RCOEM

Shri Ramdeobaba College of
Engineering and Management, Nagpur

SHRI RAMDEOBABA COLLEGE OF ENGINEERING AND MANAGEMENT, NAGPUR – 440013

An Autonomous College affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, Maharashtra (INDIA)

PROGRAMME SCHEME & SYLLABI
2023-24

B. TECH. (CSE-Cyber Security)

B. Tech. Computer Science and Engineering [2023-24]
Teaching & Evaluation Scheme [B. Tech CSE-Cyber Security]

Semester - I

Sr. No.	Category	Course Code	Course Name	Hours/week			Credits	Maximum marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1.	BSC	CHT1001	Chemistry of Smart Materials	2	0	0	2	50	50	100	2
2.	BSC	CHP1001	Chemistry of Smart Materials Lab	0	0	2	1	50	-	50	-
3.	BSC	MAT1002	Calculus	3	0	0	3	50	50	100	3
4.	ESC	CCT1001	Digital Electronics	3	0	0	3	50	50	100	3
5.	ESC	CCP1001	Digital Electronics Lab	0	0	2	1	50	-	50	-
6.	ESC	CCT1002	Programming for problem solving	3	0	0	3	50	50	100	3
7.	ESC	CCP1002	Programming for problem solving Lab	0	0	2	1	50	-	50	-
8.	VSEC	CCT1003	Computer Workshop – I	1	0	0	1	50	-	50	-
9	VSEC	CCP1003	Computer Workshop – I Lab	0	0	2	1	50	-	50	-
10	HSSM-IKS	HUT1001	Foundational Literature of Indian Civilization	2	0	0	2	50	50	100	2
11.	CCA	PET1001	Sports-Yoga-Recreation	1	0	0	1	50	-	50	-
12.	CCA	PEP1001	Sports-Yoga-Recreation Lab	0	0	2	1	50	-	50	-
			TOTAL	**15**	**0**	**10**	**20**			**850**	**-**

Semester – II

Sr. No.	Category	Course Code	Course Name	Hours/week			Credits	Maximum marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1.	BSC	PHT2001	Introduction to Quantum Computing	2	1	0	3	50	50	100	3
2.	BSC	PHP2001	Introduction to Quantum Computing Lab	0	0	2	1	50	-	50	-
3.	BSC	MAT2002	Discrete Mathematics	3	0	0	3	50	50	100	3
4.	BSC	MAP2001	Computational Mathematics Lab	0	0	2	1	50	-	50	-
5.	BSC	CHT2007	Bioinformatics	2	0	0	2	50	50	100	2
6.	ESC	CCT2001	Object Oriented Programming	3	0	0	3	50	50	100	3
7.	ESC	CCP2001	Object Oriented Programming Lab	0	0	2	1	50	-	50	-
8.	PCC	CCT2002	Computer Architecture	2	0	0	2	50	50	100	2

9.	VSEC	CCT2003	Computer Workshop – II	1	0	0	1	50	-	50	-
10.	VSEC	CCP2003	Computer Workshop – II Lab	0	0	2	1	50	-	50	-
11.	AEC	HUT2002	English for Professional Communication	2	0	0	2	50	50	100	2
12.	AEC	HUP2002	English for Professional Communication Lab	0	0	2	1	50	-	50	-
13.	CCA	HUP0001	Liberal/Performing Art	0	0	2	1	50	-	50	-
14.	VEC	HUT2004	Foundation Course in Universal Human Values	1	0	0	1	50	-	50	-
			TOTAL	**16**	**1**	**12**	**23**	700	300	**1000**	**-**

List of courses offered under the Basket of Liberal Arts (HUP0001)

Course Code	Course Name
HUP0001-1	Fundamentals of Indian Classical Dance: Bharatnatayam
HUP0001-2	Fundamentals of Indian Classical Dance: Kathak
HUP0001-3	Introduction to Digital Photography
HUP0001-4	Introduction to Japanese Language and Culture
HUP0001-5	Art of Theatre
HUP0001-6	Introduction to French Language
HUP0001-7	Introduction to Spanish Language
HUP0001-8	Art of Painting
HUP0001-9	Art of Drawing
HUP0001-10	Nature camp
PEP0001-21	Disaster Management through Adventure Sports
PEP0001-22	Self-defense Essentials and Basics Knowledge of Defense forces
CHP0001-31	Art of Indian traditional cuisine
CHP0001-32	Remedies by Ayurveda

Exit option : Award of UG Certificate in Major with 43 credits and an additional 8 credits.			
Exit Courses			
1	**Web Designer**	**Online/offline certification Course**	**8**
2	**IT Support Engineer**		**8**
3	**Certified Programmer (language learned in Sem-1 and/or Sem-2 [C,C++,Java, Python])**		**8**

Semester - III								Maximum marks			ESE
Sr. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Continuous Evaluation**	**End Sem Exam**	**Total**	**Duration (Hrs)**
1	PCC	CCT3001	Data Structures	3	1	0	4	50	50	100	3
2	PCC	CCP3001	Data Structures Lab	0	0	2	1	50	-	50	-
3	PCC	CCT3002	Computer Networks	3	0	0	3	50	50	100	3
4	PCC	CCP3002	Computer Networks Lab	0	0	2	1	50	-	50	-
5	PCC	CCP3003	Software Lab-I	0	0	2	1	50	-	50	-
6	MDM	MAT3003	Mathematics for Cyber Security	3	0	0	3	50	50	100	3
7	OE	CCT3004	Open Elective - I	4	0	0	4	50	50	100	3
8	HSSM	CCP3005	Idea Lab	0	0	4	2	50	-	50	-
9	PCC	CCT3006	Cyber Law and Ethics	2	0	0	2	50	50	100	2
10	AEC	HUT3001	Business Communication	2	0	0	2	50	50	100	2
		TOTAL		**19**	**1**	**10**	**23**	**500**	**300**	**800**	**-**

	Semester - IV							Maximum marks			ESE
Sr. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Continuous Evaluation**	**End Sem Exam**	**Total**	**Duration (Hrs)**
1	PCC	CCT4001	Operating Systems	3	0	0	3	50	50	100	3
2	PCC	CCP4001	Operating Systems Lab	0	0	2	1	50	-	50	-
3	PCC	CCT4002	Cryptography	3	0	0	3	50	50	100	3
4	PCC	CCP4002	Cryptography Lab	0	0	2	1	50	-	50	-
5	PCC	CCT4003	Theory of Computation	3	0	0	3	50	50	100	3
6	MDM	MAT4002	Probability and Queuing Theory	3	0	0	3	50	50	100	3
7	OE	CCT4004	Open Elective - II	2	0	0	2	50	50	100	2
8	PCC	CCP4005	Software Lab-II	0	0	2	1	50	-	50	-
9	CEP/FP/ZZ	CCT4006	Community Engagement Project	0	0	4	2	50	-	50	-
10	HSSM	MBT299-5	Business and Organizational Management	2	0	0	2	50	50	100	2
11	VEC	HUT4002	Environmental Education	2	0	0	2	50	50	100	2
		TOTAL		**18**	**0**	**10**	**25**	**550**	**350**	**900**	**-**

Exit option: Award of UG Certificate in Major with 91 credits and an additional 8 credits.			
Exit Courses			
1	**Application Development (Android)**	**Online/offline certification Course**	**8**
2	**Certified Software Engineer (Devop)**		**8**
3	**Certified Network Defender (CND) – EC - Council**		**8**

Semester - V								Maximum marks			ESE
Sr. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Continuous Evaluation**	**End Sem Exam**	**Total**	**Duration (Hrs)**
1	PCC	CCT5001	Design & Analysis of Algorithms	3	0	0	3	50	50	100	3
2	PCC	CCT5002	Computer Security	3	0	0	3	50	50	100	3
3	PCC	CCP5002	Computer Security Lab	0	0	2	1	50	-	50	-
4	PCC	CCT5003	Basics of Ethical Hacking	3	0	0	3	50	50	100	3
5	PCC	CCP5003	Basics of Ethical Hacking Lab	0	0	2	1	50	-	50	-
6	PCC	CCT5004	Program Elective-1	3	0	0	3	50	50	100	3
7	MDM	CCT5005	Artificial Intelligence and Machine Learning	3	0	0	3	50	50	100	3
8	MDM	CCP5005	Artificial Intelligence and Machine Learning Lab	0	0	2	1	50	-	50	-
9	OE	CCT5006	Open Elective - III	2	0	0	2	50	50	100	2
		TOTAL		**17**	**0**	**6**	**20**	**450**	**300**	**750**	**-**

Semester - VI								Maximum marks			ESE
Sr. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Continuous Evaluation**	**End Sem Exam**	**Total**	**Duration (Hrs)**
1	PCC	CCT6001	Introduction to Cloud Security	3	0	0	3	50	50	100	3
2	PCC	CCP6001	Introduction to Cloud Security Lab	0	0	2	1	50	-	50	-
3	PCC	CCT6002	Database Management System	3	0	0	3	50	50	100	3
4	PCC	CCP6002	Database Management System Lab	0	0	2	1	50	-	50	-
5	PCC	CCT6003	Software Engineering and Project Management	3	0	0	3	50	50	100	3
6	PCC	CCP6003	Software Engineering and Project Management Lab	0	0	2	1	50	-	50	-
7	PCC	CCT6004	Program Elective-2	3	0	0	3	50	50	100	3
8	PCC	CCT6005	Program Elective-3	3	0	0	3	50	50	100	3
9	PCC	CCT6006	Deep Learning	2	0	0	2	50	50	100	2
10	VSEC	CCP6007	Mini Project	0	0	4	2	25	25	50	-
TOTAL				**17**	**0**	**10**	**22**	**475**	**325**	**800**	

Exit Option: Award of UG Certificate in Major with 133 credits and an additional 8 credits.			
Exit Courses			
1	Certified Cloud Engineer (AWS, AZURE)	**Online/offline certification Course**	**8**
2	Certified Cloud Security (ZScalar)		**8**
3	Certified Ethical Hacker (EC - Council)		**8**

Semester - VII								Maximum marks			ESE
Sr. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Continuous Evaluation**	**End Sem Exam**	**Total**	**Duration (Hrs)**
1	PCC	CCT7001	Compiler Design	3	0	0	3	50	50	100	3
2	PCC	CCT7002	Secure Coding	3	0	0	3	50	50	100	3
3	PCC	CCP7002	Secure Coding Lab	0	0	2	1	50	-	50	-
4	PCC	CCT7003	Network Security Administration	3	0	0	3	50	50	100	3
5	PCC	CCP7003	Network Security Administration Lab	0	0	2	1	50	-	50	-
6	PCC	CCT7004	Program Elective-4	3	0	0	3	50	50	100	3
7	PCC	CCP7004	Program Elective-4 Lab	0	0	2	1	50	-	50	-
8	MDM	CCT7005	Data Visualization Techniques	2	0	0	2	50	50	100	2
9	Project	CCP7006	Major Project I	0	0	8	4	50	50	100	
		TOTAL		**14**	**0**	**14**	**21**	**450**	**300**	**750**	**-**

Semester - VIII								Maximum marks			ESE
Sr. No.	**Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Continuous Evaluation**	**End Sem Exam**	**Total**	**Duration (Hrs)**
1	PEC	CCT8001	Program Elective-5	3	0	0	3	50	50	100	3
2	PEC	CCT8002	Program Elective-6	3	0	0	3	50	50	100	3
3	Project	CCP8003	Major Project II	0	0	12	6	50	50	100	-
Total								**150**	**150**	**300**	
OR											
1	PEC	CCT8004	Research Methodology	3	0	0	3	50	50	100	3
2	Project	CCP8005	Research Project	0	0	12	6	50	50	100	-
3	PEC	CCT8001	Program Elective-5	3	0	0	3	50	50	100	3
Total								**150**	**150**	**300**	
OR											
1	Internship	CCP8006	Internship / TBI Internship	0	0	24	12	100	100	200	
		TOTAL		**0**	**0**	**24**	**12**			**200**	**-**

Electives Basket:

Program Elective - 1	**Program Elective - 2**	**Program Elective - 3**	**Program Elective - 4**	**Program Elective - 5**	**Program Elective - 6**
CCT5004 – 1 Operating Systems for Cyber Security	CCT6004 – 1 Wireless & Mobile Device Security	CCT6005 – 1 Managing Risk in Information Systems	CCT7004 – 1 Database & Email Forensics	CCT8001 -1 Vulnerability Assessment and Penetration Testing	CCT8002 – 1 Testing Cyber Crime Investigation and Digital Forensics
CCT5004 – 2 Threat and Malware Analysis	CCT6004 – 2 Incident Handling & Response	CCT6005 – 2 IOT Security	CCT7004 – 2 Auditing IT Infrastructure for Compliance	CCT8001- 2 Disaster Recovery & business continuity management	CCT8002 – 2 Executive Governance and Management in IT Security
CCT5004 – 3 Security Policies and implementation	CCT6004 – 3 Security Strategies in Windows & Linux	CCT6006 – 3 Application Security	CCT7004 – 3 Blockchain Security	CCT8001 - 3 Mobile Application Security Testing	CCT8002 – 3 Security in Social Networks

List of Open Electives:

Sr. No.	**Subject Code**	**Name of Subject**
Open Elective I	CCT3004	Cyber Defense Strategies
Open Elective II	CCT4004	Network Security Fundamentals
Open Elective III	CCT5005	Basics of Ethical Hacking

Syllabus for B.Tech. Semester I

(CSE- Cyber Security, Artificial Intelligence and Machine learning, Data science)

Course Code	**CHT1001**				
Category	Basic Science Course				
Course Title	**Chemistry of Smart Materials**				
Scheme& Credits	L	T	P	Credits	Semester I
	2	0	0	2	

Course Outcomes

On successful completion of course student will learn:

1. Classify and explain the different types of sensors for various applications.
2. Discuss unique properties of nano-materials to solve challenges in our life and applications in computational world.
3. Discuss how spectroscopic methods are used for qualitative and quantitative analysis.
4. Analyze the utilization of green computing technology for environmental issues

UNIT-I: Smart Sensors and Materials

RFID and IONT materials: Synthesis, properties and applications in logistic information, intelligent packaging systems (Graphene oxide, carbon nanotubes (CNTs) and polyaniline). Sensors: Introduction, types of sensors (Piezoelectric and electrochemical), nanomaterials for sensing applications (Strain sensors, gas sensor, biomolecules and volatile organic compounds).

UNIT-II: Nanomaterials

Introduction, classification, size dependent properties, surface area, optical and catalytic properties, Synthesis methods of nanomaterials- Top down and bottom-up approach.
Carbon nanomaterials: Types, properties and applications of CNT and graphene.
Applications of nano materials.

UNIT-III: Characterization Techniques and computational tools:

Fundamentals of spectroscopy, Electronic Spectroscopy, Nuclear Magnetic Resonance Spectroscopy. Basics of Nuclear magnetic resonance quantum computer
Synthesis of drugs, basic soft-wares for bio-chemical assessment of drugs.

