

No: A&L/NFSU/7<sup>th</sup>ACResolution No.\_7(c)/201/2024

Date: 22/7/2024

**Read:**

- (1) Section 19 of the NFSU Act, 2020;
- (2) Meeting of the Board of Studies of the School of Cyber Security & Digital Forensics dated 29/05/2024;
- (3) Academic Council Meeting dated 27/6/2024 - Resolution No: 7(c)

**CIRCULAR**

It is hereby informed to all concerned that the Academic Council in its meeting held on 27/6/2024, has resolved to approve the **revision in the Teaching and Examination Scheme and Syllabi of Semester I & II of the B.Tech-M.Tech Computer Science & Engineering (Cyber Security), to meet the requirements of the New Education Policy, 2020/Industry/Law, to be made effective from the Academic Year 2024-25 and onwards**, as per **Annexure-A** enclosed herewith.

  
**Executive Registrar**  
**NFSU, Gandhinagar**



**To:**

- Campus Director – Gandhinagar / Delhi / Goa / Tripura / Dharwad / Guwahati / Bhopal / Uganda
- Director – Academics, Research and Consultancy
- Concerned Dean/Associate Dean

**Copy to:**

- Controller of Examinations, NFSU, Gandhinagar
- Dy. Registrar – Admin/Academic & Legal/Exam
- Programme Coordinator

**C.f.w.c to:** Hon'ble Vice Chancellor for kind information

**Encl: Annexure A**

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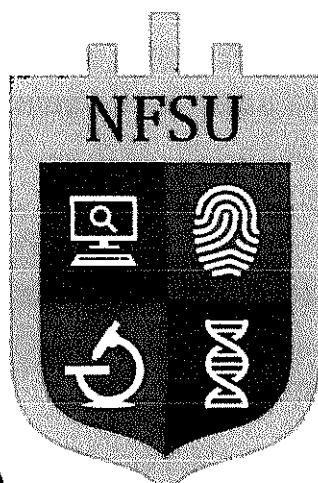
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# National Forensic Sciences University

An Institution of National Importance  
 (Ministry of Home Affairs, Government of India)  
 Sector - 9, Gandhinagar, Gujarat - 382007



विद्या अमृतं अनुसू

## School of Cyber Security & Digital Forensics

B.Tech. – M.Tech. Computer Science and Engineering  
 (Cyber Security)

(Sem - I & II)

(Syllabus, Teaching & Examination Schemes)

(Dr. V.S. Patel)

(Dr. D. Sonar)

(W.E.F. Academic Year 2024 -25)

1421



## Introduction

Traditional curriculum in Computer Science and Engineering (CSE) has focused on two major areas, i.e., theory and systems (database, computer hardware, and operating systems). With the advent of the era of Edge Computing, Cloud Computing, Security, AI and Big Data, the discipline is being transformed by the incorporation of new emerging technologies. The discipline is becoming instrumental in solving major real-world problems faced by modern society such as healthcare, security, sustainability, and socio-economic challenges along with evolving cyber threats. There is a need to align the B.Tech. - M.Tech. Computer Science and Engineering (Cyber Security) five years integrated Programme in line with National Education Policy 2020. This would improve NFSU's participation and contribution towards providing solutions for global challenges. NFSU can become a leading source of technology solutions for self-reliant India focusing on Computer Science and Engineering with specialization in Cyber Security.

## Objectives of the Programme:

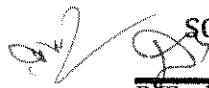
The objectives of the B.Tech. - M.Tech. Computer Science and Engineering (Cyber Security) at NFSU are

1. To equip students to undertake careers involving challenges of working on real-world problems, while innovating with their core competency in computer science.
2. To impart engineering skills for addressing emerging technological challenges in cyber security.
3. To explore emerging concepts and processes in different domains through flexibility in choosing elective courses.
4. To provide flexibility for pursuing preferred career opportunities.
5. To produce a well-prepared workforce to undertake careers in research and industry involving innovation, knowledge creation, engineering, and entrepreneurship.

## Programme Learning Outcomes:

The student will have the ability to:

1. Abstract out computational models based on mathematical and engineering rigor.
2. Critically analyse and appreciate emerging and applied fields of computer science and cyber security owing to deeper understanding and strong foundations.
3. Develop robust, secure, and efficient software systems that would involve software engineering, data structures, and algorithm design paradigms.



1422



4. Apply different concepts including digital design, computer architecture, operating systems, databases, networking, cyber security and its applications for building solutions for real-world problems.
5. Design and implement smart, intelligent, and user-friendly interfaces for computer applications for cyber security.
6. Analyse, design, develop and deploy computer-based systems in collaboration with domain experts for meeting societal needs by exploiting tools and techniques of Computer Science and Engineering, Big data, AI and Cyber Security.
7. Become proficient in some of the specialized areas such as Computer Vision, Artificial Intelligent, Internet of Things, Natural Language Understanding and Cyber Security.

### Course Structure:

The structure of 5 Years Integrated Programme on B.Tech. – M.Tech. Computer Science Engineering with Specialization in Cyber Security has essentially the following categories of courses in line with National Education Policy 2020.

Sr. No.	Course Category (Type)
1	Humanities & Social Sciences Courses including Management Courses (HSM)
2	Basic Science Courses (BSC)
3	Engineering Science Courses (ESC)
4	Professional Core Courses (PCC)
5	Professional Elective Courses (PEC) relevant to chosen specialization/branch
6	Project work, seminar and internship in industry or elsewhere (PRO)
7	Engineering Mandatory Courses (EMC)

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## B. Tech. - M. Tech. Computer Science and Engineering (Cyber Security)

### 5-Years Integrated Programme

### Teaching & Examination Scheme

Sr. No.	Subject Code	Subject Name	Type	Teaching Scheme (Credit)				Examination Scheme				Component Weightage SEE
				L	T	P	C	TCH	MSE	SEE	PRE	
1	CTBT-BSC-101	Engineering Mathematics-I	BSC	3	1	0	4	4	01:30	03:00	----	0.2
2	CTBT-ESC-101	Basics of Electrical Engineering	ESC	2	1	0	3	3	01:30	03:00	----	0.2
3	CTBT-ESC-102	Programming for Problem Solving	ESC	3	0	0	3	3	01:30	03:00	----	0.2
4	CTBT-ESC-103	Engineering Graphics	ESC	2	0	0	2	2	01:30	03:00	----	0.2
5	CTBT-BSC-102	Engineering Physics	BSC	2	1	0	3	3	01:30	03:00	----	0.2
6	CTBT-HSM-101	Communication Skills	HSM	2	1	0	3	3	01:30	03:00	----	0.2
7	CTBT-BSC-102L	Engineering Physics Laboratory	BSC	0	0	1	1	2	----	03:00	----	1.0
8	CTBT-ESC-102L	Programming for Problem Solving Laboratory	ESC	0	0	1	1	2	----	03:00	----	1.0
9	CTBT-ESC-103L	Engineering Graphics Laboratory	ESC	0	0	1	1	2	----	03:00	----	1.0
<b>Total Credit &amp; Total Credit Hours</b>				<b>21</b>	<b>24</b>							

