documents 5.2.5 Querying Methods, Aggregation, Comparisons, lookup 5.2.6 Sorting, Filtering 5.2.7 Indexing and explain()
Reference Book	1. Database System Concepts 7th Edition - Henry F. Korth & AbrahamSilberschatz – TMH 2. SQL, PL/SQL – The programming Language Oracle - 4th Edition-by Ivan Bayross – BPB 3. Principles of Database Systems - Jeffery Ullman - Galgotia Publication 4. An introduction to Database Systems - C.J.Date - Addison- Wesley 5. Introduction to Database Management - Navin Prakash – TMH 6. Introduction to Database System - Bipin C. Desai – Galgotia 7. Fundamental of Database Systems – Elmasri, Navathe – Pearson-Addison Wesley 8. Demystifying NoSQL - January 2020 by Seema Acharya - Wiley 9. MongoDB: The Definitive Guide - Powerful and Scalable Data Storage, Third Edition (Greyscale Indian Edition), Shannon Bradshaw , Eoin Brazil , et al, Shroff/O'Reilly
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment

B.Sc. (I.T.) 4th Semester

Course: 405: Practical 4

Course Code	**405**
Course Title	**Practical 4**
Credit	4
Teaching per Week	8 Hrs
Minimum weeks per Semester	15 (Including Practical Work, Examination, Preparation, Holidays etc.)
Effective From	June 2024
Purpose of Course	To impart practical knowledge of .NET, database and IoT.
Course Objective	To give practical knowledge of C#.net window forms application and SQL, to develop basic programming skills for embedded system
Course Outcomes	CO1 : Students will be able to develop applications using Microsoft C#.NET, perform database operations. CO2 : Students will be able to create databases in Oracle and perform DDL and DML operations using Structure Query Language. CO3 : Students will be able to develop programs for microcontroller peripheral setup and implement sensors and actuators in embedded system.
Mapping between COs with PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	■	■			■
CO2	■		■	■	
CO3				■	■

Pre-requisite	Basic knowledge of DBMS, Object Oriented Programming and digital electronics
Course Content	Practical based on 402- Fundamental of embedded system and IoT, Paper No- 403 C#.NET and Paper No. 404 RDBMS and NoSQL Databases Weightage: 30% based on Paper No 402 30% based on Paper No 403 40% based on Paper No 404
Reference Books	NIL
Teaching Methodology	Lab Work, Assignments

B.Sc. (I.T.) 4th Semester

Skill Enhancement Course

Course: 406: Web Development using JavaScript

Course Code	**406**
Course Title	**Web Development using JavaScript**
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)
Effective From	June 2024
Purpose of Course	To provide knowledge of client side programming, XML, JSON and jQuery
Course Objective	To teach client side programming using JavaScript, core concepts of XML, JSON and jQuery
Course Outcomes	CO1 : Students will be able to learn about client side technology using JavaScript. CO2 : Students will be able to learn jQuery to manipulate HTML elements & CSS properties, showing effects and handle events. CO3 : Students will be able to learn about XML, JSON and parse XML data using JavaScript.
Mapping between COs with PSOs	
Pre-requisite	Basic Programming Skills
Course Content	**Unit : 1 : JavaScript Basics and Object Model** 1.1. Basic of JavaScript Programming 1.2. The <script> tag – Basic Syntax 1.3. Variables 1.3.1. Expressions 1.3.2. Data Types 1.3.3. Operators 1.4. Strict Mode, hoisting 1.5. var, let, const 1.6. Arrays 1.7. Objects and Classes 1.8. Regular Expressions 1.9. Working with Text Converting Strings – Template Strings 1.10. Conditional Loops 1.11. Functions 1.12. Math Operations 1.13. Date Object 1.14. Object Model and Event Handling 1.14.1. Programming Using Objects 1.14.2. Document Object Model 1.14.2.1. Object Hierarchy 1.14.2.2. Properties

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					

Master of Science (Information Technology)

