AC: 21/02/2026
Item No.:

SIES (Nerul) College of Arts, Science & Commerce (Autonomous)
RISE WITH EDUCATION

CELEBRATING 25 YEARS 1998-2023

SIES (Nerul) College of Arts, Science and Commerce (Autonomous) Syllabus for Approval
B.Sc. (Information Technology)

Sr. No.	Heading	Particulars
1	Title of the course	B. Sc.(Information Technology)
2	Eligibility for admission	Shall have passed XII standard examination of the Maharashtra Board of Higher Secondary Education or its equivalent with Mathematics and/ or Statistics as one of the subjects
3	Minimum percentage for admission	45%
4	Passing Marks	40%
5	Semesters	I
6	Level	UG
7	Pattern	3-4 years & 6-8 semesters Choice Based Grading System
8	Status	New
9	To be implemented from	From Academic year 2024-25 in a progressive manner

Date: 28th January, 2026.

Signature:

Dr. Koel Roychoudhury

AC Chairperson

SIES (NERUL) COLLEGE OF ARTS, SCIENCE AND COMMERCE (AUTONOMOUS) NERUL NAVI MUMBAI 400 706.

Dr. Meghna Bhatia

Head of the Department

Sri Chandrasekarendra Saraswati Vidyapuram,, Plot I-C, Sector V,
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SIES (Nerul) College of Arts, Science and Commerce
(Autonomous) (Affiliated to University of Mumbai)
RE-ACCREDITED GRADE "A" BY NAAC (3rd CYCLE)
BOARD OF STUDIES
SYLLABUS FOR
B.Sc (Information Technology)

(WITH EFFECT FROM THE ACADEMIC YEAR 2024-2025)

OBJECTIVES OF THE PROGRAMME:

- To strengthen the fundamentals and basics of Information Technology and to boost technical development skills.
- To develop the ability to apply the knowledge acquired through analysis of algorithms, mathematical and statistical techniques
- To develop skills to work efficiently in designing the solution to various software and hardware problems by implementing various tools.
- To inculcate professional ethics, managerial skills to encourage entrepreneurship and promote teamwork to manage diverse projects.
- To enhance employability skills and provide scope for higher education and research in the field of information technology.

Programme Outcome:

PO1:To strengthen the fundamentals and basics of information technology and to boost the skill enhancement abilities

PO2: To identify mathematical, Graphical, digital circuitry and embedded system concepts of core concepts of Information Technology.

PO3: To enhance the technical, testing and research oriented approach required to implement the current trending practices in the field of Computer science and Technology.

PO4:The program lays a strong foundation for students to acquire technical knowledge in the areas of security, databases, operating systems, business intelligence, and web technologies.

B.Sc. Information Technology Programme

(To be implemented from Academic Year- 2024-25)

Semester I			
Course Code	**Course Type**	**Course Title**	**Credit**
U24IT1MJ01	Major	Imperative Programming using C	3
U24IT1MJP01		Imperative Programming using C Practical	1
U24IT1MJ02	Major	Computational Logic and Discrete Structures	1
U24IT1MJP02		Computational Logic and Discrete Structures Practical	1
U24MMC1E01	OE1	Media Literacy (Offered by BAMMC Department)	2
U24MMC1E02	OE2	Content Writing (Offered by BAMMC Department)	2
U24IT1VSC01	VSC	Introduction to Operating Systems	2
U24IT1SEC01	SEC	Computer Organization and Architecture	2
U24IT1AEC01	AEC	Effective Communication Skills-1 (Offered by English Department)	2
U24IT1VEC01	VEC	Understanding Indian Society and Constitutional Values	2
U24IT1IKS01 (Rev 26)	IKS	India's Contribution to Mathematics since Ages	2
Co-Curricular(Any one to be selected)			
U24CC1DLLE01	CC	Introduction to DLLE (Offered by DLLE)	2
U24CC1NSS01		NSS Paper-I (Offered by NSS)	
U24CC1TW01		Technical Writing Basics (Offered by Data Science)	
Total			22

Semester I

Major (Credit 3+1)

Imperative Programming using C

COURSE CODE : U24IT1MJ01 | **COURSE CREDIT: 03**

1 credit - 15 lectures | **1 lecture is 60 minutes**

Course Objectives:

The course will enable learners to:

1. To develop the logical ability of the student.
2. To implement different programming constructs and decomposition of problems into Functions.
3. To execute and debug the code.

Course Outcomes:

Upon completion of the course, learners will be able to:

1. Describe the fundamentals of C programming Language.
2. Apply appropriate Control structures to solve problems.
3. Write User defined functions, apply the concept of recursion to solve problems, and implement functions for performing operations on Files.

UNIT	Topic	HRS
I	Introduction: Art of Programming through Algorithms and flowchart. Overview of C: History and importance of C, Computer Languages,The basic structure of C program, executing a C program. Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants Managing Input and Output Operations: Reading a Character, Writing a Character, Formatted Input, and Formatted Output. Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence, and Associativity.	15

II	Decision Making and Branching: Introduction, Decision Making with different IF Statements, The Switch statement, The ternary operator Decision Making and Looping: Introduction, The while Statement, The do statement, The for statement, Jumps in loops (break, continue, and go to). Arrays: Basic concepts, One-dimensional Arrays,Bubble sort, Linear search, Two-dimensional Arrays, programs on Pattern Display	15
	Character Arrays and Strings: Concepts, String Input/Output function, String-handling Functions (with and without using built-in string functions)	
III	User-defined Functions: basics, user-defined functions, actual and formal arguments, parameter passing techniques, scoping, inter-function communication (call by value, call by reference), Recursion, storage classes. Pointers: Introduction, pointers with the array, pointers with functions, dynamic memory allocation. Structures: Introduction, Defining a structure, declaring structure variables, accessing structure members, structure initialization, and the array of structures. Introduction to Union. File Management in C: Introduction, Defining and Opening a File, Closing a file, Input/output and Error Handling on Files. .	15

References:

1. Let Us C, Yashavant Kanetkar,Edition 8th, BPB publication, 2007.
2. Absolute beginner's guide to C, Greg M. Perry, Edition 2, Publisher: Sams Pub., 1994.
3. Programming Language ,Brian Kernighan and Dennis Ritchie, Edition 2nd , PHI publication,1988.
4. "Programming in ANSI C", Balaguruswamy, McGraw Hill Education, 8th Edition, 2019.

Imperative Programming using C Practical

COURSE CODE : U24IT1MJP01 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Sr. No.	List of Practicals
1	a.Write an algorithm and flowchart to check whether a number is positive or negative.
	b.Write an algorithm and flowchart to perform the addition of the first 10 natural numbers.
2	a. Write a program to declare variables of types int, float, and double. Assign some values to these variables and display these values.
	b.Write a program to perform arithmetic operations.
	c.Write a program to calculate the cube of a number.
3	a.Write a program to calculate simple interest.
	b.Write a program to find the area and perimeter of a circle.
	c.Write a program to find the volume of a cube, sphere, and cylinder.
4	a.Write a program to implement increment and decrement operators.
	b.Write a program to implement conditional operators.
	c.Write a program to swap two numbers without using a third variable.
5	a. Write a program to check whether the entered character is a vowel or consonant, using the switch case.
	b. Write a program to check whether the number is even or odd.
	c.Write a program to check whether the number is positive, negative, or zero.
	d.Write a program to find the largest of three numbers.
6	a. Write a program to print the pattern of asterisks as shown below :
	1
	1 2
	1 2 3
	1 2 3 4
	b. Write a program to print the pattern of asterisks as shown below :
	* * * * *
	* * * *
	* * *
	* *
	*
7	a.Write a program to check whether the entered number is prime or not, using a function.

	b.Write a program to create functions to accept and display the data from the user.

	c.Write a program to display the Fibonacci series using function.
8	a.Write a program to display reverse numbers using a function.
	b.Write a program to find the factorial of a number using a recursive function.
	c.Write a program to find the sum of natural numbers using a recursive function.
9	a.Write a program to demonstrate the use of pointers.
	b.Write a program to perform addition and subtraction of two pointer variables.
	c.Write a program to pass a pointer as an argument.
10	a.Write a program to sort the numbers.
	b.Write a program to perform matrix addition.
11	a.Write a Program to create a structure Student to accept and display details.
	b. Write a Program to create a structure Employee and calculate the total salary of employees.
12	Write a Program to implement Union.
13	Write a Program using string handling functions.
14	Write a Program to implement file handling.
15	Write a Program using command line arguments.