UNIT-IV: Green Computing and Chemistry

E-wastes- Types, environmental and health risks, segregation and recycling (Hydrometallurgical, pyrometallurgical and direct recycling), Extraction of precious metals from e-wastes, Twelve principles of Green Chemistry. Green Computing, Role of Green Computing in Environment and Research, Green devices and Green data Servers.

Text Books:

1. Shikha Agrawal , Engineering Chemistry : Fundamentals and Applications, Cambridge University Press.
2. Dr. Rajshree Khare, A Textbook of Engineering Chemistry(AICTE), S.K. Kataria & Sons.
3. S. S. Dara, A Textbook of Engineering Chemistry, S. Chand Publications.

4. A. K. Das and M. Das, An introduction to nanomaterials and nanoscience, CBS Publishers and Distributors
5. M Afshar Alam, Sapna Jain, Hena Parveen, Green Computing Approach Towards Sustainable Development, Wiley Interscience Publications.
6. Sensor & transducers, D. Patranabis, 2nd edition, PHI

Reference Books:

1.E-waste recycling and management: present scenarios and environmental issues, Khan, Anish, and Abdullah M. Asiri. 2019, Springer, Vol. 33. ISBN: 978-3-030-14186-8.
2. Hans-Eckhardt Schaefer, Nanoscience: The Science of the Small in Physics, Engineering, Chemistry, Biology and Medicine, Springer-Verlag Berlin Heidelberg.

Syllabus for B.Tech. Semester I
(CSE- Cyber Security, Artificial Intelligence and Machine learning, Data science)

Course Code	**CHP1001**				
Category	Basic Science Course				
Course Title	**Chemistry of Smart Materials Lab**				
Scheme& Credits	L	T	P	Credits	Semester I/II
	0	0	2	1	

The Chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.
The students will learn to:
1. Apply the fundamental principles of measurement and skills in preparation and handling of hazardous chemicals and interpret the statistical data related to measurements.
2. Estimate the rate constants of reactions and order of the reaction and/or to validate adsorption isotherms.
3. Use of various computational tools for analysis of different spectral properties and bio-activities.

List of Experiments:

[1] Preparation of different Solutions: Molar solution, Normal solution and percent solution and Determination of concentration.
[2] Demonstration of Handling of hazardous chemicals, MSDS (material safety data sheet), waste minimization strategies and chemical waste disposal.
[3] Basic statistical analysis of results of neutralization of acid against the base and preparing acceptable graphs using software.
[4] Prediction of infrared/NMR spectral and analytical data of organic molecules using Computational Software.
[5]. Spectroscopic/Colorimetric determine of wavelength of maximum absorption of chemical/biological compound in solution and determination of concentration using Lambert-Beer's Law.
[6] To study chemical kinetics of peroxydisulphate and iodide ions reactions and to find out order of the reaction and analysis of experimental data using Computational Software.
[7] Molecular docking of drugs using open computational software.
[8] Determination of rate of the reaction at room temperature and analysis of experimental data using Computational Software
[9] Use of open access software for the interpretation of various parameters of materials including drugs
[10] Estimation of Copper from PCB

Suggested Books/Reference Books:
(1) S. S. Dara, A Textbook on Experiments and Calculations in Engineering Chemistry, S. Chand Publications.
(2) J. B. Yadav, Advanced Practical Physical Chemistry, Krishna's Prakashan Media (P) Limited.
(3) A. J. Elias, Collection of Interesting General Chemistry Experiments, Universities Press Publications.
(4) V. K. Ahluwalia, S. Dhingra and A. Gulati, College Practical Chemistry, Universities Press Publications.

(5) Ashutosh Kar , Advanced Practical Medicinal Chemistry, New Age International Publisher.

Suggested Reference Books:

(1) David Young, Computational Chemistry: A Practical Guide for Applying Techniques to RealWorld Problems, Wiley Interscience Publications

Annexure 4 (2023-24)

Syllabus for Bachelor of Technology (Computer Science/ AIML/Data Science/ Cyber Security/IT Engineering)

Semester I

Course Code: MAT 1002 **Course Name: Calculus**

L: 3Hrs. T: 0 Hrs. P: 0 Hrs. Per week **Total Credits:3**

Course Objective

The objective of this course is to familiarize the prospective engineers with techniques in Calculus. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Outcomes

On successful completion of the course, student shall be able to

1. Apply the concepts of continuity and differentiability to find Taylor's and Maclaurin series.
2. Understand the methods of partial derivatives and apply these concepts to determine extreme values of the functions of two variables.
3. Demonstrate the basic knowledge of vector differentiation and line integral.
4. Understand proper and improper integrals and use it find area, length, volume and surface of revolution
5. Internalize convergence of sequences and apply it to determine whether infinite series convergent or divergent with appropriate tests.

Syllabus

Module 1 :(8 Lectures)

Differential Calculus: Functions of single variable: Review of limit, continuity and differentiability. Mean value theorems: Rolle's theorem, Lagrange's theorem, Cauchy's theorem, Taylor's theorem, Taylor's and Maclaurin series.

Module 2: (8 Lectures)

Partial Differentiation: Partial derivatives, Euler's Theorem, chain rule, total derivative, Jacobians, Maxima, Minima for the functions of two variables.

Module 3: (8 Lectures)

Vector Calculus: Scalar and vector fields, gradient of scalar point function, directional derivatives, divergence and curl of vector point function, Line integral.

Module 4: (8 Lectures)

Integral Calculus: Fundamental theorem of Integral calculus, mean value theorems, evaluation of definite integrals, applications in area, length, volumes and surface of solids of revolutions, Improper integrals: Beta and Gamma functions.

Module 5: (8 Lectures)

Infinite series: Sequences, Infinite series of real and complex numbers, Cauchy criterion, tests of convergence, absolute and conditional convergence, uniform convergence, power series, radius of convergence.

Textbooks/References

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,
2010.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
5. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
6. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics Volume I & II, Pune Vidhyarthi Griha Prakashan, Pune-411030 (India).

Syllabus for Semester I, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCT1001 **Category:** Engineering Science Course (ESC)

Course: Digital Electronics **L:** 3Hrs**, T:** 0Hr**, P:** 0Hr**, Per Week, Credits:** 3

Course Objectives

The objective of this course is to familiarize the prospective engineers with:

1. Logic functions using Boolean algebraic theorems and techniques
2. Conventional combinational and sequential circuits including conversions offlip-flops.
3. The exploration of the semiconductor memories and programmable logic devices.
4. The basic concept of microprocessor with addressing mode and instruction set for programming.

SYLLABUS

UNIT-I

Basics of Digital Electronics

Motivation for digital systems: Logic and Boolean algebra, Number Systems. Logic Gates & Truth Tables, Demorgan's law, Minimization of combinational circuits using Karnaugh maps up to five variables. Map manipulation-essential prime implicants, non-essential prime implicants**.**

UNIT-II

Combinational Circuit Design

Design procedure: Multiplexers, Demultiplexer, Encoders, Decoders, Code Converters, Adders, Subtractor (Half, Full), BCD Adder/ Subtractor, ripple and carry look-ahead addition booth's Algorithm, bit-pair recoding, Integer Division- restoring and non-restoringdivision

UNIT-III

Sequential circuit Design-I

Storage elements, Flip-flops and latches: D, T, J/K, S/R flip-flops. Master Slave Conversion of one of type of F/F to another Sequential circuit. Analysis –Input equations, state table, and analysis with J-K Flip flops. Sequential circuit Design, Design procedure, designing with D & J-K Flip flop.

UNIT-IV

Sequential circuit Design-II

Counters, asynchronous and synchronous design using state and excitation tables. Registers & Shift registers., Mealey & Moore Machines

UNIT-V

Memory & Programmable logic Devices

Semiconductor RAM memories, Static and Dynamic Memories, ROM, higher order memory design, multi-module memories, Memory interleaving, Secondary storage – Magnetic disk, Optical disk, PLA, PAL.

UNIT-VI

Fundamental of Microprocessor

Introduction to µp 8085, Addressing modes, Instruction set, Programming of µp 8085.

Course Outcomes

After successful completion of this course, the student will be able to,

1. Outline binary arithmetic operations and optimize Boolean functions using Karnaugh map (k-map) method.
2. Apply combinational circuits for realization of basic building blocks of conventional digital circuits.
3. Design sequential blocks like flip flops, counters, registers, simple finite state machine and similar circuits.
4. Describe the memory elements and combinational digital circuits implementation with programmable logic devices.
5. Use addressing modes and instruction set of target microprocessors for writing efficient assembly language programs.

Text Books

1. Morris Mano; Digital Logic Design; Fourth edition, McGraw Hill
2. R.P.Jain; Modern Digital Electronic; Fourth edition; Tata McGraw-Hill.
3. V.J.Vibhute; 8-Bit Microprocessor & Microcontrollers; fifth edition.

Reference books

1. A. Anand Kumar; Fundamental of Digital Electronics; Second Edition, PHI
2. A.P.Godse; Digital circuit & design; Technical Publications; 2009.
3. Ramesh Gaonkar; 8-bit Microprocessor; CBS Publishers; 2011.

Syllabus for Semester I, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCP1001 **Category:** Engineering Science Course (ESC)

Course: Digital Electronics Lab **L:** 0Hr**, T:** 0Hr**, P:** 2Hrs**, Per Week, Credits:** 1

Course Outcome

On Successful completion of course, students will be able to:

1. Use logic gates for designing digital circuits
2. Implement combinational circuits using VHDL
3. Implement sequential circuits using VHDL
4. Apply the knowledge gained for their project work based on the hardware digital circuits

Practical based on above theory syllabus

Syllabus for Semester I, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCT1002 **Category:** Engineering Science Course (ESC)

Course: Programming for Problem Solving **L:** 3Hrs**, T:** 0Hr**, P:** 0Hr**, Per Week, Credits:** 3

Course Outcomes

On successful completion of course student will learn:

1. Create C programs using loops and decision making statements to solve and execute the given problem.
2. Develop programs and functions one dimensional and two dimensional arrays.
3. Apply the concept of pointers, structures to develop programs.
4. Implement files in C to store the data for the given problem.

UNIT-I: Introduction to Programming

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) Idea of Algorithm: Steps to solve logical and numerical problems. Representation of Algorithm: Flowchart /Pseudocode with examples. Arithmetic expressions and precedence

UNIT-II: C Programming Language

Introduction to C language: Keywords, Constant, Variable, Data types, Operators, Types of Statements,

Pre-processor Directives, Decision Control Statement-if, if-else, nested if-else statement, switch case, Loops and Writing and evaluation of conditionals and consequent branching.

UNIT-III: Arrays and Basic Algorithms

Arrays: 1-D, 2-D, Character arrays and Strings. Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

UNIT-IV: Functions and Recursion

User defined and Library Functions, Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference. Recursion: As a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

UNIT-V: Pointers and Structures

Structures, Defining structures, Array of Structures, Introduction to pointers, Defining pointers, Pointer arithmetic, pointer operators, Use of Pointers in self-referential structures, notion of linked list (no implementation)

UNIT-VI: File handling

Streams in C, Types of Files, File Input/ Output Operations: Modes of file opening, Reading and writing the file, Closing the files, using fflush ().

Text Books:

1. Programming in ANSI C: E. Balguruswami McGraw Hill
2. Mastering C: K. R. Venugopal and S. R. Prasad, Tata McGraw Hill

Reference Books

1. Programming with C: Byron Gottfried, Schaums Outline Series.
2. Let Us C: Yashwant Kanetkar, BPB Publication

Syllabus for Semester I, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCP1002 **Category:** Engineering Science Course (ESC)

Course: Programming for Problem Solving Lab **L:** 0Hr**, T:** 0Hr**, P:** 2Hrs**, Per Week,Credits:** 1

Course Outcomes

On successful completion of course student will be able to:

1. Create C programs using loops and decision making statements to solve and execute the given problem.
2. Develop programs and functions one dimensional and two dimensional arrays.
3. Apply the concept of pointers, structures to develop programs.
4. Implement files in C to store the data for the given problem.

Practical based on above theory syllabus

Syllabus for Semester I, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCT1003 **Category:** Vocational & Skill Enhancement Course (VSEC)

Course: Computer Workshop-1 **L:** 1Hr**, T:** 0Hr**, P:** 0Hr**, Per Week, Credits:** 1

Course Objectives

1. Understand the definition and principles of UI/UX in order to design with intention.
2. Achieve an understanding of the life-cycle of application design—the process, purpose, and tools.
3. Learn the basics of HCI (human-computer interaction) and the psychology behind user decision-making.
4. Explore UI/UX tools to interpret requirements of modern applications.
5. Elaborate design decisions through presentations of assignments.

Unit 1:

UI/UX Overview: Introduction to UI/UX, Principles of UI/UX, UI Components, Design Thinking, Interaction Design, Usability.

Unit 2:

UI Programming: Basic of HTML5, Elements of HTML5, Background of CSS, Bootstrap CSS, Fundamentals of JavaScript, HTML DOM Manipulations.

Unit 3:

UX Programming: Figma Basics, How to identify user needs, Wireframe and Prototype, Digital Storytelling.

Course Outcomes

On successful completion of the course, students will be able to:

1. Understand basics of UI/UX
2. Design and develop web pages using HTML, CSS and JavaScript
3. Infer the significance of Wireframing and build prototypes.

Text Books

1. UI/UX design for designer and developers: by Nathan Clark
2. Web Design: A Beginner's Guide Second Edition by Wendy Willard
3. User story mapping by Jeff Patton, O'Reilly Publication

Syllabus for Semester I, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCP1003 **Category:** Vocational & Skill Enhancement Course (VSEC)

Course: Computer Workshop-1 Lab **L:** 0Hr**, T:** 0Hr**, P:** 2Hrs**, Per Week, Credits:** 1

Course Objectives

1. Understand the definition and principles of UI/UX in order to design with intention.
2. Achieve an understanding of the life-cycle of application design—the process, purpose, and tools.
3. Learn the basics of HCI (human-computer interaction) and the psychology behind user decision-making.
4. Explore UI/UX tools to interpret requirements of modern applications.
5. Elaborate design decisions through presentations of assignments.