Sr. No.	Subject Code	Subject Name	Type	Teaching Scheme				Examination Scheme				Component Weightage SEE
				L	T	P	C	TCH	MSE	SEE	PRE	
1	CTBT-BSC-201	Engineering Mathematics – 2	BSC	3	1	0	4	4	01:30	03:00	----	0.2
2	CTBT-HSM-201	Professional Ethics	HSM	2	1	0	3	3	01:30	03:00	----	0.2
3	CTBT-PCC-201	Object Oriented Programming with C++	PCC	3	0	0	3	3	01:30	03:00	----	0.2
4	CTBT-ESC-201	Digital Logic Design	ESC	3	0	0	3	3	01:30	03:00	----	0.2
5	CTBT-EMC-201	Fundamentals of Forensic Science and Laws	EMC	3	1	0	4	4	01:30	03:00	----	0.2
6	CTBT-EMC-202	Environment Science	EMC	0	0	0	2	2	----	----	----	0.2
7	CTBT-PCC-201L	Object Oriented Programming with C++ Laboratory	PCC	0	0	1	1	2	----	03:00	----	1.0
8	CTBT-ESC-201L	Digital Logic Design Laboratory	ESC	0	0	1	1	2	----	03:00	----	1.0
<b>Total Credit &amp; Total Credit Hours</b>				<b>19</b>	<b>23</b>							



**L:** Lecture(s); **T:** Tutorial; **P:** Practical; **C:** Credit.  
1 C = 1 Hour of Theory / Tutorial OR 2 Hours of Practical.  
**TCH:** Total Credit Hours; **MSE:** Mid Semester Examination; **SEE:** Semester End Examination; **PRE:** Practical Examination; **TA:** Term Assessment; **LPW:** Laboratory Practical Work.  
**Note:** TA will be taken in two parts TA-1 and TA-2. TA-1 will be a written examination of 00:45 Hour and TA-2 will be in the form of assignments / workshops / activity / presentations / VIVA / Minor Project/ Written exam.

1425

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National Forensic  
Sciences University  
Knowledge | Wisdom | Fulfilment  
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(Ministry of Home Affairs, Government of India)

# SEMESTER - I



## CTBT-BSC-101: Engineering Mathematics - I

Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams						University Exams				
					TA-1		TA-2		MSE		Marks	Hrs			
3	1	0	4	4	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### Course Objectives

- Understand mathematical basic preliminaries.
- Express physical phenomena in mathematical formulation.
- Apply Differential and Integral Calculus in formal representation of various computing constructs.
- Recognize the importance of Calculus for analysis in engineering problems.
- Understand to solve the system of linear equations and determine Eigen values and Eigen vectors and Eigen value decomposition and singular value decomposition.

### Course Outcomes

At the end of course the student will be able to:

- Explain the concepts of calculus. Use the concepts of calculus to determine the power series expansion of functions and evaluation of limits.
- Use the concepts of partial derivatives to solve the differential equations appearing in Engineering fields.
- Use the concept of Reduction formula to find surface areas and volumes of revolution. Solve improper integrals with the help of beta and gamma functions.
- Use the concept of double integration to solve area and volume of surfaces.
- Examine principles of matrix algebra, Use Cayley Hamilton Theorem to evaluate inverse and power of matrix.

Unit	Content	Hours
I	<b>Differential Calculus</b>  Successive differentiation, Leibniz's theorem (without proof), Taylor's & McLaurin's series for a function of one variable, Evaluation of indeterminate forms by L'Hospital's rule. Infinite Series: Convergence of infinite Series by definition, Zero Test,	15



	Comparison Test, Ratio Test, Root Test, Alternating Series, Leibnitz's test, Power Series and radius of convergence.	
II	<b>Partial Differentiation and their applications</b>  Functions of two variables, Limit and Continuity of function of several variables, Partial derivative, Total derivative, Chain rule, Euler's theorem for homogeneous functions and examples based on it. Jacobian, error and approximation, maxima and minima.	10
III	<b>Integral Calculus</b>  Reduction formula for $\sin^n x$ , $\cos^n x$ , $\sin^n x \cos^n x$ , $\tan^n x$ , $\cot^n x$ , $n \geq 2$ , $n \in N$ (without proof), Beta and Gamma functions and their properties (without proof) and problems. Evaluation of improper integrals of type-I and type-II.	10
IV	<b>Multiple Integrals</b>  Double integrals, Evaluation of double integrals, change the order of integration, change of variables by Jacobian, change into polar co-ordinates, Triple integrals, Application of multiple integrals to find areas and volumes.	15
V	<b>Matrices</b>  Types of Matrices, Elementary row operation, Rank of a matrix, Normal form, Consistency of system of simultaneous linear equations, Inverse of a matrix by Gauss Jordan method, linearly dependent and independent vectors, Eigen values and eigen vectors, Cayley Hamilton theorem.	10

### References Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2000.
2. Erwin Kreyszig; Advanced Engineering Mathematics, 9th Edition, 2012.
3. B V Ramana; Higher Engineering Mathematics, 12th Reprint Edition, 2018.
4. Thomas' Calculus, Maurice D.Weir, Joel Hass, Frank R. Giordano, Pearson Education, Eleventh Edition.
5. Calculus-Single and Multivariable, Hughes – Hallett et al., John-Wiley and Sons, Fourth Edition.
6. James Stewart, Calculus early transcendental, sixth edition.
7. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002



## CTBT-ESC-101: Basics of Electrical Engineering

Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory				Practical		Total				
					Internal Exams				University Exams						
					TA-1	TA-2	MSE		Marks	Hrs	Marks	Hrs			
2	1	0	3	3	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### Course Objectives

1. To acquaint the students in fundamental concepts of electrical engineering, which includes various engineering standards, basic elements of circuits and its properties.
2. To understand basics of energy conversion, various fundamentals and laws governing the phenomena of electromagnetism and electrostatics.
3. To impart training to the students in order to enable them to understand, analyze and evaluate various aspects of basic D.C. as well and A.C. Circuits.
4. To acquaint the students in various fundamentals and Laws governing the phenomena of Electromagnetism and Electrostatics.
5. To lay foundation stone to study the advance concepts of Electrical Engineering and would also be useful in day-to-day application.