Major (Credit 1+1)
Computational Logic and Discrete Structures

COURSE CODE: U24IT1MJ02 | **COURSE CREDIT: 01**

1 credit - 15 lectures | **1 lecture is 60 minutes**

Course Objectives:

1. This course will provide an overview of Discrete Mathematics.
2. This course will enhance prospective learners' reason and ability to articulate mathematical problems.
3. This program will develop an attitude to solve problems based on graphs and trees, which are widely used in software.

Course Outcome:

Learners will be able to:

1. Define sets and relations.
2. Apply recursive functions and recurrence relations.
3. Apply basic and advanced principles of counting.
4. Use graphs and trees.

Unit	Topic	Hrs.
I	**Set Theory and Relations** Introduction, Sets and Elements, Subsets, Vein Diagram, Set Operations, Product Sets, Relations, Pictorial Representation of Relations, Composition of Relations, Types of Relations, Equivalence Relations, Partial Order Relations. **Functions** Introduction, Functions, One-to-One, Onto, Invertible Function, Recursively Defined Functions. **Techniques of Counting, Recursion** Introduction, Basic Counting Principles, Permutations, Combinations, Pigeonhole Principle, Inclusion-Exclusion Principle, Recurrence Relation, Linear Recurrence Relation with Constant Coefficients, Solution of Linear Homogeneous Recursion with Constant Coefficient. **Graphs and Trees** Introduction, Graph Terminologies and Special types of Graphs,Trees Definition, Tree Terminologies, Binary Tree.	15

References:

1. Discrete Mathematics and Its Applications Fifth Edition, by *Kenneth H. Rosen*, Tata McGraw-Hill, 2003.
2. Discrete Mathematics Revised Third Edition, by *Seymour Lipschutz and Marc Lars Lipson*, Schaum's Outlines, 2013.
3. Foundation of Discrete Mathematics Second Edition, by *K D Joshi*, New Age International Publishers, 2014.
4. Discrete Structures by *Liu*, McGraw-Hill.

Computational Logic and Discrete Structures Practicals

COURSE CODE : U24IT1MJP02 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Sr.No.	List of Practicals
1	Perform the implementation of a Cardinality and Polynomial Evaluation.
2	Perform the implementation of a Power Sets.
3	Practical based on Hasse Diagram.
4	Perform the implementation of a Recursively defined function.
5	Perform the implementation of an Inclusion Exclusion principle.
6	Perform the implementation of a Mathematical Induction.
7	Perform the implementation of a Sum rule Principle.
8	Perform the implementation of a Product rule Principle
9	Perform the implementation of Binomial coefficients.
10	Perform the implementation of a Permutations.
11	Perform the implementation of a Combination.
12	Perform the implementation of an Adjacency matrix and Incidence matrix.
13	Perform the implementation of a Path matrix.
14	Practical based on Inserting and Deleting in a Binary Search Tree.
15	Practical based on Depth-First Search and Breadth-First Search Algorithms.

Note: The above practicals will be implemented using Scilab wherever applicable.

Open Elective (4 credit)
Introduction To Computers

COURSE CODE: U24ITE01 **COURSE CREDIT: 04**

1 credit - 15 lectures

1 lecture is 60 minutes

Course Objectives:

1. To understand the basics of Computer Systems.
2. To study MS-Office basics.
3. To study basics of Internet and Security
4. Understand basic Web page designing using HTML.

Course Outcome:

1. To help learners make industry ready and will help learners to be aware of the minimum requirement of the software when stepping out into the industry and it also allows them to choose their stream.
2. To introduce the basic software and the importance of privacy, threats concepts to make the learners understand what goes behind the scene.
3. To help learners work on small-scale website designing projects during the academic period.

Sr. No	Syllabus	No. of lectures
01	**Module -1- Introduction to Basics of Computers** Basic structure of a PC, Functionalities of a computer Computer Components : HARDWARE AND SOFTWARE. Classification of Computers, Input/ output devices. Memory, storage, storage devices, RAM, ROM, Processor, Hard Disk. System Software & Application Software: System software Vs. Application Software, Application software :Types and Examples.Operating Systems, Windows Operating System, Windows basics.Networking Basics -Introduction to networks, Types of networks (peer to peer, client server, LAN, WAN, VPN, etc.), Topologies	15
02	**Module -2- MS Office2010 -Word, Excel, Powerpoint** **Word 2010**-Creating, Saving documents, Editing documents-Editing documents (formatting characters, lines and paragraphs, section & Page Breaks, Headers & Footers, Tool, index) Language Tools (spelling, grammar thesaurus) Inserting images, cut, copy, paste Creating Tables Mail merge, Use Templates- Using Existing Template, Create New Template, Use Graphics- Adding Picture,	15

	WordArt in Document **Excel 2010-** Introduction to spreadsheet, rows, columns, cell address, Workbook, worksheet Entering data, Formulae, functions, Editing sheets, Formatting. Finding, replacing and filling data **Powerpoint 2010-** Introduction to presentations, create, save Types of presentation layouts, slides, outlines, slide sorter, presentation, Formatting, Tables, Cliparts, pictures, Animation (preset, custom) Setting up slide show, timings on clicks, hyperlinks, etc. Inserting images, videos and sounds.	
03	**Module-3 – Introduction to Internet and Threats** Using the Internet -Surfing the net, Researching on the net, Domain names, URL and parts of a URL. Types of websites - Static and Dynamic websites, Portals .Services (email, search engines, ftp, etc.) Searching on the web, keywords etc., Internet Security, threats, legal challenges – copyright issues, technology issues, political issues, social issues; economic issues – ethical issues Importance of internet in media, effect of internet on journalism, Newsrooms and the internet, internet and research, journalists and the internet. Media and Internet: advantages, limitations. Internet Ethics and Safety Judging Information Value-Plagiarism, Security and Privacy Threats and Types of threats –Virus , Phishing ,Spyware, Spam	**15**
04	**Module-4 – Introduction to HTML and Elements of HTML** What is HTML? HTML Documents Basic structure of an HTML document, Creating an HTML document, Mark up Tags Heading-Paragraphs, HTML Tags. Introduction to elements of HTML .Working with Text Working with Lists and Tables ,Working with Hyperlinks, Images	**15**

References:

1. Computer Fundamentals, P. K. Sinha, BPB Publications, Sixth Edition.
2. MS-OFFICE 2010 Training Guide Prof. Satish Jain, M. Geetha, Kratika BPB Publications.
3. Teach Yourself Microsoft Office 2000 in 24 Hours by Perry Greg M.
4. Web Design The Complete Reference Thomas Powell Tata McGraw Hill
5. Computer Basics Absolute Beginner's Guide By Michael Miller and Mike Miller
6. P.Mohan computer fundamentals- Himalaya Publications

SCHEME OF EXAMINATION

The scheme of examination shall be divided into two parts:

- **Internal assessment 40% i.e. 40 marks**
- **Semester end examination 60% i.e. 60 marks**

(A) Internal Assessment 40 marks

Description	Marks
Internal tests of 20 marks each Q.1 Multiple choice Questions/True or False - 10 Marks Q.2. Attempt 2 questions out of 3 questions (5 marks each)- 10 Marks	20
One Project and Viva voce/Presentation/Case studies/Assignments	15
Attendance and Class behavior	5
Total	40

B) Semester end examination 60 marks

PAPER PATTERN

Duration : 2 hours	
Total Marks: 60	
Q.1 12 marks OR 12 marks	12
Q.2 12 marks OR 12 marks	12
Q.3 12 marks OR 12 marks	12
Q.4 12 marks OR 12 marks	12
Q.5 12 marks OR 12 marks Three short notes of 4 marks each or Case study	12
Total	60
Note: 1. Q.1, 2, 3 and 4 - 12 marks question may be divided into sub questions if required. 2. Q.5 May include theory (short notes) /Case Study in one of the options.	