Syllabus:

Practical based on Theory Syllabus

Course Outcomes

On successful completion of the course, students will be able to:

1. Design and develop static web pages using HTML and CSS
2. Develop dynamic web pages using JavaScript
3. Create high-fidelity designs and prototypes in Figma

Appendix -1

Shri Ramdeobaba College of Engineering and Management
Department of Humanities
Syllabus and Scheme of IKS course

Scheme

Course Code	Course Name	Sem.	Hours/week	Credits	Maximum marks	ESE
					Continuous Evaluation	2 hours
HUT1001/ 2001	**Foundational Literature of Indian Civilization**	I/II	2	2	50	50

Course outcome:
At the end of the course the students will be able to achieve the following:
CO1: Understand the Indian knowledge system and its scientific approach
CO2: Get introduced to the Vedic corpus and recognize the multi-faceted nature of the knowledge contained in the Vedic corpus
CO3: Understand the salient features of the philosophical systems of the Vedic and non-Vedic schools
CO4: Develop a basic understanding of the ancient wisdom recorded in various Indian literary work

Syllabus

1. **Unit 1: Overview of Indian Knowledge System:** Importance of ancient knowledge, defining IKS, IKS classification framework, Historicity of IKS, Some unique aspects of IKS.
2. **Unit 2: The Vedic corpus:** Introduction of Vedas, four Vedas, divisions of four Vedas, six Vedangas, Distinct features of Vedic life.
3. **Unit 3: Indian Philosophical systems:** Development and unique features, Vedic schools of philosophy, *Samkhya* and *Yoga* School of philosophy, *Nayay* and *Vaisesika* school of philosophy, *Purva-mimamsa* and *Vedanta* schools of Philosophy, Non-vedic philosophies: Jainism, Buddhism, and other approaches
4. **Unit 4: Indian wisdom through ages:** *Panchtantras*, ***Purans*:** contents and issues of interests, ***Itihasa:*** uniqueness of the two epics (Ramayan and Mahabharata), Key issues and messages from Ramayana, Mahabharata - a source of worldly wisdom*;*
   Indian ancient Sanskrit literature: *Kalidas, Vishakadutta, Bhavbhuti, Shudraka**
   ***any one text as decided by the course teacher**

Reference material

1. B. Mahadevan, Vinayak Rajat Bhar, Nagendra Pavana R. N., *"Introduction to Indian Knowledge System: Concepts and Applications"* PHI, 2022
2. S.C. Chatterjee and D.M. Datta, *An introduction to Indian Philosophy*, University of Calcutta, 1984

SHRI RAMDEOBABA COLLEGE OF ENGINEERING & MANAGEMENT, NAGPUR

DEPARTMENT OF PHYSICAL EDUCATION

Syllabus of Semester I UG Engineering Program

COURSE: SPORTS-YOGA-RECREATION			
L: 1 Hrs. T: 0 Hrs. P: 2 Hrs. Per Week			Total Credit: 02
	Course Code	**Credit**	**No. of Lecture/Practical**
Theory	PET 1001	1	1 Hour per week
Practical	PEP 1001	1	2 Hours per week

Aim of the Course: The course aims at creating awareness about the fundamentals of Physical Education, Sports, Yoga, Recreation and its effectiveness to promote Health and wellness through Healthy Lifestyle.

Objectives of the Course:

1. To impart the students with basic concepts of Sports, Yoga and Recreational activities for health and wellness.
2. To familiarize the students with health-related Exercise and evaluate their Health-related Fitness.
3. To make Overall growth & development with team spirit, social values and leadership qualities among students through various sports, games and Yogic activities.
4. To create Environment for better interaction and recreation among students as neutralizer for stress through various minor and recreational games.

Course Outcomes: On completion of the course, students will be able to:

1. Understand fundamental skills, basic principle and practices of sports and Yoga.
2. Practically learn the principles of implementing general and specific conditioning of physical exercises and yoga.
3. Develop Health-related fitness and Body-mind co-ordination through various fitness activities, sports, recreational games and yoga.
4. practice Healthy & active living with reducing Sedentary Life style.

Course Content: Unit1:- Theory: Introduction

- Meaning, Definition and Importance of Health & Wellness
- Dimensions of Health and Wellness
- Factors influencing Health and Wellness
- Physical Fitness, Nutrition, Habits, Age, Gender, Lifestyle, Body Types
- Health & Wellness through Physical Activities, Sports, Games, Yoga and Recreation activities
- Causes of Stress & Stress relief through Exercise and Yoga
- Safety in Sports

Unit 2: - Practical- Exercises for Health and Wellness

- Warm-Up and Cool Down - General & Specific Exercises
- Physical Fitness Activities
- Stretching Exercises
- General & Specific Exercises for Strength, Speed, Agility, Flexibility, coordinative abilities
- Cardiovascular Exercises
- Assessment of BMI
- Relaxation techniques
- Physical Efficiency Tests

Unit 3: - Yoga

- Shukshma Vyayam
- Suryanamaskar
- Basic Set of Yogasanas – Sitting, standing, supine and prone position
- Basic Set of Pranayama & Meditation

References:

1. Russell, R.P. (1994). Health and Fitness Through Physical Education. USA: Human Kinetics.
2. Uppal, A.K. (1992). Physical Fitness. New Delhi: Friends Publication.
3. AAPHERD "Health related Physical Fitness Test Manual."1980 Published by Association drive Reston Virginia
4. Kumar, Ajith. (1984) Yoga Pravesha. Bengaluru: Rashtrothanna Prakashana.
5. Dr. Devinder K. Kansal, A Textbook of Test Evaluation, Accreditation, Measurements and Standards (TEAMS 'Science)

Shri Ramdeobaba College of Engineering & Management, Nagpur

Syllabus for Semester B.Tech. I / II

(Cyber Security, Artificial Intelligence and Machine learning, Data Science, Computer Science and Engineering and Information Technology)

Course Code	PHT 2001/1006				
Category	Basic Science Course				
Course Title	Introduction to Quantum Computing (Theory)				
Scheme& Credits	L	T	P	Credits	Semester I / II
	2	1	0	3	

Course Objectives

1. To introduce the fundamentals of quantum computing to students
2. The problem-solving approach using finite dimensional mathematics

Course Outcomes

After successful completion of the course, the students will be able to -

1. Use the basic quantum theory relating to the probabilistic behaviour of an electron in an atom.
2. Utilize the knowledge of complex vector space in the domain of quantum theory.
3. Analyse classical and quantum approach towards the quantum computation.
4. Classify deterministic and probabilistic systems and analyse quantum observations and quantum measurements.
5. Use quantum gates in building architecture and quantum algorithms.

Module 1: Basic Quantum Theory

Brief introduction about Quantum Computers and Quantum mechanics, Wave nature of Particles, Bohr's quantization condition, Heisenberg's Uncertainty principle, Wave function, probability, Schrodinger's wave equation, Operators, Electron in an infinite potential well, Eigen value and Eigen functions.

Module 2: Complex Vector Spaces

Algebra and Geometry of Complex numbers, Real and Complex Vector Spaces, definitions, properties, Abelian group, Euler's formula, Dr Moivre's formula, Matrix properties.

Module 3: Linear Algebra in Quantum Computing

Basis and Dimensions, Inner products, Hilbert Spaces, Eigenvalues and Eigenvectors, Hermitian and Unitary Matrices, Tensor Product, Applications of linear algebra in computer graphics.

Module 4: Classical and Quantum Systems

Deterministic and Probabilistic Systems, Quantum Systems, Stochastic billiard ball, Probabilistic double slit experiment with bullet and photon, Superposition of states, assembling systems, Entangled states.

Module 5: Quantum representation of systems

Dirac notations, Stern-Gerlach experiment, transition amplitude, norm of the ket, Bloch Sphere, Observables, Spin matrices, commutator operator, expectation values, variance, standard deviation, Heisenberg's uncertainty principle in matrix mechanics, measuring, dynamics, observations.

Module 6: Architecture and Algorithms

Bits and Qubits, Classical Gates and their equivalent quantum representation, Reversible Gates: CNOT, Toffoli, Fredkin, gates, outline of Pauli X, Y, Z gates, Hadamard gates, Deutsch Gate.
Quantum Algorithms: Deutsch's algorithm, Grover's search algorithm.
Applications of quantum computing in Cryptography, Quantum teleportation, Cybersecurity, banking, finance, advance manufacturing and artificial intelligence.

Text Book

1. Quantum computing for computer scientists, Noson S. Yanofsky, Mirco A. Mannucci, Cambridge University Press 2008
2. Introduction to Quantum Mechanics, 2nd Edition, David J. Griffiths, Prentice Hall New Jersey 1995

Reference Books

1. Quantum computing explained, David McMahon, Wiley-interscience, John Wiley & Sons, Inc. Publication 2008
2. Quantum computation and quantum information, Michael A. Nielsen and Isaac L. Chuang, Cambridge University Press 2010

Shri Ramdeobaba College of Engineering and Management, Nagpur
Syllabus for Semester B.Tech. I / II
(Cyber Security, Artificial Intelligence and Machine learning, Data science, Computer Science and Engineering and Information Technology)

Course Code	PHP 2001/1006				
Category	Basic Science Course				
Course Title	Introduction to Quantum Computing Lab				
Scheme & Credits	L	T	P	Credits	Semester I / II
	0	0	2	1	

Course Outcomes:
The physics laboratory will consist of experiments and programming exercises illustrating the principles of quantum physics and quantum computing relevant to the study of computer science and engineering.

On completion of the course, the students will be able to

1. Develop skills required for experimentation and verification of physics laws.
2. Utilise Mathematica software for graph plotting and for least squares fitting of the experimental data.
3. Compare the properties of real and complex matrices with reference to their use in quantum system.
4. Apply the computational methods to solve eigenvalues and eigenfunctions, tensor products.
5. Simulate classical and quantum gates.

List of Experiments:

1. Introduction to IBM quantum computer.
2. Simulation of classical gates by quantum representation of the gates and inputs.
3. Arithmetic operations using IBM Quantum computer.
4. Simulation of quantum gates: CNOT gate, Toffoli gate, Fredkin gate, Hadamard gate on IBM quantum computer.
5. Linear and Nonlinear data fitting by least squares fit method
6. Working with Vectors.
7. Working with Matrices: Real and Complex numbers.
8. Eigen values, Eigen functions, Properties of Inner Product and Unitary Matrices, Tensor Product.
9. Verification of Ohm's law and error analysis of the data using Linear Least Square Fit (LLSF) method.
10. Analysis of energy values and wavefunction using Mathematica software

Reference Books
1. Lab manual prepared by Physics Department, RCOEM, Nagpur

Syllabus for Bachelor of Technology (Computer Science/ AIML/Data Science/ Cyber Security/IT Engineering)

Semester II

Course Code: MAT 2002 **Course Name: Discrete Mathematics**

L: 3Hrs. T: 0 Hrs. P: 0 Hrs. Per week **Total Credits:3**

Course Objective:

The objective of this course is to expose student to understand the basic importance of Logic, Number theory, Algebraic structures like groups and Fieild, combinatorics and graph theory l in computer science and Information technology.

Course Outcomes

On successful completion of the course, student shall be able to

1. Formulate problems and solve recurrence relations
2. Apply techniques of number theory to solve problems from linear congruences, coding theory etc. in cryptography.
3. Internalize logical notations to define and reason about fundamental mathematical concepts and use it derive logical inference.
4. Apply groups and fields in coding theory.
5. Understand the Lattice as algebraic structure and use it for pattern recognition and in cryptography.

Syllabus

Module 1: (9 Lectures)

Combinatorics: Addition and multiplication rule in combinatorics, Linear and

Circular permutation, Combination, Binomial Identities, Inclusion and Exclusion Principle, distribution Principle, recurrence relations, generating function, examples using ordinary power series and exponential generating functions.

Module 2: (8 Lectures)

Modular Arithmetic: Modular Arithmetic, Euclid's Algorithm, primes, Fermat's theorem, Euler's theorem, Diophantine equations, Linear congruences, Chinese Remainder theorem, application to Cryptography.

Module 3: (7 Lectures)

Mathematical Logic: Statement and notations, connectives, Negation, conjunction, disjunction, conditional & bi-conditional statement. Tautologies, equivalence of formulas, Duality law, Tautological implications, Theory of inference for statement calculus.

Module 4: (9 Lectures)

Groups and Fields: Group definitions and examples, cyclic group, permutation groups, subgroups and homomorphism, co-sets, Lagrange's theorem and Normal subgroup, Error correcting codes, Hamming codes. Finite field, Galois field.

Module 5: (7 Lectures)

Lattice theory: Lattices as partially ordered set, Properties of Lattice, Lattices as algebraic system, sub lattices, direct product, homomorphism, some special Lattices.

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science: *J. P. Tremblay and R. Manohar , Tata McGraw-hill.*
2. Discrete Mathematics: *Babu Ram, Pearson Publication.*
3. Combinatorial Mathematics: C. *L. Liu & D. P. Mohapatra, 3rd edition, Tata McGraw-hill.*
4. David M Burton, 'Elementary Number Theory' , McGraw Hill, Seventh edition 2014.

Reference Books:

1. Foundations of Discrete Mathematics: *K. D. Joshi, New age international Publication.*
2. Discrete Mathematics: *Kolman, Busby* & *Ross, Pearson Publication.*

Annexure 1 (2023-24)

Syllabus

B.Tech First year (Computer Science/ AIML/Data Science/ Cyber Security Engineering)

Department: Mathematics Course: Computational Mathematics Lab

Course Code: MAP2001 L:0 Hr., T:0 Hr., P:2Hrs., Per week Total Credits:1

Course Objectives:

The computational Mathematics Lab course will consist of experiments demonstrating the principles of Mathematics relevant to the study of Science and Engineering. Students will show that they have learnt Laboratory skills that will enable them to properly acquire and analyze the data in the lab and draw valid conclusions. On successful completion of the course students shall be able to:

Proposed Course Outcomes:

By using open source software SageMath Students will be able to

CO1: Download SageMath and use it as an advance calculator.

CO2: Sketch and analyze function graphs.

CO3: Apply the concepts of differential calculus to find extreme value of continuous functions and analyze solutions of difference equations

CO4: Evaluate improper integrals and its applications to find length, area, volume, centre of gravity and mass.

CO5: Understand and Analysis Data inscription standards.

CO6: Analyze the data to find best fit curve.

Mapping of Course outcomes (COs) withExperiments

Exp. No.	Name of Experiments	Mapped COs
1	To use SageMath as advanced calculator	CO1
2	2D Plotting with SageMath	CO2
3	3D Plotting with SageMath	CO2
4	Differential Calculus with SageMath	CO3
5	Solution of difference equations in SageMath	CO3
6	To Learn Cryptography by using SageMath	CO5
7	Curve Fitting by using SageMath	CO6
8	Integral Calculus with SageMath	CO4

Head of the Department

Syllabus for B. Tech. Semester-II,

CSE-Cyber Security, CSE-Artificial Intelligence and Machinelearning, CSE-Data science, Computer Science and Engineering

Course Code	**CHT 2007**				
Category	Basic Science Course				
Course Title	**Bioinformatics**				
Scheme& Credits	L	T	P	Credits	Semester II
	2	0	0	2	

Course Outcomes:

After the successful completion of the course, students shall be able to

CO1: Explain the functioning of various metabolic processes in the human body.

CO2: Acknowledge the importance of metabolic simulations in drug discovery,

CO3: Explain the functioning of various types of the drugs for therapeutic applications.

CO4: Use knowledge of bioinformatics for basic formulation of drug design

Unit- I Introduction to Biomolecules

Carbohydrates: Introduction and classification

Amino Acid: Chemistry properties and metabolism.

Proteins: primary, Secondary, tertiary and quaternary structure,

Lipids: Chemistry, Metabolism of fatty acids, Phospholipids, Cholesterol regulation of metabolism.

Nucleic Acid: Chemistry of DNA and RNA,

Vitamins: Structure and functions of some vitamins.

Unit-II Introduction to bioinformatics:

Introduction, Biological data: Sequence, gene expression, pathways and molecular interaction: Data bases: Sequence, Gene bank, Dogmass- central and peripheral, The standard genetic code, applications.

