Shah & Anchor Kutchhi Engineering College

An Autonomous Institute Affiliated to University of Mumbai

CURRICULUM STRUCTURE FIRST YEAR B.Voc.

Cyber Security

Chairman BoS
Department of Cyber Security
Shah & Anchor Kutchhi Engineering College
Chembur, Mumbai - 400088

Chairman
Academic Council

B.Voc. UG Program in Cyber Security

Vision

To be a globally recognized department that provides quality education in cybersecurity, promotes ethical practices, and prepares professionals to tackle real-world challenges.

Mission

M1: To deliver high-quality cybersecurity value-based education and enhancing the teaching-learning process for professional excellence.

M2: To promote research, industry collaboration and entrepreneurship to address global challenges in cybersecurity.

B.Voc. UG Program in Cyber Security

Program Structure for First Year B.Voc. in Cyber Security
(With Effect from 2024-2025)

Semester I (NSQF-4)

	Scheme of Instruction				Scheme of Examination					
		Hours per Week		Total Credits	Duration in Hours	Maximum Marks				Total Marks
Course Code	Name of the Course	L	P			CIA			ESE	
	General Component					MSE	CCE	Total		
BVCS0GSEAE11	Business Communication Skills	2	-	2	-	-	30	30	-	30
BVCS0GSEV512	Basics of Computer and Hardware Maintenance	3	-	3	2	20	20	40	60	100
BVCS0GSEPC13	Digital Interface Development	3	-	3	3	30	30	40	60	100
	Skill Component					CIAP			ESEP	
BVCS0GSEAE11	Interpersonal Skills Development Lab	-	4	2	-	50			-	50
BVCS0GSEV512	Hardware Care Foundation Lab	-	4	2	2	50			50	100
BVCS0GSEPC13	Web Designing Lab	-	4	2	3	50			50	100
BVCS0GSEPC14	OJT/NOS-QP (Choose Any One) 1. Software Programmer - Java (SSC/Q5109, V2.0) 2. Software Programmer - MYSQL (SSC/Q5109, V2.0) 3. Software Programmer - Python (SSC/Q5109, V2.0) 4. Data Annotator (SSC/Q2130) 5. AI Machine Learning Analyst (SSC/Q2114) 6. Any Other with NSQF Level-4	3	4	4	-	50			-	50
	Total	11	18	20	-	330			220	550

*All ESE (Theory/Practical) will be considered for 100 marks and converted as per appropriate Teaching and Examination scheme.

CIA–Continuous Internal Assessment MSE–Mid Semester Examination ESE–End Semester Examination
CIAP–Continuous Internal Assessment Practical ESEP–End Semester Examination Practical CCE– Continuous Comprehensive Evaluation

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B.Voc. UG Program in Cyber Security

Program Structure for First Year B.Voc. in Cyber Security
(With Effect from 2024-2025)

Semester II (NSQF-4)

	Scheme of Instruction				Scheme of Examination					
		Hours per Week		Total Credits	Duration in Hours	Maximum Marks				Total Marks
Course Code	Name of the Course	L	P			CIA			ESE	
	General Component					MSE	OCE	Total		
BVCS0202PC01	Fundamentals of DBMS	3	-	3	3	20	20	40	60	100
BVCS0202PC02	Fundamentals of Cyber security	3	-	3	3	20	20	40	60	100
BVCS0202PC03	Problem Solving and Programming using C	3	-	3	3	20	20	40	60	100
BVCS0202MC01	Indian Knowledge System	-	2	1	-	-	20	30	-	50
	Skill Component					CIAP			ESEP	
BVCS0202SP01	Database Design Essentials Lab	-	4	2	2	10			15	25
BVCS0202SP02	Cybersecurity Essentials Lab	-	4	2	-	25			-	25
BVCS0202SP03	Problem Solving with C Lab	-	4	2	-	25			-	25
BVCS0202EP04	Extension Activities (community engagement services)	-	2	1	2	25			-	25
BVCS0202EP05	SKILL BASED (Choose Any One) 1. Cybersecurity Essentials (python, scapy, nmap, metasploit, wireshark) 2. Data Science programs in Deep Learning (CNN and Real Time Projects (NLP, Vision, Speech)) 3. Blockchain Analytics (Web3.py/BTC) 4. Security Operations Center Analyst (SIEM/SOAR) 5. Cryptocurrency Security Analytics (Web3.py/BTC) 6. App Development with MERN Stack	2	6	3	3	-			100	100
	Total	9	22	20	-	125			295	550

*All ESE (Theory/Practical) will be conducted for 100 marks and converted as per appropriate Teaching and Examination scheme.

CIA-Continuous Internal Assessment MSE-Mid Semester Examination ESE-End Semester Examination

CIAP-Continuous Internal Assessment Practical ESEP-End Semester Examination Practical OCE- Continuous Comprehensive Evaluation

B.Voc. UG Program in Cyber Security

Credit details

Component	Course Code	Course Category		Sem I	Sem II	Total
GENERAL COMPONENT	BVCSBOGBEE101	Engineering Science Courses		-	02	02
	BVCSBOGBEPC101	Program Core Courses		02	02	04
	BVCSBOGBEVS101	Vocational & Skill Enhancement Courses		02	-	02
	BVCSBOGBEHU101	IKS	Humanities & Social Science Courses	-	01	01
	BVCSBOGBEAE101	Ability Enhancement Courses		01	-	01
SKILL COMPONENT	BVCSBOSBEE201	Engineering Science Courses			02	02
	BVCSBOSBEPC201	Program Core Courses		16	09	17
	BVCSBOSBEAE201	Ability Enhancement Courses	Humanities & Social Science Courses	02	-	02
	BVCSBOSBEFP201	Field Project	Experiential Learning Courses	-	04	04
	BVCSBOSBEVS201	Vocational & Skill Enhancement Courses		02	-	02
Total Credits				20	20	40