Passing criteria: Minimum 40% in Internal (16 out of 40) and 40% (24 out of 60) in semester end examination.

Vocational Skill Course (Credit 2)
Introduction to Operating Systems

COURSE CODE: U24IT1VSC01 **COURSE CREDIT: 02**

1 credit - 15 lectures

1 lecture is 60 minutes

Course Objectives:

The objective of this course is to

1. To understand the basics and functions of operating systems.
2. To understand processes and threads
3. To study scheduling algorithms and process synchronization.

Course Outcomes:

On successful completion of the course learner will be able to:

1. To gain knowledge on the fundamentals of Operating systems.
2. Analyze various scheduling algorithms and process synchronization.

Unit	Topic	Hrs.
I	**Introduction** **Operating System**-Introduction, Types of Operating System, Operating System services. **Processes**: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching **Thread**: Definition, Various states, Benefits of threads, Types of threads, Concept of Multithreads.	15
II	**Process management** **Process Scheduling**: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; **Scheduling algorithms**: Pre-emptive and Non-pre-emptive, FCFS, SJF, RR;Multiprocessor scheduling: Real-Time scheduling: RM and EDF. **Inter-process Communication**: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer/Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem	15

References:

1. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, AddisonWesley 2002
2. Operating Systems – Internals and Design Principles,9th Edition by Willaim Stallings Pearson 2009
3. Modern Operating System ,4th Edition by Andrew S.Tanenbum and Herbert BOS.Pearson 2015

Skill Enhancement Course (Credit 2)
Computer Organization and Architecture

COURSE CODE:U24IT1SEC01 | **COURSE CREDIT: 02**

1 credit - 15 lectures | **1 lecture is 60 minutes**

Course Objectives:

The objective of this course is to

1. Impart concepts of basic structure and operation of a digital computer.
2. Familiarize students with basic CPU organization, I/O devices and memory management.
3. Introduce students to problem solving using binary arithmetic.
4. Learn about the importance of programming languages.

Course Outcomes:

On successful completion of the course learner will be able to:

1. Identify various components of a computer and their interconnection.
2. Comprehend the design of the CPU:processor and memory, and its interaction with I/O.
3. Solve problems using Binary Arithmetic.
4. Write simple program code using algorithms and programming languages.

UNIT	Topic	HRS
I	**Computer Basic:** Algorithms, a simple model of computer, characteristics of computers, Problem solving using computers. **Data Representation:** Representation of characters in computers, Representation of Integers, Representation of Fractions,Hexadecimal Representation of Numbers,Decimal to Binary Conversion, Error-detecting Codes **Input/Output Units:** Description of Computer Input units,Other Input Methods, Computer Output Units **Processor**: Structure of Instructions, Description of a processor, a Machine Language program, an algorithm to simulate the Hypothetical Computer.	15
II	**Computer Memory**: Memory Cell, Memory Organization, Read Only Memory, Serial Access Memory, Physical Devices used to construct memories, Magnetic Hard Disk, Floppy Disk Drives, Compact Disk Read Only Memory(CDROM), Magnetic Tape Drives. **Binary Arithmetic:** Binary Addition, Binary subtraction, Signed Numbers, Two's complement representation of numbers, Addition/Subtraction of numbers in 2's complement notation, Binary multiplication, Binary division, Floating Point Representation of Numbers. **Computer Architecture**: Interconnection of Units, processor to memory communication, I/O to Processor Communication, Interrupt Structures, Multiprogramming, Virtual Memory. **Interfacing:** Memory Interfacing IO Interfacing , Direct Memory Access	15

References:

1. Fundamentals of Computers by V. Rajaraman, 6th Edition.
2. Computer Organization and Architecture by William Stallings, 9th Edition
3. Computer System Architecture by M. Morris Mano, 3rd Edition
4. Computer Architecture and Organization by John P Hayes, 3rd Edition

Indian Knowledge System (Credit 2)
India's Contribution to Mathematics since Ages

COURSE CODE: U24IT1IKS01
1 credit - 15 lectures

COURSE CREDIT: 02
1 lecture is 60 minutes

Course Objectives:

1. To make students aware about the contribution of India to Mathematics.
2. To make students aware about the several methods of ancient mathematics that will enhance their speed and accuracy in various competitive and placement exams.

Course Outcome:

1. Learners will be able to know about the contribution of Indian mathematicians and they will be able to apply several tricks and techniques of Vedic mathematics.

UNIT	Topic	HRS
I	The Non-zero Indian Contribution to Mathematics The Indian Number System, The Baudhayana-Pythagoras Theorem, The Mathematics of Language, The Sine Function in Trigonometry, Negative Number, Solution to Quadratic Equations, The Virahanka-Fibonacci Sequence, Binomial Distribution, First Exact Formula for Pie, Geometric Construction with Compass and unmarked Straightedge. Indian Mathematician and their Contribution Aryabhata, Brahamagupta, Mahavira, Bhaskara, Ramanujan, Madhava.	15
II	Sutras Ekadhikena Purvena, Urdhva – tiryagbhyam, Nikhilam navatascaramam Dasatah, Paravartya Yojayet, Sunyam Samya Samuccaye, Anurupye Sunyamanyat, Sankalana Vyavakalanbhyam, Ekanyunena Purvena, Yavadunam Tamadun Kartya Varganca Yojayet. Vedic Computation Beejank, Vinculum Numbers, Simultaneous Linear Equations, Magic Squares, Dates and Calendars	15

References:

1. Vedic Mathematics Made Easy by *Dhaval Bhatiya*, Jaico Publishing House.rtfgh
2. Vedic Mathematics by *Bharathi Krishna Tripathi*, Motilal Banarsidass Publisher.
3. Cultures and History of Mathematics, by C. S. Seshadri, Hindustan Book Agency.
4. Contributions to the History of Indian Mathematics by *Gerard G. Emch, R. Sridharan and M. D. Srinivas*

REVISED SCHEME OF EXAMINATION FOR IKS

Subject: India's Contribution to Mathematics since Ages

(for 50 marks ,2 credits)

Description	Marks
Activity I	15
Activity II	15
Presentation	15
Attendance and Class Participation	05
Total	50

Passing Criteria 40% (20 out of 50)

Revised Scheme of Examination
Faculty of Science
(Undergraduate Programme)

SCHEME OF EXAMINATION (for 100+50 marks 3+1 credits)

The scheme of examination shall be divided into two parts:

- **Internal assessment 40% i.e.40 marks**
- **Semester end examination 60% i.e.60 marks**

(A)Internal Assessment 40 marks

Description	Marks
An internal test of 20 marks Q.1 a. Multiple choice Questions - 05 Marks b. True/False - 05 Marks Q.2. Attempt 2 questions out of 3 questions (5 marks each) - 10 Marks OR **Online MCQ test**	20
Presentation/Case Studies/Assignments	15
Attendance and Class Participation	5
Total	40

B) Semester End examination 60 marks

Duration: 2 hours	
Total Marks:60	
Q.1 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Q.2 15 marks OR 15 marks (7 and 8 marks)-Unit 2	15
Q.3 15 marks OR 15 marks (7 and 8 marks)-Unit 3	15
Q.4 15 marks-attempt any 3 out of 6 (from Unit 1, Unit 2, Unit 3)	15
Total	60

C) Semester end Practical examination 50 marks

Duration: 2.5 hours	
Total Marks:50	
Q.1 Practical Q1	20
Q.2 Practical Q2	20
Viva	05
Journal	05
Total	50

Passing criteria: Minimum 40% in Internal (16 out of 40) , 40% (24 out of 60) in semester-end examination,40%(20 out of 50)in Practical Examination.

