

**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA, G.B. NAGAR
(AN AUTONOMOUS INSTITUTE)**



Affiliated to

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, UTTAR PRADESH, LUCKNOW



Evaluation Scheme & Syllabus

For

Bachelor of Technology

Computer Science & Engineering (Cyber Security)

Second Year

(Effective from the Session: 2023-24)

**NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(AN AUTONOMOUS INSTITUTE)**

**Bachelor of Technology
Computer Science and Engineering (Cyber Security)
Evaluation Scheme**

SEMESTER - III

Sl. No.	Subject Codes	Subject Name	Periods			Evaluation Schemes				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
WEEKS COMPULSORY INDUCTION PROGRAM													
1	AAS0303	Statistics and Probability	3	1	0	30	20	50		100		150	4
2	ACSE0306	Discrete Structures	3	0	0	30	20	50		100		150	3
3	ACSAI0302	Logic Design and Computer Architecture	3	0	0	30	20	50		100		150	3
4	ACSE0302	Object Oriented Techniques using Java	3	0	0	30	20	50		100		150	3
5	ACSIOT0301	Data Structures and Algorithms Design	3	1	0	30	20	50		100		150	4
6	ACSCY0301	Operating Systems	3	0	0	30	20	50		100		150	3
7	ACSE0352	Object Oriented Techniques using Java Lab	0	0	2				25		25	50	1
8	ACSIOT0351	Data Structures and Algorithms Lab	0	0	2				25		25	50	1
9	ACSCY0351	Operating Systems Lab	0	0	2				25		25	50	1
10	ACSE0359	Internship Assessment -I	0	0	2				50			50	1
11	ANC0301 / ANC0302	Cyber Security / Environmental Science	2	0	0			50		50		100	0
12		MOOCs (For B.Tech. Hons. Degree)											
		TOTAL											

List of MOOCs Based Recommended Courses for Second year B. Tech Students

S. No.	Subject Code	Course Name	University/ Industry Partner Name	No. of Hours	Credits
1.		Hands-on Introduction to Linux Commands and Shell Scripting	IBM	14 hrs	1
2.		Exploiting and Securing Vulnerabilities in Java Applications	UC Davis	23 hrs	1.5

PLEASE NOTE:-

- Internship (3-4 weeks) shall be conducted during summer break after semester-II and will be assessed during semester-III
- Compulsory Audit Courses (Non Credit - ANC0301/ANC0302)
 - All Compulsory Audit Courses (a qualifying exam) has no credit.
 - Total and obtained marks are not added in the Grand Total.

Abbreviation Used: -

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

**NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
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**Bachelor of Technology
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Evaluation Scheme

SEMESTER - IV

Sl. No.	Subject Codes	Subject Name	Periods			Evaluation Schemes				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	AAS0404	Optimization Techniques	3	1	0	30	20	50		100		150	4
2	AASL0401	Technical Communication	2	1	0	30	20	50		100		150	3
3	ACSCY0401	Computer Networks and Network Programming	3	0	0	30	20	50		100		150	3
4	ACSAI0402	Database Management Systems	3	1	0	30	20	50		100		150	4
5	ACSAI0401	Introduction to Artificial Intelligence	3	0	0	30	20	50		100		150	3
6	ACSE0404	Theory of Automata & Formal Languages	3	0	0	30	20	50		100		150	3
7	ACSCY0451	Computer Networks and Network Programming Lab	0	0	2				25		25	50	1
8	ACSAI0452	Database Management Systems Lab	0	0	2				25		25	50	1
9	ACSAI0451	Artificial Intelligence Lab	0	0	2				25		25	50	1
10	ACSE0459	Mini Project using Open Technology	0	0	2				50			50	1
11	ANC0402 / ANC0401	Environmental Science/ Cyber Security	2	0	0			50		50		100	0
12		MOOCs (For B.Tech. Hons. Degree)											
		TOTAL											
Mini Project or Internship (3-4 weeks) shall be conducted during summer break after III semester and will be assessed during IV semester													

PLEASE NOTE:-

List of MOOCs (Coursera) Based Recommended Courses for Second Year (Semester-IV) B. Tech Students

S. No.	Subject Code	Course Name	University/ Industry Partner Name	N. of Hours	Credits
1.		Ethical Hacking Essentials (EHE)	EC-Council	32 hrs	2.5
2.		Identifying Security Vulnerabilities in C/C++ Programming	UC Davis	22 hrs	1.5

- **Compulsory Audit Courses (Non Credit - ANC0401/ANC0402)**
 - All Compulsory Audit Courses (a qualifying exam) has no credit.
 - Total and obtained marks are not added in the Grand Total.

Abbreviation Used: -

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

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AICTE Guidelines in Model Curriculum:

A student will be eligible to get Under Graduate degree with Honours only, if he/she completes the additional MOOCs courses such as Coursera certifications, or any other online courses recommended by the Institute (Equivalent to 20 credits). During Complete B.Tech. Program Guidelines for credit calculations are as follows.

- | | |
|----------------------|-------------|
| 1. For 6 to 12 Hours | =0.5 Credit |
| 2. For 13 to 18 | =1 Credit |
| 3. For 19 to 24 | =1.5 Credit |
| 4. For 25 to 30 | =2 Credit |
| 5. For 31 to 35 | =2.5 Credit |
| 6. For 36 to 41 | =3 Credit |
| 7. For 42 to 47 | =3.5 Credit |
| 8. For 48 and above | =4 Credit |

For registration to MOOCs Courses, the students shall follow Coursera registration details as per the assigned login and password by the Institute these courses may be cleared during the B. Tech degree program (as per the list provided). After successful completion of these MOOCs courses, the students shall provide their successful completion status/certificates to the Controller of Examination (COE) of the Institute through their coordinators/Mentors only.

The students shall be awarded Honours Degree as per following criterion.

- i. If he / she secures 7.50 as above CGPA.
- ii. Passed each subject of that degree program in the single attempt without any grace.
- iii. Successful completion of MOOCs based 20 credits.

B. TECH. SECOND YEAR			
Course Code	AAS0303	L T P	Credit
Course Title	Statistics and Probability	3 1 0	4
Course objective: The objective of this course is to familiarize the engineers with concept of Statistical techniques, probability distribution, hypothesis testing and ANOVA and numerical aptitude. It aims to show case the students with standard concepts and tools from B. Tech to deal with advanced level of mathematics and applications that would be essential for their disciplines.			
Pre-requisites: Knowledge of Mathematics I and II of B. Tech or equivalent			
Course Contents / Syllabus			
UNIT-I	Descriptive measures	8 Hours	
Measures of central tendency – mean, median, mode, measures of dispersion – mean deviation, standard deviation, quartile deviation, variance, Moment, Skewness and kurtosis, least squares principles of curve fitting, Covariance, Correlation and Regression analysis, Correlation coefficient: Karl Pearson coefficient, rank correlation coefficient, uni-variate and multivariate linear regression, application of regression analysis, Logistic Regression, time series analysis- Trend analysis (Least square method).			
UNIT-II	Probability and Random variable	8 Hours	
Probability Definition, The Law of Addition, Multiplication and Conditional Probability, Bayes’ Theorem, Random variables: discrete and continuous, probability mass function, density function, distribution function, Mathematical expectation, mean, variance. Moment generating function, characteristic function, Two dimensional random variables: probability mass function, density function,			
UNIT-III	Probability distribution	8 Hours	
Probability Distribution (Continuous and discrete- Normal, Exponential, Binomial, Poisson distribution), Central Limit theorem			
UNIT-IV	Test of Hypothesis & Statistical Inference	8 Hours	
Sampling and population, uni-variate and bi-variate sampling, re-sampling, errors in sampling, Sampling distributions, Hypothesis testing- p value, z test, t test (For mean), Confidence intervals, F test; Chi-square test, ANOVA: One way ANOVA, Statistical Inference, Parameter estimation, Least square estimation method, Maximum Likelihood estimation.			
UNIT-V	Aptitude-III	8 Hours	

Time & Work, Pipe & Cistern, Time, Speed & Distance, Boat & Stream, Sitting Arrangement, Clock & Calendar.		
Course outcome: After completion of this course students will be able to:		
CO 1	Understand the concept of moments, skewness, kurtosis, correlation, curve fitting and regression analysis.	K1, K3
CO 2	Understand the concept of Probability and Random variables.	K1, K3
CO 3	Remember the concept of probability to evaluate probability distributions	K3, K4
CO 4	Apply the concept of hypothesis testing and estimation of parameter.	K2
CO 5	Solve the problems of Time & Work, Pipe & Cistern, Time, Speed & Distance, Boat & Stream, Sitting Arrangement, Clock & Calendar.	K3
Text books		
(1) P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003(Reprint)		
(2) S. Ross: A First Course in Probability, 6th Ed., Pearson Education India, 2002		
(3) W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.		
Reference Books		
(1) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.		
(2) T.Veerarajan : Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi		
(3) R.K. Jain and S.R.K. Iyenger: Advance Engineering Mathematics; Narosa Publishing House, New Delhi.		
(4) J.N. Kapur: Mathematical Statistics; S. Chand & Sons Company Limited, New Delhi.		
(5) D.N.Elhance,V. Elhance& B.M. Aggarwal: Fundamentals of Statistics; KitabMahal Distributers, New Delhi.		
Link:		
Unit 1	https://youtu.be/wWenULjri40 https://youtu.be/mL9-WX7wLAo https://youtu.be/nPsfqz9EljY https://youtu.be/nqPS29IvnHk https://youtu.be/aaQXMbpbNKw	

	https://youtu.be/wDXMYRPup0Y https://youtu.be/m9a6rg0tNSM https://youtu.be/Qy1YAKZDA7k https://youtu.be/Qy1YAKZDA7k https://youtu.be/s94k4H6AE54 https://youtu.be/IBB4stn3exM https://youtu.be/0WejW9MiTGg https://youtu.be/QAEZOhE13Wg https://youtu.be/ddYNq1TxtM0 https://youtu.be/YciBHHeswBM https://youtu.be/VCJdg7YBbAQ https://youtu.be/VCJdg7YBbAQ https://youtu.be/yhzJxftDgms
Unit 2	https://youtu.be/bhp4nVkkA9o https://youtu.be/8sJ9dFj_ydg https://youtu.be/u_x8zQvWWLk https://youtu.be/3rYYPWN_QS0 https://youtu.be/HZGCoVF3YvM https://youtu.be/z4e4E9igjIE https://youtu.be/dOr0NKyD31Q https://youtu.be/YXLVjCKVP7U https://youtu.be/l0ecMiNUZu8 https://youtu.be/L0zWnBrjhng https://youtu.be/cbmfYoePHPk https://youtu.be/_DWnI-gk0ys https://youtu.be/d_9KT2abCAY https://youtu.be/sSUCwLvmCLg

	https://youtu.be/H2Ji-Q4MfqU https://youtu.be/TwN79BuwiMM https://youtu.be/yXsvMlqoiK4
Unit 3	https://youtu.be/gT26Y_VJmOM https://youtu.be/onFv73Btdno https://youtu.be/mYFygtQrDxc https://youtu.be/S8YrED3mf5s https://youtu.be/z5gongqrMv8 https://youtu.be/4vsGyghhxVg https://youtu.be/CW-3qjcw-GA https://youtu.be/RqiqhrZE6Uk
Unit 4	https://youtu.be/L3wQw0wva3g https://youtu.be/n9qpktdFfLU https://youtu.be/_Qlxt0HmuOo https://youtu.be/YSwmpAmLV2s https://youtu.be/KLnGOL_AUgA https://youtu.be/cQp_bJdxjWw https://youtu.be/geB0A7CPGaQ https://youtu.be/zmyh7nCjmsg https://youtu.be/ohquDY3fZqk https://youtu.be/izGZLnB-mEo https://youtu.be/q48uKU_KWas https://youtu.be/lZFmFuZGQ Tk https://youtu.be/iin6vthyzsQ https://youtu.be/ysjkkBspbYY https://youtu.be/pXjaMY29k1g https://youtu.be/pvvoK4rlzqQ