SEMESTER I

Program: First Year B.Voc.	Semester: I	L	P	C
Business Communication Skills	Course Code: BVC101GEAE11	2	0	2
Interpersonal Skills Development Lab	Lab Code: BVC101SSEAE11	0	4	2
		2	4	4

Course Objectives:	
1	To familiarize Students with the need of communication in various contexts
2	To analyze different communication styles and use of language
3	To apply the linguistic skills for an interactive environment
4	To develop confident personality traits along with grooming and social etiquette

Course Outcomes:	
After successful completion of this course, the students should be able to:	
CO1	Eliminate hindrances and use verbal non-verbal cues in social and workplace situations
CO2	Employ listening strategies to comprehend wide-ranging vocabulary, grammatical structures, tone and connotations.
CO3	Acquire effective writing skills for drafting academic and technical documents.
CO4	Enhance basic linguistic skills for day-to-day situations.

Pre-requisite courses: Nil

Course Assessment Methods:

DIRECT
1. Continuous Internal Assessment (Theory component)
2. Assignments/ Tutorials/ Power-point-presentation/ Group-discussion/ Quiz sessions/ Case-studies/ Design Thinking/Innovation/ Creativity/ Blog writing/ Tagging, etc)
3. Pre/Post – Experiment Test/Viva, Experimental Write-Up for each Experiment, Day to Day Experiment Assignments/ Tutorials/ Power-point-presentation/ Group-discussion/ Quiz sessions/ Case-studies/ Design Thinking/Innovation/ Creativity/ Blog writing/ Tagging, etc) (Lab Component)
4. End Semester Examination (Theory and Lab component)
INDIRECT
1. Course-end survey
2. Activity-based survey (if any)

DETAILED SYLLABUS	
Module 1: Fundamentals of Communication	**07 Hours**
1.1 Communication: Meaning, Concept, Definition, Communication Cycle 1.2 Organizational Communication- Formal/Informal Channels of Communication 1.3 Barriers to Communication- Mechanical, Physical, Linguistic, Psychological, Cultural 1.4 Strategies to Overcome the Barriers of Communication	
Module 2: Soft Skills	**07 Hours**
2.1 Empathy: (Understanding of someone else point of view) 2.2 Intrapersonal Skills, Interpersonal skills, Negotiation Skills 2.3 Cultural Aspects of Communication	
Module 3: Formal Writing Skills	**07 Hours**
3.1 Email Etiquettes 3.2 Drafting Official Mails-Use of Language 3.3 How to Respond to Professional Messages on- What's App / Telegram/Emails with Proper Etiquettes 3.4 Technical Writing: Describing the Object and Writing User Instructions	
Module 4: Language Enhancement Skills	**05 Hours**
4.1 Listening Skills 4.2 Speaking Skills 4.3 Reading Skills 4.4 Writing Skills	

Lecture: 2 Hrs/Week **Total Hours: 26 Hrs**

LAB COMPONENT CONTENTS:

Suggested List of Experiments: (Minimum 8 Experiments)

1. Self Introduction and Partner Introduction for breaking activity
2. Voice the opinions- can be given in different topics
3. Extempore
4. Enhancing Listening Skills
5. Activities on Communication Hindrances- Dictation and role playing
6. Situational Role Plays
7. Reading Activity- Book Review
8. Information transfer through Graphic organizers
   1. Verbal to visual
   2. Visual to verbal
9. Debate
10. Non- Verbal Skill
11. Social and Professional Etiquettes
    1. Formal Dining Etiquettes
    2. Cubicle Etiquettes
12. Case studies on Effective Communication
13. Monologue

Practical: 4 Hrs/Week **Total Hours: 52 Hrs**

Textbooks:

1. Kumar S. &Pushp Lata, Communication Skills a workbook, New Delhi: Oxford University Press, 2018
2. Ram A, Ram Manan, Tests of Aptitude for Placement Readiness, Oxford University Press, 2018
3. Raman M., Sharma S, Technical Communication, Principles and Practice, Oxford University Press, 2004

Reference Books:

1. Arms, V. M., Humanities for the engineering curriculum: With selected chapters from Oliver Wendell. Technical writing and professional communication, second edition. Boston, MA: McGraw-Hill, 2003
2. Bovee, C. L., &Thill, J. V., Business communication today. Upper Saddle River, NJ: Pearson, 2021
3. Butterfield, J. , Verbal communication: Soft skills for a digital workplace. Boston, MA: Cengage Learning, 2017
4. Masters, L. A., Wallace, R. R., & Harwood, L., Personal development for life and work. Mason: South-Western Cengage Learning, 2011
5. Robbins, S. P., Judge, T. A., & Campbell, T. T. , Organizational behaviour. Harlow, England: Pearson, 10

Program: First Year B.Tech.	Semester: I	L	P	C
Basics of Computer and Hardware Maintenance	Course Code: BVCSBSCBV101	3	0	3
Hardware Core Foundation Lab	Lab Code: BVCSBSBEV101	0	4	2
		3	4	5

Course Objectives:	
1	To familiarize Students with the need of IT fields in various sectors
2	To familiarize students with different computer fundamentals
3	To understanding of computer hardware components and their functions
4	To develop the understanding of fundamentals of software.