### Course Outcomes

At the end of course the student will be able to:

1. Understand the basic terminology/definitions of electrical and electronics engineering.
2. Build strong fundamentals of electrical circuit components used for design and development of digital circuits.
3. Understand power requirements of electrical components and equipment used for running of computer systems and applications.
4. Construct and analyze simple AC circuits and their importance in computer science engineering.
5. Prepare for next-level learning in design aspects for digital circuits and appliances.

Unit	Content	Hours
I	<b>Fundamental and Basic Circuit Element</b> Concepts of E.M.F., Potential Difference and current, Resistance and Resistors, effect of temperature on resistance, resistance	10



	temperature coefficient, resistors in series and parallel, S.I. units of work, power and energy.	
II	<b>Electromagnetism</b>  Magnetic effect of an electric current, cross and dot conventions, right hand thumb rule and cork screw rule, nature of magnetic field of long straight conductor, solenoid and toroid. Concept of m.m.f., flux, flux density, reluctance, permeability and field strength, their units and relationships. Simple series and parallel magnetic circuits, comparison of electrical and magnetic circuit, force on current carrying conductors placed in magnetic field, Fleming's left-hand rule. Faradays laws of electromagnetic induction, statically and dynamically induced E.M.F., self and mutual inductance, coefficient of couplings. Energy stored in magnetic field. Charging and discharging of inductor and time constant.	08
III	<b>Electrostatics</b>  Electrostatics field, electric flux density, electric field strength, absolute permittivity, relative permittivity, capacitance and capacitor, composite dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors and time constant.	08
IV	<b>D.C. Circuits &amp; AC Fundamentals</b>  Classification of electrical networks, Ohm's law, Kirchhoff's law and their applications for network solutions. Simplifications of networks using series and parallel combinations and star-delta conversions, Sinusoidal voltages and currents, their mathematical and graphical representation, Concept of instantaneous, peak (maximum), average and R.M.S. values, frequency, cycle, period, peak factor and form factor, phase difference, lagging, leading and in phase quantities and phasor representation. Rectangular and polar representation of phasors.	10
V	<b>AC Circuits</b>  Single Phase AC Circuit: Study of A.C. circuits consisting of pure resistance, pure inductance, pure capacitance and corresponding voltage-current phasor diagrams and waveforms. Development of	09



	concept of reactance, study of series R-L, R-C, R-L-C circuit and resonance, study of parallel R-L, R-C and R-LC circuit, concept of impedance, admittance, conductance and susceptance in case of above combinations and relevant voltage-current phasor diagrams, concept of active, reactive and apparent power and power factor. Single Phase Power Measurement. Poly-Phase AC Circuit: Poly phase A.C. Circuits: Concept of three-phase supply and phase sequence. Voltages, currents and power relations in three phase balanced star-connected loads and delta-connected loads along with phasor diagrams. Three Phase Power Measurement.	
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### References Books

1. Electrical Technology Vol.1, B.L.Theraja, S.Chand Publication, New Delhi
2. Basic Electrical Engineering, V.N.Mittal, TMH Publication, New Delhi
3. Basic Electrical Engineering, V.K.Mehta, S.Chand and Company Ltd., New Delhi
4. Electrical Technology, Edward Hughes, Seventh Edition, Pearson Education
5. Elements of Electrical Technology, H.Cotton, C.B.S. Publications
6. Basic Circuits Analysis, John Omalley Shawn, Mc Graw Hill.



## CTBT-ESC-102: Programming for Problem Solving

Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams						University Exams				
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs	
3	0	0	3	3	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### Course Objectives

1. To explain fundamental concepts and techniques of programming.
2. To provide an entry-level computer programming concept.
3. To develop the Logical and programming ability in students.
4. To improve their proficiency in applying the computing fundamentals to their field of study.
5. To provide a logical base to high level programming languages.

### Course Outcomes

At the end of course the student will be able to:

1. Build strong fundamentals of programming skills with analytical approach.
2. Understand step by step approach for building programs and algorithms with the help of flowcharts and pseudocode.
3. Foster sound programming skills used for building application-oriented algorithms.
4. Understand of large and complex data using the concept of functions and array.
5. Explore the different ways of data handling using pointers, structures and file handling.

Unit	Content	Hours
I	<b>Fundamentals of Computer</b>  What is computer? History of computer, Block diagram of computer system, Hardware and software, Overview of types of operating systems, Compiler and interpreter, Programming Languages, Flowchart and Algorithm.	07
II	<b>Overview of C</b>  History of C, Features of C, Basic structure of C program, Process of executing a C program, Character set, trigraph sequences, C tokens,	09



	Data type, Variable, Storage class, Symbolic Constant, Overflow of data, Operators, Operator Precedence and Associativity, Type conversions, I/O Functions.	
III	<b>Branching &amp; Looping statements</b>  Introduction, if statement, types of if statement, switch statement, while statement, for statement, do-while statement, go to statement, break and continue statement	09
IV	<b>Array &amp; Structure</b>  Introduction, One-dimensional array, Two-dimensional array, multidimensional array, limitation of array, strings, string handling functions, table of string, defining a structure, declare and accessing structure variable, structure member as array, structure variable as array, structure within structure, unions, bit fields.	11
V	<b>Pointers and User Defined Functions</b>  Introduction, advantages, declaration of pointers, chain of pointers, scale factor, pointers and arrays, pointers and structures, Advantages of functions, elements of functions, categories of functions, recursion, function and arrays, functions and structure, functions and pointers.	09

## References Books

1. Programming in ANSI C, E. Balagurusamy, PHI
2. Let us C, Yawant Kantikar, BPB
3. C: The Complete Reference, Herbert Schildt, McGrawHill
4. Computer concepts and Programming, Vikas Gupta, DreamTech
5. Computer fundamentals and Programming in C, Pradip dey and Manas Ghosh, Oxford.



## CTBT-ESC-103: Engineering Graphics

Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams						University Exams				
					TA-1	TA-2	MSE	Marks	Hrs	Marks	Marks	Hrs			
Marks	Hrs	Marks	Hrs	Marks	Hrs										
2	0	0	2	2	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### Course Objectives

1. To understand about basic tools and techniques of engineering graphics.
2. To allow and help students visualize the objects.
3. To allow and help students understanding and read drawing.
4. To allow and help students to draw and present their drawing.
5. To allow and help students in understanding 3D Projections.