Unit -III Drug and Data Bases

Drug and Data bases: Introduction, classification of drugs, Drug Solubility/permeability, Drug Likeness Introduction to metabolic engineering and systems biology, role of metabolic simulations in drug discovery,

Unit-IV Computer Aided Drug Design

Introduction to molecular docking, rigid docking, flexible docking, 3D pharmacophore, 3D data base searching and virtual searching, pharmacophore modelling, brief introduction about various online tools for drug designing and molecular docking.

Text Books

1. Upadhayay, K. Upadhayay, N. Nath, Biophysical Chemistry (Principles and Techniques), Himalaya Publishing House, 2009.
2. David L. Nelson and Michael M. Cox, Lehninger Principles of Biochemistry, Fifth Edition, W. H. Freeman and Company, New York, 2008.

3. Young David. Computational drug design: A Guide for Computational and Medicinal Chemists.Publisher: Wiley. 2009. ISBN: 9780470126851

Reference books:

1. Bioinformatics: Sequence and Genome Analysis, Mount. D. W, CSHL Press, New York 2nd Edition 2004.
2. Introduction to Bioinformatics by Arthur M. Lesk University of Cambridge, Published in theUnited States by Oxford University Press Inc., New York
3. Introduction to Computational Biology: Maps, Sequences and Genomes, Waterman, M.,Chapman and Hall, 1995.
4. Abraham, Donald (Ed). Burger's medicinal chemistry and drug discovery. Publisher: John Wiley& Sons, Inc. 2003. ISBN: 0471270903
5. Schlick, T. Molecular modelling and simulation: an interdisciplinary guide. Publisher: Springer.2002. ISBN: 0-387-95404-X
6. Leach, Andrew. Molecular Modelling: Principles and Applications. Publisher: Prentice Hall.2001. ISBN: 0582239338.
7. Jensen, Jan H. Molecular Modeling Basics. Publisher: CRC Press. 2010. ISBN: 978-1420075267
8. Hinchliffe Alan. Molecular modelling for beginners. Publisher: John Wiley and Sons Ltd. 2008.ISBN: 978 0470513149

E- Text book

1. Computer Aided Drug Design by Prof. Mukesh Doble, Biotechnology, IIT, Madras(SwayamNPTEL)

Syllabus for Semester II, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCT2001 **Category:** Engineering Science Course (ESC)

Course: Object Oriented Programming **L:** 3Hrs**, T:** 0Hr**, P:** 0Hr**, Per Week, Credits:** 3

Course Objectives

1. To make students understand Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections
2. Introduce students with fundamental concepts like exception handling, generics, collection classes and streams.

Unit I: Features of Object-Oriented Programming languages, Abstraction, Encapsulation, Inheritance, polymorphism and late binding. Programming paradigms, Bytecode, JDK, JRE, JVM. Concept of a class and object, ways of representing objects, access control of members of a class, instantiating a class, constructor.

Unit II: Concept of overloading: Constructor Overloading, Function Overloading. Arrays and Array of objects, Wrapper classes (Integer, Double etc.), String Class, creating packages, importing packages. Lambda Expressions Introduction, Block, Passing Lambda expression as Argument

Unit III: Concept of inheritance, methods of derivation, use of super keyword and final keyword in inheritance, run time polymorphism, abstract classes and methods, Interface, implementation of interface, static and non-static members.

Unit IV: Exceptions, types of exception, use of try catch block, handling multiple exceptions, using finally, throw and throws clause, user defined exceptions, Introduction to streams, byte streams, character streams, file handling in Java, Serialization.

Unit V: Generics, generic class with two type parameter, bounded generics. Collection classes: Arraylist, LinkedList, TreeSet, HashMap, Iterator, ListIterator, Comparator, Comparable

Unit VI: Introduction to Design Patterns, Need of Design Pattern, Classification of Design Patterns, Role of Design Pattern in Software design, Creational Patterns, Structural Design Patterns and Behavioral Patterns.

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand the object-oriented programming features, classes, objects and methods.
2. Develop efficient programs by implementing the concept of Inheritance, polymorphism exception handling.
3. Use the concept of generics, collections, streams to develop solution to the given problem.
4. Analyze characteristics and need of design pattern in software design process.

Text Books

1. Herbert Schildt; JAVA The Complete Reference; Ninth Edition, Tata McGraw- Hill Publishing Company Limited.
2. Design Patterns By Erich Gamma, Pearson Education

Reference Books

1. Paul Deitel, Harvey Deitel; Java 9 for Programmers; Pearson
2. Herbert Schildt and Dale Skrien; Java Fundamentals A Comprehensive Introduction; Tata McGraw- Hill Education Private Ltd 2013

Syllabus for Semester II, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCP2001 **Category:** Engineering Science Course (ESC)

Course: Object Oriented Programming Lab **L:** 0Hr**, T:** 0Hr**, P:** 2Hr**, Per Week, Credits:** 1

Course Objectives

1. To develop ability of students to implement basic concepts and techniques of object oriented programming paradigm like encapsulation, inheritance, polymorphism, exception handling.
2. Develop solution to problems using collection classes, generics, streams, multithreading.

Course Outcomes

On completion of the course the student will be able to

1. Develop the solutions using basic features of Object-Oriented Programming.
2. Design efficient and reusable solutions using inheritance and exception handling techniques.
3. Create and use type-safe object through generics and collection classes.

SYLLABUS

Experiments based on the above Syllabus.

Syllabus for Semester II, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCT2002 **Category:** Programme Core Course (PCC)

Course: Computer Architecture **L:** 2Hrs**, T:** 0Hr**, P:** 0Hr**, Per Week, Credits:** 2

Course Objectives

The objective of this course is to familiarize the prospective engineers with:

1. Concepts of computer architecture by developing understanding of various functional units, components of computers and working of all the modules.
2. Design principles of modern computers including memory, bus system, input/output operation, interrupt handling mechanism and parallelization.

SYLLABUS

UNIT I: Basic Structure of Computers: Functional units of computer, basic operational concepts- Instruction, processor and memory, operating steps, address, Big- and Little-endian assignments, Instructions set architecture of a CPU- Instruction Formats, Instruction sequencing, addressing modes, and instruction set classification, subroutine & parameter passing, expanding opcode, RISC and CISC.

UNIT II: Basic Processing Unit and Data Representation: Basic Concepts- Instruction execution, Bus architecture- One bus and Multi-bus, Execution of a Complete Instruction, sequencing of control signals, Hardwired control, Micro-programmed Control. Floating point numbers-representation, guard bits and rounding.

UNIT III: Memory & Input/output: Cache memory, Cache size vs. block size, mapping functions, replacement algorithms, Cache read/write policy, Virtual Memory, I/O mapped I/O and memories mapped I/O, interrupt and interrupt handling mechanisms, vectored interrupts, synchronous vs. asynchronous data transfer, Bus Arbitration, Direct Memory Access

UNIT IV: Pipelining: Basic concepts of pipelining, throughput and speedup, Introduction of Parallel Computing: SISD, MISD, SIMD, MIMD

Course Outcomes:

On Successful completion of course, students will be able to:

1. Demonstrate the understanding about the functional units of a digital computer system.
2. Execute complete instruction on different types of bus architectures with control signal generation.
3. Analyse memory, multiprocessor and multicore architectures and their implications in parallel computing.

Text Books

1. V.C.Hamacher, Z.G.Vranesic and S.G.Zaky; Computer Organisation; 5th edition; Tata McGraw Hill, 2002.
2. W. Stallings; Computer Organization & Architecture; PHI publication; 2001.
3. J. P. Hayes; Computer Architecture & Organization; 3rd edition; McGraw-Hill; 1998.
4. Reference Books
5. M Mano; Computer System and Architecture; PHI publication; 1993.
6. A.S.Tanenbaum; Structured Computer Organization; Prentice Hall of India Ltd.

Syllabus for Semester II, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCT2003 **Category:** Vocational & Skill Enhancement Course (VSEC)

Course: Computer Workshop-2 **L:** 1Hr**, T:** 0Hr**, P:** 0Hr**, Per Week, Credits:**1

Course Objective

The objective of this course is to familiarize the students with an important web framework for developing user interfaces. It aims for developing high end web applications by the use of ReactJS features.

Course Outcomes

After successful completion of this course, the student will be able to,

1. Implement the fundamentals of React with Java Script and JSX
2. Understand Templating concept along with different types of components in ReactJS
3. Understand different state and Life Cycle Methods
4. Implement Router with react Router.

Course Contents

UNIT-I

Introduction to React

React JS Introduction, Advantages of React JS, Introduction to JSX, Difference between JS and JSX.

UNIT-II

Components in React

React Components overview, Types of components, Controlled, Split Up, Composable, Reusable, Component Declarations and Styling Components

State and it significance, Read state and set state, Passing data to component using props, Validating props using prop Types, Supplying default values to props using default Props

UNIT-III

Routing with react router

Introduction to React Router, Routing in single page applications, Browser Router and Hash Router components Configuring route with Route component.

Text Books

1. Pure React- a step by step guide - Dave Ceddia
2. Road to learn react - Robin Wieruch
3. React in Action 1st Edition - Mark Tielens Thomas

Syllabus for Semester II, B. Tech. Computer Science & Engineering (Cyber Security)

Course Code: CCP2003 **Category:** Vocational & Skill Enhancement Course (VSEC)

Course: Computer Workshop-2 Lab **L:** 0Hr, **T:** 0Hr, **P:** 2Hrs, **Per Week, Credits:**1

Course Objective

The objective of this course is to familiarize the students with an important web framework for developing user interfaces. It aims for developing high end web applications by the use of ReactJS features.

Syllabus:

Practical based on Theory Syllabus

Course Outcomes

After successful completion of this course, the student will be able to

1. Understanding the fundamentals of ReactJS including components, props, state, and lifecycle methods.
2. Design and implement complex applications by composing smaller, reusable components together.
3. Building Web Applications to create dynamic and interactive web applications using React and other related technologies like JSX and ES6.
4. Implement React Router to handle client-side routing and create single-page applications.

Shri Ramdeobaba College of Engineering and Management
Department of Humanities
Syllabus and Scheme of English for Professional Communication Theory

Scheme

Course Code	Course Name	Sem.	Hours/week	Credits	Maximum marks	ESE
					Continuous Evaluation	2 hours
HUT1002/2002	English for Professional Communication	I/II	2	2	50	50

Course Objectives

The main objective of this course is to enhance the employability skills of students as well as prepare them for effective work place communication.

Course outcomes:

On successful completion of the course the students will be able to achieve the following:

CO1. Demonstrate effective use of word power in written as well as oral communication.
CO2. Understand the techniques of listening and apply the techniques of reading comprehension used in professional communication.
CO3. Apply the principles of functional grammar in everyday as well as professional communication.
CO4. Effectively implement the comprehensive principles of written communication by applying various writing styles.
CO5. Create precise and accurate written communication products.

Unit-1: Vocabulary Building

1.1 Importance of using appropriate vocabulary
1.2 Techniques of vocabulary development
1.3 Commonly used power verbs, power adjectives and power adverbs.
1.4 Synonyms, antonyms, phrases & idioms, one-word substitutions and standard abbreviations

Unit -2: Listening and Reading Comprehension

2.1 Listening Comprehension: active listening, reasons for poor listening, traits of a good listener, and barriers to effective listening
2.2 Reading Comprehension: types and strategies.

Unit -3: Functional Grammar and Usage

3.1 Identifying Common Errors in use of: articles, prepositions, modifiers, modal auxiliaries, redundancies, and clichés
3.2 Tenses
3.3 Subject-verb agreement, noun-pronoun agreement

3.4 Voice

Unit-4: Writing Skills

4.1 Sentence Structures
4.2 Sentence Types
4.3 Paragraph Writing: Principles, Techniques, and Styles

Unit-5: Writing Practices

5.1 Art of Condensation: Précis, Summary, and Note Making
5.2 Correspondence writing techniques and etiquettes - academic writing
5.3 Essay Writing

Books

1. *Communication Skills*. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
2. *Practical English Usage*. Michael Swan. OUP. 1995.
3. *Remedial English Grammar*. F.T. Wood. Macmillan.2007
4. *On Writing Well*. William Zinsser. Harper Resource Book. 2001
5. *Study Writing*. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
6. *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Shri Ramdeobaba College of Engineering and Management
Department of Humanities
Syllabus and Scheme of English for Professional Communication Practical

Scheme

Course Code	Course Name	Sem.	Hours/week	Credits	Maximum marks
HUP1002/2002	English for Professional Communication Lab	I/II	2	1	50

Course Objective
To enhance competency of communication in English among learners

Course Outcomes
On completion of English Lab course, students will be able to achieve the following:
CO1: Apply effective listening and speaking skills in professional and everyday conversations.
CO2: Demonstrate the techniques of effective Presentation Skills
CO3: Evaluate and apply the effective strategies for Group Discussions
CO4: Analyse and apply the effective strategies for Personal Interviews
CO5: Implement essential language skills- listening, speaking, reading, and writing

Syllabus
List of practicals

Computer Assisted + Activity Based Language Learning
Practical 1: Everyday Situations: Conversations and Dialogues - Speaking Skills
Practical 2: Pronunciation, Intonation, Stress, and Rhythm
Practical 3: Everyday Situations: Conversations and Dialogues - Listening Skills
Activity Based Language Learning
Practical 4: Presentation Skills: Orientation & Mock Session
Practical 5: Presentation Skills: Practice
Practical 6: Group Discussions: Orientation & Mock Session
Practical 7: Group Discussions: Practice
Practical 8: Personal Interviews: Orientation & Mock Session
Practical 9: Personal Interviews: Practice

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/week	Credits	Maximum Marks (Continuous Evaluation)
HUP0001-1	Fundamentals of Indian Classical Dance: Bharatnatayam	I/II	2	1	50

Course objective

The course aims to introduce the students to Bharatnatyam, an important element of Indian traditional knowledge system. The course will not only provide the learning and skill to perform this art but would also enhance many mental and physical aspects of the students such as strength, flexibility, discipline, self-confidence, creativity, focus, coordination, etc.

Course Outcomes

On completion of the course, students will be able to achieve the following:

CO1: Understand the importance of dance and Bharatnataym as an Indian dance form

CO2: Develop skills to perform the dance form at its basic level.

CO3: Evaluate their strengths and interest to take bridge course to give *Pratham* (1st level formal exam of Bharatnatayam).

Syllabus

Practical -1: Orientation in Bharatnatayam

Practical-2: Tattu Adavu till 8, Naatta Adavu 4 Steps, Pakka Adavu 1 step, Metta Adavu 1 Step, Kuditta Metta Adavu 4 Steps,

Practical -3: Practice sessions

Practical-4: Tatta Kuditta Adavu (Metta), Tatta Kuditta Adavu (Metta) 2 Steps, Tirmanam Adavu 3 Steps, Kattu Adav - 3 Steps, Kattu Adav - 3 Steps

Practical-5: Practice sessions

Practical-6: Tiramanam (front) 3 Steps, Repeat of Tiramanam (Overhead) 3 Steps,

Practical-7: practice sessions

Practical – 8: final practice sessions and performances.