Course Outcomes:	
After successful completion of this course, the students should be able to	
CO1:	Learn the basic terminology in the field of IT.
CO2:	Impart functional knowledge about PC hardware, operations and concepts
CO3:	Impart functional knowledge in the use of GUI Operating System.
CO4:	Acquire knowledge of Software's and standard office packages.

Pre-requisite courses: Nil

Course Assessment Methods:

DIRECT
1. Continuous Internal Assessment (Theory component)
2. Assignments/Tutorials/Power-point-presentation/Group-discussion/Quiz/seminar/Case-studies/ Design Thinking/Innovation/Creativity/Blog writing/Viva/poster, etc)
3. Pre/Post – Experiment Test/Viva, Experimental Write-Up for each Experiment, Day to Day Experiments/Assignments/Tutorials/Power-point-presentation/Group-discussion/Quiz/seminar/ Case-studies/Design Thinking/Innovation/Creativity/ Blog writing/Viva/poster, etc) (Lab Component)
4. End Semester Examination (Theory and Lab component)
INDIRECT
1. Course-end survey
2. Activity based survey (if any)

DETAILED SYLLABUS	
Module 1: Computer Characteristics	**10 Hours**
1.1 Computer characteristics: Speed, storage, accuracy, diligence, Digital signals, Binary System, ASCII 1.2 Historic Evolution of Computers 1.3 Classification of computers: Microcomputer, Minicomputer, mainframes, Supercomputers 1.4 Personal Computers Desktop, Laptop, Palmtop, TabletPC 1.5 Hardware & Software 1.6 Von Neumann model	
Module 2: Computer Fundamentals	**10 Hours**
2.1 Computer Fundamentals: Concept of data and information, Components of Computer 2.2 Hardware: Input Devices, Output Devices, CPU, Components of CPU 2.3 Memory and Storage Devices, Computer Software: System Software and Application Software 2.4 Functions of Operating Systems, Programming Languages: Machine, Assembly, High Level Language 2.5 ASCII 2.6 Language Translators: Linker, Loader 2.7 Classification of Computers: Micro, Mini, Mainframe, Supercomputer	
Module 3: Hardware	**10 Hours**
3.1 Hardware: CPU, Memory, Input devices, output devices 3.2 Memory units: RAM (SDRAM, DDR RAM, RDRAM etc. feature wise comparison only) 3.3 ROM- different types: Flash memory, Auxiliary storage: Magnetic devices, Optical Devices 3.4 Floppy, Hard Disk, Memory Stick, CD, DVD, CD-Writer 3.5 Input Devices-keyboard, mouse, scanner, speech input devices, digital camera, Touchscreen, Joystick, Optical readers, barcode reader 3.6 Output devices: Display devices, size and resolutions, 3.7 CRT, LCD, Printers, Dot-matrix, Inkjet, Laser, Plotters, Sound cards, speakers	
Module 4 Software	**3 Hours**
4.1 Software- System software, Application software 4.2 Concepts of files and folders 4.3 Introduction to Operating systems, Different types of operating systems: single user, multitasking, time sharing, multi-user 4.4 Application Software: Generic Features of Word Processors, Spreadsheets and Presentation software	

Lecture: 3 Hrs/Week — Total Hours: 33 Hrs

LAB COMPONENT CONTENTS:

Suggested List of Experiments (Minimum 12 Experiments)

1. Identify and study the Various Components of Computer and explore the versions of windows
2. Installation of Personal Computer and safely assemble and disassemble the Computer
   a. Setting the PC's Configuration to a Known State
   b. Initial PC Disassembly and Identifying Adapter Cards
   c. Labeling and Disconnecting Drive Cables
   d. Disconnecting Motherboard Power Cables and Removing the PC Power Supply
3. Work with Flip Computer Screen through display settings
4. Implement MS-DOS Internal & External DOS Commands
5. Install a computer motherboard and explore the ports and types of the motherboard briefly.
6. Introduction of memory and Install the RAM DIMM (SRAM, SDRAM, and DDR) on the Motherboard
7. Identify CMOS RAM and CMOS Battery using program for configuration
8. Create the new folder and files on Windows / macOS also create a directory MS-DOS and windows command prompt, create directory with batch file
9. Install and setup the Internet explorer applications, office applications software
10. Install the CD/DVD on Windows10 /Windows11
11. Install and setup the Microsoft-office(MS word, MS Excel,MS Powerpoint) with a license key on Windows operating system
12. Demonstrate the Installation of windows 10 operating system on Hard Disk Drive
13. Demonstrate the Installation of Ubuntu /Redhat (Linux) operating system
14. Wireless Configuration Lab: Optimizing WiFi Settings for Performance

Practical: 4 Hrs/Week | Total Hours: 52 Hrs

Textbooks:

1. E Balagurusamy,Fundamentals of Computers, Mcgraw hill,2014
2. Dennis P Curtin,Information Technology: The Breaking wave,McGraw hill,2014
3. Peter Norton, Introduction to Computers,McGraw hill,Seventh Edition
4. G.M. Kadambi Ramesh,"IT Workshop",2nd edition,Seventh

Reference Books:

1. Pradeep K. Sinha,Priti Sinha, "Computer Fundamentals",B P B Publications
2. Henry Lucas,"Information Technology for Management", 7th Edition,Tata McGraw-Hill
3. P K Sinha,"Computer Fundamentals",B P B Publications
4. Leon and Leon, "Fundamentals of Information Technology", 2nd Edition, Vikas Publishing House

Program: First Year B.Voc	Semester: I	L	P	C
Digital Interface Development	Course Code: BVCSRDSEPC11	3	0	3
Web Designing Lab	Lab Code: BVCSRDSEPC12	0	4	2
		3	4	5

Lab Objectives:	
1	To understand the foundational concepts of Web technologies, including HTML, CSS, & JavaScript.
2	To familiarize with essential tools and technologies used in web development.
3	To acquire knowledge about Client-Side Scripts helps develop interactive web pages.
4	To explore the knowledge about Server-side Programming Language and develop dynamic and interactive pages, understand database integration.