Unit 5	https://www.youtube.com/playlist?list=PLFqNfk5W2ZuzjUsRqDp1Zj3S8n9yfdmN9 https://youtu.be/x3SEYdBUGaA https://youtu.be/B7sMHZj_p18 https://youtu.be/4HRLswVPOG8 https://youtu.be/aHEWcn_bPYc https://youtu.be/ePQiVq8WtL8
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B. TECH. SECOND YEAR								
Course Code		ACSE0306			L	T	P	Credits
Course Title		Discrete Structures			3	0	0	3
Course objective: The subject enhances one’s ability to develop logical thinking and ability to problem solving. The objective of discrete structure is to enables students to formulate problems precisely, solve the problems, apply formal proofs techniques and explain their reasoning clearly.								
Pre-requisites: 1. Basic Understanding of mathematics 2. Basic knowledge algebra. 3. Basic knowledge of mathematical notations								
Course Contents / Syllabus								
Unit 1	Set Theory, Relation, Function							8 Hours
Set Theory: Introduction to Sets and Elements, Types of sets, Venn Diagrams, Set Operations, Multisets, Ordered pairs. Proofs of some general Identities on sets. Relations: Definition, Operations on relations, Pictorial Representatives of Relations, Properties of relations, Composite Relations, Recursive definition of relation, Order of relations. Functions: Definition, Classification of functions, Operations on functions, Growth of Functions. Combinatorics: Introduction, basic counting Techniques, Pigeonhole Principle. Recurrence Relation & Generating function: Recursive definition of functions, Recursive Algorithms, Method of solving Recurrences. Proof techniques: Mathematical Induction, Proof by Contradiction, Proof by Cases, Direct Proof.								
Unit 2	Algebraic Structures							8 Hours
Algebraic Structures: Definition, Operation, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups, Permutation and Symmetric Groups, Group Homomorphisms, Rings, Internal Domains, and Fields.								
Unit 3	Lattices and Boolean Algebra							8 Hours
Ordered set, Posets, Hasse Diagram of partially ordered set, Lattices: Introduction, Isomorphic Ordered set, Well ordered set, Properties of Lattices, Bounded and Complemented Lattices, Distributive Lattices. Boolean Algebra: Introduction, Axioms and Theorems of Boolean Algebra, Algebraic Manipulation of Boolean Expressions, Simplification of Boolean Functions.								
Unit 4	Propositional Logic							8 Hours
Propositional Logic: Introduction, Propositions and Compound Statements, Basic Logical Operations, Well-formed formula, Truth Tables, Tautology, Satisfiability, Contradiction, Algebra of Proposition, Theory of Inference. Predicate Logic: First order predicate, Well-formed formula of Predicate, Quantifiers, Inference Theory of Predicate Logic.								
Unit 5	Tree and Graph							8 Hours
Trees: Definition, Binary tree, Complete and Extended Binary Trees, Binary Tree Traversal, Binary Search Tree. Graphs: Definition and terminology, Representation of Graphs, Various types of Graphs, Connectivity, Isomorphism and Homeomorphism of Graphs, Euler and Hamiltonian Paths, Graph Coloring								
Course outcome: After completion of this course students will be able to:								

CO1	Apply the basic principles of sets, relations & functions and mathematical induction in computer science & engineering related problems.	K3
CO2	Understand the algebraic structures and its properties to solve complex problems.	K2
CO3	Describe lattices and its types and apply Boolean algebra to simplify digital circuit.	K2, K3
CO4	Infer the validity of statements and construct proofs using predicate logic formulas.	K3, K5
CO5	Design and use the non-linear data structure like tree and graphs to solve real world problems.	K3, K6

Text books:

- 1) B. Kolman, R.C. Busby, and S.C. Ross, Discrete Mathematical Structures, 5/e, Prentice Hall, Edition 6th, 2018.
- 2) Liptschutz, Seymour, “Discrete Mathematics”, McGraw Hill, Edition 3rd, 2017.
- 3) Trembley, J.P & R. Manohar, “Discrete Mathematical Structure with Application to Computer Science”, McGraw Hill, Edition 1st, 2017.
- 4) Liu and Mohapatra, “Elements of Discrete Mathematics”, McGraw Hill.

Reference Books:

- 1) Deo & Narsingh, “Graph Theory With application to Engineering and Computer Science.”, PHI.
- 2) Krishnamurthy, V., “Combinatorics Theory & Application”, East-West Press Pvt. Ltd., New Delhi.
- 3) Koshy, Discrete Structures, Elsevier Pub. 2008 Kenneth H. Rosen, Discrete Mathematics and Its Applications, 6/e, Mc Graw-Hill, Edition 7th, 2017.

Links:

Unit 1	https://www.youtube.com/watch?v=hGtOLG3SsjI&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=9 https://www.youtube.com/watch?v=rGcTcGFx9_s&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=10 https://www.youtube.com/watch?v=oU60TuGHxe0&list=PL0862D1A947252D20&index=11
Unit 2	https://www.youtube.com/watch?v=M8nh83bFJAA&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=38 https://www.youtube.com/watch?v=CjmWE-f3vEc&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=41
Unit 3	https://www.youtube.com/watch?v=c6ARWh6lVgc&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=24 https://www.youtube.com/watch?v=QKP6sOnu1vg&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=22
Unit 4	https://www.youtube.com/watch?v=hklHg9oMkGA&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=3 https://www.youtube.com/watch?v=ASDaXWCExzo&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=4
Unit 5	https://www.youtube.com/watch?v=AtDgXyluW-Y&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=12 https://www.youtube.com/watch?v=cwbZUjzf_I0&list=PLwdnzlV3ogoVxVxCTII45pDVM1aoYoMHf&index=13

B. TECH. SECOND YEAR			
Course Code	ACSAI0302	L T P	Credit
Course Title	Logic Design and Computer Architecture	3 0 0	3
Course objective: To understand the types of organizations, structures, and functions of computers, design of arithmetic and logic units, and float point arithmetic. To understand the concepts of the memory system, communication with I/O devices, and interfaces.			
Pre-requisites: <ul style="list-style-type: none">• Basic knowledge of computer systems.• Logic gates and their operations.			
Course Contents / Syllabus			
UNIT-I	Introduction	8 Hours	
Basics of Logic Design: Basic of number System, Boolean algebra, Half Adder and Full Adder, Half Subtractor and Full Subtractor, Multiplexer, Encoder, Decoder. Computer Organization and Architecture, Functional units of a digital system and their interconnections, buses, bus architecture, types of buses,and bus arbitration and its types. Register, bus, and memory transfer. Process or organization, general registers organization, stack organization,and addressing modes.			
UNIT-II	ALU Unit	8 Hours	
Arithmetic and logic unit: Lookahead carries adders. Multiplication: Signed operand multiplication, Booth’s algorithm, and array multiplier. Division and logic operations. Floating-point arithmetic operation, Arithmetic &logic unit design. IEEE Standard for Floating-Point Numbers.			
UNIT-III	Control Unit	8 Hours	
Control Unit: Instruction types, formats, instruction cycles and sub-cycles (fetch and execute, etc.), micro-operations, execution of a complete instruction. Program Control, Reduced Instruction Set Computer, Complex Instruction Set Computer, Pipelining. Hardwire and microprogrammed control, Concept of horizontal and vertical microprogramming, Flynn's classification.			
UNIT-IV	Memory Unit	8 Hours	
Memory: Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2D memory organization. ROM memories. Cache memories: concept and design issues & performance address mapping and replacement Auxiliary memories: magnetic disk, magnetic tape, and optical disks Virtual memory: concept implementation, Memory Latency, Memory Bandwidth, Memory Seek Time.			
UNIT-V	Input/Output	8 Hours	

Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access, I/O channels and processors. Serial Communication: Synchronous & asynchronous communication.

Course outcome: After completion of this course students will be able to:

CO 1	Understand the basic structure and operation of a digital computer system.	K2
CO 2	Analyze the design of arithmetic & logic unit and understand the fixed point and floating-point arithmetic operations.	K4
CO 3	Implement control unit techniques and the concept of Pipelining	K3
CO 4	Understand the hierarchical memory system, cache memories and virtual memory.	K2
CO 5	Understand different ways of communicating with I/O devices and standard I/O interfaces.	K2

Text books:

- 1) M. Mano, “Computer System Architecture”, 3rd Edition, Pearson Publication, 2007.
- 2) John P. Hayes, Computer Architecture and Organization, Tata McGraw Hill, Third Edition, 1998.
- 3) William Stallings, Computer Organization and Architecture-Designing for Performance, Pearson Education, Seventh edition, 2006.

Reference Books:

- 1) Carl Hamacher, Zvonko Vranesic, Safwat Zaky Computer Organization, McGraw-Hill, Fifth Edition, Reprint 2012
- 2) Ray A K, Bhurchandi K M, “Advanced Microprocessors and Peripherals”, TM.

Links:

Unit 1	https://www.youtube.com/watch?v=L9X7XXfHYdU&list=PLxCzCOWd7aiHMonh3G6QNKq53C6oNXGrX
Unit 2	https://www.youtube.com/watch?v=WLgXUPOjKEc
Unit 3	https://www.youtube.com/watch?v=BPhWIFIU1rc
Unit 4	https://www.youtube.com/watch?v=6R7JDkpG1Wk&list=PLrjkTql3jnm8HbdMwBYIMAd3UdstWChFH
Unit 5	https://www.youtube.com/watch?v=nxryfWg5Hm4

B.TECH. SECOND YEAR			
Course Code	ACSE0302	L T P	Credit
Course Title	Object Oriented Techniques using Java	3 0 0	3
Course objective: The objective of this course is to understand the object-oriented methodology and its techniques to design and develop conceptual models and demonstrate the standard concepts of object-oriented techniques modularity, I/O. and other standard language constructs. The basic objective of this course is to understand the fundamental concepts of object-oriented programming in Java language and also implement the Multithreading concepts, GUI based application and collection framework.			
Pre-requisites: <ul style="list-style-type: none">• Student must know at least the basics of how to use a computer, and should be able to start a command line shell.• Knowledge of basic programming concepts, as covered in ‘Programming Basic” course is necessary.			
Course Contents / Syllabus			
UNIT-I	Introduction	8 Hours	
Object Oriented Programming: Introduction and Features: Abstraction, Encapsulation, Polymorphism, and Inheritance. Modeling Concepts: Introduction,Class Diagram and Object Diagram. Control Statements: Decision Making, Looping and Branching, Argument Passing Mechanism: Command Line Argument.			
UNIT-II	Basics of Java Programming	8 Hours	
Class and Object: Object Reference, Constructor, Abstract Class, Interface and its uses, Defining Methods, Use of “this” and “super” keyword, Garbage Collection and finalize () Method. Inheritance: Introduction and Types of Inheritance in Java, Constructors in Inheritance. Polymorphism: Introduction and Types, Overloading and Overriding. Lambda expression: Introduction and Working with Lambda Variables. Arrays: Introduction and its Types.			
UNIT-III	Packages, Exception Handling and String Handling	8 Hours	
Packages: Introduction and Types, Access Protection in Packages, Import and Execution of Packages. Exception Handling,Assertions and Localizations: Introduction and Types, Exceptions vs. Errors, Handling of Exception. Finally, Throws and Throw keyword, Multiple Catch Block, Nested Try and Finally Block, Tokenizer. Assertions and Localizations Concepts and its working. String Handling: Introduction and Types, Operations, Immutable String, Method of String class, String Buffer and String Builder class.			
UNIT-IV	Concurrency in Java and I/O Stream	8 Hours	
Threads: Introduction and Types, Creating Threads, Thread Life-Cycle, Thread Priorities, Daemon Thread, Runnable Class, Synchronizing Threads. I/O Stream: Introduction and Types, Common I/O Stream Operations, Interaction with I/O Streams Classes. Annotations: Introduction, Custom Annotations and Applying Annotations.			
UNIT-V	GUI Programming, Generics and Collections	8 Hours	

GUI Programming: Introduction and Types, Swing, AWT, Components and Containers, Layout Managers and User-Defined Layout and Event Handling.

Generics and Collections: Introduction, Using Method References, Using Wrapper Class, Using Lists, Sets, Maps and Queues, Working with Generics.

Course outcome: After completion of this course students will be able to:

CO1	Identify the concepts of object-oriented programming and relationships among them needed in modeling.	K2
CO2	Demonstrate the Java programs using OOP principles and also implement the concepts of lambda expressions.	K3
CO3	Implement packages with different protection level resolving namespace collision and evaluate the error handling concepts for uninterrupted execution of Java program.	K5
CO4	Implement Concurrency control, I/O Streams and Annotations concepts by using Java program.	K3
CO5	Design and develop the GUI based application, Generics and Collections in Java programming language to solve the real-world problem.	K6

Text books:

1) Herbert Schildt, "Java - The Complete Reference", McGraw Hill Education 12th edition

2) Herbert Schildt, "Java: A Beginner's Guide", McGraw-Hill Education 2nd edition

3) James Rumbaugh et. al, "Object Oriented Modeling and Design", PHI 2nd Edition

Reference Books:

1) Cay S. Horstmann, "Core Java Volume I – Fundamentals", Prentice Hall

2) Joshua Bloch, "Effective Java", Addison Wesley

3) E Balagurusamy, "Programming with Java A Primer", TMH, 4th edition.