SCHEME OF EXAMINATION

(for 50 marks ,2 credits Subject without Practical)

The scheme of examination shall be divided into two parts:

- **Internal assessment 40% i.e.20 marks**
- **Semester end examination 60% i.e.30 marks**

(A)Internal Assessment 20 marks(Theory)

Description	Marks
An internal test of 10 marks Q.1 Multiple choice Questions/True or False - 05 Marks Q.2. Attempt 1 questions out of 2 questions (5 marks each) - 05 Marks OR **Online MCQ test**	10
Presentation/Case Studies/Assignments	05
Attendance and Class Participation	05
Total	20

B) Semester End examination 30 marks

Duration: 1 hour	
Total Marks:30	
Q.1 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Q.2 15 marks OR 15 marks (7 and 8 marks)-Unit 2	15
Total	30

Passing criteria: Minimum 40% in Internal (08 out of 20) and 40% (12 out of 30) in semester-end examination.

SCHEME OF EXAMINATION

(for 50 marks ,2 credits (1+1) Subject with Practical)

The scheme of examination shall be divided into two parts:

A) Semester End examination 30 marks

Duration: 1 hour	
Total Marks:30	
Q.1 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Q.2 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Total	30

(B)Internal Assessment 20 marks(Practical)

Description	Marks
Practical Question	10
Journal	05
Viva	05
Total	20

Passing criteria: Minimum 40% in Internal (08 out of 20) and 40% (12 out of 30) in semester-end examination.

Passing Standards

The learners to pass a course shall have to obtain a minimum of 40% marks in each head of passing, consisting of Internal Assessment and Semester End Examination. The learners shall obtain a minimum of 40% marks (i.e. 16 out of 40 or 8 Out of 20) in the Internal Assessment and 40% marks in the Semester End Examination (i.e. 24 Out of 60 or 12 Out of 30) separately, to pass the course and a minimum of Grade D, wherever applicable, to pass a particular semester. A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

AC: 21/02/2026
Item No.:

SIES (Nerul) College of Arts, Science & Commerce (Autonomous)
RISE WITH EDUCATION

SIES (Nerul) College of Arts, Science and Commerce (Autonomous)
Syllabus for Approval
B.Sc. (Information Technology)

Sr. No.	Heading	Particulars
1	Title of the course	B. Sc.(Information Technology)
2	Eligibility for admission	Shall have passed XII standard examination of the Maharashtra Board of Higher Secondary Education or its equivalent with Mathematics and/ or Statistics as one of the subjects
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8	Status	New
9	To be implemented from	From Academic year 2024-25 in a progressive manner

Date: 28th January, 2026.

Signature :

Dr. Koel Roychoudhury
AC Chairperson

Dr. Meghna Bhatia
Head of theDepartment

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SIES (Nerul) College of Arts, Science & Commerce

RISE WITH EDUCATION

SIES (Nerul) College of Arts, Science and Commerce (Autonomous)
(Affiliated to University of Mumbai)
RE-ACCREDITED GRADE "A" BY NAAC (3rd CYCLE)
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SYLLABUS FOR
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(WITH EFFECT FROM THE ACADEMIC YEAR 2024-2025)

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PO2: To identify mathematical, Graphical, digital circuitry and embedded system concepts of core concepts of Information Technology.

PO3: To enhance the technical, testing and research oriented approach required to implement the current trending practices in the field of Computer science and Technology.

PO4: The program lays a strong foundation for students to acquire technical knowledge in the areas of security, databases, operating systems, business intelligence, and web technologies

B.Sc. Information Technology Programme

(To be implemented from Academic Year- 2024-25)

Semester II			
Course Code	**Course Type**	**Course Title**	**Credit**
U24IT2MJ01	**Major**	Functional Programming	3
U24IT2MJP01		Functional Programming Practical	1
U24IT2MJ02	**Major**	Microprocessor System: Architecture and 8085 Programming	2
U24IT2MI01	**Minor**	Calculus	1
U24IT2MIP01		Calculus Practical	1
	OE	To be Opted from the List	4
U24IT2VSC01	**VSC**	Database Management System	1
U24IT2VSCP01		Database Management System Practical	1
U24IT2SEC01	**SEC**	Web Application Development	1
U24IT2SECP01		Web Application Development Practical	1
U24IT2AEC01	**AEC**	Effective Communication Skills-2	2
U24IT2VEC01	**VEC**	Green IT	2
U24CC2NSS02	**CC (any 1)**	NSS Paper-II	2
U24CC2SP02		Training in Sports	
U24CC2DLLE02		NGO Collaboration	
U24CA2CC01		Co-Curricular Course in Cultural Activities	
Total			**22**

Open Elective (To be Opted)

Sr. No.	Course Code	Course Title	Credits
1	U24ICE2E01	Fundamental Aspects of Education (Offered by SIES Comprehensive Education Department)	2
2	U24BI2E01	Basics of Banking (Offered by BBI Department)	2
3	U24MS2E01	Personality Skill Development (Offered by B.MS Department)	2
4	U24MMC2E01	Film Appreciation (Offered by BAMMC Department)	2
5	U24IT1E01	E -Commerce (Offered by BSc.I.T Department)	2
6	U24IT1E02	Customer Relationship Management (Offered by BSc.I.T Department)	2

Major Department Specific Course (Credit 3+1)

Functional Programming

Course Code: U24IT2MJ01 **Course Credit: 03**

1 credit - 15 lectures **1 lecture is 60 minutes**

Course Objectives:

The course will enable learners to Understand functional programming concepts

1. The course is designed to provide Basic knowledge of Python.
2. Express proficiency in the handling of strings and functions.
3. Be able to program using more advanced features of Python.

Course Outcomes:

Upon completion of the course, learners will be able to:

1. Implement the variables, expressions, looping, and conditions used in Python programming.
2. Apply the knowledge of functions and strings.
3. Create functions, strings, lists, tuples, and directories.