Lab Outcomes:	
After successful completion of this course, the students should be able to:	
CO 1:	Learn the HTML and CSS syntax and semantics to build web pages.
CO 2:	Construct and visually format tables and forms using HTML and CSS.
CO 3:	Analyze Develop Client-Side Scripts using JavaScript.
CO 4:	Familiarize with Server-Side Scripts using PHP to generate and display the contents dynamically.

Pre-requisite courses: C Programming, Basic computer knowledge :

Course Assessment Methods:

DIRECT
1. Continuous Internal Assessment (Theory component) 2. Assignments/ Tutorials/ Power-point-presentation/ Group-discussion/ Quiz seminar/ Case-studies/ Design Thinking/ Innovation/ Creativity/ Blog writing/ Tagging, etc) 3. Test/Viva – Experiment Test/Viva, Experimental Write-Up for each Experiment, Day to Day Experiments/ Assignments/ Tutorials/ Power-point-presentation/ Group-discussion/ Quiz seminar/ Case-studies/ Design Thinking/ Innovation/ Creativity/ Blog writing/ Tagging, etc) (Lab Component) 4. End Semester Examination (Theory and Lab component)
INDIRECT
1. Course-end survey. 2. Alumni/ Parent survey (if any)

DETAILED SYLLABUS	
Module 1: HTML & CSS	**10 Hours**
1.1 Introduction of HTML, Dynamic HTML, HTML Syntax & Semantic Markup, Structure of HTML Document, HTML5 Semantic Structure Elements, Hyperlinks, Images and Multimedia, Forms and controls, Marquee tags, GUI HTML Editors, Image Inserting Techniques. 1.2 Basics of Cascading style sheets (CSS): CSS syntax & Properties, CSS Selectors, Lists and Tables, CSS Styling (Background, Text Format, Controlling Fonts), The Cascade, Box Model, CSS Text Styling.	
Module 2: Introduction to Forms & HTML Tables	**10 Hours**
2.1 HTML Tables and Forms, Create Frames, Introducing Tables, Styling Tables, Introducing Forms, Create Web Forms, Form Control Elements, Table and Form Accessibility, Miscellaneous. 2.2 Advanced Cascading styles (CSS): Creating page Structure and Site Designs, Element Positions, Floating Elements, Designing Multicolumn Structure, Approaches to CSS Layout, CSS Frameworks.	
Module 3: JavaScript	**10 Hours**
3.1 JavaScript: Client-Side Scripting, Features of JavaScript, and its usage and principles, Java Vs JavaScript,Variables ,JavaScript Objects, Data Types,Array ,Functions, String, Loops,Decision Making, Form Validation. 3.2 The Document Object Model (DOM),Building Blocks of Forms, Properties & Methods of Forms , Button, Text, Textarea ,Radio buttons, Select elements. 3.3 Form events :Mouse & key events,Changing attribute value dynamically,Changing Option list dynamically ,validating checkbox selection.	
Module 4: Basics of PHP	**10 Hours**
4.1 Introduction of PHP, PHP features, Syntax, data types, variables, PHP echo and print Statements Casting, PHP Math, PHP Operators, PHP If...Else.... Elseif statements, PHP Loops, PHP Switch, PHP, PHP Functions, Arrays, PHP Global Variables - Superglobals, PHP Form Handling & Validation, Sessions and Cookie. 4.2 Database Connectivity with MySql, Introducing MQuery, MQuery Forms, MQuery Examples.	

Lecture: 3 Hrs/ Week **Total Hours: 30 Hrs**

LAB COMPONENT CONTENTS:

Suggested List of Experiments (Minimum 12 Experiments)

1. Create a single Web page using all HTML & apply styles with CSS.
2. Construct a HTML code for demonstrating Hyperlinks
   Navigation from one page to another
   Navigation within the page
3. Design a Form to store the information about the students affiliated to Mumbai university the information must include Name of college, Registration number, Student name, Year of Joining, and email id. Make sample data for 3 students. Create a CSS style sheet and use it to display the document.
4. Design an HTML form for displaying information using animation CSS including images, tables.
5. Create a button that triggers an alert or changes the content on a web page when clicked using JavaScript
6. Implement JavaScript to validate the following fields of employee on HTML form (i.e. Name of Employee, Email, Employee number, Salary, Address, Contact Number, etc)
7. Develop a JavaScript to Display the user login for that use text area, text field attributes for Username & Password apply validation, Exception handling and mouse and key events
8. Develop a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.
9. Construct a PHP Program code to check student grade based on the marks using if-else statements
   Conditions:

   a. If marks are 60% or more, the grade will be First Division
   b. If marks between 45% to 59%, grade will be Second Division
   c. If marks between 35% to 44%, grade will be Third Division
   d. If marks are less than 35%, student will be Fail

10. Construct a program code to show day of the week (for example: Monday) based on numbers using switch case statements
    Conditions:
    a. You can pass 1 to 7 number in switch
    b. Day 1 will be considered as Monday
    c. If the number is not between 1 to 7, show invalid number by default
11. Design a PHP program to implement Sign-In and Sign -out functionality

Software's:

1. Macromedia Dreamweaver / Notepad /Chrome
2. Editor: Notepad, Notepad++, Sublime etc.

Practical: 4 Hrs/ Week **Total Hours: 52 Hrs**

Textbooks:

1. Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", 1st Edition, Pearson Education India. (ISBN 978-9332571271)
2. HTML 5 Black Book, Covers CSS3, JavaScript, XML, XHTML, Ajax, PHP and jQuery, 2nd (English, Paperback, DT Editorial Services)
3. Michael Morrison, HTML & XML for beginners
4. Kseniya Ilina, JavaScript Demystified, 2007
5. McPeak, Jeremy and Wilton, Paul, Beginning JavaScript

Reference Books:

1. Robin Nixon, "Learning PHP, MySQL &JavaScript with jQuery, CSS and HTML5", 4th Edition, O'Reilly Publications, 2015. (ISBN: 978-9352130153)
2. Luke Welling, Laura Thomson, "PHP and MySQL Web Development", 5th Edition, Pearson Education, 2016. (ISBN: 978-8932582736)
3. Nicholas C Zakas, "Professional JavaScript for Web Developers", 3rd Edition, Wrox/Wiley India, 2012. (ISBN 978-8126553588)
4. David Sawyer McFarland, "JavaScript & jQuery : The Missing Manual", 1st Edition, O'Reilly/Shroff Publishers & Distributors Pvt Ltd, 2014

Online Repository:

1. [redacted]
2. [redacted]

SEMESTER II

Program: First Year B.Tech.	Semester: II	L	P	C
Fundamentals of DBMS	Course Code: BVCS88GEPC21	3	0	3
Database Design Essentials Lab	Lab Code: BVCS88SEPC21	0	4	2
		3	4	5

Course Objectives:	
1	To provide mapping techniques to convert the entity-relationship data model into the relational model efficiently.
2	To understand the use of Structured Query Language (SQL) and learn SQL syntax.
3	To apply normalization techniques to normalize the database.
4	To understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access.

Course Outcomes:	
After successful completion of this course, the students should be able to:	
CO 1:	Apply concepts of Entity-Relationship (ER) Model & Relational Algebra to design the database & formulate complex queries.
CO 2:	Analyze SQL queries, demonstrating proficiency in database management and manipulation.
CO 3:	Apply normalization techniques to refine and design database, ensuring data integrity.
CO 4:	Apply techniques for concurrency control, to ensure the integrity of ACID properties in transactions and implement robust recovery systems.

Pre-requisite courses: Nil

Course Assessment Methods:

DIRECT
1. Continuous Internal Assessment (Theory component) 2. Assignments/Tutorials/Power-point-presentation/Group-discussion/Quiz/seminar/Case-studies/Design Thinking/Innovation/Creativity/(Blog writing/Vlogging, etc) 3. Pre/Post – Experiment Test/Viva, Experimental Write-Up for each Experiment, Day to Day Experiments/Assignments/Tutorials/Power-point-presentation/Group-discussion/Quiz/seminar/Case-studies/Design Thinking/Innovation/Creativity/(Blog writing/Vlogging, etc)/(Lab Component) 4. End Semester Examination (Theory and Lab component)
INDIRECT
1. Course-end survey 2. Alumni-based survey (if any)

DETAILED SYLLABUS

Module 1: Fundamentals of Database	12 Hours
1.1 Introduction, Characteristics of database, File system vs Database system, Data abstraction and Data Independence, DBMS system architecture, Database Administrator & its role. 1.2 The Entity-Relationship (ER) Model: Entity types Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Weak Entity Types, Notation for ER diagrams, Relationship constraints: Cardinality and Participation. 1.3 Extended Entity-Relationship (EER) Model: Subclasses, Superclasses, and Inheritance, Generalization, Specialization and Aggregation. 1.4 Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Integrity, Referential Integrity, Concept of keys, Mapping the ER and EER Model to the Relational Model, Relational Algebra operations, Relational Algebra Queries.	
Module 2: Structured Query Language (SQL)	**16 Hours**
2.1 Overview of SQL, SQL Data Definition and Data Types, Data Definition Commands, Data Manipulation commands, Data Control commands, Transaction Control Commands. 2.2 Integrity constraints - Key Constraints, Domain Constraints, Referential Integrity, Check Constraints, Set and String Operations, Aggregate Function, GROUP BY clause, HAVING Clause, Views in SQL, joins, Nested and Complex Queries.	
Module 3: Relational-Database Design	**08 Hours**
3.1 Relational-Database design. 3.2 Concept of normalization, Function Dependencies. 3.3 First Normal Form, 2NF, 3NF, BCNF.	
Module 4: Transactions Management and Concurrency	**08 Hours**
4.1 Transaction concept, Transaction states, ACID properties. 4.2 Concurrent Executions, Serializability Conflict and View. 4.3 Concurrency Control: Lock-based, Timestamp-based protocols. 4.4 Recovery System: Log based recovery, Deadlock handling.	

Lecture: 3 Hrs/Week **Total Hours: 50 Hrs**

LAB COMPONENT CONTENTS:

Suggested List of Experiments (Minimum 12 Experiments)

1. Identify the case study and detailed statement of the problems. Design an Entity-Relationship (ER) / Extended Entity-Relationship (EER) Model.
2. Mapping ER/EER to Relational schema model.
3. Create a database using Data Definition Language (DDL) and apply integrity constraints for the specified System.
4. Apply DML Commands for the specified system.
5. Perform Single-row queries, string manipulation operations and aggregate functions.
6. Implement various Join operations.
7. Perform Nested and Complex queries.
8. Perform DCL and TCL commands.
9. Implement procedure and functions.
10. Implementation of Views and Triggers.
11. Demonstrate Database connectivity.
12. Implementation and demonstration of Transaction and Concurrency control techniques using locks.