Link:

Unit 1	https://www.youtube.com/watch?v=r59xYe3Vyks&list=PLS1QulWo1RIbfTjQvTdj8Y6yyq4R7g-Al
Unit 2	https://www.youtube.com/watch?v=ZHLdVRXIuC8&list=PLS1QulWo1RIbfTjQvTdj8Y6yyq4R7g-Al&index=18
Unit 3	https://www.youtube.com/watch?v=hBh_CC5y8-s
Unit 4	https://www.youtube.com/watch?v=qQVqfvs3p48
Unit 5	https://www.youtube.com/watch?v=2qWPpgALJyw

B. TECH. SECOND YEAR			
Course Code	ACSIOT0301	L T P	Credits
Course Title	Data Structures and Algorithms Design	3 1 0	4
Course objective: In this course, the students will gain the knowledge of the structure and working of non-primitive data structures, searching, sorting algorithms with their complexities and learn different algorithm design techniques to solve real world problems.			
Pre-requisites:			
Course Contents / Syllabus			
UNIT-I	Introduction	8 Hours	
Overview and importance of algorithms and data structures. Characteristics of data structures, Operations on data structures, Fundamental of algorithm analysis, time and space complexity, types of asymptotic notations and order of growth, Algorithm efficiency-best case, worst case and average case, Analysis of non-recursive and recursive algorithms. Asymptotic analysis for recurrence relation. Arrays: 1D and 2D arrays, Row and column major order. Linear Search, Bubble Sort, Selection Sort, Insertion Sort.			
UNIT-II	Algorithm Design Approaches	8 Hours	
Divide and conquer: Concepts, Binary Search, Merge Sort, Quick Sort, Dynamic programming: Concepts, 0-1 knapsack problem, Greedy Programming: Concepts, Huffman Coding, Fractional knapsack, Backtracking: Concepts, N-queen Problem.			
UNIT-III	Linear Data Structures	8 Hours	
Linked lists: types of linked lists – Singly, Doubly and Circular linked lists, Operations on linked lists. Stacks: Implementation of stacks– Using array and linked list, operations on stacks, Applications of Stacks, Notations – infix, prefix and postfix, Conversion and evaluation of arithmetic expressions using Stacks. Queues: Implementation of queues– Using array and linked list, Operations on queues, Double ended queue and Priority queue.			
UNIT-IV	Trees	8 Hours	
Binary tree, Binary search tree, Threaded binary tree, AVL Trees, Heaps, Heap Sort, Hash tables, B Tree.			
UNIT-V	Graphs	8 Hours	
Graph Traversal: Breadth-First Search, Depth First Search, Topological Sort, Strongly Connected Components. Minimum Spanning Trees: Kruskal’s and Prim’s Algorithms, Single Source Shortest path: Dijkstra’s and Bellman-Ford’s Algorithm, All pair shortest path: Floyd-Warshall’s Algorithm.			
Course outcome: After completion of this course students will be able to			
CO 1	Understand characteristics and operations on data structure, analyse complexity of algorithms using asymptotic notation.		K4
CO 2	Implement and analyse linear data structure like arrays, linked lists, stacks and queues with their applications in real world.		K4
CO 3	Describe algorithm design techniques and explain when an algorithmic design situation calls for it.		K3

CO 4	Implement various types of trees and operations on trees.	K4
CO 5	Analyse the use of Graph related algorithms and its applications in real world.	K3
Text books:		
1) Aaron M. Tenenbaum, Yedidya Langsam and Moshe J. Augenstein, “Data Structures Using C and C++”, PHI Learning Private Limited, Delhi India		
2) Horowitz and Sahani, “Fundamentals of Data Structures”, Galgotia Publications Pvt Ltd Delhi India.		
3) Lipschutz, “Data Structures” Schaum’s Outline Series, Tata McGraw-hill Education (India) Pvt. Ltd.		
4) Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest, “Introduction to Algorithms”, Printice Hall of India.		
5) E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms".		
6) Aho, Hopcraft, Ullman, “The Design and Analysis of Computer Algorithms” Pearson Education, 2008.		
7) LEE "Design & Analysis of Algorithms (POD)", McGraw Hill.		
Reference Books:		
1) Gajendra Sharma, Design & Analysis of Algorithms, Khanna Publishing House		
2) Richard E. Neapolitan "Foundations of Algorithms" Jones & Bartlett Learning		
3) Jon Kleinberg and Éva Tardos, Algorithm Design, Pearson, 2005.		
4) Michael T Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Wiley, 2006.		
5) Harry R. Lewis and Larry Denenberg, Data Structures and Their Algorithms, Harper Collins, 1997		
6) Robert Sedgewick and Kevin Wayne, Algorithms, fourth edition, Addison Wesley, 2011.		
7) Harsh Bhasin, "Algorithm Design and Analysis", First Edition, Oxford University Press.		
8) Gilles Brassard and Paul Bratley, Algorithmics: Theory and Practice, Prentice Hall, 1995.		
Links:		
Unit 1	https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFI-O29szjTrs_O https://www.youtube.com/watch?v=aGjL7YXI31Q&list=PLEbnTDJUr_IeHYw_sfBOJ6gk5pie0yP-0 https://nptel.ac.in/courses/106/106/106106131/ https://nptel.ac.in/courses/106/101/106101060/	
Unit 2	https://nptel.ac.in/courses/106/106/106106127/	
Unit 3	https://nptel.ac.in/courses/106/106/106106127/ https://www.youtube.com/watch?v=g1USSZVWDsY&list=PLBF3763AF2E1C572F&index=2	
Unit 4	https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFI-O29szjTrs_O https://www.youtube.com/watch?v=aGjL7YXI31Q&list=PLEbnTDJUr_IeHYw_sfBOJ6gk5pie0yP-0 https://nptel.ac.in/courses/106/106/106106131/ https://nptel.ac.in/courses/106/101/106101060/	
Unit 5	https://nptel.ac.in/courses/106/106/106106127/ https://www.youtube.com/watch?v=tORLeHHtazM&list=PLBF3763AF2E1C572F&index=6 https://nptel.ac.in/courses/106/106/106106127/	

B. TECH. SECOND YEAR			
Course Code	ACSCY0301	L T P	Credits
Course Title	Operating Systems	3 0 0	3
Course objective: The objective of the course is to provide an understanding of the basic modules and architecture of an operating system and the functions of the modules to manage, coordinate and control all the parts of the computer system This course cover processor scheduling, deadlocks, memory management, process synchronization, system call and file system management.			
Pre-requisites: 1. Basic knowledge of computer fundamentals, Data structure and Computer organization.			
Course Contents / Syllabus			
UNIT-I	Fundamental Concepts of Operating System	8 Hours	
Introduction, Functions of Operating System, Characteristics of Operating System, Computer System Structure, Evolution of Operating Systems-Bare Machine, Single Processing, Batch Processing, Multiprogramming, Multitasking, Multithreaded, Interactive, Time sharing, Real Time System, Distributed System, Multiprocessor Systems, Multithreaded Systems, System Calls, System Programs and System Boot, Interrupt Handling, Operating System Structure- Simple structure, Layered Structure, Monolithic, Microkernel and Hybrid, System Components, Operating System Services, Case Studies: Windows, Unix and Linux.			
UNIT-II	Process Management	8 Hours	
Scheduling Concepts, Performance Criteria, Process States, Process Transition Diagram, Schedulers, Process Control Block (PCB), Process Address Space, Process Identification Information, Threads and their management, Types of Scheduling: Long Term Scheduling, Mid Term Scheduling, Short Term Scheduling, Pre-emptive and Non Pre-emptive Scheduling, Dispatcher, Scheduling Algorithm: FCFS, Non Pre-emptive SJF, Pre-emptive SJF, Non Pre-emptive Priority, Pre-emptive Priority, Round Robin, Multilevel Queue Scheduling and Multilevel Feedback Queue Scheduling.			
UNIT-III	Deadlock and Concurrent Processing	8 Hours	
Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from Deadlock, Principle of Concurrency, Process Synchronization, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Peterson’s Solution, Lamport Bakery Solution, Semaphores, Test and Set Operation; Critical Section Problems and their solutions - Bound Buffer Problem, Reader-Writer Problem, Dining Philosopher Problem, Sleeping Barber Problem; Inter Process Communication Models and Schemes, Process Generation.			
UNIT-IV	Memory Management	8 Hours	
Memory Management function, Address Binding Loading : Compile Time, Load Time and Execution Time, MMU, Types of Linking, Types of Loading, Swapping, Multiprogramming with Fixed Partitions, Multiprogramming with variable partitions, Memory Allocation: Allocation Strategies First Fit, Best Fit, and Worst Fit, Paging, Segmentation, Paged Segmentation, Virtual Memory Concepts, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms: FIFO,LRU, Optimal and LFU, Belady’s Anomaly, Thrashing, Cache Memory Organization, Locality of Reference.			
UNIT-V	I/O Management and Disk Scheduling	8 Hours	

I/O Devices, and I/O Subsystems, I/O Buffering, I/O Ports, Disk Storage: Seek Time, Rotational Latency, Data Transfer Time, Average Access Time and Controller Time, DiskStorage Strategies, Disk Scheduling:FCFS, SSTF, SCAN, C-SCAN, LOOK and C-LOOK. Directory and Directory Structure, File System: File concept, File Access Mechanism: - Sequential Access, Direct Access and Index Access methods, File Allocation Method: Contiguous, Linked and Indexed, Free Space Management: -Bit Vector, Linked List, Grouping and Counting File System Implementation Issues, File System Protection and Security, RAID.

Course outcome: After completion of this course students will be able to:

CO 1	Understand the fundamentals of an operating systems, functions and their structure and functions.	K1, K2
CO 2	Implement concept of process management policies, CPU Scheduling and thread management.	K5
CO 3	Understand and implement the requirement of process synchronization and apply deadlock handling algorithms.	K2, K5
CO 4	Evaluate the memory management and its allocation policies.	K5
CO 5	Understand and analyze the I/O management and File systems	K2, K4

Text books:

1) Operating System Concepts Essentials. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne.

Reference Books:

1) Operating Systems: Internals and Design Principles. William Stallings.

2) Operating System: A Design-oriented Approach. Charles Patrick Crowley.

3) Operating Systems: A Modern Perspective. Gary J. Nutt.

4) Design of the Unix Operating Systems. Maurice J. Bach.

5) Understanding the Linux Kernel, Daniel Pierre Bovet, Marco Cesati.

Link:

Unit 1	https://www.youtube.com/watch?v=783KAB-tuE4 https://www.youtube.com/watch?v=Bxx2_aQVeeg https://www.youtube.com/watch?v=ZaGGKFCLNc0 https://nptel.ac.in/courses/106/105/106105214/
Unit 2	https://www.youtube.com/watch?v=NShBeqTkXnQ https://www.youtube.com/watch?v=4hCih9eLc7M https://www.youtube.com/watch?v=9YRxhlvt9Zo
Unit 3	https://www.youtube.com/watch?v=UczJ7misUEk https://www.youtube.com/watch?v=_IxqinTs2Yo
Unit 4	https://www.youtube.com/watch?v=IwESijQs9sM https://www.youtube.com/watch?v=-orfFhvNBzY https://www.youtube.com/watch?v=2OobPx246zg&list=PL3-wYxht4yCjpcfUDz-TgD_ainZ2K3MUZ&index=10
Unit 5	https://www.youtube.com/watch?v=AnGOeYJCv6s https://www.youtube.com/watch?v=U1Jpvni0Aak

B. TECH. SECOND YEAR

Course Code	ACSE0352	L T P	Credit
Course Title	Object Oriented Techniques using Java Lab	0 0 2	1
List of Experiments:			
Sr. No.	Name of Experiments	CO	
1.	Write a simple program in Java.	CO1	
2.	Write a Java program to display default values of all primitive data types	CO1	
3.	Write a Java program to understand Command line arguments.	CO1	
4.	Write a Java program to understand if-then-else statement	CO1	
5.	Write a Java Program to find the Factorial of a given number	CO1	
6.	Write a Java Program to check whether the given number is Palindrome or not	CO1	
7.	Write a JAVA program to display Fibonacci series.	CO1	
8.	Write a JAVA program to implement class mechanism. Create a class, methods and invoke them inside main method.	CO2	
9.	Write a Java program to illustrate the abstract class concept	CO2	
10.	Write a Java program to Access the instance variables by using this keyword	CO2	
11.	Write a Java class to show the concept of static class	CO2	
12.	Write a Java program to Access the Class members using super Keyword	CO2	
13.	Write a JAVA program to implement Single Inheritance.	CO2	
14.	Write a JAVA program to implement multi-level inheritance.	CO2	
15.	Write a Java program to implement Interface	CO2	
16.	Write a JAVA program to implement constructor and constructor overloading.	CO2	
17.	Write a JAVA program implement method overloading and method overriding.	CO2	
18.	Write a JAVA program to implement a user defined functional interface using lambda expressions.	CO2	
19.	Write a program prints a multidimensional array of integers.	CO2	
20.	Write a JAVA program to show the multiplication of two matrices using arrays.	CO2	
21.	Write a Java program to Search an element using Linear Search	CO2	