Recommended reading

1. *Introduction to Bharata's Natyasastra*, Adya Rangacharya, 2011
2. *The Natyasastra and the Body in Performance: Essays on the Ancient Text*, edited by Sreenath Nair, 2015
3. *Bharatanatyam How to ... : A Step-by-step Approach to Learn the Classical Form*, Eshwar Jayalakshmi, 2011

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/ week	Credits	Maximum Marks (Continuous Evaluation)
HUP0001-2	Fundamentals of Indian Classical Dance: Kathak	I/II	2	1	50

Course objective

The course aims to introduce the students to Kathak, an important element of Indian traditional knowledge system. The course will not only provide the learning and skill to perform this art but would also enhance many mental and physical aspects of the students such as strength, flexibility, discipline, self-confidence, creativity, focus, coordination, etc.

Course Outcomes

On completion of the course, students will be able to achieve the following:

CO1: Understand the importance of dance and Kathak as an Indian dance form
CO2: Develop skills to perform the dance form at its basic level.
CO3: Evaluate their strengths and interest to take bridge course to give *Prarambhik* (1st level formal exam of Kathak).

Syllabus

Practical -1: Orientation in Kathak. Correct posture of kathak, Basic Movements and exercise Stepping, Chakkar of 5 count (Bhramari),
Practical -2: practice sessions of practical 1
Practical -3: Hastaks, Hastaks and Steppings, Reciting asamyukta Mudra shloka, Hastak and steppings
Practical -4: practice sessions of practical 3
Practical -5: Todas and Asamyukta hasta mudra shlok, Vandana of Shlok, 2 Todas and Vandana, Ghante Ki Tihai,
Practical -6: practice sessions of practical 5
Practical -7: 2 1 Chakkardar Toda and Ginnti Ki Tihai, 2 Todas and 1 Chakkardar Toda, practice sessions
Practical -8: Final performances.

Recommended reading

1. Kathak Volume1 A "Theoretical & Practical Guide" (Kathak Dance Book), Marami Medhi & Debasish Talukdar, 2022, Anshika Publication (13 September 2022)

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/week	Credits	Maximum Marks (Continuous Evaluation)
HUP0001-3	Introduction to Digital Photography	I/II	2	1	50

Course objective

The course aims to develop basic skills of students in digital photography to lay a foundation for them as a hobby and/or a profession.

Course outcome:

At the end of the course the students will be able to achieve the following:

CO1: Develop an understanding of the technical aspects and aesthetics of Photography.
CO2: Apply the rules of digital photography for creating photographs.
CO3: Develop skills to enhance photographs through post processing.
CO4: Create a portfolio of their photographs in selected genre.

Syllabus

Practical 1: **Orientation in digital photography:** Genres, camera handling and settings
Practical 2: **Rules of Composition**
Practical 3: **Rules of Composition**: practice sessions
Practical 4: **Understanding Exposure and Art of Pre-Visualization**
Practical 5: **Rules of Composition and Art of Pre-Visualization:** practice sessions
Practical 6: **Post Processing Photographs and Portfolio creation**
Practical 7: **Post Processing Photographs:** practice sessions
Practical 8: **Portfolio finalization and presentation in selected genre.**

Reference material

1. Scott Kelby (2020) *The Digital Photography Book: The Step-by-Step Secrets for how to Make Your Photos Look Like the Pros*, Rocky Nook, USA
2. Larry Hall (2014) *Digital Photography Guide: From Beginner to Intermediate: A Compilation of Important Information in Digital Photography*, Speedy Publishing LLC, Newark
3. J Miotke (2010) *Better Photo Basics: The Absolute Beginner's Guide to Taking Photos Like a Pro*, AMPHOTO Books, Crown Publishing Group, USA

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/week	Credits	Maximum Marks (Continuous Evaluation)
HUP0001-4	Introduction to Japanese Language and Culture	I/II	2	1	50

Course objective

The course aims to develop basic communication skills in Japanese Language and help develop a basic understanding of Japanese culture in cross-cultural communication.

Course outcome

CO1: Gain a brief understanding about Japan as a country and Japanese culture.
CO2: Develop ability to use vocabulary required for basic level communication in Japanese language.
CO3: Able to write and read the first script in Japanese language.
CO4: Able to frame simple sentences in Japanese in order to handle everyday conversations
CO5: Able to write in basic Japanese about the topics closely related to the learner.

Syllabus

Practical-1: Orientation about Japan, its language, and its culture
Practical-2: Communication Skills 1: Vocabulary for basic Japanese language
Practical -3: Practice sessions
Practical-4: Writing Skills 1: Reading and writing first script in Japanese
Practical-5: Practice sessions
Practical- 6: Communication Skills 2: framing sentences
Practical- 7: Practice sessions
Practical- 8: Writing Skills 2: Write basic Japanese and practice

Recommended reading

1. Marugoto Starter (A1) Rikai - Course Book for Communicative Language Competences, by The Japan Foundation, Goyal Publishers & Distributors Pvt. Ltd (ISBN: 9788183078047)
2. Japanese Kana Script Practice Book - Vol. 1 Hiragana, by Ameya Patki, Daiichi Japanese Language Solutions (ISBN: 9788194562900)

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/ week	Credits	Maximum Marks (Continuous Evaluation)
HUP0001-5	Art of Theatre	I/II	2	1	50

Course objectives:

The course aims to develop in the students, an actor's craft through physical and mental training.

Course Outcomes:

On completion of the course, students will be able to achieve the following:

CO1: Understand and synthesize the working of the prominent genres of theatre across the world.
CO2: Apply the skill of voice and speech in theatre and public speaking
CO3: Apply the art of acting and also develop generic skills such as confidence, communication skills, self-responsibility, motivation, commitment, interpersonal skills, problem solving, and self-discipline.
CO4: Apply skills acquired related to technical/production aspects of theatre and also develop problem solving and interpersonal skills.

Syllabus:

Syllabus

Practical 1: **Orientation in theatre**
Practical 2: **Voice and Speech training**
Practical 3: **Voice and Speech training**: practice sessions
Practical 4: **Art of acting**
Practical 5: **Art of acting:** practice sessions
Practical 6: **Art of script writing**
Practical 7: **Art of script writing:** practice sessions
Practical 8: **Final performances**

Reference books:

1. Boleslavsky, R. (2022). *Acting: The First Six Lessons* (1st ed., pp. 1-92). Delhi Open Books.
2. Shakthi, C. (2017). *No Drama Just Theatre* (1st ed., pp. 1-171). Partridge.
3. Bruder, M., Cohn, L. M., Olnek, M., Pollack, N., Previto, R., & Zigler, S. (1986). *A Practical Handbook for the Actor* (1st ed.). Vinatge Books New York.

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/week	Credits	Maximum Marks (Continuous Evaluation)
HUP0001-6	Introduction to French Language	I/II	2	1	50

Course objective:

To help build a foundation and interest in French language so that the students can pursue the proficiency levels of the language in higher semesters.

Course outcomes:

On successful completion of the course the students will be able to achieve the following:
CO1. Demonstrate basic knowledge about France, the culture and similarities/differences between India and France
CO2. Learn to use simple language structures in everyday communication.
CO3. Develop ability to write in basic French about themselves and others.
CO4. Develop ability to understand beginner level texts in French

Syllabus
List of Practicals

Practical-1: Orientation about France, the language, and culture
Practical-2: Communication Skills 1: Vocabulary building for everyday conversations
Practical -3: Practice sessions
Practical-4: Reading and writing Skills : Reading and writing simple text in French
Practical-5: Practice sessions
Practical-6: Communication Skills 2: listening comprehension
Practical-7: Practice sessions
Practical-8: Writing Skills: Write basic French and practice

Recommended reading

1. 15-minute French by Caroline Lemoine
2. Cours de Langue et de Civilisation Françaises by G. Mauger Vol. 1.1
3. Cosmopolite I by Natalie Hirschsprung, Tony Tricot

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/week	Credits	**Maximum Marks (Continuous Evaluation)**
HUP0001-7	Introduction to Spanish Language	I/II	2	1	50

Course objective:

To help build a foundation and interest in Spanish language so that the students can pursue the proficiency levels of the language in higher semesters.

Course outcomes:

On successful completion of the course the students will be able to achieve the following:
CO1. Demonstrate basic knowledge about Spain, the culture and similarities/differences between India and France
CO2. Learn to use simple language structures in everyday communication.
CO3. Develop ability to write in basic Spanish about themselves and others.
CO4. Develop ability to read and understand beginner level texts in Spanish

Syllabus
List of Practicals

Practical-1: Orientation about Spain, the language, and culture
Practical-2: Communication Skills 1: Vocabulary building for everyday conversations
Practical -3: Practice sessions
Practical-4: Reading and writing Skills : Reading and writing simple text in Spanish
Practical-5: Practice sessions
Practical-6: Communication Skills 2: listening comprehension
Practical-7: Practice sessions
Practical-8: Writing Skills: Write basic Spanish and practice

Recommended reading

1. 15-Minute Spanish by Ana Bremon
2. Aula Internacional 1 by Jaime Corpas ,Eva Garcia, Agustin Garmendia.
3. Chicos Chicas Libro del Alumno by María Ángeles Palomino

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/week	Credits	Maximum Marks (Continuous Evaluation)
HUP0001-8	Art of Painting	I/II	2	1	50

Course objective

Painting is fundamentally about learning to see, and to transport that vision onto paper through a variety of mark making techniques. This course aims to develop basic skills of students in painting to lay a foundation for them as a hobby and/or a profession.

Course outcome:

At the end of the course the students will be able to achieve the following:

CO1: Become familiar with the basic methods, techniques & tools of painting.
CO2: Train the eye and hand to develop sense of balance, proportion and rhythm.
CO3: Develop the ability to observe and render simple natural forms.
CO4: Enjoy the challenging and nuanced process of painting.

Syllabus

Practical 1: **Orientation in Painting tools & basics of lines, shapes, light, shadows and textures**
Practical 2: **The art of observation** how to see shapes in drawing
Practical 3: **Introduction Water color** how to handle water paints
Practical 4: **Introduction to acrylic colors** how to handle acrylic paints
Practical 5: **Explore layering paint and capturing the quality of light with paint.**
Practical 6: **Create landscape painting**
Practical 7: **Create Abstract painting**
Practical 8: **Paint on Canvas** (try to recreate any famous painting)

Reference material

1. Drawing made easy by Navneet Gala; 2015th edition
2. Alla Prima II Everything I Know about Painting--And More by Richard Schmid with Katie Swatland
3. Daily Painting: Paint Small and Often To Become a More Creative, Productive, and Successful Artist by Carol Marine

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/ week	Credits	Maximum Marks (Continuous Evaluation)
HUP0001-9	Art of Drawing	I/II	2	1	50

Course objective

Drawing is fundamentally about learning to see, and to transport that vision onto paper through a variety of mark making techniques. This course aims to develop basic skills of students in drawing to lay a foundation for them as a hobby and/or a profession.

Course outcome:

At the end of the course the students will be able to achieve the following:

CO1: Become familiar with the basic methods, techniques & tools of drawing.
CO2: Train the eye and hand to develop sense of balance, proportion and rhythm.
CO3: Develop the ability to observe and render simple natural forms.
CO4: Enjoy the challenging and nuanced process of drawing.

Syllabus

Practical 1: **Orientation in Drawing tools & basics of lines, shapes, light, shadows and textures**
Practical 2: **The art of observation** how to see shapes in drawing
Practical 3: **One/two-point basic linear perspective**
Practical 4: **Nature drawing and landscapes**
Practical 5: **Gestalt principles of visual composition**
Practical 6: **Figure drawing**: structure and proportions of human body
Practical 7: **Gesture drawing:** expression and compositions of human figures
Practical 8: **Memory drawing:** an exercise to combine the techniques learnt

Reference material

1. Drawing made easy by Navneet Gala; 2015th edition
2. Perspective Made Easy (Dover Art Instruction) by Ernest R. Norling

Scheme and syllabus

Course Code	Course Name	Sem.	Hours/week	Credits	Maximum Marks (Continuous Evaluation)
HUP0001-10	**Nature camp**	II	2	1	50

Course Objective: To create an opportunity for the students to develop affinity with nature and thus subsequently impact their ability to contribute towards sustainability of nature.

Course outcome:
After the completion of the course the students will be able to do the following:
CO1: Develop an affinity with nature by observing and understanding it marvels with guidance from experts
CO2: Develop an understanding of the challenges and solutions associated with nature and its conservation.

Course content
In collaboration with the Forest Department and/or a local NGO working in the field of environment conservation, this course would be conducted in 24 hours. Students will be taken to a tiger reserve in Central Indian region or Forest fringe villages or work with an NGO from Central Indian region working on natural resource management. The camps (for 2 days) will cover any one of the following topics as decided by the course coordinator:

1. Awareness about each element of biodiversity (camps on moths, butterflies, birds, other wildlife etc)
2. Environment management (water, forest, wildlife) - practices of Forest Department in managing a tiger reserve, and other aspects of water and forest conservation.
3. Sustainable natural resource management - initiatives by rural communities and local NGOs
4. Man-animal conflict and solutions (socio-economic and technical) - role of local communities and Forest Department
5. Traditional practices in environment conservation - role of local communities and local NGOs

SHRI RAMDEOBABA COLLEGE OF ENGINEERING & MANAGEMENT, NAGPUR

DEPARTMENT OF PHYSICAL EDUCATION

Syllabus of Semester I and II UG Engineering Program

COURSE: DISSASTER MANAGEMENT THROUGH ADVENTURE SPORTS

Code: PEP0001-21 **Course Type:** Liberal Arts

L: 0 Hrs. T: 0 Hrs. P: 2 Hrs. Per Week **Total Credits:** 01

Objectives of the Course:

To enable the student:

1. To inculcate rational thinking and scientific temper among the students.
2. To develop critical awareness about the social realities among the students.
3. To build up confidence, courage and character through adventure sports.

Course Outcomes:

On completion of the course, students will be able to:

1. Understand the meaning and importance of Adventure sports.
2. Learn the various types of adventure sports, the equipment and resources required to practice disaster Management activities.
3. Learn the safety measures about different risk and their management.
4. To apply Disaster management theory to institutional & Societal problems and situations.

Course Content:

1. Basic adventure
2. First AID
3. various types of knots
4. Shelter making
5. Disaster management
6. Team building and goal setting
7. Realization of fear, risk and their roles and analyzing safety Management Plan

SHRI RAMDEOBABA COLLEGE OF ENGINEERING & MANAGEMENT, NAGPUR

DEPARTMENT OF PHYSICAL EDUCATION

Syllabus of Semester I and II UG Engineering Program

COURSE: SELF-DEFENSE ESSENTIALS AND BASICS KNOWLEDGE OF DEFENSE FORCES

Course Code: PEP0001-22 **Course Type:** Liberal Arts

L: 0 Hrs. T: 0 Hrs. P: 2 Hrs. Per Week **Total Credits:** 01

Course Outcomes:

On completion of the Course the student will be able to:

- Understand the meaning, need and fitness requirements to implement self-defense
- Learn the basic techniques of selected combative sports.
- Learn to prepare basic Physical Training for Defense forces.
- Implement survival techniques during emergencies.