Module	Topics	Lectures
1	**Introduction to Python:** The Python Programming Language, History, features, Installing Python, Running Python program, Debugging : Syntax Errors, Runtime Errors, Semantic Errors, Experimental Debugging, Formal and Natural Languages, The Difference Between Brackets, Braces, and Parentheses, **Variables and Expressions :**Values and Types, Variables, Variable Names and Keywords, Type conversion, Operators and Operands, Expressions, Interactive Mode and Script Mode, Order of Operations. **Conditional Statements:** if, if-else, nested if –else **Looping**: for, while, nested loops **Control statements:** Terminating loops, skipping specific conditions	15
2	**Functions:** Function Calls, Type Conversion Functions, Math Functions, Composition, Adding New Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters Are Local, Stack Diagrams, Fruitful Functions and Void Functions, Why Functions? Importing with from, Return Values, Incremental Development, Composition, Boolean Functions, More Recursion, Leap of Faith, Checking Types	15

	Strings: A String Is a Sequence, Traversal with a for Loop, String Slices, Strings Are Immutable, Searching, Looping and Counting, String Methods, The in Operator, String Comparison, String Operations. **Exceptions:** Built-in Exceptions, Handling Exceptions, Exception with Arguments, User-defined Exceptions.	
3	**Lists:** Values and Accessing Elements, Lists are mutable, traversing a List, Deleting elements from List, Built-in List Operators, Concatenation, Repetition, In Operator, Built-in List functions and methods **Tuples and Dictionaries:** Tuples, Accessing values in Tuples, Tuple Assignment, Tuples as return values, Variable-length argument tuples, Basic tuples operations, Concatenation, Repetition, in Operator, Iteration, and Built-in Tuple Functions Creating a Dictionary, Accessing Values in a dictionary, Updating Dictionary, Deleting Elements from Dictionary, Properties of Dictionary keys, Operations in Dictionary, Built-In Dictionary Functions, Built-in Dictionary Methods **Files:** Text Files, The File Object Attributes, Directories **Regular Expressions**: Concept of regular expression, various types of regular expressions, using the match function.	15

References:

1. Think Python ,Allen Downey, O'Reilly Publication,1st Edition,2012.
2. An Introduction to Computer Science using Python 3,Jason Montojo, Jennifer Campbell, Paul Gries, SPD Publication,1st Edition ,2014.
3. Introduction to Problem solving with Python, E. Balagurusamy, Tata Mcgraw Hill Publication,1st Edition ,2015.
4. Object-Oriented Programming in Python, Michael h. Goldwasser, David Letscher, Pearson Prentice Hall,1st Edition,2008.
5. Exploring Python, Budd, Tata Mcgraw Hill Publication,1st Edition ,2016.

Functional Programming Practical

Course Code : U24IT2MJP01 **Course Credit: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Course Objectives:

The main objective of this laboratory is to put into practice computational thinking. The students will be expected to write, compile, run and debug Python programs to demonstrate the usage of :

1. variables, conditionals and control structures .
2. functions (both recursive and iterative) ,strings, exception handling
3. basic data types as well as compound data structures such as strings, lists, sets, tuples, and dictionaries.

Course Outcomes:

Learners will be able to understand real world problem and can implement different functional programming concepts to solve it.

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.
b	Enter the number from the user and depending on whether the number is even or odd, print out an appropriate message to the user.
c	Write a program to generate the fibonacci series.
2	**Write the program for the following:**
a	Write a program to find the greatest number among the three.
b	Write a program to display class based on the percentage.
3	**Write the program for the following:**
a	**Write a program to display following pattern**
	1
	1 2
	1 2 3

	1 2 3 4
b	**Write a program to display following pattern**
	* * *
	* *
	*
4	**Write the program for the following:**
a	Write a program to implement break and continue statement.
b	Write a program to perform sum of ten even numbers.
5	**Write the program for the following:**
a	Write a function that reverses the user defined value.
b	Write a function to check if the input value is Armstrong and also write the function for Palindrome.
c	Write a recursive function to print the factorial for a given number.
6	**Write the program for the following:**
a	Write a function that takes a character (i.e. a string of length 1) and returns True if it is a vowel, False otherwise.
b	Define a function that computes the length of a given list or string.
7	**Write the program for the following:**
a	Program with function to find GCD of two integers.
b	Program with to convert decimal number to Binary equivalent
c	Program with a function to find how many numbers are divisible by 2, 3,4,5,6 and 7 between 1 to 1000

8	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:
	****
	*********
	*******
9	**Write the program for the following:**
a	A program 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.
b	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.
10	**Write the program for the following:**
a	Write a program to create and access the value of Python tuple.
b	Write a python code to construct tuple from string and list
11	**Write the program for the following:**
a	Write a python program that takes two lists and returns True if they have at least one common member.
b	Write a Python program to print a specified list after removing the 0th, 2nd, 4th, and 5th elements.
c	Write a Python program to clone or copy a list.
12	**Write the program for the following:**
a	Write a Python script to sort (ascending and descending) a dictionary by value.

b	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}
c	Write a Python program to sum all the items in a dictionary.
13	**Write the program for the following:**
a	Write a Python program to read an entire text file.
b	Write a Python program to append text to a file and display the text.
c	Write a Python program to read the last n lines of a file.
14	**Write the program for the following:**
a	Write a python program to implement exception handling.
b	Write a python program to create user define exception.
15	**Write the program for the following:**
a	Write a python code to match the pattern: any five letter string starting with a and ending with s.
b	Write a Python code to find all Adverbs and their positions in the string.

Major Department Specific Course (Credit 2)
Microprocessor System: Architecture and 8085 Programming

Course Code : U24IT2MJ02 **Course Credit :02**

1 Credit - 15 lectures **1 lecture is 60 minutes**

Course Objectives:

1. To understand the basic concept of microcomputer systems
2. To develop background knowledge in 8085 Microprocessor
3. To write Assembly language Programs of 8085

Course Outcomes:

Learners will be able to:

1. Understand the basic concepts of microcomputer systems.
2. Understand the architecture and hardware aspects of 808 and Write assembly language programs in 8085.

UNIT	Topics	HRS.
I	**Microprocessor, Microcomputers, and Assembly Language:** Microprocessor, Microprocessor Instruction Set and Computer Languages, From Large Computers to Single-Chip Microcontrollers, Applications. **Microprocessor Architecture and Microcomputer System:** Microprocessor Architecture and its operations, Memory, I/O Devices, Microcomputer System, Logic Devices and Interfacing, Microprocessor-Based System Application. **Microprocessor Architecture and Memory Interface:** Introduction, 8085 Microprocessor unit, 8085-Based Microcomputer, Memory Interfacing, Interfacing the 8085 Memory Segment. **Introduction to 8085 Assembly Language Programming:** The 8085 Programming Model, Instruction Classification, Instruction, Data, and Storage, Writing assembling and Execution of a Simple Program Overview of the 8085 Instruction Set, Writing and Assembling Program	15
II	**Introduction to 8085 Instructions:** Data Transfer Operations, Arithmetic Operations, Logic Operation, Branch Operation, Writing Assembly Languages Programs **Programming Techniques With Additional Instructions:** Programming Techniques: Looping, Counting and Indexing, Additional Data Transfer and 16-Bit Arithmetic Instructions, Arithmetic Instruction Related to Memory, Logic Operations: Rotate, Logical Operations: Compare. **Counters and Time Delays:** Counters and Time Delays, Illustrative Program: Hexadecimal Counter, Illustrative Program: zero-to-nine (Modulo Ten) Counter, Generating Pulse Waveforms.	15

	Stacks, Sub-Routines and Interrupts: Stack, Subroutine, Restart, Conditional Call, Return Instructions, the 8085 Interrupt, 8085 vectored Interrupts.	

References:

1. Microprocessors Architecture, Programming and Applications with the 8085 (5th Edition):Ramesh Gaonkar, Penram ,2012.
2. 8080A/8085 Assembly language programming :Lance A. Leventhel ,Osborne,1978.
3. Embedded Systems(3rd Edition):Rajkamal, Tata Mcgraw-Hill,2009.
4. Introduction to embedded systems(1st Edition): Shibu K V ,Tata Mcgraw-Hill,2012.

Minor (Credit 1+1)
Calculus

Course Code: U24IT2MI01 **Course Credit: 01**

1 credit - 15 lectures **1 lecture is 60 minutes**

Course Objectives:

1. This course will provide an overview of basic concepts as function, limit and continuity.
2. This course will give an elaborate idea about sequences and its behavior.
3. This course will enhance the understanding of derivatives by applying it to understand the behavior of a function.

Course Outcome:

Learners will be able to:

Plot the polynomials.

1. Understand the behavior of function.
2. Analyze the behavior of a sequence.
3. Apply the application of derivatives to real life problems.