Practical: 4 Hrs/Week **Total Hours : 52 Hrs**

Textbooks:

1. Korth, Silberschatz, Sudarshan, Database System Concepts, 6th Edition, McGraw Hill.
2. Elmasri and Navathe, Fundamentals of Database Systems, 5th Edition, Pearson Education.
3. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems, TMH.

Reference Books:

1. Peter Rob and Carlos Coronel, Database Systems Design, Implementation and Management, Thomson Learning, 5th Edition.
2. Dr. P.S. Deshpande, SQL and PL/SQL for Oracle 11g, Black Book, Dreamtech Press.
3. G. K. Gupta, Database Management Systems, McGraw Hill, 2011.

Program: First Year B.Tec.	Semester: II	L	P	C
Fundamentals of Cyber security	Course Code: BVCSR0GEPC21	3	0	3
Cybersecurity Essentials Lab	Lab Code: BVCSR0GEPC21	0	4	2
		3	4	4

Course Objectives:	
1	To understand cybersecurity principles, practices, and tools
2	To understand the threats associated with data and elements of data security
3	To understanding of computer hardware components and their functions
4	To identify the different types of threats, attacks, and vulnerabilities in computer systems

Course Outcomes:	
After successful completion of this course, the students should be able to	
CO 1:	Understand the fundamental principles of cyber security including confidentiality, integrity, and availability (CIA triad).
CO 2:	Enhance overall security by implementing robust security measures for both Windows OS.
CO 3:	Gain insights into malware and its various types for comprehensive understanding.
CO 4:	Develop strong password security practices and encryption techniques.

Pre-requisite courses: Nil

Course Assessment Methods:

DIRECT
1. Continuous Internal Assessment (Theory component) 2. Assignments/Tutorials/Power point presentations/Group discussion/Quiz sessions/Case studies/ Design Thinking/Interviews/Creativity/Blog writing/Viogging, etc) 3. Pre/Post – Experiment Test/Viva, Experimental Write-Up for each Experiment, Day to Day Experiments Assignments/Tutorials/Power point presentations/Group discussion/Quiz sessions/ Case studies/Design Thinking/Interviews/Creativity/ Blog writing/Viogging, etc/ (Lab Component) 4. End Semester Examination (Theory and Lab component)
INDIRECT
1. Course end survey 2. Activity based survey (If any)

DETAILED SYLLABUS

Module 1: Cyber Security Fundamentals	7 Hours
1.1 Introduction to Cyber Security, Historical perspective. 1.2 CIA Triad and Principles 1.3 The need for Security. 1.4 Evolution of Threats,Threat Landscape and Cyber Attacks:Phishing, Malware,ransomware,DDOS attack, MITM attack. 1.5 Cyber attack vectors, Cyber attack lifecycle, and Cyber threat intelligence. 1.6 Ethical considerations in cyber security.	
Module 2: Malware and Antivirus	**7 Hours**
2.1 Malware, Symptoms of Malware Infection, How Malware Spreads 2.2 Viruses,Worms, Trojan Horses, Spyware, Other Forms of Malware,The Buffer Overflow Attack 2.3 Antivirus – What is Antivirus? Limitations of Antivirus Software, Choosing the right Antivirus, Free Vs Paid Antivirus software. 2.4 Steps to Install Antivirus Software, How to Test if Antivirus is Working?	
Module 3: Data Security	**7 Hours**
3.1 Data: Digital Building Blocks, Importance of Data in the Information Age, Threats to Data:, Data Security 3.2 Elements of Security, Potential Losses Due to Security Attacks, Implementing Security, Securing Operating System. 3.3 Guidelines to secure window 10 3.4 Access control:, Authentication methods	
Module 4: Security Policies and Forensics	**6 Hours**
4.1 Security Policies, Defining User Policies, Defining System Administration Policies, Defining Access Control, Developmental Policies, Standards, Guidelines and Procedures. 4.2 Introduction to Forensics: General Guidelines, Finding Evidence on the PC, Finding Evidence on System Logs,Getting Back Deleted Files,Operating System Utilities, The Windows Registry.	

Lectures: 2 Hrs/Week | Total Hours: 36 Hrs

LAB COMPONENT CONTENTS:

Suggested List of Experiments (Minimum 12 Experiments)

1. Cybersecurity Fundamentals
   1. Introduction to Cybersecurity Tools
   2. Familiarization with common cybersecurity tools
   3. Introduction to virtualization platforms for lab environment setup
2. Securing Operating Systems
   Generate a strong Windows 10 user account password by accessing account settings, choosing security options, creating a complex password, verifying entry, and saving changes.
3. Minimize Windows 10 system resource usage by disabling unnecessary services through service configuration
4. Activate Windows Firewall on Windows 10 for enhanced system security
5. Install Avast antivirus software on your system for comprehensive protection
6. Complete Avast Antivirus registration for full functionality and ongoing protection
7. Initiate a scan using Avast Antivirus for comprehensive system security
8. Securing Email Communications
   1. Utilize PhishTank SiteChecker for assessing website authenticity and security
   2. Use PhishTank SiteChecker for quick website authenticity verification
9. Securing Mobile Devices
   1. Update the Android device's operating system through the system settings for the latest features and security enhancements.
   2. Enable Screen Lock on Android Devices
10. Internet Security
    1. How to Secure Windows Edge?
    2. How to Secure Mozilla Firefox?
    3. How to Secure Google Chrome?