Course Content:

- General conditioning and self-defense specific conditioning
- Applications of techniques of combative sports for self-defense.
- Self-defense techniques for specific situations: chain snatching, knife or stick attack, holding from back or front etc.
- Basic Military Knowledge and exposure making students Confident, bold, disciplined and trains them to join Armed Forces.

Course Code	CHP0001-31				
Category	Basket of Liberal Learning Course				
Course Title	**Art of Indian traditional cuisine**				
Scheme& Credits	L	T	P	Credits	Semester I/II
	0	0	2	1	

Course outcome:
At the end of the course the students will be able to achieve the following:

CO1: Understand the factors that affect regional eating habits and the unique ingredients found in variousstates of India
CO2: Get insight to prepare popular dishes from various regions of India. ·

Module 1: Indian Regional foods and snacks - factors effecting eating habits.
Module 2: Indian gravies – ingredients, their importance
Module 3: Indian Sweets - ingredients, their importance
Module 4: Presentation of Indian Meals, Menu Planning, Food Costing
Module 5: Food Preservatives and Safety

List of experiments:

1) Introduction to cookery: does and don'ts
2) Introduction to Indian cuisine, philosophy and classification.
3) Regional influence on Indian Food- factors affecting eating habits
4) Preparation of Garam masala and or Chat masala with ingredients and their importance
5) Preparation of different gravies such as white, yellow or brown gravies with ingredients and theirimportance
6) Preparation of Indian sweets like Besan ke laddu with ingredients and their importance
7) Presentation of meal, Menu planning and Food costing
8) Common chemical food preservatives and their safety standards.

Reference books

[1] Arora, K.,; Theory of cookery; First Edition, Frank Brothers Company (Pub) Pvt. Ltd., 2008 ISBN:9788184095036, 8184095031
[2] Philip, Thangam . E.,; Modern Cookery: Vol. 1; Sixth Edition, Orient BlackSwan., 2008 ISBN:9788125040446, 8125040447ali
[3] Parvinder S;Quantity Food Production Operations and Indian Cuisine (Oxford Higher Education); FirstEdition; Oxford University Press, 2011 ISBN 10: 0198068492 ISBN 13: 9780198068495
[4] Singh, Yogesh; A Culinary Tour of India; First Edition I.K. International Publishing House Pvt. Ltd.
ISBN 978-93-84588-48-9
[5] Singh Shakesh;Simplifying Indian Cuisine;First Edition, Aman Publications, ISBN81-8204-054-X
[6] Dubey Krishna Gopal; The Indian Cuisine;PHI Learning Pvt. Ltd.ISBN978-81 203-4170-8

Head
Department of Chemistry
Shri Ramdeobaba College of
Engineering and Management, Nagpur-13

Course Code	**CHP0001-32**				
Category	Basket of Liberal Learning Course				
Course Title	**Introduction to Remedies by Ayurveda**				
Scheme & Credits	L	T	P	Credits	Semester I/II
	0	0	2	1	

Course outcome:

At the end of the course the students will be able to achieve the following

CO1: Know basic principle of Ayurvedic formulations.
CO2: Different types of Natural Remedies.
CO3: Basic idea about their Characterization

Module 1- Introduction to Ayurveda
Module 2- Different types of Ayurvedic formulations: Churn, Bhasma, Vati, Tailum
Module 3- Introduction to Methods of preparation
Module 4 -Characterization, applications

Practicals based on above syllabus

1) Preparations of some medicinal oils like Bramhi tel, Bramhi Awala, Vatnashak Tel, Bhurngraj Tel etc.
2) Preparation of Churn, like Trifala Churn, Hingastak Churn, Trikut Churn etc.
3) Preparation of some Bhasmas and vati

Books

1) Chemistry and Pharmacology of Ayurvedic Medicinal Plants by Mukund Sabnis, Chaukhambha Amarbharati Prakashan.
2) Everyday Ayurveda by Shailesh Rathod
3) A text Book of Rasashastra by Vikas Dhole and Prakash Paranjpe
4) A text Book of Bhaiajya Kalpana Vij¯nana

Course Code	HUT2004				
Category	Value Education Course (VEC)				
Course Title	**Foundation course in Universal Human Values**				
Scheme & Credits	L	T	P	Credits	Semester II
	1	0	0	1	

Course Objectives:

1. To help the student see the need for developing a holistic perspective of life
2. To sensitize the student about the scope of life – individual, family (inter-personal relationship), society and nature/existence
3. To strengthen self-reflection
4. To develop more confidence and commitment to understand, learn and act accordingly

Course outcome:
On completion of course, students will be able to achieve the following:
CO1: Develop a holistic perspective of life
CO2: Better understanding of inter-personal relationships and relationship with society and nature.
CO3: An ability to strengthen self-reflection.

Syllabus
Unit 1:- Aspirations and concerns
Need for Value Education: Guidelines and content of value education.
Exploring our aspirations and concerns:Knowing yourself, Basic human aspirations Need for a holistic perspective, Role of UHV; Self-Management: harmony in human being

Unit 2:- Health
Harmony of the Self and Body, Mental and physical health; Health for family, friends and society.

Unit 3:- Relationships and Society
Harmony in relationships, Foundational values: Trust, Respect, Reverence for excellence, Gratitude

and love; harmony in society; harmony with nature.

Reference Material:

1. The primary resource material for teaching this course consists of

Text book: R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

2. Reference books:

a) B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
b) PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.
c) Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
d) Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
e) Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, limits to Growth, Club of Rome's Report, Universe Books.
f) Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
g) A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
h) E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
i) A.N. Tripathy, 2003, Human Values, New Age International Publishers.

Syllabus for Semester III
B. Tec. Computer Science & Engineering (Cyber Security)

Course Code:	**CCT3001**	**Course Name:**	**Data Structure Lab**		
L: 3 Hrs	**T: 1 Hr**	**P: 0 Hr**	**Per Week**	**Total Credits:**	**4**

Course Objectives:

1. To impart to students the basic concepts of data structures and algorithms.
2. To familiarize students on different searching and sorting techniques.
3. To prepare students to use linear (stacks, queues, linked lists) and non-linear (trees, graphs) data structures.
4. To enable students to devise algorithms for solving real-world problems.

Syllabus:

UNIT I Data Structures and Algorithms Basics

- Introduction: basic terminologies, elementary data organizations, data structure operations; abstract data types (ADT) and their characteristics.
- Algorithms: definition, characteristics, analysis of an algorithm, asymptotic notations, time and space tradeoffs.
- Array ADT: definition, operations and representations – row-major and column- major.

UNIT II Stacks and Queues

- Stack ADT: allowable operations, algorithms and their complexity analysis, applications of stacks – expression conversion and evaluation (algorithmic analysis), multiple stacks.
- Queue ADT: allowable operations, algorithms and their complexity analysis for simple queue and circular queue, introduction to double-ended queues and priority queues.

UNIT III Linked Lists

- Singly Linked Lists: representation in memory, algorithms of several operations: traversing, searching, insertion, deletion, reversal, ordering, etc.
- Doubly and Circular Linked Lists: operations and algorithmic analysis. Linked representation of stacks and queues, header node linked lists.

UNIT IV Sorting and Searching

- Sorting: different approaches to sorting, properties of different sorting algorithms (insertion, Shell, quick, merge, heap, counting), performance analysis and comparison.
- Searching: necessity of a robust search mechanism, searching linear lists (linear search, binary search) and complexity analysis of search methods.

UNIT V Trees

- Trees: basic tree terminologies, binary tree and operations, binary search tree [BST] and operations with time analysis of algorithms, threaded binary trees.
- Self-balancing Search Trees: tree rotations, AVL tree and operations, B+-tree: definitions, characteristics, and operations (introductory).

UNIT VI Graphs and Hashing

- Graphs: basic terminologies, representation of graphs, traversals (DFS, BFS) with complexity analysis, path finding (Dijkstra's SSSP, Floyd's APSP), and spanning tree (Prim's method) algorithms.
- Hashing: hash functions and hash tables, closed and open hashing, randomization methods (division method, mid-square method, folding), collision resolution techniques.

Course Outcomes:

On completion of the course the student will be able to

1. Recognize different ADTs and their operations and specify their complexities.
2. Design and realize linear data structures (stacks, queues, linked lists) and analyze their computation complexity.
3. Devise different sorting (comparison based, divide-and-conquer, distributive, and tree-based) and searching (linear, binary) methods and analyze their time and space requirements.
4. Design traversal and path finding algorithms for Trees and Graphs.

Text Books:

1. Ellis Horowitz, Sartaj Sahni & Susan Anderson-Freed, Fundamentals of Data Structures in C, Second Edition, Universities Press, 2008.
2. Mark Allen Weiss; Data Structures and Algorithm Analysis in C; Second Edition; Pearson Education; 2002.
3. G.A.V. Pai; Data Structures and Algorithms: Concepts, Techniques and Application; First Edition; McGraw Hill; 2008.

Reference Books:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein; Introduction to Algorithms; Third Edition; PHI Learning; 2009.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran; Fundamentals of Computer Algorithms; Second Edition; Universities Press; 2008.
3. A. K. Sharma; Data Structures using C, Second Edition, Pearson Education, 2013.

Syllabus for Semester - III, B.TECH. CSE (Cyber Security)

Course Code: CCP3001 **Course Name:** Data Structure Lab

L: 0 Hrs **T: 0 Hrs** **P: 2 Hrs** **Per Week** **Total Credits:** **1**

Course Objectives:

1. To enable students to employ different searching and sorting methods.
2. To prepare students to identify and apply linear (stacks, queues, linked lists) and non-linear (trees, graphs) data structures in solving problems.
3. To encourage students to design and execute tree-based algorithms for solving real-world problems.

Syllabus:

Experiments based on CCT203 Syllabus in C | C++

Course Outcomes:

On completion of the course the student will be able to

1. Design and realize different linear data structures.
2. Identify and apply specific methods of searching and sorting to solve a problem.
3. Implement and analyze operations on binary search trees and AVL trees.
4. Implement graph traversal algorithms, find shortest paths and analyze them.

Reference Books:

1. K R. Venugopal and Sudeep. R Prasad; Mastering C; Second Edition; McGraw Hill; 2015.
2. Ellis Horowitz, Sartaj Sahni & Susan Anderson-Freed, Fundamentals of Data Structures in C, Second Edition, Universities Press, 2008.
3. Mark Allen Weiss; Data Structures and Algorithm Analysis in C; Second Edition; Pearson Education; 2002.

Syllabus for Semester - III, B.TECH. CSE (Cyber Security)

Course Code:	**CCT3002**	**Course Name:**	**Computer Networks**		
L: 3 Hrs	**T: 0 Hrs**	**P: 0 Hrs**	**Per Week**	**Total Credits:**	**3**

Course Objectives:

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To introduce the student to the major concepts involved in network protocols.
3. To provide an opportunity to do network programming.

Syllabus:

UNIT I

- Data communication Components: Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division

UNIT II

- Data Link Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ.

UNIT III

- Medium Access Sub Layer: Switching, Random Access, Multiple access protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA, IEEE 802 standard protocols.

UNIT IV

- Network Layer: Internet Protocol (IP) – Logical Addressing: IPV4, IPV6; Address mapping: ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

UNIT V

- Transport Layer: Elements of Transport protocols: Addressing, Connection establishment,
- Connection release, Crash recovery, User Datagram Protocol (UDP), Transmission Control Protocol
- (TCP), TCP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and
- Token Bucket algorithm.

UNIT VI

- Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand basics of computer networks and reference models
2. Identify the Design issues of each layer of OSI model
3. Implement the protocols of OSI model

Text Books:

1. Computer Networks: 5th ed by Andrew. S. Tanenbaum. PHI Publication.
2. Data Communications and Networks: 3rd ed by Behrouz A. Forouzan. Tata McGraw Hill Publication.

Reference Books:

1. James F. Kurose and Keith W. Ross: Computer Networking: A Top-Down Approach Featuring the Internet, 3rd Edition.
2. William Stallings, "Data and Computer Communications", PHI 6th Edition

Syllabus for Semester - III, B. TECH. CSE (Cyber Security)

Course Code:	**CCP3002**	**Course Name:**	**Computer Networks Lab**		
L: 0 Hrs	**T: 0 Hrs**	**P: 2 Hrs**	**Per Week**	**Total Credits:**	**1**

Course Objectives:

1. To introduce use of different network simulation software.
2. To analyze performance of different protocols at various layers of a network architecture.
3. To demonstrate the implementation of various networking concepts.

Syllabus:

Experiments based on CCP3002 Syllabus.

Course Outcomes:

On successful completion of the course, students will be able to:

1. Simulate and then configure different types of networks.
2. Implement algorithms present in different layers of OSI model
3. Implement networking concepts like server, client and addressing mechanism.

Syllabus for Semester - III, B.TECH. CSE (Cyber Security)

Course Code:	**CCP3003**	**Course Name:**	**Software Lab 1**		
L: 0 Hrs	**T: 0 Hrs**	**P: 2 Hrs**	**Per Week**	**Total Credits:**	**1**

Course Objectives:

1. To introduce the Python programming language.
2. To teach how to use Python for cybersecurity tasks.
3. To develop skills in automating security tasks using Python.

Syllabus:

Lab 1: Introduction to Python & Python Basics

- Overview of Python
- Installation and setup
- Variables, data types, and operators
- Control flow: loops and conditional statements
- Functions and modules

Lab 2: Working with Files

Lab 3: Python Libraries for Cyber Security

- Introduction to key libraries (e.g., socket, requests, scapy)
- Using libraries for network programming and analysis

Lab 4: Web Scraping and Data Analysis

Lab 5: Network Security with Python

Lab 6: Web Application Security

Lab 7: Cryptographic Operations

Lab 8: Penetration Testing with Python

Course Outcomes:

After successful completion of the course students will be able to:

1. Write Python scripts to automate security tasks.
2. Use Python libraries for network analysis and penetration testing.
3. Develop simple security tools using Python.

Reference books:

Title: Black Hat Python: Python Programming for Hackers and Pentesters

Author: Justin Seitz

Publisher: No Starch Press

Title: Violent Python: A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers

Author: TJ O'Connor

Publisher: Syngress

Title: Python Forensics: A Workbench for Inventing and Sharing Digital Forensic Technology

Authors: Chet Hosmer, Joshua I. James

Publisher: Syngress

Title: Python Network Programming for Network Engineers (Python Programming for Network Engineers)

Author: Brandon Rhodes, John Goerzen

Publisher: O'Reilly Media

Title: Gray Hat Python: Python Programming for Hackers and Reverse Engineers

Author: Justin Seitz

Publisher: No Starch Press

Syllabus for Semester - III, B.TECH. CSE (Cyber Security)

Course Code:	**MAT3003**	**Course Name:**	**Mathematics for Cyber Security**	
L: 3 Hrs	**T: 0 Hrs**	**P: 0 Hrs**	**Per Week**	**Total Credits: 3**

Course Objective:

1. Introduce basic concepts and knowledge in number theory, together with a wide variety of interesting applications of discrete mathematics.
2. Train students to solve problems from algorithm design and analysis, coding theory etc. and to apply techniques of number theory in cryptography.
3. Provide a foundational understanding and application of linear algebra concepts relevant to various aspects of computer science and related fields

Syllabus:

Module 1: (9 Lectures) Algebra of matrices, Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; orthogonal matrices; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, Orthogonal transformation and quadratic to canonical forms.