Module	Details	Lectures
I	**Limit, Continuity and Sequence:** Definition of limit, Right hand and left hand limit, Definition of Continuity, Definition of sequence, Important examples, Bounded sequence, Increasing and Decreasing sequence, Sandwich theorem (Only statement), Convergence of Sequence. **Derivatives and its Applications:** Derivative of a function, Derivative In Graphing And Applications: Analysis of Functions: Increase, Decrease, Concavity, Relative Extrema; Graphing Polynomials, Absolute Maxima and Minima, Applied Maxima and Minima Problems, Newton's Method.	15

References:

1. Calculus: Early transcendental (10th Edition): Howard Anton, Irl Bivens, Stephen Davis, John Wiley & sons, 2012.
2. Calculus and analytic geometry (9th edition): George B Thomas, Ross L Finney, Addison Wesley, 1995.
3. Calculus: Early Transcendentals (8th Edition): James Stewart, Brooks Cole, 2015. 3. Calculus (10th Edition): Ron Larson, Bruce H. Edwards, Cengage Learning, 2013.
4. Thomas' Calculus (13th Edition): George B. Thomas, Maurice D. Weir, Joel R. Hass, Pearson, 2014.

Calculus Practical

Course Code: U24IT2MIP01 **Course Credit: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Note: The following practicals are to be taken as tutorial as well as by using Geogebra.

Sr. No.	List of Practicals
1	Practical based on the functions of one and multiple variables, its domain and range and operations on functions.
2	Practical based on problems of limit.
3	Practical based on left hand limit and right hand limit.
4	Practical based on continuity of a function at a point.
5	Practical based on the examples of the sequence.
6	Practical based on bounded sequence.
7	Practical based on increasing and decreasing sequence.
8	Practical based on convergent sequence.
9	Practical based on sandwich theorem.
10	Practical based on graphing of polynomials.
11	Practical based on increasing and decreasing function.
12	Practical based on concavity and inflection points.
13	Practical based on maxima and minima
14	Practical based on applied maxima and minima.
15	Practical based on Newton's method.

Open Elective - I

E-Commerce

Course Code: U24IT1E01 **Course Credit:02**

1 credit - 15 lectures **1 lecture is 60 minutes**

Course Objective:

- To provide students with an overview and understanding of e-commerce with a specific emphasis on processes of developing and implementing information systems.
- To explore the major issues associated with e-commerce-security, privacy, intellectual property rights, authentication, encryption, acceptable use policies, and legal liabilities.

Learner Outcomes:

- Obtain a general understanding of basic business management concepts. Have complete knowledge about basic technical concepts relating to E-Commerce. Obtain thorough understanding about the security issues, threats and challenges of E-Commerce.

Module	Topics	Lectures
I	Introduction, History of Electronic Commerce and Business Information Exchange, A framework for electronic commerce,Impact of Internet on Commerce , Impact of E Commerce, E-Commerce advantage to stakeholders , E-Commerce disadvantages and Electronic Data Interchange. Business Models for E-commerce: The Birth of Portals – E-Business Models – Business-toConsumer (B2C) – Business-to-Business (B2B) – Consumer-to Consumer (C2C) – Consumer To-Business (C2B) – Brokerage Model – Value Chain Model – Advertising Model. E-marketing – Traditional Marketing Vs.E-Marketing – Impact of E-commerce on markets. India's Readiness for E Commerce,E Commerce Opportunities for Industries	15

II	Customer Effective Web -Designs and strategies for Website Development. Enabling Technologies for Web , Telnet, FTP, DNS, IPv6,ISP , Search Engine and its Working .Emarketing . E-Security: Security for E-commerce – Security Design – Analyzing risk – E-Banks and Security – Safety of E-Commerce – Secure Online Shopping – Firewalls– Virus Protection and Protection from intruders. E-payment Systems -Digital Tokens, Electronic Cash and Digital Signature Case Studies on the rise of ECommerce in India.	15

References:

1. Joseph P. T., E - Commerce – An Indian Perspective
2. David Whiteley , "E-Commerce Strategy, Technologies and Applications", Tata McGraw Hill, 2001. 2. Ravi Kalakota, Andrew B Whinston, "Frontiers of Electronic Commerce", Pearson 2006, 12th Impression

SCHEME OF EXAMINATION

The scheme of examination shall be divided into two parts:

- **Internal assessment 40% i.e. 20 marks**
- **Semester end examination 60% i.e. 30marks**

(A) Internal Assessment 20 marks

Description	Marks
Internal tests of 10 marks each Q.1 Multiple choice Questions/True or False - 5 Marks Q.2. Attempt 1 Question out of 2 Questions 5 Marks	**10**
One Project and Viva voce/Presentation/Case studies/Assignments	**10**
Total	**20**

B) Semester end examination 30 marks

PAPER PATTERN

Duration: 1 hour	
Total Marks: 30	
Q.1 Attempt Q1 a) or b) Q.2 Attempt Q2 a) or b) Q.3 Attempt Q3 a) or b)	**10** **10** **10**
Total	**30**
Note: Q1, 2, 3 - 10 marks questions may be divided into sub questions if required.	

Passing criteria: Minimum 40% in Internal (08 out of 20) and 40% (12 out of 30) in semester end examination.

Open Elective - V

Customer Relationship Management

Course Code: U24IT1E02
1 credit - 15 lectures

Course Credit: 02
1 lecture is 60 minutes

Course Objective:

- Comprehend the cuoncept and application of CRM and the benefits of CRM to companies and consumers.
- How to implement CRM best practices and technologies enhance the achievement of marketing, sales and service objectives throughout the customer life-cycle stages.
- How to use CRM tools for implementation of CRM in an organization.

Learner Outcomes:

- Apply the concept of CRM, the benefits delivered by CRM, the contexts in which it is used, the technologies that are deployed and how it can be implemented.
- Implement how CRM practices and technologies enhance the achievement of marketing, sales and service objectives throughout the customer life-cycle stages of customer acquisition, retention and development whilst simultaneously supporting broader organizational goals.
- Implement various technological tools for data mining and also successful implementation of CRM in the Organizations

Modules	Topics	Lectures
I	CRM: Definition, Emergence of CRM Practice, Factors responsible for CRM growth, CRM process, framework of CRM, Benefits of CRM, Types of CRM, Scope of CRM, Customer Profitability, Features Trends in CRM , CRM and Cost-Benefit Analysis, CRM and Relationship Marketing. CRM Concepts: Customer Value, Customer Expectation, Customer Satisfaction, Customer Centricity, Customer Acquisition, Customer Retention, Customer Loyalty, Customer Lifetime Value. Customer Experience Management, Customer Profitability, Enterprise Marketing Management, Customer Satisfaction Measurements, Web based Customer Support. BBA (Entrepreneurship)	15

II	Planning for CRM : Steps in Planning-Building Customer Centricity, Setting CRM Objectives, Defining Data Requirements, Planning Desired Outputs, Relevant issues while planning the Outputs, Elements of CRM plan, CRM Strategy: The Strategy Development Process, Customer Strategy Grid CRM Planning and Implementation: Issues and Problems in implementing CRM, Information Technology tools in CRM, Challenges of CRM Implementation. CRM Implementation Roadmap, Road Map (RM) Performance: Measuring CRM performance, CRM Metrics.	15

References:

1. Francis Buttle, Stan Maklan, Customer Relationship Management: Concepts and Technologies, 3rd edition, Routledge Publishers, 2015
2. Kumar, V., Reinartz, Werner Customer Relationship Management Concept, Strategy and Tools, 1st edition, Springer Texts, 2014

Vocational Course (VSC)