### Course Outcomes

At the end of course the student will be able to:

1. Get acquainted with the knowledge of various lines, geometrical constructions and construction of various kinds of scales, and Ellipse.
2. Improve their imagination skills by gaining knowledge about points, lines and planes.
3. Become proficient in drawing the projections of various solids.
4. Gain knowledge about orthographic and isometric projections.
5. Understand mechanical design requirements for digital circuits and systems.

Unit	Content	Hours
I	<b>Introduction &amp; Geometric Constructions</b>  Introduction: Drawing instruments & accessories, drawing layout and lettering, drawing conventions and dimensioning rules, geometric constructions, BIS, representative fraction. Types of graphical scales: (plain scale, diagonal scale, Vernier scale, comparative scale, scale of chords). Engineering curves classifications and application: [parabola, ellipse, hyperbola, cycloidal curves: (spirals, roulettes, trochoids, involutes)]	06
II	<b>Projection of points &amp; lines</b>  Basics of projection theory: Principles of projection, Projection methods (1st & 3rd angle), Planes of projections, Symbols for method of projection, Projection of points: Introduction, Projection	06



	in quadrants, Projection of lines: Introduction, Inclined to HP and VP, True length & inclinations, Traces of lines	
III	<b>Projection of planes &amp; solids</b>  Projection of planes: Introduction, Types of planes, Projections of a Plane surface & its examples (A. perpendicular to both the reference planes, B: Perpendicular to one plane and parallel to another plane, C: Perpendicular to one plane and inclined to the other plane, D: Inclined to both planes)	06
IV	<b>Projection &amp; Section of solids</b>  Projection of solids: Introduction, Types of solids, Projection of solids (Cylinder, Cone, Pyramid and Prism), Sections of Solids: Introduction, Sections of Solids, A: Section plane parallel to VP, B: Section plane parallel to HP, C: Section plane perpendicular to HP and inclined to VP, D: Section plane perpendicular to VP and inclined to HP, Intersections of solids, Methods of Intersection, Development of Surfaces, Methods of development, True shape of the section.	06
V	<b>Orthographic &amp; Isometric Projections</b>  Isometric Projection: Introduction, Classifications, Types of projection, 1 <sup>st</sup> angle projection, 3 <sup>rd</sup> angle projection, Projection of points, lines & planes, Isometric axes, Lines & planes, Isometric scale, Isometric projection and Isometric view, Conversion of Isometric to Orthographic Projections.	06

### References Books

1. Engineering drawing NSQF, Directorate General of Training, Ministry of Skill Development & Entrepreneurship, Government of India.
2. Dhananjay A Jolhe, Engineering Drawing, Tata McGraw Hill.
3. M.B. Shah and B.C. Rana, Engineering Drawing, Pearson Education.
4. K. Venugopal, Engineering Drawing and Graphics, New Age International (P) Ltd., publishers.
5. N.D. Bhatt and V.M. Panchal, Engineering Drawing, Charotar Publishing house.
6. Engineering Graphics, P.J.Shah, S.Chand & Company Ltd., New Delhi
7. Engineering Drawing, P.S.Gill, S.K.Kataria & sons, Delhi
8. Engineering Drawing, B. Agrawal and C M Agrawal, Tata McGraw Hill, New Delhi



## CTBT-BSC-102: Engineering Physics

Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams						University Exams		University Exams (LPW)		
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs	
2	1	0	3	3	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### Course Objectives

1. To help students learn basic principles of physics.
2. To help students learn basic laws and principles of motions and forces.
3. To study and understand concepts of waves and reflection.
4. To study the concepts of nuclear fission and fusion.
5. To understand concepts of radioactivity.

### Course Outcomes

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

1. Know Newton's laws of motion
2. Define inertia, momentum and impulse of force
3. Distinguish between transverse and longitudinal waves.
4. Describe properties of Alpha, Beta and Gamma rays
5. Understand various Properties Of Light

Unit	Content	Hours
I	<b>Laws of Motion</b>  Motion and its physical interpretation. Newton's law of motion, Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, rolling friction, lubrication.	09
II	<b>Circular motion</b>  Centripetal and Centrifugal force, examples of circular motion, Projectile motions and its application.	09
III	<b>Nature and Properties of Wave Optics</b>  Definition of wave and wave motion. Difference between longitudinal and transverse waves. Nature and properties of	09



	electromagnetic waves. Reflection, refraction polarization and diffraction of light. Refractive index and total internal reflection of light. Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers. Physical and Chromatic aberrations. Propagation of sound wave and their properties.	
IV	<b>Nuclear Physics</b>  Structure of atom. Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum. Composition and size of nucleus, atomic masses, isotopes, isobars; isotones.	09
V	<b>Radioactivity</b>  Alpha, beta and gamma particles/rays and their properties; radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission and fusion.	09

### References Books

1. Sears and Zemansky, University Physics, Pearson Publication
2. Paul G Hewitt Conceptual Physics Pearson Publication
3. Gomber & Gogia Fundamentals of Physics Pradeep Publications, Jalandhar
4. Arvind Kumar & Shrish Barve, How and Why in Basic Mechanics Universities Press



## CTBT-HSM101: Communication Skills

Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams						University Exams		University Exams (LPW)		
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs	
2	1	0	3	3	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### Course Objectives

1. Communicate across the cultures in professional groups and develop their critical listening skills.
2. Improve their competences in professional writing.
3. Use grammar & vocabulary in correct and appropriate manner.
4. Articulate different sounds in effective ways.
5. Improve their speaking skills in day-to-day life.

### Course Outcomes

At the end of the course, the students would be able to:

1. Develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others using basic fundamentals.
2. Understand and practice different techniques of verbal communication.
3. Practical innovative ways of Non-verbal communications for effective outcomes.
4. Practice and adhere to professional writing skills for achieving objectives.
5. Understand and practice Interview Etiquettes through literatures.