Module 2: (9 Lectures)
Ring, Subring, Integral Domain, Field, Finite field, Factorization of polynomials over a field, Elliptic curves, Elliptic curves over finite field.

Module 3: (12 Lectures)
Fermat's Number , Fermat's theorem, Euler's theorem, Pseudoprimes, Quadratic Residues, Primitive roots. Euler's formula and roots modulo pq with its application, RSA algorithm in cryptography.

Module 4: (8 Lectures)
Discrete Logarithms and the Discrete Log Problem, Pollard's ρ-Algorithm, Primality Testing-Sieving Methods, Fermat's Primality Testing, and Probabilistic Primality Testing.

Course Outcomes:

On successful completion of the course, student shall be able to

1. Understand matrix algebra and use it to compute Eigen values, Eigen vectors and orthogonal transformations.
2. Apply concepts of group and ring theory to solve problems related to elliptic curves over finite field.
3. Apply Modular arithmetic to generate public key, privet key in security system algorithm.
4. Apply techniques of number theory to solve problems from algorithm design and analysis, coding theory etc. in cryptography

Textbooks:

1. Ivan Niven, Herbert S. Zuckerman, and Hugh L. Montgomery, ‘An introduction to the theory of numbers’, John Wiley and Sons 2004.
2. David M Burton, ‘Elementary Number Theory’ , McGraw Hill, Seventh edition 2014.
3. Fraleigh J. B., ‘A first course in abstract algebra’, Narosa, 1990.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

References:

1. Wade Trappe, Lawrence C. Washington, ‘Introduction to Cryptography with Coding Theory’, Pearson Education International 2012.
2. Baumslag, Fine, Kreuzer, Rosenberger., ‘A Course in Mathematical cryptography’, De Gruyter Graduate, 2015.

Syllabus for Semester - III, B.TECH. CSE (Cyber Security)

Course Code: CCT3004 Course Name: Open Elective – 1 (Cyber Defense Strategies)

L: 4 Hrs T: 0 Hrs P: 0 Hrs Per Week Total Credits: 4

Syllabus for Semester - III, B.TECH. CSE (Cyber Security)

Course Code:	**CCP3005**	**Course Name:**	**Idea Lab**		
L: 0 Hrs	**T: 0 Hrs**	**P: 4 Hrs**	**Per Week**	**Total Credits:**	**2**

Course Objective:

1. The course aims to provide participants with a comprehensive understanding of design thinking principles, prototyping fundamentals, entrepreneurship essentials, and business development strategies.

2. Through a combination of theoretical learning and hands-on exercises, participants will gain the knowledge and skills necessary to identify market needs, develop innovative solutions, and successfully launch entrepreneurial ventures.

Syllabus:

Module 1: Introduction to Design Thinking and Ideation, Understanding the design thinking process, Empathy and user-centered design, Ideation techniques: brainstorming, mind mapping, etc., Identifying market needs and opportunities.

Module 2: Prototyping Fundamentals, Introduction to rapid prototyping tools and techniques, Hands-on exercises in prototyping using low-fidelity materials, Iterative design process: testing and refining prototypes

Module 3: Entrepreneurship Essentials, Introduction to entrepreneurship and lean startup methodology, developing a value proposition and business model canvas, Identifying target customers and validating market demand

Module 4: Business Development and Pitching, crafting persuasive pitches and presentations, Financial modeling and revenue projections, Pitching prototypes and business concepts to a panel of experts

Module 5: Project Implementation and Showcase, implementing prototypes and gathering user feedback, Iterating based on feedback and improving prototypes, Final showcase event: presenting prototypes and business ventures to peers, faculty, and industry, professionals.

Course Outcome:

After Completing this course students will be able to:

1. Gain a deep understanding of the design thinking process, generating creative ideas through ideation techniques, and translating ideas into actionable prototypes.
2. Acquire proficiency in rapid prototyping tools and techniques, enabling them to efficiently create and iterate low-fidelity prototypes.
3. Develop skills in testing and refining prototypes through an iterative design process.
4. Implement prototypes, gather user feedback, and iterate based on insights gained.

Syllabus for Semester - III, B.TECH. CSE (Cyber Security)

Course Code:	**CCT3006**	**Course Name:**	**Cyber Law and Ethics**		
L: 2 Hrs	**T: 0 Hrs**	**P: 0 Hrs**	**Per Week**	**Total Credits:**	**2**

Course Objectives:

1. Describe laws governing cyberspace and analyze the role of Internet Governance in framing policies for Internet security
2. Identify intellectual property right issues in the cyberspace and design strategies to protect your intellectual property
3. Understand the importance of freedom of expression, defamation and hate speech in the Cyber world.
4. Recognize the importance of digital divide, contingent workers and whistle blowing situations.

Syllabus:

UNIT I
Cyber laws and rights in today's digital age; IT Act, Intellectual Property Issues connected with use and management of Digital Data, Emergence of Cyberspace, Cyber Jurisprudence.

UNIT II
Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber terrorism, Cyber Defamation, Different offenses under IT Act, 2000,Cyber Torts.

UNIT III
Ethics in business world, Ethics in IT, Ethics for IT professionals and IT users, IT professional malpractices, communications eavesdropping, computer break-ins, denial-of-service, destruction and modification of data, distortion and fabrication of information, Types of Exploits and Perpetrators.

UNIT IV
Intellectual Property: Copyrights, Patents, Trade Secret Laws, Key Intellectual property issues, Plagiarism, Competitive Intelligence, Cybersquatting, Information warfare policy and ethical Issues.

UNIT V
Privacy: The right of Privacy, Protection, Key Privacy and Anonymity issues, Identity Theft, Consumer Profiling, Defamation, Freedom of Expression, Anonymity, National, Security Letters, Defamation and Hate Speech.

UNIT VI
Ethics of IT Organization: Contingent Workers H- IB Workers, Whistle- blowing, Protection for Whistle-Blowers, Handling Whistle- blowing situation, Digital divide.

Course Outcomes:

On successful completion of course student will learn:

1. To identify and analyse statutory, regulatory, constitutional, and organizational laws that affect the software professional.
2. To understand various cyber laws with respect to legal dilemmas in the Information Technology field.

3. To interpret various intellectual property rights, Privacy, Protection issues in software development field.
4. To understand the role of ethics in IT organization.

Text Books:

1. George Reynolds, "Ethics in information Technology",5th edition, Cengage Learning
2. Hon C Graff, Cryptography and E-Commerce - A Wiley Tech Brief, Wiley Computer Publisher,2001

Reference Books:

1. Michael Cross, Norris L Johnson, Tony Piltzecker, Security, Shroff Publishers and Distributors Ltd.
2. Debora Johnson," Computer Ethics",3/e Pearson Education.
3. Sara Baase, "A Gift of Fire: Social, Legal and Ethical Issues, for Computing and the Internet," PHI Publications.
4. Chris Reed & John Angel, Computer Law, OUP, New York, (2007).

Syllabus for Semester - III, B.TECH. CSE (Cyber Security)

Course Code:	**HUT3001**	**Course Name:**	**Business Communication**		
L: 2 Hrs	**T: 0 Hrs**	**P: 0 Hrs**	**Per Week**	**Total Credits:**	**2**

Course Objectives

Course Objective
The course aims to develop the skills of students to proficiently craft compelling business documents and employ strategic verbal communication techniques. By honing these skills, students will gain the ability to convey ideas persuasively and interact confidently in diverse business contexts.

Syllabus

Syllabus:

UNIT 1: Fundamentals of Business Communication (6 Hours)
Definition of communication, Emergence of communication as a key concept in the Corporate and Global world, Types- Internet, Blogs, E-mails, social media, Channels- Formal and Informal: Vertical, Horizontal, Diagonal, Grapevine, Persuasive Communication- Negotiation Skills, PAC concept

UNIT 2: Business Correspondence (6 Hours)
Planning, Writing, and Completing Business Messages
Personnel Correspondence: Job Application Letter, Letter of Acceptance of Job Offer, Letter of Resignation, Letter of Appointment, Promotion and Termination, Letter of Recommendation
Trade Correspondence: Inquiry, Order, Credit and Status Enquiry, Complaints, Claims, Adjustments, Consumer Grievance Letters

UNIT 3: Visual and Content Creation (6 Hours)
Visual design principles, Ethics of visual communication, selecting visuals for presenting data, Content Creation: Website, Help file, User Guides, Promotional leaflets and fliers

UNIT 4: Reports (4 Hours)
Basic formats and types of reports - Feasibility, Progress, Project, Case Study Evaluation, Agenda, Notices, Minutes of Meeting, Organizational announcements, Statement of Purpose.

UNIT 5: Communication for Employment (4 Hours)
Pre-interview technique- NOISE Analysis, Job Description and Resume, Creating LinkedIn Profile, Effective use of job portals, Business etiquette.

Text Books

1. Sharon Gerson, Steven Gerson, “Technical Communication: Process and Product”, 2018, Pearson
2. Courtland L Bovee, John V Thill and Roshan Lal Raina “Business Communication Today”, 14th edition Pearson
3. P.D. Chaturvedi and Mukesh Chaturvedi, Fundamentals of Business Communication, Pearson Publications, 2012.

Reference Books:

1. Shalini Verma, Business Communication, Vikas Publishing House Pvt. Ltd., 2015.
2. Sanjay Kumar, Pushpa Lata, Communication Skills, 2nd Edition, Oxford Publication, 2018
3. William Strunk Jr. and E.B. White, The Elements of Style, Allyn & Bacon, A Pearson Education Company, 2000

Course Outcomes:

On successful completion of the course the students will be able to achieve the following:
CO1: Understand the fundamentals of business communication.
CO2: Apply tools and techniques to create effective workplace correspondence.
CO3: Analyse and apply visual design principles to create business documents.
CO4: Understand and evaluate information to draft reports.
CO5: Apply and evaluate strategies for effective communication for employment.

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code: CCT4001 **Course Name: Operating System**

L: 3 Hrs **T: 0 Hrs** **P: 0 Hrs** **Per Week** **Total Credits: 3**

Course Objectives:

1. The course focuses on developing a fundamental knowledge of operating systems.
2. The course targets at the detail understanding of the basic tasks such as scheduling, memory management and File systems
3. It also covers the complex concepts of inter process communication and deadlocks.

Syllabus

Unit I

Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine, Case study on LINUX and Windows Operating System.

Unit II

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching.

Threads: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads.

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, SRTF, Priority, RR, Case study on Process Management in LINUX Operating System.

Unit III

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion,
Peterson's solution, Hardware Solution, Semaphores, Monitors, Message Passing, Classical IPC Problems: Producer-Consumer Problem, Reader-Writer Problem, Dinning Philosopher Problem etc.

Unit IV

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Unit V

Memory Management: Basic concept, Logical and Physical address mapping, Memory allocation: Contiguous Memory allocation – Fixed and variable partition, Internal and External fragmentation and Compaction, Paging: Principle of operation – Page allocation, Hardware support for paging, Protection and sharing, Advantages & Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory, Hardware and control structures, Locality of reference, Page fault, Working Set, Dirty page/ Dirty bit, Demand paging; Page Replacement algorithms: First in First Out (FIFO), Least Recently used (LRU), and Optimal.

Unit VI

File Management: Concept of File, Access methods, File types, File operations, Directory structure, File System structure, Allocation methods, Free-space management.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, LOOK, C- LOOK, Disk reliability, Disk formatting, Boot block, Bad blocks, case study on File Systems in LINUX operating System.

Course Outcomes

On successful completion of the course, students will be able to:

1. Describe and classify differing structures for operating systems.
2. Understand the role of various components (process, page, file systems etc.) of operating system.
3. Analyze and apply resource (CPU, Memory, Disk) management policies.
4. Determine challenges in inter process communication and design solution for it.

Text Books

1. Operating System Concepts, 8th Edition by A. Silberschatz, P.Galvin, G. Gagne, Wiley India Edition.
2. Modern Operating Systems, 2nd Edition by Andrew Tanenbaum, PHI.

Reference Books

1. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.
2. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly.

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code:	**CCP4004**	**Course Name:**	**Operating System Lab**		
L: 0 Hrs	**T: 0 Hrs**	**P: 2 Hrs**	**Per Week**	**Total Credits:**	**1**

Course Objectives:

Using C language in Linux environment:

1. To develop ability of students to design and implement concepts of operating systems such as system calls, CPU scheduling, process/thread management.
2. To develop the components and management aspects of concurrency management, memory management, and File management.

Syllabus:

Experiments based on CCP4004 Syllabus.

Course Outcomes:

On completion of the course the student will be able to :

1. Demonstrate LINUX commands and implement system commands.
2. Implement process and process schedulers.
3. Design and implement solution to handle synchronization and deadlock.
4. Implement memory management and File management solutions.

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code:	**CCT4002**	**Course Name:**	**Cryptography**		
L: 3 Hrs	**T: 0 Hrs**	**P: 0 Hrs**	**Per Week**	**Total Credits:**	**3**

Course Objectives:

1. To understand basics of Cryptography.
2. To be able to secure a message over insecure channel by various means.
3. To learn about how to maintain the Confidentiality, Integrity and Availability of data To understand various protocols to protect against the threats in the networks.

Syllabus:

UNIT I

Introduction to Cryptography

Introduction to security attacks - services and mechanism, Mathematics of Cryptography- Integer Arithmetic, Modular Arithmetic, introduction to cryptography - Conventional Encryption: Conventional encryption model - classical encryption techniques - substitution ciphers and transposition ciphers – cryptanalysis – steganography

UNIT II

Stream & Block Ciphers

Mathematics of Symmetric-key Cryptography- Algebraic Structures- Groups, ring & Finite field, stream and block ciphers - Modern Block Ciphers: Block ciphers principals -
Shannon's theory of confusion and diffusion - fiestal structure - data encryption standard (DES) - strength of DES - block cipher modes of operations - DES – AES.

Unit III

Confidentiality and Modular Arithmetic

Confidentiality using conventional encryption - traffic confidentiality - key distribution, Mathematics of Asymmetric-key cryptography- random number generation - Introduction to graph, prime and relative prime numbers - modular arithmetic - Fermat's and Euler's theorem - primality testing - Euclid's Algorithm - - discrete algorithms.

Unit IV

Public key cryptography and Authentication requirements

Principles of public key crypto systems - RSA algorithm - security of RSA - key management
–Diffie-Hellman key exchange algorithm - introductory idea of Elliptic curve cryptography
– Elgamal encryption – Message Authentication and Hash Function: Authentication requirements - authentication functions - message authentication code - hash functions - birthday attacks – security of hash functions and MACS.