22.	Write a Java program to Search an element using Binary Search	CO2
23.	Write a Java Program to Sort elements using Insertion Sort	CO2
24.	Write a Java Program to Sort elements using Selection Sort - Largest element method	CO2
25.	Write a Java program to Sort elements using Bubble Sort	CO2
26.	Write a Java program to handle an Arithmetic Exception - divided by zero	CO3
27.	Write a program to implement user defined exception in java.	CO3
28.	Write a Java program to illustrate Finally block	CO3
29.	Write a Java program to illustrate Multiple catch blocks	CO3
30.	Write a Java program for creation of illustrating throw	CO3
31.	To implement the concept of assertions in JAVA programming language.	CO3
32.	To implement the concept of localization in JAVA programming language.	CO3
33.	Write a Java program to print the output by appending all the capital letters in the input in a string.	CO3
34.	Write a JAVA program to show the usage of string builder.	CO3
35.	Write a JAVA program to show the usage of string buffer.	CO3
36.	Write a JAVA program to implement even and odd thread by using Thread class and Runnable interface.	CO4
37.	Write a JAVA program to synchronize the threads by using Synchronize statements and Synchronize block	CO4
38.	To demonstrate the concept of type annotations in JAVA programming language.	CO4
39.	To demonstrate the concept of user defined annotations in JAVA programming language.	CO5
40.	Write a JAVA program to implement the concept of Generic and Collection classes.	CO5

Lab Course Outcome: After completion of this course students will be able to

CO1	Understand how to design and implement basic data types, command line arguments and control statements	K3
CO2	Demonstrate the Java programs using OOP principles and also implement the concepts of lambda expressions and arrays.	K3

CO3	Demonstrate, understand and use of different exceptional handling mechanisms, assertions, localizations and string handling.	K3
CO4	Solve the real time problems using multithreading and annotations concept.	K3
CO5	Design and develop collections and generic classes in JAVA programming language	K6

B. TECH. SECOND YEAR

Course Code	ACSIOT0351	L T P	Credit
Course Title	Data Structures and Algorithms Design Lab	0 0 2	1

List of Experiments:

Sr. No.	Name of Experiment	CO
1	Searching Algorithms: Linear and Binary.	CO2
2	Program for Recursive Binary Search.	CO2
3	Program for Bubble Sort.	CO2
4	Program for Selection Sort.	CO2
5	Program for Insertion Sort.	CO2
6	Program for Merge Sort.	CO2
7	Program for Quick Sort.	CO2
8	Implement 0/1 Knapsack.	CO5
9	Implementation of Linked List	CO1
10	Implementation of Stack using Array.	CO1
11	Implementation of Queue using Array.	CO1
12	Implementation of Circular Queue using Array.	CO1
13	Implementation of Stack using Linked List.	CO1
14	Implementation of Queue using Linked List.	CO1
15	Implementation of Circular Queue using Linked List.	CO1
16	Implementation of Tree Structures, Tree Traversal, Binary Search Tree, Insertion and Deletion in BST.	CO4
17	Program for Heap Sort.	CO2
18	Graph Implementation of BFS, DFS.	CO4
19	Find Minimum Spanning Tree using Kruskal's Algorithm.	CO4
20	Graph Implementation of Shortest path Algorithm.	CO4

Lab Course Outcome: Upon the completion of the course, the student will be able to:

CO 1	Implement various data structures like stacks, queue, linked lists, sparse matrices, hash tables using arrays and linked list data structure.	K3
CO 2	Implement and analyze sorting and searching programs.	K4
CO 3	Implement various Algorithm design techniques like greedy method, dynamic programming, backtracking to solve complex problems.	K3
CO 4	Implement non-linear data structure like trees and graph to solve real life problems.	K6
CO 5	Solve real life problems by identifying the applicable data structures and algorithms.	K6

B. TECH. SECOND YEAR			
Course Code	ACSCY0351	L T P	Credits
Course Title	Operating Systems Lab	0 0 2	1
List of Experiments:			
Sr. No.	Name of Experiment	CO	
1. Linux based Commands	<p>Lab1: Execute Various types of Linux Commands (Miscellaneous, File oriented, Directory oriented)</p> <p>Lab2: Shell Programming</p> <p>Write a shell program, which accepts the name of a file from standard input and perform the following test on it:</p> <ol style="list-style-type: none"> File readable File writable Both readable and writable 	CO1	
2. CPU Scheduling Algorithms	<p>Lab3: Implement CPU Scheduling Algorithms:</p> <ol style="list-style-type: none"> FCFS SJF PRIORITY <p>Lab4:</p> <ol style="list-style-type: none"> Round Robin Multi-level Queue Scheduling 	CO3	
3. Deadlock Management	Lab5: Implementation of Banker's algorithm for the purpose of Deadlock Avoidance.	CO3	
4. Memory Management Techniques	<p>Lab6: Write a program to simulate the following contiguous memory allocation techniques:</p> <ol style="list-style-type: none"> First fit Best fit Worst Fit <p>Lab7: a) Write a Program for implementation of Contiguous memory fixed partition technique.</p> <p>b) Write a program for implementation of Contiguous memory variable partition technique.</p> <p>Lab8: Write a program to simulate page replacement algorithms:</p> <ol style="list-style-type: none"> FIFO LRU 	CO4	

	c) Optimal	
5. Disk Scheduling Techniques	Lab9: Write a program to simulate Disk Scheduling Algorithms: a) FCFS b) SSTF Lab 10: c) SCAN & C-SCAN d) Look & C-LOOK	CO5
6. Process Synchronization	Lab11: Write a program to simulate Producer Consumer problem	CO2
Lab Course Outcome: After completion of this course students will be able to		
CO1	Gain all round knowledge of various Linux Commands.	K2
CO2	Analyze and implement Process Synchronization technique.	K4
CO3	Analyze and implement CPU scheduling algorithms.	K4
CO4	Analyze and implement Memory allocation and Memory management techniques.	K4
CO5	Analyze and implement Disk Scheduling Policies.	K4

B. TECH. SECOND YEAR

Course Code	ANC0301	L	T	P	Credit
Course Title	Cyber Security	2	0	0	0
Course objective: Achieve knowledge about Security of Information system and Risk factors and examine security threats and vulnerability in various scenarios, understand concept of cryptography and encryption technique to protect the data from cyber-attack and provide protection for software and hardware.					
Pre-requisites: Basics recognition in the domain of Computer Science, Concept of network and operating system, Commands of programming language.					
Course Contents / Syllabus					
UNIT-I	INTRODUCTION				8 Hours
Introduction to Information Systems: Types of Information Systems, Development of Information Systems, Need for Information Security, Threats to Information Systems, Information Assurance, Guidelines for Secure Password and WI-FI Security and social media and Windows Security, Security Risk Analysis, and Risk Management.					
UNIT-II	APPLICATION LAYER SECURITY				8 Hours
Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall, Intrusion Detection System, Access Control, Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail Viruses, Macro Viruses, Malicious Software, Network and Denial of Services Attack, Security, Threats to E-Commerce: Electronic Payment System, E-Cash, Issues with Credit/Debit Cards.					
UNIT-III	SECURE SYSTEM DEVELOPMENT				8 Hours
Application Development Security, Architecture & Design, Security Issues in Hardware: Data Storage and Downloadable Devices, Mobile Protection, Security Threats involving in social media, Physical Security of IT Assets, CCTV, Backup Security Measures.					
UNIT-IV	CRYPTOGRAPHY AND NETWORK SECURITY				8 Hours
Introduction to Cryptography and Types of cryptography Public key cryptography: RSA Public Key Crypto with implementation in Python, Public Key Distribution. Symmetric key cryptography: DES (Data Encryption Standard), AES (Advanced Encryption Standard) Hash Function: Introduction, Secure Hash Algorithm (SHA-1), Digital Signature					

Real World Protocols: Basic Terminologies, VPN, Email Security Certificates, Transport Layer Security, IP security, DNS Security.

UNIT-V	SECURITY POLICY	8 Hours
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Policy design Task, WWW Policies, Email based Policies, Policy Revaluation Process-Corporate Policies, Sample Security Policies, Publishing and Notification Requirement of the updated and new Policies. Recent trends in Cyber security.

Course outcome: At the end of course, the student will be able to

CO 1	Analyse the cyber security needs of an organization.	K4
CO 2	Identify and examine software vulnerabilities and security solutions.	K3
CO 3	Comprehend IT Assets security (hardware and Software) and performance indicators	K2
CO 4	Measure the performance and encoding strategies of security systems.	K5
CO 5	Understand and apply cyber security methods and policies to enhance current scenario security.	K3

Text books:

- 1) Charles P. Pfleeger, Shari LawrancePfleeger, “Analysing Computer Security”, Pearson Education India
- 2) V.K.Pachghare, “Cryptography and information Security”, PHI Learning Private Limited, Delhi India
- 3) Sarika Gupta & Gaurav Gupta, Information Security and Cyber Laws, Khanna Publishing House
- 4) Michael E.Whitman and Herbert J Mattord "Principle of Information Security" Cengage

Reference Books:

- 1) Schou, Shoemaker, “Information Assurance for the Enterprise”, Tata McGraw Hill.
- 2) CHANDER, HARISH,” Cyber Laws and It Protection”, PHI Learning Private Limited,Delhi
- 3) V.K. Jain, Cryptography and Network Security, Khanna Publishing House, Delhi
- 4) William Stallings, Network Security Essentials: Applications and Standards, Prentice Hall, 4th edition, 2010

E-books& E-Contents:

- 1) <https://prutor.ai/welcome/>

2) <https://crypto.stanford.edu/cs155old/cs155-spring11/lectures/03-ctrl-hijack.pdf>

3) <https://cybermap.kaspersky.com/stats>

4) <https://www.fireeye.com/cyber-map/threat-map.html>

Reference Links:

1) <https://crypto.stanford.edu/cs155old/cs155-spring11/lectures/03-ctrl-hijack.pdf>

2) <https://cs155.stanford.edu/lectures/03-isolation.pdf>

3) http://uru.ac.in/uruonlinelibrary/Cyber_Security/Cryptography_and_Network_Security.pdf

NPTEL/ Youtube/ Faculty Video Link:

1) <https://www.youtube.com/watch?v=vv1ODDhXW8Q>

2) <https://www.youtube.com/watch?v=fQ3ESFfvchg&list=PLUtfVcb-ign834VGI9faVXGIGSDXZMGp8>

3) <https://www.youtube.com/watch?v=iTVyKbDCJrA&list=PLgMDNELGJ1CbdGLyn7OrVAP-IKg-0q2U2>

4) https://www.youtube.com/watch?v=1plMO7ChXMU&list=PLJ5C_6qdAvBFauGoLC2wFGruY_E2gYtev

5) https://www.youtube.com/watch?v=_9QayISruzo

B. TECH. SECOND YEAR

Course Code	ANC0302	L T P	Credits
Course Title	Environmental Science	2 0 0	0
Course objective:			
1	To help the students in realizing the inter-relationship between man and environment. and help the students in acquiring basic knowledge about environment.		
2	To develop the sense of awareness among the students about environment and its various problems.		
3	To create positive attitude about environment among the student.		
4	To develop proper skill required for the fulfilment of the aims of environmental education and educational evaluations		
5	To develop the capability of using skills to fulfil the required aims, to realise and solve environmental problems through social, political, cultural and educational processes		
Pre-requisites: Basic knowledge of nature.			
Course Contents / Syllabus			
UNIT-I	Basic Principle of Ecology	8 Hours	
Definition, Scope and basic principles of ecology and environment. Ecosystem: Basic concepts, components of ecosystem. Food chains and food webs. Ecological pyramids, Energy flow in ecological systems, Characteristics of different ecosystems. Biogeochemical Cycles: Importance, gaseous and sedimentary cycles. Carbon, Nitrogen, Phosphorus and Sulphur Cycles. Basic concepts of sustainable development, SDGs, Ecosystem services, UN Decade for Ecorestoration.			
UNIT-II	Natural Resources and Associated Problems	8 Hours	
Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forest and tribal people. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. Land resources: Land as a resource, land degradation, man induced landslides. Equitable use of resources for sustainable lifestyles. Non-Renewable Energy Resources: Fossil fuels and their reserves, Nuclear energy, types, uses and effects, Renewable Energy Resources: hydropower, Solar energy, geothermal, tidal and wind energy, Biomass energy, biogas and its advantages.			
UNIT-III	Biodiversity Succession and Non-Renewable Energy Resources	8 Hours	
Biodiversity and their importance, Threats to biodiversity, major causes, extinction's, vulnerability of species to extinction, IUCN threat categories, Red data book. Strategies for biodiversity conservation, principles of biodiversity conservation in-situ and ex-situ conservation strategies Mega diversity zones and Hot spots, concepts, distribution and importance. Succession: Concepts of succession, Types of Succession. Trends in succession. Climax and stability.			
UNIT-IV	Pollution and Solid Waste Management	8 Hours	
Air pollution: sources of air pollution, Primary and secondary air pollutants. Origin and effects of SOX, NOX, Cox, CFC, Hydrocarbon, control of air pollution. Water pollution: sources and types of water pollution, Effects of water pollution, Eutrophication, Soil pollution: Causes of soil pollution, Effects of soil pollution, Major sources of and effects of noise pollution on health, Radioactive and thermal pollution sources and their effects on surrounding environment. Solid waste disposal and its effects on surrounding environment, Climate change, global warming, acid rain, ozone layer depletion.			
UNIT-V	Role of Community and Environmental Protection Acts	8 Hours	
Role of community, women and NGOs in environmental protection, Bioindicators and their role, Natural hazards, Chemical accidents and disasters risk management, Environmental Impact Assessment (EIA), Salient features of following Acts: a. Environmental Protection Act, 1986, Wildlife (Protection) Act, 1972.b. Water (Prevention and control of pollution) Act, 1974.c. Air (Prevention and control of pollution) Act, 1981. Forest (Conservation) Act, 1980.d. Wetlands (Conservation and Management) Rules, 2017; e. Chemical safety and Disaster Management law. F. District Environmental Action Plan. Climate action plans.			