Unit	Content	Hours
I	<b>Basic Fundamentals of Communication</b>  Meaning, definition, objectives & Characteristics /nature of Communication, Communication Process, flow of Communication, Introduction to Professional Communication, Principles of Professional Communication, Communication Networks, Informal Communication	07
II	<b>Non-Verbal Communication</b>  Introduction, Components of NVC - Proxemics, Haptics, Kinesics, Chronemics, Paralinguistic Features, Other NVC, Importance of	08



	NVC in oral communication, Listening Skills: Hearing v/s Listening, Types & Barriers of Listening, Active v/s Passive Listening, Traits of a good listener.	
III	<b>Writing Skills</b>  Paragraph Development: What is Paragraph? Components of Paragraph – Unity, Topic Sentence, Cohesion, Coherence, Adequate Development, Approaches of Paragraph – Inductive , Deductive & Expository Approach, Types of Paragraph, Attributes of good paragraph, Use of Transitional Words, Business & Technical Letter Writing: Introduction to Letter Writing, Informal Letters, Personal Letter Vs Business Letter, Style of writing Business Letter, Principles of writing Business Letter, Layout of Business Letter, Types of Letter – Inquiry, order, quotation, claim & adjustment, sales ,credits & Circular.	09
IV	<b>Verbal Communications</b>  Reading Skills: Purpose of reading, Understanding and Interpreting Ideas, Reading Rates, Reading & Interpretation, Interpreting Technical graphics in reading, Techniques of Reading, Reading Comprehensive Skills, Reasons for Poor the Reading Comprehensive Skills,_Conversation Practice: Dialogue Practice, Telephonic Conversation, Speaking for Various Purposes, Grammar & Vocabulary: Parts of Speech, Tenses, Active Voice & Passive Voice, Confusable words.	10
V	<b>Language through Literature</b>  Selected Stories from “Wise and Otherwise” by Sudha Murthy 1) A Lesson in Life from a Beggar 2) Death without Grief 3) Idealists at Twenty Realists at Forty 4) Think Positive, Be Happy 5) Crisis of Confidence 6) Sorry, the line is Busy 7) Oh Teacher, I Salute Thee 8) Life is an Examination.	11

### References Books

1. Green Andy, Effective Personal Communication Skills for Public Relations, Kogan Page, Limited, 2006.
2. John M. Penrose, Jr., Robert W. Rasberry, Robert J. Myers, Advanced Business Communication, Thomson/South-Western, 2004



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3. Technical Communication, D.K. Chakradev, Tech-max publication.
4. Basic Business Communication, Flatly and Lesicar
5. Basic Communication Skills for Technology, Andrea J. Rutherford, Pearson Education
6. From sentence to paragraph, William J. Kelly and Deborah L. Lawton, Longman
7. Technical Communication: Principles and Practice, Meenaxi Raman and Sangeeta Sharma, Oxford Press
8. Wise and Otherwise, Sudha Murty, Penguin Books India Pvt. Ltd. Delhi
9. An Intermediate English Grammar, Raymond Murphy, Cambridge University Press
10. A High School English Grammar, Wren & Martin, S. Chand Publication



### CTBT-BSC-102L: Engineering Physics Laboratory

Teaching Scheme					Examination Scheme											
L	T	P	C	TCH	Theory								Practical		Total	
					Internal Exams				University Exams		University Exams (LPW)					
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs		
					Marks	Hrs	Marks	Hrs	Marks	Hrs	-	-	100	03:00	100	
0	0	1	1	2	-	-	-	-	-	-	-	-	100	03:00	100	

Experiments to support the associated theory course.



### CTBT-ESC-102L: Programming for Problem Solving Laboratory

Teaching Scheme					Examination Scheme											
L	T	P	C	TCH	Theory						Practical		Total			
					Internal Exams				University Exams		University Exams (LPW)					
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs		
0	0	1	1	2	Marks	Hrs	Marks	Hrs	Marks	Hrs	-	-	-	100	03:00	100

Experiments to support the associated theory course.



### **CTBT-ESC-103L: Engineering Graphics Laboratory**

Teaching Scheme					Examination Scheme									
L	T	P	C	TCH	Theory						Practical		Total	
					Internal Exams						University Exams		University Exams (LPW)	
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs
					Marks	Hrs	Marks	Hrs	Marks	Hrs	-	-	100	03:00
0	0	1	1	2	-	-	-	-	-	-	-	-	100	100

Experiments to support the associated theory course.



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# SEMESTER - II



## CTBT-BSC-201: Engineering Mathematics -2

Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams						University Exams		University Exams (LPW)		
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs	
					Marks	Hrs	Marks	Hrs	Marks	Hrs					
3	1	0	4	4	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### Course Objectives

1. To foster basics of statistics in engineering problems.
2. To explore applications of curve fitting in engineering design.
3. To understand concepts of probability for judgement of engineering objectives.
4. To solve non-linear equations for solving engineering problems.
5. To understand the concepts of Finite Differences & Numerical Integration.

### Course Outcomes

At the end of the course, the students would be able to:

1. Solve non-linear algebraic equations by using numerical methods and understand the rate of convergence of it.
2. Find the unknown value of given data by using various interpolation methods and curve fitting.
3. Calculate integration and solve differential equations by using numerical methods.
4. Understand the terminologies of basic probability.
5. Understand the central tendency methods.

Unit	Content	Hours
I	<b>Basics Statistics</b>  Measure of central tendency: Moments, Expectation, dispersion, skewness, kurtosis, expected value of two-dimensional random variables, Linear Correlation, correlation coefficient, rank correlation coefficient, Regression.	12
II	<b>Curve Fitting</b>	12



	Curve fitting by of method of least squares, fitting of straight lines, second degree parabola and more general curves.	
III	<b>Probability</b>  Random experiment, Trial, Sample point, Sample space, Definition of Equally likely, Mutually exclusive and Exhaustive events. Definition of probability: Classical, Relative and Axiomatic approach & its properties, Conditional Probability, Multiplicative law of Probability, Independent events, Law of Total Probability, Bayes theorem and its application. Binomial, Poisson and Normal distributions.	12
IV	<b>Roots of Non- Linear Equations</b>  Bisection, Regula-Falsi, Secant method, Successive approximation method, Newton-Raphson method, Rate of Convergence.	12
V	<b>Finite Differences &amp; Numerical Integration</b>  Finite differences, Interpolation, Newton's formulae, Lagrange's and Divided difference formula for unequal intervals. Newton-Cotes integration formulas: Trapezoidal rule, Simpson's rules, Gaussian Quadrature formulae: one, two and three points.	12

### References Books

1. Erwin Kreyszig: Advanced Engineering Mathematics, 8th Ed., John Wiley & Sons, India, 1999
2. Probability and Statistics for Computer Science by James L. Johnson
3. Introductory Methods in Numerical Analysis By S. S. Sastry.
4. Numerical Methods in Science & Engineering Prog.- By Dr. B. S. Grewal, Khanna Pub., New Delhi.
5. Computer Oriented Statistical and Numerical Methods By E. Balagurusamy, TMH.
6. Statistical Methods, S.P.Gupta, Sultan and Chand Publications.
7. Numerical Methods for engineers. S C Chapra and R P Canale, McGraw Hill International Edition.