Unit V

Integrity checks and Authentication algorithms

MD5 message digest algorithm - Secure hash algorithm (SHA) Digital Signatures: Digital Signatures - authentication protocols - digital signature standards (DSS) - proof of digital signature algorithm - Authentication Applications: Kerberos and X.509 - directory authentication service

Unit VI

Application Layer Security, IP Security and Key Management

Electronic mail security-pretty good privacy (PGP), S/MIME, IP Security: Architecture - Authentication header - Encapsulating security payloads - combining security associations- key management.

Course Outcomes:

1. Understand various cryptographic Techniques.
2. Apply various public key cryptography techniques.
3. Implement hashing and digital signature techniques.
4. Apply IP security techniques.

Text Books:

1. William Stallings, "Cryptography and Network security Principles and Practices", Pearson/PHI ,5th Edition
2. Wade Trappe, Lawrence C Washington, "Introduction to Cryptography with coding theory", Pearson.
3. Behrouz A. Forouzan, Debdeep Mukhopadhyay, "Cryptography and Network Security" 3rd Edition, McGrawHill.

Reference Books:

1. W. Mao, "Modern Cryptography – Theory and Practice", Pearson Education.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing – Prentice Hall of India.

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code:	**CCP4002**	**Course Name:**	**Cryptography Lab**		
L: 0 Hrs	**T: 0 Hrs**	**P: 2 Hrs**	**Per Week**	**Total Credits:**	**1**

Course Objectives:

Using programming languages in Linux environment.

1. To develop ability of students to understand and implement concepts of various cryptographic techniques.
2. To make students aware of various Integrity checks and Authentication algorithms.
3. To make students familiar with Application layer security.

Syllabus:

Experiments based on CCP4002 Syllabus.

Course Outcomes:

On completion of the course the student will be able to:

1. Understand and implement various public key cryptography techniques
2. Apply various types of integrity checks and authentication mechanisms.
3. Design and Implement Application layer security techniques.

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code: CCT4003 **Course Name: Theory of Computation**

L: 3 Hrs **T: 0 Hrs** **P: 0 Hrs** **Per Week** **Total Credits: 3**

Course Objectives:

1. To provide students an understanding of basic concepts in the theory of computation.
2. To teach formal languages and various models of computation.
3. To exhibit fundamental concepts related with computability theory.

Syllabus:

UNIT I
Basics of Sets and Relation, Countability and Diagonalisation, Principle of mathematical induction, Pigeon-hole principle. Fundamentals of formal languages and grammars, Chomsky hierarchy of languages.

UNIT II
Finite automata: Deterministic finite automata (DFA), Nondeterministic finite automata (NFA) and equivalence with DFA, Minimization of finite automata, NFA with Epsilon Transitions, Finite Automata with output.

UNIT III
Regular expressions and Regular languages, Regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, Context- free grammars (CFG) and language (CFL), parse trees, ambiguity in CFG, Reduction of CFGs, Chomsky and Greibach normal forms

UNIT IV
Push Down Automata: Deterministic pushdown automata and Non-Deterministic pushdown automata, Acceptance by two methods: Empty stack and Final State, Equivalence of PDA with CFG, closure properties of CFLs.

UNIT V
Turing machines: The basic model for Turing machines (TM), Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages, variants of Turing machines, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.

UNIT VI
Undecidability: Church-Turing thesis, Universal Turing machine, Undecidable problems aboutv languages, Recursive Function Theory.

Course Outcomes:

On successful completion of the course, students will be able to demonstrate

1. Describe the formal relationships among machines, languages and grammars.
2. Design and optimize finite automata for given regular language.
3. Design Push Down Automata, Turing Machine for given languages.
4. Demonstrate use of computability, decidability, recursive function theory through problem solving.

Text Books:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.

Reference Books:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
2. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
3. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
4. John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill.

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code:	**MAT4002**	**Course Name:**	**Probability and Queuing Theory**		
L: 3 Hrs	**T: 0 Hrs**	**P: 0 Hrs**	**Per Week**	**Total Credits:**	**3**

Course Objective:

1. Acquire skills in handling situations involving several random variables and functions of random variables.
2. Understand and characterize phenomena which evolve with respect to time in a probabilistic manner.
3. Be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

Syllabus:

Module 1: (9 Lectures) Joint probability function, Marginal and Conditional distribution, Mean , Variance, Covariance of two dimensional random variables.

Module 2: (9 Lectures)
Introduction to stochastic process, Poisson process, random walk, stationary process, transition probability matrix, transition diagram, Markov chain, birth and death process.

Module 3: (10 Lectures)
Modelling of queuing systems, queuing systems with losses, queuing systems allowing waiting time.

Module 4: (10 Lectures)
Markovian Models: Single server queues(M/M/1), Multi-server Queues(M/M/C), Finite Source model M/G/1 (steady state solution only), Pollaczek Khintchine formula, Queues with unlimited service(M/M/∞).

Textbooks:

1. Medhi J., "Stochastic Processes", New Age Publishers, New Delhi, 1994
2. T. Veerarajan, "Probability, Statistics and Random process", Tata McGraw Hill, Second Edition, New Delhi, 2003.
3. Kishore S. Trivedi, " Probability and statistics with reliability, Queuing and computer science application, PHI private Ltd, 2009.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

References:

1. Gross, D. and Harris, C.M., "Fundamentals of Queuing theory", John Wiley 2014.
2. Ross, S., "A first course in probability", Pearson Education, Sixth Edition, Delhi, 2002.
3. Allen., A.O., "Probability, Statistics and Queuing Theory", Academic press, New Delhi, 1981

Course Outcomes:

On successful completion of the course, student shall be able to

1. Understand Joint Probabilities and compute quantitative metrics of performance for queuing systems.
2. Analyze stochastic models, calculating probabilities, transition probabilities and steady state probabilities within stochastic system.
3. Model queuing system with losses and waiting time.
4. Apply and extend queuing models to analyze real world

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code: CCT4004 Course Name: Open Elective II – Network Security Fundamentals

L: 2 Hrs T: 0 Hrs P: 0 Hrs Per Week Total Credits: 2

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code: CCP4005 **Course Name: Software Lab - II**

L: 0 Hrs **T: 0 Hrs** **P: 2 Hrs** **Per Week** **Total Credits: 1**

Course Objectives:

- To introduce students to open-source tools and IDEs used in network security.
- To provide students with hands-on experience in network scanning, vulnerability assessment, threat detection, and firewall configuration.
- To develop students' analytical and critical thinking skills for identifying and mitigating security threats.
- To prepare students to apply cybersecurity principles and practices in real-world scenarios.

Course Content:

Network Scanning and Enumeration (Wireshark, Nmap, Zenmap, Netcat etc.), Vulnerability Assessment (OpenVAS, Nikto, etc.), Lynis, Threat Detection using snort, Firewalls (pfSense: Exploring pfSense for configuring network security and firewalls) and UFW (Uncomplicated Firewall), Creating virtual environments for secure testing and practice. Web application security tools. Case Studies and Real-World Scenarios (Security incidents analysis and best practices)

Course Outcomes:

After successful completion of the course students will be able to:

- perform network scanning and enumeration using open-source tools.
- conduct vulnerability assessments, threat detection and audits using appropriate tools.
- Configure, manage firewalls for securing network environments and apply cybersecurity principles to real-world scenarios and case studies.

Reference Books:

1. **Network Security Assessment** by Chris McNab - Provides in-depth coverage of network scanning, enumeration, and vulnerability assessment tools and techniques.
2. **The Practice of Network Security Monitoring** by Richard Bejtlich - Offers insights into threat detection using tools like Snort and real-world network security monitoring practices.
3. **pfSense: The Definitive Guide** by Christopher M. Buechler and Jim Pingle - Comprehensive guide to pfSense for configuring network security and firewalls.
4. **Web Application Security: A Beginner's Guide** by Bryan Sullivan - Covers web application security tools and best practices.

Case Studies:

1. **Stuxnet Worm** - Analyze the Stuxnet worm as a case study for threat detection and incident response.
2. **Target Data Breach** - Study the Target data breach case as an example of a security incident analysis.
3. **WannaCry Ransomware Attack** - Explore the WannaCry ransomware attack as a case study for vulnerability assessment and mitigation.

Additional Resources:

1. **Wireshark User's Guide** - Official documentation for Wireshark to deepen understanding of network packet analysis.
2. **Nmap Network Scanning** by Gordon Fyodor Lyon - Comprehensive guide to Nmap for network scanning and enumeration.
3. **OpenVAS Documentation** - Official documentation for OpenVAS for vulnerability assessment.
4. **Snort Intrusion Detection** - Official documentation for Snort for intrusion detection.

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code:	**CCT4006**	**Course Name:**	**Community Engagement Project**		
L: 0 Hrs	**T: 0 Hrs**	**P: 4 Hrs**	**Per Week**	**Total Credits:**	**2**

Course Objectives:

The objective of Community Engagement Project is to instill a sense of social responsibility amongst the students, empowering them to apply their knowledge and skills to positively impact and contribute to the society.

Execution Plan for the Subject:
The students will impart their knowledge and skills in the society by identifying the potential needs or identify a society need and address it by building a technical solution.

Course Outcomes:

On successful completion of the course, students will be able to:

1. Propose a community engagement project tailored to address society needs by devising a strategy or solution to address it.
2. Apply technical knowledge or skills towards execution of the proposed solution.
3. Evaluate the effectiveness of the project in addressing community needs.
4. Demonstrate ethical principles, project management skills, teamwork and communication skills for project completion within the confines of a deadline.

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code: MBT299-5 Course Name: Business and Organizational Management

L: 2 Hrs T: 0 Hrs P: 0 Hrs Per Week Total Credits: 2

Objectives

1. To understand business and its role in society.
2. To enable the student to undertake business activities.
3. To familiarize the students with concepts and principles of management.
4. To impart knowledge on the functions of management among the students

Syllabus:

Unit 1: Introduction to Management: Concept of Management, nature and importance & Functions of Management, Overview of management principles and Theories: Taylor's Scientific Management, Henri Fayol's Principles of Management, Role of managers in modern business environments.

Unit 2 Planning and Decision Making: Importance of planning in organizational success, Types of plans: strategic, tactical, operational, Decision-making process and its components, Tools and techniques for effective decision making.

Unit 3: Organizing: Concept & Principles of Organizing; Formal/Informal Organizations, Virtual Organizations, Organization Structure: Factors affecting Organization structure, Span of Management, Delegation of Authority, Centralization and Decentralization.

Unit 4: Staffing & Controlling: Nature & Scope of Staffing, Man Power Planning - Concept and importance, Meaning and Definition of Controlling, Features and Importance of Controlling, Process of Controlling.

Unit 5: Management of Change in organization: Meaning and Definition of Management of Change, Need for change, Types of Change, Process of planned change, Resistance to change.

Unit 6: Business organization & its Form: Concept, Meaning, Features, Stages of development of Business, importance of business; Classification of Business activities; Business Organization: Meaning, characteristics, objectives, Business Organization, Forms of Business Ownership/ Formats, Micro, Small & Medium Enterprises

Books recommended:

1. Essential of Management by Knootz & O Donnel
2. Practice of Management by Peter Drucker
3. Management and Organization by Louise and Allen
4. Management by P. Subba Rao, Himalaya Publishing House
5. Principles & Practice of Management by L. M Prasad Sultan Chand & Sons
6. Principles of Business management by Dr. Pratibha M.Siriya Sai Jyoti Publication

Course Outcome:

Students will be able to:

1. Understand the fundamentals of management and its significance in achieving organizational goals.
2. Apply planning and decision-making techniques to enhance organizational effectiveness.
3. Analyze organizational structures and processes for efficient staffing, controlling, and managing change.

Syllabus for Semester - IV, B.TECH. CSE (Cyber Security)

Course Code: HUT4002 **Course Name: Environmental Education**

L: 2 Hrs **T: 0 Hrs** **P: 0 Hrs** **Per Week** **Total Credits: 2**

Syllabus:

UNIT 1: Humans and the Environment (UNIT 4)
Great ancient civilizations and the environment, Indic Knowledge and Culture of sustainability; Middle Ages and Renaissance; Industrial revolution and its impact on the environment; Population growth and natural resource exploitation; Global environmental change; emergence of environmentalism

UNIT 2: Natural Resources and Sustainable Development (4 Hours)
Definition of resource; Classification of natural resources
Water resources; Soil and mineral resources; Energy resources; Sustainable Development Goals (SDGs)

UNIT 3: Environmental Issues: Local, Regional and Global (6 Hours)
Environmental issues and scales, Pollution, Land use and Land cover change, Global change, case studies/field visit

UNIT 4: Conservation of Biodiversity and Ecosystems (6 Hours)
Biodiversity and its distribution – India and the world; Ecosystems and ecosystem services, Threats to biodiversity and ecosystems; Major conservation policies and practises, case studies/field visit

UNIT 5: Environmental Management (6 Hours)
Introduction to environmental laws and regulation, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis; Environmental audit and impact assessment; Concept of 3R (Reduce, Recycle and Reuse) and sustainability; Ecolabeling /Ecomark scheme, case studies/field visit.

Reference Books:

1. Fisher, Michael H. (2018) An Environmental History of India- From Earliest Times to the Twenty-First Century, Cambridge University Press.
2. Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press.
3. Simmons, I. G. (2008). Global Environmental History: 10,000 BC to AD 2000. Edinburgh University Press
4. Singh, J.S., Singh, S.P. & Gupta, S.R. 2006. Ecology, Environment and Resource Conservation. Anamaya Publications https://sdgs.un.org/goals
5. Harris, Frances (2012) Global Environmental Issues, 2nd Edition. Wiley- Blackwell.
6. Rajagopalan, R. (2011). Environmental Studies: From Crisis to Cure. India: Oxford University Press.
7. Krishnamurthy, K.V. (2003) Textbook of Biodiversity, Science Publishers, Plymouth, UK
8. Singh, Kartar and Anil Shishodia (2007) ‘Environmental Economics: Theory and Applications”, Sage,

9. Karpagam. M (2019) Environmental Economics: A textbook, Sterling
10. Jørgensen, Sven Marques, Erik João Carlos and Nielsen, Søren Nors (2016) Integrated Environmental Management, A transdisciplinary Approach. CRC Press.
11. Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2ndEdition. CRC Press.
12. Barrow, C. J. (1999). Environmental management: Principles and practice. Routledge.
13. Tiefenbacher, J (ed.) (2022), Environmental Management - Pollution, Habitat, Ecology, and Sustainability, Intech Open, London. 10.5772/
14. Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge University Press.
15. N. Mani (2020) Environmental Economics, New NC Century
16. Subhashini Muthukrishnan (2015) Economics of Environment, PHI
17. Rabindra N. Bhattacharya (2001) Environmental Economics: An Indian Perspective, Oxford University press

Course Outcomes:

On successful completion, of course student will able to do the following:

CO1: Understand and appreciate the historical context of human interactions with the environment.
CO2: Understand the concept of natural resources and their sustainable development
CO3: Develop a critical understanding of the environmental issues of concern
CO4: Understand the concepts of ecosystems, biodiversity and conservation
CO5: Understand broad aspects of environmental management and assessment systems