Practical: 4 Hrs/Week	Total Hours: 52 Hrs

Textbooks:

1. Nilakant Jain & Ramesh Menon, "Cyber Security & Cyber Laws"
2. Edward McCallister, Tim Grance, and Karen Scarfone, "Cyber security: A Practical Guide to the Law of Cyber Risk"
3. Dr. Sohail Chhajed", Cyber security: The Beginner's Guide"
4. Michael Whitman, "Information" Security, wiley Publications

Reference Books:

1. Sumit Belaguru, "Cyber Security" Nina Godbole, Wiley, India, New Delhi
2. Chuck Easttom, Computer Security Fundamentals, Pearson, 2011
3. Nayyar Bhushan, Rajkumar Singh Rathore, Anirf Jamshed, Fundamentals of Cyber Security, 2012

Program: First Year B.Tech.	Semester: II	L	P	C
Problem Solving and Programming using C	Course Code: BYCS20GE11	3	0	3
Problem Solving with C Lab	Lab Code: BYCS20GE11	0	4	2
		3	4	4

Course Objectives:	
1	To develop a strong foundation in problem-solving techniques, computer systems, programming concepts, and the C programming language.
2	To develop skills in structuring programs, handling variables and parameters, working with expressions and operators, and applying sequential logic to solve problems efficiently.
3	To explore control loops and functions, including recursion, for efficient problem-solving.
4	To develop a strong foundation in working with arrays, linked lists, structures, and pointers for building efficient data structures and manipulating memory in C programming.

Course Outcomes:	
After successful completion of this course, the students should be able to:	
CO 1	Ability to effectively solve problems using computers, write efficient programs, and develop a strong foundation in computer science and programming.
CO 2	Integrating computer science fundamentals to tackle challenging programming tasks in various domains, such as software engineering, data analysis, and system design.
CO 3	Demonstrate proficiency in structuring programs efficiently, utilizing decision logic structures, various loop types, functions, and recursion for efficient problem-solving in programming.
CO 4	Building efficient data structures, efficiently manipulating memory, and implementing complex algorithms with precision and accuracy.

Pre-requisite courses: Basic Computer Knowledge.

Course Assessment Methods:

DIRECT
1. Continuous Internal Assessment (Theory component)
2. Assignments/Tutorials/Power-point presentations/Group-discussion/Quiz/Online Case-studies – Design Thinking/Innovation/Creativity/Blog writing/Viva/etc, etc.
3. Pre/Post – Experiment Test/Viva, Experimental Write-Up for each Experiment, Day to Day Experiments Assignments/Tutorials/Power-point presentations/Group-discussion/Quiz/online Case-studies/Design Thinking/Innovation/Creativity/Blog writing/Viva/etc, etc. (Lab Component)
4. End Semester Examination (Theory and Lab component)
INDIRECT
1. Course-end survey
2. Alumni/Industry survey (if any).

DETAILED SYLLABUS	
Module 1: Fundamentals of Problem Solving and Programming Structure	**8 Hours**
1.1 Problem Solving in Everyday Life, Types of Problems, Problem Solving with computers, difficulties with problem solving, Concept of computers and computer systems, Hardware and software components and functions. 1.2 Algorithm, Instructions and Flowchart symbols, Pseudo code with examples, concepts of program and data, Procedure for problem analysis, concept of structured programming, Common programming error, Program coding, Program compilation, Program execution, Program testing, Program processing environment. 1.3 Fundamentals of C Programming: Structured language, Procedural language, C Token, Keywords, Constants, Variables, Rules for naming and using variables, Data types, Functions, Operators, Expressions and Equations.	
Module 2: Sequential Logic Structure, decisions and loops	**7 Hours**
2.1 Structuring a Program, The modules and their functions, Local and Global variable, Parameters, Return values, overflow and underflow; 2.2 Type conversions, Basic Input and Output Operations: Expressions, 2.3 Statements and Precedence of Operators, Types of operators, In-built Functions. 2.4 Problem solving with the sequential Logic Structure	
Module 3: Control Structure:	**7 Hours**
3.1 Decision Logic Structure: Multiple If Then Else instructions, using straight through logic 3.2 The loop logic structure, incrementing, accumulating, While/WhileEnd, Repeat/Until, For Loop, Nested Loop, function & Recursion	
Module 4: Array and Pointer	**6 Hours**
4.1 Arrays, One- dimensional arrays, Two- dimensional arrays, Multidimensional arrays, The pointer technique 4.2 Linked List: creating Linked List, Examples of adding and deleting Data, algorithms and flowchart to add, delete, & access data, structure definition, syntax, static & dynamic memory allocation 4.3 Pointer: syntax, use of pointer, declaring and initializing, accessing pointers, pointer to array	

Lectures: 2 Hrs/Week	Total Hours: 36 Hrs

LAB COMPONENT CONTENTS:

Suggested List of Experiments (Minimum 12 Experiments)

1. Explore algorithm instructions, flowchart symbols, and notation techniques for efficient problem-solving.
2. Identify common types of problems encountered in daily life and in computer programming.
3. Develop skills in organizing problems using IPO charts, tracing solutions, coding programs, and handling user input.
4. Write algorithms and flowcharts for problems involving conditional statements.
5. Explore data types, functions, operators, expressions, and equations in C programming.
6. Explore different decision logic structures and decision tables to optimize problem-solving.
7. Implement multiple If Then Else statements for decision-making.
8. Implement algorithms and flowcharts for adding, deleting, and accessing data in linked lists.
9. Calculate fixed ticket charges based on age using decision logic.
10. Practice using loops for tasks like calculating pay or an hourly rate with overtime.
11. Explore the pointer technique for array manipulation.
12. Practice adding and deleting data in linked lists.
13. Implement pointers to functions for callback functions and function pointers.
14. Write linear and binary search algorithms.