## **CTBT-HSM-201: Professional Ethics**

Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams						University Exams				
					TA-1	TA-2	MSE				Marks	Hrs			
2	1	0	3	3	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### **Course Objectives**

1. To understand the basics of human values.
2. To understand the importance of values and ethics in personal lives and professional careers.
3. To explore professional practices to achieve professional milestones.
4. To learn the rights and responsibilities as an employee, team member and a global citizen.
5. To maintain ethical conduct and discharge their professional duties.

### **Course Outcomes**

At the end of the course, the students would be able to:

1. Understanding basic purpose of profession, professional ethics and various moral and social issues.
2. Exhibit ethical behavior towards employee team member and a global citizen.
3. Handle ethical issues in business operations correctly and confidently
4. Awareness of professional rights and responsibilities of an Engineer, safety and risk benefit analysis of an Engineer.
5. Acquiring knowledge of various roles of Engineer in applying ethical principles at various professional levels.

Unit	Content	Hours
I	<b>Human Values</b>  Morals, values and Ethics, Integrity, Work ethic, Service learning, Civil virtue, Respects for others, living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Cooperation, Commitment, Empathy, Self-confidence, Character, Spirituality, Social expectations.	10
II	<b>Engineering Ethics</b>	08



	Senses of Engineering Ethics, Evolution of ethics over the years, Distinction between values and Ethics, Variety of moral issues, Types of inquiry, Moral dilemmas, Moral Autonomy, Kohlberg 's theory, Gilligan 's theory, Consensus and Controversy, Models of professional roles, Theories about right action, Self-interest, Customs and Religion, Uses of Ethical Theories, Indian Ethical Traditions.	
III	<b>Professional Practices in Engineering</b>  Codes of Ethics, plagiarism, piracy, A Balanced Outlook on Law, Professions and norms of professional conduct, norms of Professional Conduct vs Profession; Responsibilities, Obligations and moral values in professional ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession. Central responsibilities of engineers: Lessons from Bhopal Gas tragedy, Lessons from SLV-3, Lessons from Indian Space Shuttle (Wings of Fire), Lessons from International Incidents (Titanic Tragedy /Chernobyl Nuclear Tragedy / American Airline DC-10 Crash / Kansas City Hyatt Regency Walk Away Collapse).	10
IV	<b>Responsibilities and Rights of Engineer</b>  Responsibilities and accountability while dealing with public issues (safety, hazards, risk), Collegiality towards other engineers (working in the same organization or outside) and loyalty (towards employer), obligation of loyalty and misguided loyalty, respect for authority and its limitations, Bootlegging, Collective bargaining, Commitments and convictions, Confidentiality, Occupational crime and industrial espionage, Whistle blowing and moral guidelines, conflicts of interests, bribes, gifts, kickbacks, Discrimination, preferential treatment and harassment rights of engineers, engineers as managers and leaders promoting ethical climate.	08
V	<b>Global Issues</b>  Global issues in Professional Ethics: Introduction, Current Scenario, Multinational Corporations, Environmental Ethics, Computer Ethics, Weapon Development, Engineers as managers, Consulting engineers, Engineers as expert witnesses and advisors,	09



moral leaderships, code of conducts, corporate social responsibility, International Trades, World Summits, Human Values for Indian Managers, Lessons from Ancient Indian Education system, The law of Karma, Quality of Working life, Ethics of Vivekananda, Gandhiji, Aurobindo and Tagore.	
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### References Books

1. Engineering Ethics, M. Govindrajan, S Natarajan and V S Senthil Kumar, PHI Learning Pvt. Ltd., New Delhi, 2012.
2. A textbook on Professional Ethics and Human Values, R S Nagarajan, New Age International Private Limited; First edition (2020); New Age International Pvt Ltd.
3. Ethics in Engineering, Mike W. Martin and Roland Schinzinger, Tata McGraw Hill, New Delhi, 2003.
4. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
5. Indian Culture, Values and Professional Ethics, P S R Murthy, B S Publications, Hyderabad, 2013.
6. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press, 2015.
7. Lt Gen Dr. M. L. Chibber : "Leadership-Education in Human Values", Sri Sathya Sai Books and Publications Trust, Prasanthinilayam, 1st Edition, 2009.
8. Wings of Fire, APJ Abdul Kalam, University Press Publications, 2013
9. Ethics in Management and Indian Ethos by Biswanath Gosh
10. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.



## CTBT-PCC-201: Object Oriented Programming with C++

Teaching Scheme						Examination Scheme									
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams						University Exams				
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs	
3	0	0	3	3	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### Course Objectives

1. To introduce students to the basic concepts of object-oriented programming.
2. To familiarize students with the fundamentals of programming, including classes, objects, and tokens, to solve real-world problems.
3. To develop skills in formulating and using functions within object-oriented programming.
4. To cover the concepts of inheritance, polymorphism, and operator overloading.
5. To enhance understanding of advanced programming practices, including file management and exception handling.

### Course Outcomes

At the end of the course, the students would be able to:

1. Recall and understand the fundamental concepts of object-oriented programming and the benefits of OOP.
2. Write, compile, and debug C++ programs using basic programming constructs such as variables, operators, and control structures.
3. Apply knowledge of user-defined functions, including inline functions and function overloading, to create modular and reusable code.
4. Design and implement classes and objects in C++, including the use of constructors, destructors, and friend functions, to solve complex problems.
5. Utilize advanced programming practices, including file management and exception handling, to develop robust applications.