Database Management Systems

Course Code: U24IT2VSC01 **Course Credit: 01**

1 credit - 15 lectures **1 lecture is 60 minutes**

Course Objectives:

- To understand the concepts of Database systems
- To understand data models
- To understand relational schema

Learner Outcomes:

- Define and describe the fundamental of database architecture
- Learners will be able to understand relational database model
- Learners will be able to do complex queries

Sr. No	Syllabus	No. of lectures
Unit I	Introduction to Databases and Transactions What is database system, purpose of database system, view of data,relational databases, database architecture, transaction management Data Models The importance of data models, Basic building blocks, Business rules,The evolution of data models, Degrees of data abstraction. Database Design, ER Diagram Database design and ER Model: overview, ER Model, Constraints, ER Diagrams, weak entity sets, Codd's rules, Relational Schemas, Relational database model Logical view of data, keys, integrity rules.	15

References

1. Bayross, I. (2010) SQL, PI/SQL the Programming Language of Oracle. 4th edition. BPB Publications.
2. Elmsasri, R., & Navathe, S.(2017). Fundamentals of Database Systems. 7th edition. Pearson Education.
3. Silberschatz, A., Korth, H. F., & Sudarshan, S. (2011), Database System Concepts. 6th edition. Tata McGraw-Hill Education.

Course Name: Database Management Systems Practical

Course Code: U24IT2VSCP01 **Course Credit: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Sr. No.	List of Practicals
1	Defining data a. Using CREATE statement b. Using DROP statement c. Using TRUNCATE statement d. Using RENAME statement
2	Manipulating data a. Using INSERT statement b. Using UPDATE statement c. Using DELETE statement d. Using SELECT statement
3	Retrieve Data using the SQL SELECT Statement a. Select All Columns b. Select Specific Columns c. Use Arithmetic Operators d. Learn the DESCRIBE command to display the table structure
4	a. Write queries that contain a WHERE clause to limit the output retrieved b. Sort output in descending and ascending order
5	Creating and managing the tables
6	Creating table with constraints: a .NOTNULL, b. UNIQUE c. PRIMARY KEY d. FOREIGN KEY
7	a. Using DISTINCT, AS, SORT,LIKE,ISNULL, OR b. Using Group By, Having clause, Order By clause
8	Aggregate and Mathematical functions:

	a. AVG,MIN,MAX,SUM,COUNT b. ABS,SQRT,ROUND,MOD
9	Using the SET Operators a. Use ALL operator to return all rows from multiple tables c. Describe the INTERSECT operator and Use the INTERSECT operator d. Explain the UNION operator to return all rows from multiple tables and eliminate any duplicate rows b. Use the UNION A the MINUS operator and Use the MINUS operator
10	Join operation a. Inner Join b. Outer join c. Left and right Join
11	Use Subqueries to Solve Queries a. Describe the types of problem that subqueries can solve b. List the types of sub-queries
12	Other Schema Objects a. Create a simple and complex view b. Retrieve data from views
13	Create, maintain, and use sequences
14	Create and maintain indexes
15	Write a query using the following a. BETWEEN, d. IN and EXISTS

Skill Enhancement Course (SEC –Credit (1+1))

Web Application Development

Course Code: U24IT2SEC01 **Course Credit: 01**

1 credit - 15 lectures **1 lecture is 60 minutes**

Course Objectives:

- Understanding HTML5 and CSS Fundamentals
- Implementing Structural Elements and Styling Techniques
- Introduction to JavaScript for Interactivity

Learner Outcomes:

- Proficiency in HTML5 and CSS Basics
- Mastery in CSS Styling
- Basics of JavaScript Implementation

Sr. No	Syllabus	No. of lectures
Unit I	**Overview of HTML5** -Exploring new features of HTML5, Structuring an HTML Document, Creating an saving HTML document, Viewing an HTML document, Basic syntax, Basic text markup. **CSS** -Implementing Styles using CSS – Stylesheets, Formatting Text and Links using CSS, CSS Selectors, Changing Background, Adding Border. **List-** Introduction to list and types of list. **Tables-** Introduction to table, rowspan, colspan and attributes of table. **Frames:** Introduction To frames, using frames & frameset tags, named frames. **Forms-** Form controls **JavaScript**:Introduction, JavaScript Variables and Constants, Data Types, Comments, Operators, Statements.	15

References:

1. HTML, XHTML and CSS Bible, 5th Edition, Steven M. Schafer, Wiley-India Edition.
2. The Complete Reference HTML & CSS, 5th Edition, Thomas A. Powell, McGrawHill.
3. Beginning JavaScript, 4th Edition Paul Wilton, Jeremy McPeak, Wiley-India Edition.

Additional References:

1. Learning Web Design A Beginner's Guide to Html, CSS, JavaScript, And Web Graphics, 5th Edition, Jennifer Niederst Robbins, O'Reilly.
2. The Complete Reference JavaScript, 3rd Edition, Thomas A. Powell & Fritz Schneider, McGrawHill.

Practicals of Web Application Development

Course Code: U24IT2SECP01 **Course Credit: 01**

1 credit - 15 lectures **1 lecture is 60 minutes**

Sr.No.	Practicals
1	Create a web page using Character formatting tags such as B, I, U and so on.
2	Create a web page using font color, font face, font size, background color.
3	Create a web page using Paragraph tags such as P tag and BR tag.
4	Create a web page demonstrating different stylesheet types.
5	Create a web page demonstrating grouping selectors.
6	Create a web page using List types.
7	Create a web page using Table tags with rowspan, colspan, border, border size, border color and Image in a particular cell.
8	Create a web page using Form tag. (Hint: make use of text field, password field, e-mail, lists, radio buttons, checkboxes, submit button)
9	Create a web page using Frameset tag.
10	Using JavaScript, create a web page to display the largest integer among two integers. Take input from user.
11	Using JavaScript, create a web page to display the even and odd numbers between range. Take input from user.
12	Using JavaScript, create a web page to create a simple multiplication table asking the user input. Take input from user.
13	Using JavaScript, create a web page to Find the Factorial of a Number. Take input from user.
14	Using JavaScript, create a web page for a simple calculator.
15	Create a simple static website of five pages for BSc IT Department using HTML, CSS and JavaScript.

ABILITY ENHANCEMENT COURSE (AEC)

Effective Communication Skills-2

Course Code: U24IT2AEC01 **Course Credit: 02**

1 credit - 15 lectures **1 lecture is of 60 minutes**

Course Objectives:

1. To develop effective interpersonal skills among learners for corporate employability.
2. To develop effective business letter writing skills among students applicable in corporate world.
3. To develop professional skills among learners for better personality development.

Course Outcomes:

1. Learner will be able to apply interpersonal skills for better employability.
2. Learner will be able to utilize effective business letter writing skills required in corporate world.
3. Learner will be able to use specified oral and written skills for the professional development.

Sr.No	Syllabus	No. of lectures
01	**Module-1. Group Communication** Interview Skills: Preparing for Interview, Types of Interviews, Group Discussion: Nature and Ingredients, Process and Preparation, Corporate Meetings: Theory, Group Dynamics, Process of Conducting Meeting, Notice, Agenda and Minutes of Meeting, Conference: Types, Organization, Advanced Methods of conducting conferences	10
02	**Module-2. Business Correspondence -2** Trade Letters: Inquiry Letter, Complaint Letter, Adjustment Letter, Sales Letter, RTI and Consumer Grievance Letter ,Report Writing: Types of Report, Format of Report, Investigative Report, Feasibility Report	10
03	**Module-3. Language and Writing Skills:** Presentation Skills: Principles of Effective Presentation, Use of PPT Summarization: Identification of main points and sub points, Presenting in cohesive manner, Paraphrasing and summarizing	10

Reference Books:

1. A Handbook of Commercial Correspondence by Ashley, A, Oxford University Press, 1992.
2. Basic Business Communication: Skills for Empowering the Internet Generation by Raymond Lesikar and Marie Flatley,9th Edition, Tata McGraw Hill, New Delhi,2002.
3. Business Communication by D Chaturvedi and MukeshChaturvedi,Third Edition, Pearson Publications Ltd,2013.
4. Business Communication by Meenakshi Raman and Prakash Singh ,Oxford University Press,2007.