Course outcome: After completion of this course students will be able to		
CO 1	Understand the basic principles of ecology and environment. Ecosystem: Basic concepts, components of ecosystem., food chains and food webs. Ecological pyramids	K2
CO 2	Understand the different types of natural resources like food, forest, minerals and energy and their conservation	K2
CO 3	Understand the importance of biodiversity, Threats of biodiversity and different methods of biodiversity conservation.	K2
CO 4	Understand the different types of pollution, pollutants, their sources, effects and their control methods	K3
CO 5	Understand the basic concepts of sustainable development, Environmental Impact Assessment (EIA) and different acts related to environment	K3
Text books:		
1. Brady, N.C. 1990. The nature and properties of Soils, Tenth Edition. Mac Millan Publishing Co., New York. 2. Botkin, D.B and Odum E.A., 2000, Environmental Studies: The earth as a living planet. John Wiley and Sons Inc. 3. Rao M.N. and H.V.N. Rao, 1989: Air Pollution, Tata McGraw Hill Publishing Co. Ltd., New Delhi 4. Singh J.S., Singh S.P. and Gupta S.R., 2006, Ecology Environment and Resource Conservation, Anamaya Publishers, New Delhi. 5.Environmental Studies -Benny Joseph-Tata McGrawHill-2005 6. Environmental Studies- Dr. D.L. Manjunath, Pearson Education-2006. 7. Environmental studies- R. Rajagopalan -Oxford Publication2005.		
Reference Books:		
1.Sodhi G.S. 2005, Fundamentals of Environmental Chemistry: Narosa Publishing House, New Delhi. 2.Dash, M.C. (1994), Fundamentals of Ecology, Tata Mc Graw Hill, New Delhi. 3. Sharma P. D. (1996). Environmental Biology, Rastogi Publications, Meerut. 4. Verma P.S. and V.K. Agarwal. (1985). Principles of Ecology. S. Chand and Company (Pub.), New Delhi. 5.Principles of Environmental Sciences and Engineering -P. Venugopalan Rao, Prentice Hall of India. 6. Environmental Science and Engineering Meenakshi, Prentice Hall India.		
NPTEL/ Youtube/ Faculty Video Link:		
Unit 1	https://www.youtube.com/watch?v=T21OO0sBBfc , https://www.youtube.com/watch?v=qt8AMjKKPD0 https://www.youtube.com/watch?v=yAK-m91Nxrsh https://www.youtube.com/watch?v=ha_O-1uOWkk , https://www.youtube.com/watch?v=brF0RWJyx9w	
Unit 2	https://www.youtube.com/watch?v=mOwyPENHhbc , https://www.youtube.com/watch?v=yqev1G2iy20 , https://www.youtube.com/watch?v=_74S3z3IO_I , https://www.youtube.com/watch?v=jXVw6M6m2g0	
Unit 3	https://www.youtube.com/watch?v=GK_vRtHJZu4 , https://www.youtube.com/watch?v=b6Ua_zWDH6U , https://www.youtube.com/watch?v=7tgNamjTRkk , https://www.youtube.com/watch?v=ErATB1aMiSU , https://www.khanacademy.org/science/high-school-biology/hs-ecology/hs-human-impact-on-ecosystems/v/conservation-and-the-race-to-save-biodiversity	
Unit 4	https://www.youtube.com/watch?v=7qkaz8Chell , https://www.youtube.com/watch?v=NuQE5fKmfME , https://www.youtube.com/watch?v=9CpAjOVLHII , https://www.youtube.com/watch?v=yEci6iDkXYw , https://www.youtube.com/watch?v=yEci6iDkXYw	
Unit 5	https://www.youtube.com/watch?v=ad9KhgGw5iA , https://www.youtube.com/watch?v=nW5g83NSH9M , https://www.youtube.com/watch?v=xqSZL4Ka8xo , https://www.youtube.com/watch?v=WAI-hPRoBqs , https://www.youtube.com/watch?v=o-WpeyGIV9Y , https://www.youtube.com/watch?v=EDmtawhADnY	

B. TECH. SECOND YEAR			
Course Code	AAS0404	L T P	Credit
Course Title	Optimization and Numerical Techniques	3 1 0	4
Course objective: The objective of this course is to familiarize the engineers with concept of Linear Programming Problem (LPP), Integer Programming Problems, Constraint programming, various numerical techniques for mathematical task such as roots, integration, differential equations and numerical aptitude. It aims to show case the students with standard concepts and tools from B. Tech to deal with advanced level of mathematics and applications that would be essential for their disciplines.			
Pre-requisites: Knowledge of Mathematics I and II of B. Tech or equivalent.			
Course Contents / Syllabus			
UNIT-I	Linear Programming	8 Hours	
Introduction, Mathematical formulation of LP Models, Graphical Method, Description of simplex method, Big-M method, Two phase method, Alternative optimum solutions, unbounded solutions, Degeneracy, Duality in LPP.			
UNIT-II	Integer Programming	8 Hours	
Introduction, Importance of Integer Programming Problems, Gomory’s Cutting Plane method, Branch-and-Bound Method, Cargo Loading for Knapsack problem, Applications of Integer Programming.			
UNIT-III	Non-linear programming	8 Hours	
Basic facts of maxima, minima & convex optimization, Convex sets and convex functions, Continuity and differentiable properties of convex functions, Constrained Optimization- Local and Global Solution Introduction, Elements of Constraint Programming, Lagrange multiplier method, Kuhn Tucker Condition.			
UNIT-IV	Numerical Techniques	8 Hours	
Errors analysis, Zeroes of transcendental and polynomial equations using Bisection method, Regula-falsi method and Newton-Raphson method, Interpolation: Finite differences, Newton’s forward and backward interpolation, Lagrange’s and Newton’s divided difference formula for unequal intervals. Solution of system of linear equations, Crout’s method, Gauss- Seidel method. Numerical integration, Trapezoidal rule, Simpson’s one third and three-eighth rules, Solution of first order ordinary differential equations by fourth-order Runge- Kutta methods.			
UNIT-V	Aptitude-IV	8 Hours	
Number System, Permutation & Combination, Probability, Function, Data Interpretation, Syllogism.			

Course outcome: After completion of this course students will be able to		
CO 1	Understand the concepts to formulate and to solve a Linear Programming Problem.	K1, K3
CO 2	Understand the concepts of Integer Programming Problem.	K1, K3
CO 4	Apply the concept of numerical techniques to evaluate the zeroes of the Equation, concept of interpolation and numerical methods for various mathematical operations and tasks, such as integration, the solution of linear system of equations and the solution of differential equation.	K3
CO 5	Solve the problems of Number System, Permutation & Combination, Probability, Function, Data Interpretation, Syllogism.	K3
Text books:		
(1) Sharma J K - Operations Research (Pearson, 3rd Edition.		
(2) Rao S.S,”Optimization – Theory and applications”, Wiley Easter Ltd., 1979.		
(3) Introduction to Linear Optimization by Dimitris Bertsimas & John N. Tsitsiklis, Athena Scientific 1997.		
(4) TahaHamdy - Operations Research - An Introduction (Prentice-Hall, 9th edition).		
(5) B. S. Grewal, Higher Engineering Mathematics, Khanna Publisher, 2005.		
Reference Books:		
(1) An introduction to Optimization by Edwin P K Chong, Stainslaw Zak.		
(2) Hillier F S and Lieberman G J, Operations Research, Holden Day Inc., San Francisco.		
(3) David G.Luerbeggan, “Introduction to Linear and Non Linear Programming”, Addison Wesley Publishing Co. 1973.		
(4)Cordan C.C. Beveridge and Robert S. Schedther, “Optimization, Theory and Practice” McGraw Hill Co.1970.		
Link:		
Unit 1	https://youtu.be/a2QgdDk4Xjw https://youtu.be/XEA1pOtyrfo https://youtu.be/qxls3cYg8to https://youtu.be/DUFcNysR-w8 https://youtu.be/OUduOnhO94k https://youtu.be/_uRKG9tkrew	

	https://youtu.be/7w30ueP5ayI https://youtu.be/gmDwUCvOJQ8
Unit 2	https://youtu.be/gxLQ7Q26SkE https://youtu.be/PkFKuoJQrN4 https://youtu.be/-cBkrzNdQn4 https://youtu.be/-Cg-aL1D8CM https://youtu.be/-cLsEHP0qt0
Unit 3	https://youtu.be/jGwA4hknYp4 https://youtu.be/ejol5TMpYJc https://youtu.be/tJfizPGPo34 https://youtu.be/nZ40jnChzbs https://youtu.be/nZ40jnChzbs https://youtu.be/PlpJShHvNfQ
Unit 4	https://youtu.be/QH2WL92bzLs https://youtu.be/DGmNbs5Cywo https://youtu.be/FliKUWUVrEI https://youtu.be/7eHuQXMCOvA https://youtu.be/ZkvQR3ajm3k https://youtu.be/zdyUwzOm1zw https://youtu.be/BBuV14-isyU https://youtu.be/xPr7YFSnmiQ https://youtu.be/ajJD0Df5CsY https://youtu.be/iviiGB5vxLA https://youtu.be/Ym1EUjTWMnE
Unit 5	https://youtu.be/Dsi7x-A89Mw https://youtu.be/mrCrjeqJv6U https://youtu.be/jZXHzpq-vmM https://youtu.be/KSFnfUYcxoI https://youtu.be/i72ptXTEmkk

B. TECH. SECOND YEAR			
Course Code	AASL0401	L T P	Credit
Course Title	Technical Communication	2 1 0	3
Course objective:			
1	To help the students develop communication and critical thinking skills necessary for securing a job, and succeeding in the diverse and ever-changing workplace of the twenty first century		
2	To enable students to communicate effectively in English at the workplace.		
Pre-requisites:			
<ul style="list-style-type: none">The student must have a good degree of control over simple grammatical forms and some complex grammatical forms of English language.The student should be able to speak English intelligibly.			
Course Content / Syllabus			
UNIT-I	Introduction to Technical Communication and Reading	4 Hours	
<ul style="list-style-type: none">Fundamentals of technical communicationRole of technical communicationReading Comprehension - central idea, tone, and intentionCritical reading strategies			
UNIT-II	Technical Writing 1	5 Hours	
<ul style="list-style-type: none">Characteristics of technical writing; technical vocabulary, etymologyBusiness letters /emails – types, format, style and languageNotices, agenda and minutesJob application, CV and resume			
UNIT-III	Technical Writing 2	5 Hours	
<ul style="list-style-type: none">Technical reports – types & formatsStructure of a reportTechnical Proposal - structure and typesTechnical/ Scientific paper writing			
UNIT-IV	Public Speaking	5 Hours	
<ul style="list-style-type: none">Components of effective speaking (emphasis on voice dynamics)Seminar and conference presentationConducting/ participating in meetings			

<ul style="list-style-type: none"> • Appearing for a job interview • Mobile etiquettes 		
UNIT-V	Manuscript Preparation	5 Hours
<ul style="list-style-type: none"> • Short report writing • Copy editing and referencing • Developing writing style – Jargons, Abbreviations • Ethical writing 		
Course outcome: At the end of the course the students will be able to Levels.		
CO 1	Comprehend the fundamental principles of technical communication with special reference to reading.	K2
CO 2	Write various kinds of professional correspondence.	K5
CO 3	Recognise and produce different kinds of technical documents.	K2
CO 4	Apply effective speaking skills to communicate at the workplace.	K3
CO 5	Demonstrate their understanding of various ethical concerns in written communication.	K3
Textbook:		
1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.		
Reference Books:		
1. Personality Development and Soft Skills by Barun K Mitra, Oxford Univ. Press, 2012, New Delhi.		
2. Spoken English- A Manual of Speech and Phonetics by R K Bansal & J B Harrison, Orient Blackswan, 2013, New Delhi.		
3. Business Correspondence and Report Writing by Prof. R C Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.		
4. Practical Communication: Process and Practice by L U B Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2014, Delhi.		
5. Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; USA.		
6. A Textbook of Scientific and Technical Writing by S D Sharma; Vikas Publication, Delhi.		
7. Skills for Effective Business Communication by Michael Murphy, Harvard University, USA.		
8. A Complete Guide to Write Right by Agarwal, Deepa. Scholastic, 1 st edition.		
9. Technical writing and communication, R S Sharma, V.P. Publication, 1 st edition.		
10. Business Communication for Managers by Payal Mehra, Pearson Publication, Delhi.		