Unit	Content	Hours
I	<b>Introduction to C++</b>  Overview of POP, Basic Introduction to OOP, Basic Concepts of OOP, Benefits of OOP, Application of OOP, Structure of C++ program, simple C++ program, tokens - keywords, identifiers, constants, data	10



	types-fundamental, derived and user-defined, #define keyword, variables, basic operators, Operators in C++, conditional statements, Control structure.	
II	<b>Functions in C++</b>  Introduction, User-defined function, function prototyping, call by value, Call by reference, inline function, default arguments, function overloading.	05
III	<b>Classes and Objects</b>  Introduction, structure Vs Class, defining class, inline function, access specifiers, nesting of member function, arrays within a class, static data members and member function, array of object, Object as function argument and returning objects, friend function, manipulating string: creating string objects, relational operations, characteristics and accessing, constructor with its different types with example - Copy Constructor, parameterized Constructor, destructor.	10
IV	<b>Operator overloading, Type conversion and Inheritance</b>  Introduction, defining operator overloading, rules of operator overloading, overloading unary operator: prefix and postfix, Overloading Binary operator with and without friend function, Manipulation of string using operators, type conversion-Basic to class, class to basic and from one type to another. <b>Inheritance:</b> Introduction, defining a derived class, types of inheritance: single, multilevel, multiple, hierarchical, hybrid, Virtual base class, Abstract classes, Introduction to containership	10
V	<b>Pointers, File Management &amp; Exception Handling</b>  Pointers, Virtual functions and polymorphism: Introduction, Polymorphism with its types, Pointers to objects, this pointer, Virtual function and pure virtual functions, File Management: Introduction, classes for file stream, file operations, file modes, file pointers and manipulators, updating a file, error handling and command line arguments. Exception Handling: Introduction of Exception Handling, Template, Standard Template Library (STL)	10



## References Books

1. Object Oriented Programming with C++, E. Balagurusamy, PHI
2. Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia,
3. C++: The Complete Reference, Herbert Schildt, McGrawHill
4. C++ Programming, Black Book, Steven Holzner, DreamTech
5. Let us C++, Yashwant Kantikar, BPB



## CTBT-ESC-201: Digital Logic Design

Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams						University Exams				
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs	
					Marks	Hrs	Marks	Hrs	Marks	Hrs					
3	0	0	3	3	25	00:45	25	--	50	01:30	100	03:00	-	-	200

### Course Objectives

1. To learn and understand various number systems and codes.
2. To learn the concepts of Boolean algebra and K-maps for design of digital circuits.
3. To understand digital circuits such as combinational and sequential logic circuits.
4. To understand different logic families such as TTL, DTL, ECL, etc.
5. To understand different types of memories.

### Course Outcomes

At the end of the course, the students would be able to:

1. Understand various types of number systems and their conversions.
2. Simplify the Boolean expressions and apply the Boolean theorems through logical gates.
3. Design and implement variety of logical devices using combinational circuits concepts.
4. Demonstrate and compare the construction of programmable logic devices and different types of ROM.
5. Analyze sequential circuits like Registers and Counters using flip-flops.

Unit	Content	Hours
I	<b>Introduction to Digital Systems Design</b>  Digital Systems, Binary Numbers, Number-Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary, Binary codes, Binary Storage & Registers, Binary Logic, Standard Graphic Symbols	10
II	<b>Boolean Algebra &amp; Logic Gates</b>  Boolean Algebra: Introduction, Axiomatic Definition of Boolean Algebra, Basic Theorems, Properties of Boolean Algebra, Boolean	08



	Functions, Canonical & Standard forms, Logic Operations. Logic Gates: Introduction to Logic Gates & Integrated Circuits. Gate Level Minimization: Karnaugh Map (2-Variable, 3-Variable & 4-Variable K-Map), POS & SOP Forms, Don't Care Condition, NAND & NOR Implementation, Other Two-Level Implementations, Exclusive OR Function, Parity Generation	
III	<b>Logic Circuits</b>  Logic Circuits: Introduction to Logic Circuits. Combinational Logic Circuits: Analysis of CLC, Design Procedure, Adders and Subtractors (Half & Full), Comparators, Multiplexers, Encoders, Decoders. Sequential Logic Circuits: Synchronous Sequential Logic Circuits, Latches, Flip-Flops, Asynchronous Sequential Logic Circuits, Circuits with Latches, Design Procedure, Analysis Procedure	09
IV	<b>Digital Circuits</b>  Digital Circuits: Registers, Counters, Memory & Programmable Logic, RAM, ROM, Programmable Logic Array, Programmable Array Logic, Memory Decoding, Error Detection and Correction, Transistors, MOS, CMOS, Special Characteristics, Bipolar Transistor Characteristics.	09
V	<b>Hardware Description Languages (HDLs)</b>  Introduction to HDL: Verilog, VHDL & System Verilog: Introduction, Data Types, Naming Convention, Operators Explicit Behavioural Intent, Bottom-Testing Loop, working with HDL: Truth tables in HDL, HDL Models of Combinational Circuits, VHDL (Process Statements, Variables), Writing Simple Testbench, Logic Simulation, HDL Models of Registers & Counters, RTL Notations & Descriptions, ASMs, HDL description of Binary Multiplier, Design with Multiplexers, Switch Level Modelling with HDL.	09

### References Books

1. Digital Design with an Introduction to the Verilog HDL, VHDL, and System Verilog by M. Morris Mano & Michael D. Ciletti, Pearson Education Inc.
2. Digital logic and computer Design", M. Morris Mano, PHI Publication
3. "Fundamentals of Digital Circuits", A. Anandkumar, PHI Publication
4. "Digital Electronics", R. P. Jain, TMH Publication
5. "Digital Electronics and Logic Design", B. Somanathan Nair, PHI publication



## **CTBT-EMC-201: Fundamentals of Forensic Science and Laws**

Teaching Scheme					Examination Scheme									
L	T	P	C	TCH	Theory						Practical		Total	
					Internal Exams						University Exams		University Exams (LPW)	
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs
					Marks	Hrs	Marks	Hrs	Marks	Hrs	100	03:00	-	-
3	1	0	4	4	25	00:45	25	--	50	01:30				200

### **Course Objectives**

1. To learn about the significance of forensic science to human society and criminal investigation.
2. To understand about basic requirements and practices of forensic investigations.
3. To understand the fundamental principles of forensic science.
4. To understand the working of the forensic establishments in India and abroad
5. To learn the legal aspects of forensic investigations.

### **Course Outcomes**

At the end of course the student will be able to know:

1. The history and development, basic principles, scopes of Forensic Science.
2. The various methods of investigation.
3. Synergy between forensic science and government bodies.
4. The basic understanding Forensically important Laws, Criminal Justice System and Courtroom testimony.
5. The cyber laws and related case studies.