5. Business Communication Strategies by Monippally, Matthukutty, M,Tata McGraw Hill New Delhi,2001.
6. Effective Business Communication by Herta Murphy, Herbert Hildebrandt, JaneThomas,McGraw Hill Education,2009.
7. Effective Communication by Balan K.R. and Rayadu C.S., Beacon Publication, New Delhi, 1996.
8. Effective Technical Communication by M.Ashraf, Rizvi,McGraw Hill Publications,2006.

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SCHEME OF EXAMINATION

The scheme of examination shall be divided into two parts:

- **Internal assessment 40% i.e.20 marks**
- **Semester end examination 60% i.e.30 marks**

(A)Internal Assessment 20 marks

Description	Marks
* Continuous Evaluation	10
Project/ Activity Report /Assignments	5
Attendance and Class behavior	5
Total	20

**Application oriented activities will be conducted*

B) Semester end examination 30 marks

Question no.1	A) Descriptive Question OR B) Short Notes -2 out of 3 (5 Marks each) Module no.1	10 Marks
Question no.2	A) Descriptive Question OR B) Short Notes-2 out of 3 (5 Marks each) Module no.2	10 Marks
Question no.3	A) Descriptive Question OR B) Short Notes-2 out of 3 (5 Marks each) Module no.3	10 Marks

Passing criteria: Minimum 40% in Internal (8 out of 20) and 40% (12 out of 30) in semester-end examination. ***

Value Education Course (VEC)

Green IT

Course Code: U24IT2VEC01 **Course Credit: 02**

1 credit - 15 lectures **1 lecture is 60 minutes**

Course Objective:

- Environmental Awareness to recognize and understand tech-related environmental issues and disposal methods.
- Sustainable Tech Implementation to apply recycling and responsible disposal strategies in tech environments.
- Responsible Disposal Skills to evaluate and apply methods for eco-friendly hardware and data disposal.
- Compliance and Standards to understand laws and standards promoting green technology and responsible disposal.

Learner Outcomes:

- Environmental Issue Recognition to identify and comprehend environmental impacts on technology.
- Sustainable Practices Application to implement eco-friendly disposal methods in tech settings.
- Responsible Disposal Proficiency to apply methods for eco-friendly hardware and data disposal.
- Compliance and Standards Understanding to comprehend laws and global standards promoting eco-friendly tech and disposal practices.

Sr. No	Syllabus	No. of lecture
Unit I	**Overview and Issues:** Problems: Toxins, Power Consumption, Equipment Disposal, Company's Carbon Footprint: Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power. **Recycling:** Materials, Means of Disposal, Recycling, Refurbishing, Life Cycle from beginning to end, Life, Cost, Green Design, Recycling Companies, Finding the Best One, Checklist, Certifications **Hard Drive Recycling:** Consequences, cleaning a Hard Drive, Pros and cons of each method, CDs and DVDs. **Green Devices and Hardware:** Introduction, Life Cycle of a device or hardware, Reuse, Recycle and Dispose.	15

Unit II	**Green Software:** Introduction, Energy-saving software techniques, Evaluating and Measuring software Impact to platform power. **Going Paperless:** Paper Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Going Paperless, Organizational Realities, Changing Over, Paperless Billing, Handheld Computers vs. the Clipboard **Electronic Data Interchange (EDI):** Nuts and Bolts, Value Added Networks, Advantages, Obstacles. **Laws, Standards and Protocols:** Introduction, The regulatory environment and IT manufacturers, Non regulatory government initiatives, Industry associations and standards bodies, Green building standards, Green data centres, Social movements and Greenpeace.	15

References:

1. Harnessing Green IT Principles and Practices , San Murugesan, G.R. Gangadharan Wiley Publication.
2. Green IT Toby Velte, Anthony Velte, Robert Elsenpeter McGraw Hill 2008.
3. Green Data Center: Steps for the Journey, Alvin Galea, Michael Schaefer, Mike Ebbers Shroff Publishers and Distributers, 2011.

Revised Scheme of Examination
Faculty of Science
(Undergraduate Programme)

SCHEME OF EXAMINATION (for 100+50 marks 3+1 credits)

The scheme of examination shall be divided into two parts:

- **Internal assessment 40% i.e.40 marks**
- **Semester end examination 60% i.e.60 marks**

(A)Internal Assessment 40 marks

Description	Marks
An internal test of 20 marks Q.1 a. Multiple choice Questions - 05 Marks b. True/False - 05 Marks Q.2. Attempt 2 questions out of 3 questions (5 marks each) - 10 Marks OR **Online MCQ test**	20
Presentation/Case Studies/Assignments	15
Attendance and Class Participation	5
Total	40

B) Semester End examination 60 marks

Duration: 2 hours	
Total Marks:60	
Q.1 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Q.2 15 marks OR 15 marks (7 and 8 marks)-Unit 2	15
Q.3 15 marks OR 15 marks (7 and 8 marks)-Unit 3	15
Q.4 15 marks-attempt any 3 out of 6 (from Unit 1, Unit 2, Unit 3)	15
Total	60

C) **Semester end Practical examination 50 marks**

Duration: 2.5 hours	
Total Marks:50	
Q.1 Practical Q1	20
Q.2 Practical Q2	20
Viva	05
Journal	05
Total	50

Passing criteria: Minimum 40% in Internal (16 out of 40) , 40% (24 out of 60) in semester-end examination,40%(20 out of 50)in Practical Examination.

SCHEME OF EXAMINATION

(for 50 marks ,2 credits Subject without Practical)

The scheme of examination shall be divided into two parts:

- **Internal assessment 40% i.e.20 marks**
- **Semester end examination 60% i.e.30 marks**

(A)Internal Assessment 20 marks(Theory)

Description	**Marks**
An internal test of 10 marks Q.1 Multiple choice Questions/True or False - 05 Marks Q.2. Attempt 1 questions out of 2 questions (5 marks each) - 05 Marks OR **Online MCQ test**	10
Presentation/Case Studies/Assignments	05
Attendance and Class Participation	05
Total	20

B) Semester End examination 30 marks

Duration: 1 hour	
Total Marks:30	
Q.1 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Q.2 15 marks OR 15 marks (7 and 8 marks)-Unit 2	15
Total	30

Passing criteria: Minimum 40% in Internal (08 out of 20) and 40% (12 out of 30) in semester-end examination.

SCHEME OF EXAMINATION

(for 50 marks ,2 credits (1+1) Subject with Practical)

The scheme of examination shall be divided into two parts:

A) Semester End examination 30 marks

Duration: 1 hour	
Total Marks:30	
Q.1 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Q.2 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Total	30

(B)Internal Assessment 20 marks(Practical)

Description	Marks
Practical Question	10
Journal	05
Viva	05
Total	20

Passing criteria: Minimum 40% in Internal (08 out of 20) and 40% (12 out of 30) in semester-end examination.

Passing Standards

The learners to pass a course shall have to obtain a minimum of 40% marks in each head of passing, consisting of Internal Assessment and Semester End Examination. The learners shall obtain a minimum of 40% marks (i.e. 16 out of 40 or 8 Out of 20) in the Internal Assessment and 40% marks in the Semester End Examination (i.e. 24 Out of 60 or 12 Out of 30) separately, to pass the course and a minimum of Grade D, wherever applicable, to pass a particular semester. A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.