B. TECH. SECOND YEAR			
Course Code	ACSCY0401	L T P	Credit
Course Title	Computer Networks and Network Programming	3 0 0	3
Course objective: The objective of the course is to present an introduction of TCP/IP protocol, packet switching and message switching, sliding window protocol, CDMA, network layer protocols (IPv4, ARP, RARP), routing, TCP and UDP, congestion control, quality of service, and network applications such as DNS, FTP, TELNET, and remote logging.			
Pre-requisites: The student should have a basic knowledge of data communication and programming.			
Course Contents / Syllabus			
UNIT-I	Introduction to Networking	8 HOURS	
Goals and applications of networks, Categories of networks, Organization of the Internet, ISP, The OSI reference model, TCP/IP protocol suite, Network devices and components, Mode of communications, Physical Layer: Network topology design, Types of connections, LAN, MAN and WAN, Transmission media, Signal transmission and encoding, Network performance and transmission impairments, multiplexing, IEEE standards.			
UNIT-II	Data Link and Network Layer	8 HOURS	
Framing, Error Detection and Correction, Flow control (Elementary Data Link Protocols, Sliding Window protocols). Medium Access Control and Local Area Networks: Channel allocation, Multiple access protocols, LAN standards, Link layer switches & bridges. Network Layer: Point-to-point networks, Logical addressing, Basic internetworking (IP, CIDR, ARP, RARP, DHCP, ICMP), IPv4, IPv6, Routing, forwarding and delivery, Static and dynamic routing, Routing algorithms and protocols, Congestion control algorithms.			
UNIT-III	Transport Layer	8 HOURS	
Process-to-process delivery, Transport layer protocols (UDP and TCP), Connection management, Flow control and retransmission, Window management, TCP Congestion control, and Quality of service. Introduction to Sockets: Introduction to sockets, network programming and its applications, client-server model, socket address structures, UDP sockets, and TCP connection establishment.			
UNIT-IV	Network Connections	8 HOURS	
Network Programming Libraries and Frameworks, Byte ordering and Byte manipulation functions, socket presentation function, socket options, and configuration. Establish connections and send and receive data.			
UNIT-V	Application Layer	8 HOURS	
Domain Name System, World Wide Web and Hyper Text Transfer Protocol, Electronic mail, File Transfer Protocol, Remote login, Network Management, Data compression, VPN, Firewalls.			
Course outcome: After completion of this course students will be able to:			
CO1	Build an understanding of the Layered Architecture of computer networking and the physical layer.	K2	
CO2	Understand the properties of link and network layer and also analyzed the solutions for error control, flow control, and addressing, for networks.	K4	
CO3	Understand the duties of the transport layer and the addressing and functions of sockets.	K2	
CO4	Implement and analyzed the network connections using programming skills.	K4	
CO5	Understand and analyzed the different protocols used at application layer.	K4	

Textbooks:
(1) Behrouz Forouzan, “Data Communication and Networking” Fourth Edition-2006, Tata McGraw Hill
(2) UNIX Network Programming: The sockets networking API, Vol 1
ReferenceBooks:
(1) William Stallings, “Data and Computer Communication”, Eighth Edition-2008, Pearson.
(2) Andrew Tanenbaum “Computer Networks”, Fifth Edition-2011, Prentice Hall.
(3) Kurose and Ross, “Computer Networking- A Top-Down Approach”, Eighth Edition-2021, Pearson.
NPTEL/ Youtube/ Faculty Video Link:
1. https://onlinecourses.nptel.ac.in/noc21_cs18/preview
2. https://nptel.ac.in/courses/106105081
3. https://elearn.nptel.ac.in/shop/nptel/computer-networks-and-internet-protocol/
4. https://archive.nptel.ac.in/courses/106/105/106105080/

B. TECH. SECOND YEAR			
Course Code	ACSAI0402	L T P	Credit
Course Title	Database Management Systems	3 1 0	4
Course objective: The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information in relational and non relation Database.			
Pre-requisites: The student should have basic knowledge of discrete mathematics and data structures.			
Course Contents / Syllabus			
UNIT-I	Introduction	8 Hours	
Overview, Database system Vs File system, Database system concepts, architecture and structures, data model schema and instances, Data independence and Database language and Interfaces, DDL, DML. Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, Candidate key, Primary key, Generalization, Aggregation, Reduction of an ER diagrams to tables, Extended ER model, Relationship of higher degree.			
UNIT-II	Relational Data Model and Language	8 Hours	
Relational data model Concepts, Integrity constraints, Entity integrity, Referential integrity, Keys constraints, Domain constraints, Relational algebra, Relational calculus, Tuple and Domain calculus. Introduction on SQL: Characteristics of SQL, advantage of SQL. SQL data type and literals. Types of SQL commands. SQL operators and their procedure. Tables, Views and indexes. Queries and sub queries. Aggregate functions. Insert, Update and Delete operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL.			
UNIT-III	Database Design-Normalization	8 Hours	
Normalization, Normal Form (NF), Functional Dependencies (FD), Closure of an attribute set and FD sets, Canonical Cover of FD Sets, Normal Forms based on Functional Dependencies (1 NF, 2 NF, 3 NF, BCNF), Multivalued Dependencies (MVDs) and 4NF, Join Dependencies (JDs) and 5NF and Domain Key Normal Formal (DKNF or 6NF), Inclusion Dependencies, Loss-Less Join Decompositions.			
UNIT-IV	Transaction Processing and Recovery Concept	8 Hours	
Transaction system, Testing of serializability, Serializability of schedules, Conflict &View serializable schedule, Recoverability, Recovery from transaction failures, Log based recovery, Checkpoints, Deadlock handling. Control Concurrency Techniques: Concurrency Control, Locking Techniques for concurrency control, Time stamping protocols for concurrency control, Validation-based protocol, Multiple granularity, Multi version schemes, Recovery with concurrent transaction, Case study of Oracle. Distributed Database: -Introduction Distributed Database, Centralized and Distributed System Database System.			
UNIT-V	Introduction No-SQL with cloud Database	8 Hours	

Definition of NoSQL, History of NoSQL and Different NoSQL products, Exploring Mongo DB, Interfacing and Interacting with NoSQL, NoSQL Storage Architecture, CRUD operations with MongoDB, Querying, Modifying and Managing NoSQL Data stores, Indexing and ordering datasets(MongoDB).

Cloud database: - Introduction of Cloud database, NoSQL with Cloud Database, Introduction to Real time Database.

Course outcome: After completion of this course students will be able to:

CO 1	Analyze database used to solve real world and complex problem and design the ER, EER Model.	K4
CO 2	Analyze and apply Structured Query Language (SQL) or Procedural Query Language (PL/SQL) to solve the complex queries. Implement relational model, integrity constraints.	K4,K3
CO 3	Design and implement database for storing, managing data efficiently by applying the Normalization process on the database.	K6
CO 4	Synthesize the concepts of transaction management, concurrency control and recovery.	K5
CO 5	Understand and implement the concepts of NoSQL with cloud database.	K2, K5

Text books:

1) Korth, Silbertz, Sudarshan,” Database System Concepts”, Seventh Edition, McGraw - Hill.

2) Elmasri, Navathe, “ Fundamentals of Database Systems”, Seventh Edition, Addison Wesley.

3) Ivan Bayross “SQL,PL/SQL The programming language Oracle, Forth Edition, BPB Publication.

Reference Books:

1) Thomas Cannolly and Carolyn Begg, “Database Systems: A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007.

2) Raghu Ramakrishnan and Johannes Gehrke “Database Management Systems” Third Edition, McGraw-Hill.

3) NoSQL and SQL Data Modeling: Bringing Together Data, Semantics, and Software First Edition by Ted Hills.

4) Brad Dayley “NoSQL with MongoDB in 24 Hours” First Edition, Sams Publisher.

NPTEL/ Youtube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=TIbJk78TqYY http://www.nptelvideos.com/lecture.php?id=6472 http://www.nptelvideos.com/lecture.php?id=6473
Unit 2	http://www.nptelvideos.com/lecture.php?id=6474 http://www.nptelvideos.com/lecture.php?id=6475 http://www.nptelvideos.com/lecture.php?id=6476 http://www.nptelvideos.com/lecture.php?id=6477 http://www.nptelvideos.com/lecture.php?id=6478 http://www.nptelvideos.com/lecture.php?id=6479 http://www.nptelvideos.com/lecture.php?id=6480 http://www.nptelvideos.com/lecture.php?id=6481
Unit 3	http://www.nptelvideos.com/lecture.php?id=6484

	http://www.nptelvideos.com/lecture.php?id=6485 http://www.nptelvideos.com/lecture.php?id=6486 http://www.nptelvideos.com/lecture.php?id=6487 http://www.nptelvideos.com/lecture.php?id=6493 http://www.nptelvideos.com/lecture.php?id=6495 http://www.nptelvideos.com/lecture.php?id=6496 http://www.nptelvideos.com/lecture.php?id=6497
Unit 4	http://www.nptelvideos.com/lecture.php?id=6499 http://www.nptelvideos.com/lecture.php?id=6500 http://www.nptelvideos.com/lecture.php?id=6501 http://www.nptelvideos.com/lecture.php?id=6502 http://www.nptelvideos.com/lecture.php?id=6503 http://www.nptelvideos.com/lecture.php?id=6504 http://www.nptelvideos.com/lecture.php?id=6505 http://www.nptelvideos.com/lecture.php?id=6506 http://www.nptelvideos.com/lecture.php?id=6508 http://www.nptelvideos.com/lecture.php?id=6509 http://www.nptelvideos.com/lecture.php?id=6514 http://www.nptelvideos.com/lecture.php?id=6516 http://www.nptelvideos.com/lecture.php?id=6517 http://www.nptelvideos.com/lecture.php?id=6518 http://www.nptelvideos.com/lecture.php?id=6519
Unit 5	http://www.nptelvideos.com/lecture.php?id=6516 http://www.nptelvideos.com/lecture.php?id=6517 http://www.nptelvideos.com/lecture.php?id=6518 http://www.nptelvideos.com/lecture.php?id=6519 https://www.youtube.com/watch?v=2yQ9TGFpDuM

B. TECH. SECOND YEAR			
Course code	ACSAI0401	L T P	Credits
Course title	Introduction to Artificial Intelligence	3 0 0	3
Course objective: Introductory knowledge of historical perspective of AI and its foundations and familiarity with principles of AI toward problem solving, inference, perception, knowledge representation, and learning Acquiring the knowledge various forms of learning and computation statistics.			
Pre-requisites: Basic Knowledge of Transform techniques			
Course Contents / Syllabus			
UNIT-I	INTRODUCTION	8 Hours	
Introduction to Artificial Intelligence, Historical developments of Artificial Intelligence, well defined learning problems, Designing a Learning System, Basics of problem-solving: problem representation paradigms, state space, Problem reduction, Constraint satisfaction, Applications of AI			
UNIT-II	SEARCH TECHNIQUES	8 Hours	
Searching for solutions, Uninformed Search Strategies: DFS, BFS, Informed Search Strategies: Local search algorithms and optimistic problems, adversarial Search, Search for games, minimax, Alpha - Beta pruning, Heuristic Search techniques, Hill Climbing, Best-first search, Means Ends Analysis, Iterative deepening Heuristic Search and A.			
UNIT-III	LOGIC AND KNOWLEDGE REPRESENTATION	8 Hours	
Introduction of Logic, Propositional Logic Concepts, Semantic Tableaux and Resolution in Propositional logic, FOPL, Semantic Tableaux and Resolution in FOPL, Logic Programming in Prolog. Production systems and rules for some AI problems: Water Jug Problem, Missionaries-Cannibals Problem, n-Queen problem, monkey banana problem, Travelling Salesman Problem. Knowledge representation, semantic nets, partitioned nets, parallel implementation of semantic nets. Frames, Common Sense reasoning and thematic role frames.			
UNIT-IV	EXPERT SYSTEM	8 Hours	
Architecture of knowledge-Based System, Rule-based systems, Forward and Backward Chaining, Frame Based systems. Architecture of Expert System, Agents and Environment, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.			
UNIT-V	PLANNING & UNCERTAINTY	8 Hours	
Course outcome: After completion of this course students will be able to:			
CO 1	After completion of this course students will be able to Understand fundamental understanding of the history of artificial intelligence (AI) and its foundations	K2	

CO 2	Apply principles of AI in solutions that require problem solving, inference and perception.	K3
CO 3	Explain strong familiarity with a number of important AI techniques, including in particular intelligent search methods and solutions	K3
CO4	Apply the concepts of knowledge & reasoning of predicate logic and representing knowledge using rules, Probabilistic reasoning	K3
CO 5	Assess/ Evaluate critically the techniques presented and apply them to real world problems	K5

Textbooks:

1) Stuart Russell, Peter Norvig, “Artificial Intelligence – A Modern Approach”, Pearson Education. Fourth Edition 2021.