Practical: 4 Hrs/Week **Total Hours : 52 Hrs**

Textbooks:

1. Waterman, Sprankle, "Problem Solving and Programming Concepts", 9th Edition, Pearson Education.
2. Balaguruswamy, Programming in C, McGraw Hill Education India Private Limited, Seventh edition, 2017.
3. Brain W. Kernighan & Dennis Ritchie, The C Programming Language, Prentice Hall, 2nd Edition.

Reference Books:

1. Reema N. Reddy, Carol A. Ziegler, "C Programming for Scientists and Engineers with Applications".
2. R. S. Salaria, "Programming for Problem Solving" Khanna Publication House.
3. R. S. Bichkar, Programming with C, Orient Blackswan, 1 st Edition, 2012.
4. Herbert Schildt, C The Complete Reference, McGraw-Hill Publications.
5. Yashavant Kanetkar, Let Us C, 14th Edition, BPB Publications, 2016

Program: First Year B.Tech.	Semester: II	L	T	C
Indian Knowledge System	Course Code: BYCSBGEH04	0	2	1

Course Objectives:	
1	To deeply comprehend the Bhagavad Gita, including its historical context, key themes, and teachings.
2	To explore how the timeless wisdom of the Gita can be integrated into modern life to foster holistic well-being.
3	To learn techniques and philosophies from the Gita to attain mental and emotional balance in everyday life.
4	To gain insights from the Gita on building meaningful and harmonious relationships, enhancing effective communication, and critical thinking.

Course Outcomes:	
After successful completion of this course, the students will be able to:	
CO 1:	Understand the principles of Bhagavad Gita about Dharma, Karma and Yog.
CO 2:	Apply the principles to attain emotional balance.
CO 3:	Apply the principles to develop harmonious relationships.
CO 4:	Apply the principles to resolve conflicts and attain clarity of mind for the given situations.

Pre-requisite courses: Familiarity with Devanagari Script.

Course Assessment Methods:

DIRECT
1. Continuous Internal Assessment (Theory component)
2.Assignments/Tutorials/Power-point-presentation/Group-discussion/Quiz/seminar/Case Studies/Design Thinking/Interaction/Creativity/Blog writing/Tagging, etc)
3.Pre Post – Experiment Test/Viva, Experimental Write-Up for each Experiment, Day to Day Experiments/Assignments/Tutorials/Power-point-presentation/Group-discussion/Quiz/seminar/Case/Field work/Design Thinking/Interaction/Creativity/Blog writing/Tagging, etc) (Laboratory Component)
4. End Semester Examination (Theory and Laboratory components)
INDIRECT
1. Course-end survey
2. Alumni-based survey (if any)

LAB COMPONENT:

Suggested Topics/List of experiments(minimum 3 activity)

1. Activity Based Learning : Introduction to Bhagavad Gita
   A. Activity 1 based on Bhagavad Gita (Historical context, Situational background)
   B. Activity 2 Based on Bhagavad Gita (Overview of each chapter and its central theme)
2. Activity Based Learning : Systems of Yog in Bhagavad Gita.
   A. Activity 1 based on chapter 3 from Bhagavad Gita (Study of Karma Yog)
   B. Activity 2 based on chapter 4 from Bhagavad Gita (Purushottama)
   C. Activity 3 based on chapter 6 from Bhagavad Gita (Dhyan Yog)
   D. Activity 4 based on chapter 12 from Bhagavad Gita (Bhakti Yog)
3. Activity based Learning : Bhagavad Gita for harmonious Relationships
   A. Activity 1 based on Bhagavad Gita's view of life and relationships
   B. Activity 2 based on chapter 2 from Bhagavad Gita.
   C. Activity 3 based on chapter 12 from Bhagavad Gita.
   D. Activity 4 based on chapter 16 from Bhagavad Gita.
4. Activity based Learning : Happy Life Lessons from Bhagavad Gita
   A. Activity 1 based on chapter 4 from Bhagavad Gita.
   B. Activity 2 based on chapter 3 and 12 from Bhagavad Gita.
   C. Activity 3 based on Mind Control, Service and Compassion lessons from Bhagavad Gita.

Activity may include: –

1) Recitation of verses and discussing their meaning.
2) Presentation by the students on contemporary problems and their solutions as per guidelines of Bhagavad Gita.
3) Group Discussion on the applicability/importance of teachings of Gita for the personal/social/national/international problems.
4) Debates among the student groups on applicability of teachings of Bhagavad Gita on the given problems.
5) Field work. –Going to a certain town/Village/Colony as part of activity, staying with them for a certain duration, trying to first understand the problems they are going through and trying to find out solutions as per the teachings of Gita which may also include Empowering solutions to the problems as decided by the teacher at the time of teaching the course.

Practical: 2 Hrs/Week | Total Hours : 30 Hrs

Textbooks:

1. Prabhupada, AC Bhaktivedanta Swami, and Bhaktivedanta Swami. Bhagavad-Gita as it is. Los Angeles: Bhaktivedanta Book Trust, 1972.
2. The Gospel of Selfless Action: The Gita According to Gandhi" by Mahadev Desai. Navajivan Publishing House
3. Bhagavad Gita and Its Message" by Sri Aurobindo, Lotus Press.