Name of Program	**Master of Science (Information Technology)**
Abbreviation	**M.Sc. (I.T.)**
Duration	**5 Years Integrated Course** **B.Sc.(I. T.) – 3 years – Semester 1 to 6** **M.Sc.(I. T.) – 2 years – Semester 7 to 10**
Eligibility Criteria	5 Years (Integrated): H S C / Equivalent Examination from Science Stream (A / B / AB Group) or Vocational Stream or General Stream (Commerce) with English as one of the subject.
Objective of Program	The objective of the program is to transform students into professionals by indoctrinating advanced technical knowledge, enhancing technical skills, communication skills and provide outstanding placement in reputed I.T. companies.
Program Outcome	**PO1 : Fundamental Knowledge Enrichment** Program trains students with the core computer science and Information Technology (IT) knowledge domains. It also makes students capable of using core concepts in the conceptualization of domain specific application development. **PO2 : Critical Thinking Development** The program develops the skills of critical thinking, problem solving, evaluative learning of various techniques, and understanding the essence of the problem. **PO3 : Advanced Emerging Technology Awareness** The program trains students with the latest technologies that are being used in the industry. The continuous syllabi review adds value to the program for the outgoing students and makes them ready to face challenging demands of the industry. **PO4 : Advanced Tools Usage** The program teaches the students to apply advanced tools to solve real world problems. **PO5 : Nurturing Project Planning and Management Capabilities** The program trains students for designing and conceptualizing the software architecture, planning and managing the product development process of complex and live software projects. It also makes students understand the decision making for selection of appropriate project management capabilities. **PO6 : Real World Problem / Project Development** Real world projects provide the candidates exposure to work in the challenging and demanding environment of the industry. The project development training makes students employable and industry ready. **PO7 : Teamwork and Leadership Development** Trains students to work in a team and also to take leadership of the project management team.
Program Specific Outcomes	PSO1 : Students will learn to develop and strengthen the fundamental concepts that are required to solve complex programming problems. PSO2 : Students will develop the ability to identify, formulate and design solutions to face computational challenges.

	PSO3 : Students will be able to apply software engineering concepts to solve real world problems. PSO4 : Students will be able to learn emerging technologies and apply them for the development of Web applications, Mobile application, Desktop application, etc. PSO5: Students will develop necessary Entrepreneur and Technical skills to start their own business in I.T domain.
Mapping between POs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5
PO1	■				
PO2	■	■			
PO3				■	■
PO4				■	■
PO5			■		■
PO6			■		■
PO7			■		■

Medium of Instruction	English
Last Review / Revision	**June 2024**

Program Structure		**M.Sc. (I.T.) – Semester 7 (M.Sc. (I.T.) 5 years Integrated Course)**						
Course Code	**Title**	**Teaching per week**		**Course Credits**	**University Examination**		**Internal Marks**	**Total Marks**
		Theory	**Practical**		**Duration**	**Marks**		
701	Application Development using Full Stack	4	0	4	3 Hrs	70	30	100
702	Advanced .NET	4	0	4	3 Hrs	70	30	100
703	Software Engineering	4	0	4	3 Hrs	70	30	100
704	Data Analysis using Python	4	0	4	3 Hrs	70	30	100
705	Practical 15	0	3	3	2 Hrs	70	30	100
706	Practical 16	0	3	3	3 Hrs	70	30	100
707	Part-time Project - 1	0	3	3	-	70	30	100
	Total	**16**	**9**	**25**	**-**	**490**	**210**	**700**

Program Structure		**M.Sc. (I.T.) – Semester 8 (M.Sc. (I.T.) 5 years Integrated Course)**						
Course Code	**Title**	**Teaching per week**		**Course Credits**	**University Examination**		**Internal Marks**	**Total Marks**
		Theory	**Practical**		**Duration**	**Marks**		
801	Enterprise Java	4	0	4	3 Hrs	70	30	100
802	Artificial Intelligence and Machine Learning	4	0	4	3 Hrs	70	30	100
803	Smart Device Computing using iOS	4	0	4	3 Hrs	70	30	100
804	Blockchain Computing	4	0	4	3 Hrs	70	30	100
805	Practical 17	0	3	3	2 Hrs	70	30	100
806	Practical 18	0	3	3	2 Hrs	70	30	100
807	Part-time Project - 2	0	3	3	-	70	30	100
	Total	**16**	**9**	**25**	**-**	**490**	**210**	**700**

Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

ક્રમાંક : એસ/પરિપત્ર/૧૦૬૩૫/૨૦૨૪
તા.૨૦/૦૫/૨૦૨૪

પ્રતિ,
વડાશ્રી,
જે.પી.દાવર ઈન્સ્ટીટયૂટ ઓફ ઈન્ફોર્મેશન
સાયન્સ એન્ડ ટેકનોલોજી,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષય :– બી.એસસી. (આઈ.ટી.) સેમે.–૩ અને ૪ નાં (AEC) અંગ્રેજી વિષયનાં અભ્યાસક્રમ બાબત.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર બી.એસસી.(આઈ.ટી.) સેમે.–૩ અને સેમે.–૪ નો બી.એસસી. (આઈ.ટી.) સેમે.–૩ અને ૪ નાં (AEC) અંગ્રેજી વિષયનો અભ્યાસક્રમ ઈન્ફોર્મેશન ટેકનોલોજી અભ્યાસ સમિતિનાં ચેરમેનશ્રીએ તથા કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિદ્યાશાખા વતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૦૧/૩/૨૦૨૪ ની સભાનાં ઠરાવ ક્રમાંકઃ૧૦૪ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય ઈ.ચા.કુલપતિશ્રી ધ્વારા મંજૂર કરેલ છે. જેની આથી જાણ કરવામાં આવે છે.

કુલસચિવ

બિડાણઃ ઉપર મુજબ

પ્રતિ,
૧) અધ્યક્ષશ્રી, કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા
૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તથા અમલ સારૂ.

B. Sc. (I.T.) 3rd Semester

Course : 301: IT Business Communication 1

<table>
<tr><td>Course Code</td><td>301</td></tr>
<tr><td>Course Title</td><td>IT Business Communication 1</td></tr>
<tr><td>Credit</td><td>2</td></tr>
<tr><td>Teaching per Week</td><td>2Hrs</td></tr>
<tr><td>Minimum weeks per Semester</td><td>15 (Including Class work, examination, preparation, holidays etc.)</td></tr>
<tr><td>Last Review / Revision</td><td>June 2024</td></tr>
<tr><td>Purpose of Course</td><td>To make the Students Industry ready Professionals</td></tr>
<tr><td>Course Objective</td><td>To make the students aware about the IT Related business communication.</td></tr>
<tr><td>Course Outcomes</td><td>CO1: Students will be aware about the Needs and requirements in IT Placements.

CO2: Students will be able to enhance their key vocabulary via English for specific purpose (ESP) -English for IT

CO3: Students will develop their language skills as per the Industry standards.</td></tr>
<tr><td>Mapping between COs with PSOs</td><td><table><tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td></tr><tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>Pre-requisite</td><td>Basic knowledge of English and communication skills</td></tr>
<tr><td>Course Content</td><td>Unit : 1 : Group Discussion
1.1 Meaning and essentials
1.2 Types of group discussion
1.3 Participating in a GD
1.4 Body Language during a GD
1.5 Expressions used during a GD
1.6 Group Discussions on Different topics (Practical)

Unit : 2 :Meeting communication

2.1 Agenda and Minutes
2.2 Preparation for a meeting
2.3 Participating in a meeting
2.4 Expressions used in a meeting
Unit : 3 : Customer/Client Communication

3.1 Basics of Customer communication
3.2 Communicating Empathetically
3.3 Asking questions to understand Problems
3.4 Denying Requests</td></tr>
</table>

	3.5 Conversations/Expressions based on client communication **Unit : 4 :Developing a Professional work ethic:** **4.1 Demonstrating your work ethic and commitment** **4.2 Being Dependable and Reliable** **4.3 Earning Recognition** 4.4 Developing Professional Work Ethics **Unit 5:English for Information Technology:** 5.1 **Language Tasks Based on:** 5.1.1 IT jobs and duties 5.1.2 IT business and products 5.1.3 IT Operations 5.1.4 Networks
Reference Books	1.Alex, K. Soft Skills : Know Yourself and Know the World. S. Chand & Company Pvt. Ltd., 2014. 2.Anand, Renu, and Neena Kaul. Communicative English Resource Book. Oxford University Press, 2018. 3.Butterfield, Jeff. Soft Skills for Everyone. Cengage Learning, 2014. 4Glendinning, Eric H. and John McEwan. Oxford English for Information Technology. Oxford, University Press, 2002. 5.Hill, David. English for Information Technology. Pearson. 6.Krasnenko, Oksana, et al. Professional English in IT B2-C1 : Textbook for Students of Information Technology. Taras Shevchenko National University of Kyiv, 2019. 7.Meyer, Carolyn, and N. Bringi Dev. Communicating for Results. Oxford University Press, 2021. 8.Mishra, Sunita, and C. Muralikrishna. Communication Skills for Engineers. Dorling Kindersley (India) Pvt. Ltd., 2007. 9..Mukerjee, Hory Sankar. Business Communication : Connecting at Work. Oxford University Press, 2021. 10.Raman, Meenakshi, and Sangeeta Sharma. Professional Communication. Oxford University Press, 2017. 11..Ramesh, Gopalaswamy, and Mahadevan Ramesh. The ACE of Soft Skills : Attitude, Communication and Etiquette for Success. Dorling Kindersley (India) Pvt. Ltd., 2013.
Teaching Methodology	Lectures, Discussion, Practical sessions, Seminars, Case Studies,Language Lab sessions and Assignments