2) Elaine Rich and Kevin Knight, “Artificial Intelligence”, McGraw-Hill 3rd Edition 2010.

Reference Books:

1) Patrick Henry Winston, “Artificial Intelligence”, Pearson Education Inc., Third edition.

2) Python Machine Learning: Learn Python in a Week and Master It. An Hands-On Introduction to Artificial Intelligence Coding, a Project-Based Guide with Practical Exercises (7 Days Crash Course, Book 2) 2020.

3) Nils J.Nilsson, “Artificial Intelligence - A New Synthesis”, Harcourt Asia Pvt. Ltd

4) AI in the Wild: Sustainability in the Age of Artificial Intelligence 2020.

5) Knowledge-Based Systems Techniques and Applications (4-Volume Set).

Links:

Unit 1	https://nptel.ac.in/courses/106/106/106106198/
Unit 2	https://nptel.ac.in/courses/111/107/111107137/
Unit 3	https://nptel.ac.in/courses/106/106/106106202/
Unit 4	https://nptel.ac.in/courses/106/106/106106213/
Unit 5	https://nptel.ac.in/courses/106/105/106105152/

B. TECH. SECOND YEAR			
Course Code	ACSE0404	L T P	Credits
Course Title	Theory of Automata and Formal Languages	3 0 0	3
Course objective: To teach mathematical foundations of computation including automata theory, provide the design concepts of abstract computation model of finite automata, push down automata and turing Machine and familiarize the notions of algorithm, decidability, complexity, and computability.			
Pre-requisites: <ul style="list-style-type: none">Discrete MathematicsFundamental of Computer System			
Course Contents / Syllabus			
UNIT-I	Basic Concepts of Formal Language and Automata Theory	8 Hours	
Introduction to Theory of Computation- Alphabet, Symbol, String, Formal Languages, Grammar, Derivation and Language generation by Grammar, Chomsky Hierarchy, Finite Automata, Deterministic Finite Automaton (DFA)- Definition, Representation, Acceptability of a String and Language, Non-Deterministic Finite Automaton (NFA), Equivalence of DFA and NFA, NFA with ϵ -Transition, Equivalence of NFA's with and without ϵ -Transition, Finite Automata with output- Moore Machine, Mealy Machine, Equivalence of Moore and Mealy Machine, Minimization of Finite Automata, Myhill-Nerode Theorem, Simulation of DFA and NFA.			
UNIT-II	Regular Language and Finite Automata	8 Hours	
Regular Expressions, Transition Graph, Kleen's Theorem, Finite Automata and Regular Expression- Arden's theorem, Algebraic Method Using Arden's Theorem, Regular Grammars-Right Linear and Left Linear grammars, Conversion of FA into Regular grammar and Regular grammar into FA, Regular and Non-Regular Languages- Closure properties of Regular Languages, Pigeonhole Principle, Pumping Lemma, Application of Pumping Lemma. Decidability- Decision properties, Finite Automata and Regular Languages, Simulation of Transition Graph and Regular language.			
UNIT-III	Context Free Language and Grammar	8 Hours	
Context Free Grammar (CFG)-Definition, Derivations, Languages, Derivation Trees and Ambiguity, Simplification of CFG, Normal Forms- Chomsky Normal Form (CNF), Greibach Normal Form (GNF), Pumping Lemma for CFL, Closure properties of CFL, Decision Properties of CFL			
UNIT-IV	Push Down Automata	8 Hours	
Pushdown Automata- Definition, Representation, Instantaneous Description (ID), Acceptance by PDA, Nondeterministic Pushdown Automata (NPDA)- Definition, Moves, Pushdown Automata and Context Free Language, Pushdown Automata and Context Free Grammar, Two stack Pushdown Automata.			
UNIT-V	Turing Machine and Undecidability	8 Hours	
Turing Machine Model, Representation of Turing Machines, Language Acceptability of Turing Machines, Techniques for Turing Machine Construction, Variations of Turing Machine, Turing Machine as Computer of Integer Functions, Universal Turing machine, Linear Bounded Automata, Church's Thesis, Recursive and Recursively Enumerable language, Closure Properties of Recursive and Recursively Enumerable Languages, Non-Recursively Enumerable and Non-Recursive Languages, Undecidability, Halting Problem, Undecidability of Halting Problem, Post's Correspondence Problem.			

Course outcome: After completion of this course students will be able to:

CO 1	Design and Simplify automata for formal languages and transform non-deterministic finite automata to deterministic finite automata.	K6
CO 2	Identify the equivalence between the regular expression and finite automata and apply closure properties of formal languages to construct finite automata for complex problems.	K3
CO 3	Define grammar for context free languages and use pumping lemma to disprove a formal language being context- free.	K3
CO 4	Design pushdown automata (PDA) for context free languages and Transform the PDA to context free grammar and vice-versa.	K6
CO 5	Construct Turing Machine for recursive and recursive enumerable languages. Identify the decidable and undecidable problems.	K6

Text books:

- (1) Introduction to Automata theory, Languages and Computation, J.E. Hopcraft, R. Motwani, and Ullman. 3rd edition, Pearson Education Asia.
- (2) Theory of Computer Science-Automata Language and Computation, K.L.P. Mishra, and N. Chandrasekharan, 3rd Edition, PHI.
- (3) An Introduction to Formal Languages and Automata, P. Linz, 6th Edition, Jones & Bartlett Learning Publication.

Reference Books:

- (1) Finite Automata and Formal Languages- A simple Approach, A. M. Padma Reddy, Cengage Learning Inc.
- (2) Elements and Theory of Computation, C Papadimitrou and C. L. Lewis, PHI.
- (3) Introduction to languages and the theory of computation, J Martin, 3rd Edition, Tata McGraw Hill.
- (4) Introduction to The Theory of Computation, M Sipser, 3rd Edition, Cengage Learning Inc.

Links:

Unit I	https://nptel.ac.in/courses/106/104/106104028/Lecture 1 -10, Lecture 16, 17 18, 19 https://nptel.ac.in/courses/113/11111/1003016/ https://www.youtube.com/results?search_query=%23AutomataTheory
Unit II	https://nptel.ac.in/courses/106/104/106104028/Lecture 11 -15 https://nptel.ac.in/courses/113/11111/1003016/ https://www.youtube.com/results?search_query=%23AutomataTheory
Unit III	https://nptel.ac.in/courses/106/104/106104028/Lecture 20 -30 https://nptel.ac.in/courses/106/106/106106049/ https://www.youtube.com/results?search_query=%23AutomataTheory
Unit IV	https://nptel.ac.in/courses/106/104/106104028/Lecture 31 -33 https://nptel.ac.in/courses/113/11111/1003016/ https://www.youtube.com/results?search_query=%23AutomataTheory
Unit V	https://nptel.ac.in/courses/106/104/106104028/Lecture 34-42 https://nptel.ac.in/courses/113/11111/1003016/ https://www.youtube.com/results?search_query=%23AutomataTheory

B. TECH. SECOND YEAR				
Course Code		ACSCY0451	L T P	Credit
Course Title		Computer Networks and Network Programming Lab	0 0 2	1
S.No.	Name of Experiment			CO
1	To build and test simple network using UTP cable (crossover) and a hub based network. Introduction to Network Devices (Repeater, Hub, Bridge, Switch, Router, Gateways, NIC etc.)			CO1
2	Implementation of data link layer framing method such as bit stuffing in any language like C, Java or Python.			CO1
3	Test the Network connection using ping command and use of ipconfig, netstat and traceroute command provided by TCP/IP.			CO1
4	Implementation of CRC algorithm in any language like C , Java or Python.			CO1
5	Implementation of stop and wait protocol in any language like C , Java or Python.			CO1
6	Implementation of hamming code (7, 4) code to limit the noise. We have to code the bit data in to 7bit data by adding 3 parity bits. Implement in in any language like C , Java or Python			CO1
7	Write a program in java to find the IP address a given site.			CO2
8	Introduction to CISCO Packet Tracer. Design Bus, Star, Mesh, Ring Topology and check the connectivity using ping command. Switch Configuration on CISCO packet tracer using CLI.			CO2
9	Write TCP Client Server Echo program.			CO3
10	Firewall Configuration using CISCO Packet Tracer.			CO4
Lab Course Outcome: After the completions of this course students will be able to				
CO 1	Build and test simple network using UTP cable.			K6
CO 2	Understand and analyze the topology and configuration of switch and router using cisco packet tracer.			K4
CO3	Apply TCP/IP Client Server communications			K3
CO 4	Configuring, analyze and evaluating impact of Firewall			K5

B. TECH. SECOND YEAR

Course Code	ACSAI0452	L T P	Credit
Course Title	Database Management Systems Lab	0 0 2	1
List of Experiments:			
Sr. No.	Name of Experiment	CO	
1.	Installing ORACLE/ MYSQL/NOSQL.	CO1	
2.	Creating Entity-Relationship Diagram using case tools with Identifying (entities, attributes, keys and relationships between entities, cardinalities, generalization, specialization etc.)	CO1	
3.	I. Implement DDL commands –Create, Alter, Drop etc. II. Implement DML commands- Insert, Select, Update, Delete	CO2	
4.	I. Implement DCL commands-Grant and Revoke II. Implement TCL commands- Rollback, Commit, Save point III. Implement different type key: -Primary Key, Foreign Key and Unique etc.	CO2	
5.	Converting ER Model to Relational Model (Represent entities and relationships in Tabular form, Represent attributes as columns, identifying keys).	CO1, CO2	
6.	Practice Queries using COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING, VIEWS Creation and Dropping.	CO2	
7.	Practicing Queries using ANY, ALL, IN, EXISTS, NOT EXISTS, UNION, INTERSECT, CONSTRAINTS etc.	CO2	
8.	Practicing Sub queries (Nested, Correlated) and Joins (Inner, Outer and Equi).	CO2	
9.	Practicing on Triggers - creation of trigger, Insertion using trigger, Deletion using trigger, Updating using trigger	CO4	
10.	Procedures - Creation of Stored Procedures, Execution of Procedure, and Modification of Procedure	CO4	
11.	Cursors - Declaring Cursor, Opening Cursor, Fetching the data, closing the cursor.	CO4	
12.	Study of Open Source NOSQL Database: MongoDB (Installation, Basic CRUD operations, Execution)	CO5	
13.	Design and Develop MongoDB Queries using CRUD operations. (Use CRUD operations, SAVE method, logical operators)	CO5	
14.	Implement aggregation and indexing with suitable example using MongoDB.	CO5	
15.	Mini project (Design & Development of Data and Application) for following: - a) Inventory Control System. b) Material Requirement Processing. c) Hospital Management System. d) Railway Reservation System. e) Personal Information System. f) Web Based User Identification System. g) Timetable Management System.	CO1	

	h) Hotel Management System	
Lab Course Outcome: After completion of this course students will be able to		
CO 1	Design and implement the ER, EER model to solve the real-world problem and transform an information model into a relational database schema and to use a data.	K6
CO 2	Formulate and evaluate query using SQL solutions to a broad range of query and data update problems.	K6
CO 3	Apply and create PL/SQL blocks, procedure functions, packages and triggers, cursors.	K6
CO 4	Analyze entity integrity, referential integrity, key constraints, and domain constraints on database.	K4
CO5	Demonstrate understanding of MongoDB and its query operations.	K3

B. TECH. SECOND YEAR			
Course Code	ACSAI0451	L T P	Credit
Course Title	Introduction to Artificial Intelligence Lab	0 0 2	1
List of Experiments:			
Sr. No.	Name of Experiment	CO	
1	Write a python program to implement simple Chat-bot.	CO1	
2	Implement Tic-Tac-Toe using A algorithm.	CO1	
3	Implement alpha-beta pruning graphically with proper example and justify the pruning.	CO2	
4	Write a python program to implement Water Jug Problem.	CO2	
5	Use Heuristic Search Techniques to Implement Best first search (Best-Solution but not always optimal) and A algorithm (Always gives optimal solution).	CO3	
6	Use Heuristic Search Techniques to Implement Hill-Climbing Algorithm.	CO5	
7	Write a program to implement Hangman game using python.	CO5	
8	Write a program to solve the Monkey Banana problem	CO4	
9	Write a python program to implement Simple Calculator program.	CO4	
10	Write a python program to POS (Parts of Speech) tagging for the give sentence using NLTK	CO5	
11	Solve 8-puzzle problem using best first search	CO5	
12	Solve Robot (traversal) problem using means End Analysis.	CO5	
13	Implementation of Image features Processing using OPENCV AND OPEN VINO	CO4	
14	Write a program to implement Naïve Bayes Algorithm	CO5	
15	Write a Program to implement alpha-beta Pruning.	CO2	
Lab Course Outcome: After completion of this course students will be able to			
CO 1	Apply searching problems using various algorithms. Explain functionality of Chat-bot.	K3	
CO 2	Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.	K1	
CO 3	Implement the program to POS (Parts of Speech) tagging for the give sentence using NLTK.	K3	
CO 4	Design and carry out an empirical evaluation of different algorithms on a problem formalization, and state the conclusions that the evaluation supports.	K3	
CO5	Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).	K3	