Unit	Content	Hours
I	<b>Introduction to Forensic Science</b>  History of Development of Forensic Science in India. Functions of forensic science. Historical aspects of forensic science. Definitions and concepts in forensic sciences. Scope of forensic science. Various contemporary disciplines of forensic sciences and their applications in different approaches with theoretical concepts Need of forensic science. Basic principles of forensic science.	12
II	<b>Forensics Science requirements</b>	12



	Contemporary development in the academic and practices in forensic sciences-advantage of scientific investigations- Tools and Techniques in Forensic Science- Branches of forensic science. Forensic science in international perspectives, including set up of INTERPOL, and FBI. Duties of forensic scientists. Code of conduct for forensic scientists. Qualifications of forensic scientists. Data depiction. Report writing.	
III	<b>Forensic Sciences and Government</b>  Academic institutions involvement -Organizational set up of Forensic Science Laboratories in India Hierarchical set up of Central Forensic Science Laboratories, State Forensic Science Laboratories, Government Examiners of Questioned Documents, Fingerprint Bureaus, National Crime Records Bureau, Police & Detective Training Schools, NIA, CCNTS, Bureau of Police Research & Development, Directorate of Forensic Science and Mobile Crime Laboratories. Police Academies. National investigation agency and other agencies involved in the criminal investigations- agencies referred for the additional information and requisite examinations	12
IV	<b>Forensics Sciences and Laws</b>  Definition of Law, Court, Judge, Basic Terminology in Law, Introduction to Criminal Procedure Code, FIR, Difference between civil and Criminal Justice, Object of Punishment, Kinds of Punishment, Primary and Sanctioning Rights Primary and Secondary functions of Court of Law. Law to Combat Crime-Classification – civil, criminal cases. Essential elements of criminal law. Constitution and hierarchy of criminal courts. Criminal Procedure Code: Cognizable and non-cognizable offences. Bailable and nonbailable offences. Sentences which the court of Chief Judicial Magistrate may pass.  Laws specific to Forensic Science: Bharatiya Sakshya Adhiniyam, 2023: S.2(1)e – Definition of Evidence, Ss.3-14- Relevancy of Facts, Ss. 15-27- Admission and Confession, S.39- Opinion of Experts, S.57- Primary Evidence, S.58- Secondary Evidence, S.61- Electronic Digital Records, S.63- Admissibility of Electronic Records, S.136- Exclusion from witness upon production of documents, S.140-144-	12



	<p>Examination and Cross Examination, S.158- Impeaching credit of witness, S. 165- Production of Documents.</p> <p>Bharatiya Nagrik Suraksha Sanhita, 2023: FIR, Zero FIR, S.6-Courts, S.197-Inquiry and Trial, Ss.105/185- Videographer of Search and Seizure, S.176- Procedure for Investigation S.178-Power to hold investigation,S.180- Examination of witness by police, S.184-Medical examination of victims of rape, S.193/194-Police report, S.329- report of Government Scientific experts etc.</p> <p>Bhartiya Nyaya Sanhita, 2023: S.3- General Explanations, Mens Rea, Actus Reus, S. Sections 45-62-Abetment/Criminal Conspiracy/Attempt, S.63- Sexual Offences, S.101- Murder, S.178-Counterfeiting, S.317- Receiving stolen property etc.</p>	
V	<p><b>Cyber Laws</b></p> <p>Introduction to Computer and its components, different types of storage media, Category to Cyber-crime, Cyber Law, IT Act 2000 and its amendments, Digital Personal Data Protection Act of 2023 (DPDP), International Cyber Laws, Cyber Ethics, Child Sexual Abuse Material related to cyber domain, various acts related to social media, privacy and security on cyber domain, case studies.</p>	12

### References Books

1. B.B. Nanda and R.K. Tiwari, Forensic Science in India: A Vision for the Twenty First Century, Select Publishers, New Delhi (2001).
2. S.H. James and J.J. Nord by, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005).
3. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
4. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013)
5. Tallinn Manual on The International Law Applicable To Cyber Warfare, International Group of Experts and NATO by Michael N. Schmitt
6. IT Act 2000 and 2008 bare acts documents
7. Cyber Law in India, Satish Chandra (2017)
8. Criminal Manual (Containing Nagarik Suraksha Sanhita, Nyaya Sanhita and Sakshya Adhiniyam, 2023).
9. Taxmann's Bharatiya Sakshya Adhiniyam (BSA) 2023



## CTBT-EMC-202: Environmental Science

Teaching Scheme					Examination Scheme									
L	T	P	C	TCH	Theory						Practical		Total	
					Internal Exams				University Exams		University Exams (LPW)			
		TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs	Marks	Hrs	
Marks	Hrs	Marks	Hrs	Marks	Hrs	Marks	Hrs	-	-	-	-	-	-	-
0	0	0	0	2	-	-	-	-	-	-	-	-	-	-

### Course Objectives

1. To learn about environmental sciences.
2. To understand the fundamental of natural resources and ecological systems.
3. To understand the working biogeochemical cycle.
4. To understand biodiversity and study about environmental pollution & its factors.
5. To foster practices for the solution of global crisis and environmental problems.

### Course Outcomes

At the end of course the student will be able to know:

1. Importance of environment and nature.
2. Entire ecosystem scientifically.
3. The natural resources and its types.
4. About the pollution and its mitigation.
5. The biodiversity and its conservation.

Unit	Content	Hours
I	<b>The Multidisciplinary nature of environmental studies</b>  The Multidisciplinary nature of environmental studies, Concept of biosphere – lithosphere, hydrosphere, atmosphere; Biogeochemical cycle.	06
II	<b>Environment Concept</b>  Principles and scope of Ecology; concepts of ecosystem, population, community, biotic interactions, biomes, ecological succession.	06
III	<b>Natural Resources</b>	06



	Renewable and non-renewable resources, Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources.	
IV	<b>Environmental Pollution</b>  Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution & Nuclear hazards.	06
V	<b>Biodiversity and It's Conservation</b>  Introduction – Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	06

### References Books

1. Masters, G.M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., (1991) M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).
2. Masters, G.M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., (1991)
3. Odum, E.P., "Ecology: The Link between the natural and social sciences", IBH Publishing Com., Delhi



**CTBT-PCC-201L: Object Oriented Programming with C++ Laboratory**

Teaching Scheme						Examination Scheme									Total
L	T	P	C	TCH	Theory						Practical			Total	
					Internal Exams						University Exams		University Exams (LPW)		
					TA-1		TA-2		MSE		Marks	Hrs	Marks	Hrs	
					Marks	Hrs	Marks	Hrs	Marks	Hrs	-	-	-	-	100 03:00 100
0	0	1	1	2	-	-	-	-	-	-	-	-	-	-	100 03:00 100

Experiments to support the associated theory course.



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Teaching Scheme					Examination Scheme										
L	T	P	C	TCH	Theory						Practical		Total		
					Internal Exams				University Exams		University Exams (LPW)				
					TA-1		TA-2		MSE		Marks	Hrs			
					Marks	Hrs	Marks	Hrs	Marks	Hrs	Marks	Hrs			
0	0	1	1	2	-	-	-	-	-	-	-	-	100	03:00	100

Experiments to support the associated theory course.

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