B.Sc. (I.T.) 4th Semester

Course :401: IT Business Communication 2

<table>
<tr><td>Course Code</td><td>401</td></tr>
<tr><td>Course Title</td><td>IT Business Communication 2</td></tr>
<tr><td>Credit</td><td>2</td></tr>
<tr><td>Teaching per Week</td><td>2 Hrs</td></tr>
<tr><td>Minimum weeks per Semester</td><td>15(Including Class work, examination, preparation, holidays etc.)</td></tr>
<tr><td>Last Review / Revision</td><td>June 2024</td></tr>
<tr><td>Purpose of Course</td><td>To make the Students Industry ready Professionals.</td></tr>
<tr><td>Course Objective</td><td>To make the students well-versed in IT Industry Related business communication.</td></tr>
<tr><td>Course Outcomes</td><td>CO1: Students will be to well versed with the soft skills as per the standards of IT Industry.
CO2: Students will enhance English language and use in context as per the scenario and context in an IT Industry.
CO3:Students will be Industry Ready Professionals</td></tr>
<tr><td>Mapping between COs with PSOs</td><td>
<table>
<tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Pte-requisite</td><td>Basic knowledge of English and communication skills</td></tr>
<tr><td>Course Content</td><td>Unit : 1 : Presentation Skills
1.1 Developing Presentation Content
1.2 Delivering Presentations (Practical)
1.3 Building Rapport
1.4 Managing Anxiety
1.5 Expressions used during a Presentation

Unit : 2 :Preparation for Job
2.1 Identifying Job Opportunities
2.2 Interpreting Job advertisements
2.3 CV and Resume writing

Unit : 3 : Presenting yourself Professionally
3.1 Managing your Image
3.2 Dressing Appropriately
3.3 Meeting business causal standards
3.4 Interacting with others</td></tr>
</table>

	Unit : 4 : Interview Skills 4.1Introducing yourself 4.2 Personal Interview 4.3 Interview Etiquette and Body language and Dress code 4.4 Interview Question answers 4.5 Expressions used during an Interview 4.6 Telephonic Interview **Unit 5: English for Information Technology:** **5.1 Language Communication based on IT :** 5.1.1 Communication related to Databases 5.1.2 Communication related to System Administration 5.1.3 Communication related to E-Mail 5.1.4 Communication related to Mobile computing 5.1.5Communication related to Computer problems 5.1.6 Communication related to CV/Interviews
Reference Books	1.Alex, K. Soft Skills : Know Yourself and Know the World. S. Chand & Company Pvt. Ltd., 2014. 2.Anand, Renu, and Neena Kaul. Communicative English Resource Book. Oxford University, Press, 2018. 3.Butterfield, Jeff. Soft Skills for Everyone. Cengage Learning, 2014. 4.Glendinning, Eric H. and John McEwan. Oxford English for Information Technology. Oxford, University Press, 2002. 5.Hill, David. English for Information Technology. Pearson. 6.Krasnenko, Oksana, et al. Professional English in IT B2-C1 : Textbook for Students of Information Technology. Taras Shevchenko National University of Kyiv, 2019. 7..Meyer, Carolyn, and N. Bringi Dev. Communicating for Results. Oxford University Press, 2021. 8.Mishra, Sunita, and C. Muralikrishna. Communication Skills for Engineers. Dorling Kindersley (India) Pvt. Ltd., 2007. 9.Mukerjee, Hory Sankar. Business Communication : Connecting at Work. Oxford University, Press, 2021. 10.Raman, Meenakshi, and Sangeeta Sharma. Professional Communication. Oxford University, Press, 2017. 11.Ramesh, Gopalaswamy, and Mahadevan Ramesh. The ACE of Soft Skills : Attitude, Communication and Etiquette for Success. Dorling Kindersley (India) Pvt. Ltd., 2013.
Teaching Methodology	Lectures, Discussion, Seminars, Case Study , Assignment,Practical sessions based on the syllabus,Language Lab Sessions