B. TECH. SECOND YEAR			
Course Code	ANC0402	L T P	Credits
Course Title	Environmental Science	2 0 0	0
Course objective:			
1	To help the students in realizing the inter-relationship between man and environment. and help the students in acquiring basic knowledge about environment.		
2	To develop the sense of awareness among the students about environment and its various problems.		
3	To create positive attitude about environment among the student.		
4	To develop proper skill required for the fulfilment of the aims of environmental education and educational evaluations		
5	To develop the capability of using skills to fulfil the required aims, to realise and solve environmental problems through social, political, cultural and educational processes		
Pre-requisites: Basic knowledge of nature.			
Course Contents / Syllabus			
UNIT-I	Basic Principle of Ecology	8 Hours	
Definition, Scope and basic principles of ecology and environment. Ecosystem: Basic concepts, components of ecosystem. Food chains and food webs. Ecological pyramids, Energy flow in ecological systems, Characteristics of different ecosystems. Biogeochemical Cycles: Importance, gaseous and sedimentary cycles. Carbon, Nitrogen, Phosphorus and Sulphur Cycles. Basic concepts of sustainable development, SDGs, Ecosystem services, UN Decade for Ecorestoration.			
UNIT-II	Natural Resources and Associated Problems	8 Hours	
Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forest and tribal people. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. Land resources: Land as a resource, land degradation, man induced landslides. Equitable use of resources for sustainable lifestyles. Non-Renewable Energy Resources: Fossil fuels and their reserves, Nuclear energy, types, uses and effects, Renewable Energy Resources: hydropower, Solar energy, geothermal, tidal and wind energy, Biomass energy, biogas and its advantages.			
UNIT-III	Biodiversity Succession and Non-Renewable Energy Resources	8 Hours	
Biodiversity and their importance, Threats to biodiversity, major causes, extinction's, vulnerability of species to extinction, IUCN threat categories, Red data book. Strategies for biodiversity conservation, principles of biodiversity conservation in-situ and ex-situ conservation strategies Mega diversity zones and Hot spots, concepts, distribution and importance. Succession: Concepts of succession, Types of Succession. Trends in succession. Climax and stability.			
UNIT-IV	Pollution and Solid Waste Management	8 Hours	
Air pollution: sources of air pollution, Primary and secondary air pollutants. Origin and effects of SOX, NOX, Cox, CFC, Hydrocarbon, control of air pollution. Water pollution: sources and types of water pollution, Effects of water pollution, Eutrophication, Soil pollution: Causes of soil pollution, Effects of soil pollution, Major sources of and effects of noise pollution on health, Radioactive and thermal pollution sources and their effects on surrounding environment. Solid waste disposal and its effects on surrounding environment, Climate change, global warming, acid rain, ozone layer depletion.			
UNIT-V	Role of Community and Environmental Protection Acts	8 Hours	

Role of community, women and NGOs in environmental protection, Bioindicators and their role, Natural hazards, Chemical accidents and disasters risk management, Environmental Impact Assessment (EIA), Salient features of following Acts: a. Environmental Protection Act, 1986, Wildlife (Protection) Act, 1972.b. Water (Prevention and control of pollution) Act, 1974.c. Air (Prevention and control of pollution) Act, 1981. Forest (Conservation) Act, 1980.d. Wetlands (Conservation and Management) Rules, 2017; e. Chemical safety and Disaster Management law. F. District Environmental Action Plan. Climate action plans.

Course outcome: After completion of this course students will be able to

CO 1	Understand the basic principles of ecology and environment. Ecosystem: Basic concepts, components of ecosystem., food chains and food webs. Ecological pyramids	K2
CO 2	Understand the different types of natural resources like food, forest, minerals and energy and their conservation	K2
CO 3	Understand the importance of biodiversity, Threats of biodiversity and different methods of biodiversity conservation.	K2
CO 4	Understand the different types of pollution, pollutants, their sources, effects and their control methods	K3
CO 5	Understand the basic concepts of sustainable development, Environmental Impact Assessment (EIA) and different acts related to environment	K3

Text books:

1. Brady, N.C. 1990. The nature and properties of Soils, Tenth Edition. Mac Millan Publishing Co., New York.
2. Botkin, D.B and Kodler E.A., 2000, Environmental Studies: The earth as a living planet. John Wiley and Sons Inc.
3. Rao M.N. and H.V.N. Rao, 1989: Air Pollution, Tata McGraw Hill Publishing Co. Ltd., New Delhi
4. Singh J.S., Singh S.P. and Gupta S.R., 2006, Ecology Environment and Resource Conservation, Anamaya Publishers, New Delhi.
- 5.Environmental Studies -Benny Joseph-Tata McGrawHill-2005
6. Environmental Studies- Dr. D.L. Manjunath, Pearson Education-2006.
7. Environmental studies- R. Rajagopalan -Oxford Publication2005.

Reference Books:

- 1.Sodhi G.S. 2005, Fundamentals of Environmental Chemistry: Narosa Publishing House, New Delhi.
- 2.Dash, M.C. (1994), Fundamentals of Ecology, Tata Mc Graw Hill, New Delhi.
3. Sharma P. D. (1996). Environmental Biology, Rastogi Publications, Meerut.
4. Verma P.S. and V.K. Agarwal. (1985). Principles of Ecology. S. Chand and Company (Pub.), New Delhi.
- 5.Principles of Environmental Sciences and Engineering -P. Venugoplan Rao, Prentice Hall of India.
6. Environmental Science and Engineering Meenakshi, Prentice Hall India.

NPTEL/ Youtube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=T21OO0sBBfc , https://www.youtube.com/watch?v=qt8AMjKKPD0 https://www.youtube.com/watch?v=yAK-m91Nxrsh https://www.youtube.com/watch?v=ha_O-1uOWkk , https://www.youtube.com/watch?v=brF0RWJyx9w
Unit 2	https://www.youtube.com/watch?v=mOwyPENHhbc , https://www.youtube.com/watch?v=yqev1G2iy20 , https://www.youtube.com/watch?v=74S3z3IO_I , https://www.youtube.com/watch?v=jXVw6M6m2g0
Unit 3	https://www.youtube.com/watch?v=GK_vRtHJZu4 , https://www.youtube.com/watch?v=b6Ua_zWDH6U , https://www.youtube.com/watch?v=7tgNamjTRkk , https://www.youtube.com/watch?v=ErATB1aMiSU , https://www.khanacademy.org/science/high-school-biology/hs-ecology/hs-human-impact-on-ecosystems/v/conservation-and-the-race-to-save-biodiversity
Unit 4	https://www.youtube.com/watch?v=7qkaz8Chell , https://www.youtube.com/watch?v=NuQE5fKmfME , https://www.youtube.com/watch?v=9CpAjOVLHII , https://www.youtube.com/watch?v=yEci6iDkXYw , https://www.youtube.com/watch?v=yEci6iDkXYw
Unit 5	https://www.youtube.com/watch?v=ad9KhgGw5iA , https://www.youtube.com/watch?v=nW5g83NSH9M , https://www.youtube.com/watch?v=xqSZL4Ka8xo , https://www.youtube.com/watch?v=WAI-hPRoBqs , https://www.youtube.com/watch?v=o-WpeyGIV9Y , https://www.youtube.com/watch?v=EDmtawhADnY

B. TECH. SECOND YEAR

Course Code	ANC0401	L T P	Credit
Course Title	Cyber Security	2 0 0	0

Course objective: Achieve knowledge about Security of Information system and Risk factors and examine security threats and vulnerability in various scenarios, understand concept of cryptography and encryption technique to protect the data from cyber-attack and provide protection for software and hardware.

Pre-requisites: Basics recognition in the domain of Computer Science, Concept of network and operating system, Commands of programming language.

Course Contents / Syllabus

UNIT-I	INTRODUCTION	8 Hours
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Introduction to Information Systems: Types of Information Systems, Development of Information Systems, Need for Information Security, Threats to Information Systems, Information Assurance, Guidelines for Secure Password and WI-FI Security and social media and Windows Security, Security Risk Analysis, and Risk Management.

UNIT-II	APPLICATION LAYER SECURITY	8 Hours
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Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall, Intrusion Detection System, Access Control, Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail Viruses, Macro Viruses, Malicious Software, Network and Denial of Services Attack, Security, Threats to E-Commerce: Electronic Payment System, E-Cash, Issues with Credit/Debit Cards.

UNIT-III	SECURE SYSTEM DEVELOPMENT	8 Hours
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Application Development Security, Architecture & Design, Security Issues in Hardware: Data Storage and Downloadable Devices, Mobile Protection, Security Threats involving in social media, Physical Security of IT Assets, CCTV, Backup Security Measures.

UNIT-IV	CRYPTOGRAPHY AND NETWORK SECURITY	8 Hours
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Introduction to Cryptography and Types of cryptography

Public key cryptography: RSA Public Key Crypto with implementation in Python, Public Key Distribution.

Symmetric key cryptography: DES (Data Encryption Standard), AES (Advanced Encryption Standard)

Hash Function: Introduction, Secure Hash Algorithm (SHA-1), Digital Signature

Real World Protocols: Basic Terminologies, VPN, Email Security Certificates, Transport Layer Security, IP security, DNS Security.

UNIT-V	SECURITY POLICY	8 Hours
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Policy design Task, WWW Policies, Email based Policies, Policy Revaluation Process-Corporate Policies, Sample Security Policies, Publishing and Notification Requirement of the updated and new Policies. Recent trends in Cyber security.

Course outcome: At the end of course, the student will be able to

CO 1	Analyse the cyber security needs of an organization.	K4
CO 2	Identify and examine software vulnerabilities and security solutions.	K3
CO 3	Comprehend IT Assets security (hardware and Software) and performance indicators	K2
CO 4	Measure the performance and encoding strategies of security systems.	K5
CO 5	Understand and apply cyber security methods and policies to enhance current scenario security.	K3

Text books:

1) Charles P. Pfleeger, Shari LawrancePfleeger, “Analysing Computer Security”, Pearson Education India

2) V.K.Pachghare, “Cryptography and information Security”, PHI Learning Private Limited, Delhi India

3) Sarika Gupta & Gaurav Gupta, Information Security and Cyber Laws, Khanna Publishing House

4) Michael E.Whitman and Herbert J Mattord "Principle of Information Security" Cengage

Reference Books:

1) Schou, Shoemaker, “Information Assurance for the Enterprise”, Tata McGraw Hill.

2) CHANDER, HARISH,” Cyber Laws and It Protection”, PHI Learning Private Limited,Delhi

3) V.K. Jain, Cryptography and Network Security, Khanna Publishing House, Delhi

4) William Stallings, Network Security Essentials: Applications and Standards, Prentice Hall, 4th edition, 2010

E-books& E-Contents:

1) <https://prutor.ai/welcome/>

2) <https://crypto.stanford.edu/cs155old/cs155-spring11/lectures/03-ctrl-hijack.pdf>

3) <https://cybermap.kaspersky.com/stats>

4) <https://www.fireeye.com/cyber-map/threat-map.html>

Reference Links:

1) <https://crypto.stanford.edu/cs155old/cs155-spring11/lectures/03-ctrl-hijack.pdf>

2) <https://cs155.stanford.edu/lectures/03-isolation.pdf>

3) http://uru.ac.in/uruonlinelibrary/Cyber_Security/Cryptography_and_Network_Security.pdf

NPTEL/ Youtube/ Faculty Video Link:

1) <https://www.youtube.com/watch?v=vv1ODDhXW8Q>

2) <https://www.youtube.com/watch?v=fQ3ESFfvchg&list=PLUtfVcb-ign834VGI9faVXGIGSDXZMGp8>

3) <https://www.youtube.com/watch?v=iTVyKbDCJrA&list=PLgMDNELGJ1CbdGLyn7OrVAP-IKg-0q2U2>

4) https://www.youtube.com/watch?v=1plMO7ChXMU&list=PLJ5C_6qdAvBFauGoLC2wFGruY_E2gYtev

5) https://www.youtube.com/watch?v=_9QayISruzo