NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH 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 And Engineering (Internet Of Things)

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 (Internet Of Things)
EVALUATION SCHEME
SEMESTER -III

Sl. No.	Subject Codes	Subject Name	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
WEEKS COMPULSORY INDUCTION PROGRAM													
1	ACSE0306	Discrete Structures	3	0	0	30	20	50		100		150	3
2	AEC0304	Sensors and its Applications	3	1	0	30	20	50		100		150	4
3	ACSE0302	Object Oriented Techniques using Java	3	0	0	30	20	50		100		150	3
4	ACSIOT0302	Logic Design & Microcontroller	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	ACSIOT0303	Introduction to IOT	3	0	0	30	20	50		100		150	3
7	ACSIOT0352	Logic Design & Microcontroller Lab	0	0	2				25		25	50	1
8	ACSIOT0351	Data Structures and Algorithms Design Lab	0	0	2				25		25	50	1
9	ACSIOT0353	IOT Lab using Arduino and Node MCU Platform	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	30	20	50		50		100	
12		MOOCs (For B.Tech. Hons. Degree)											
		GRAND TOTAL										**1100**	**24**

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

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	AMC0020	Interfacing with the Arduino	University of California, Irvine	11	0.5
2	AMC0010	IoT Devices	University of Illinois at Urbana-Champaign	13	1

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
Computer Science And Engineering (Internet Of Things)
EVALUATION SCHEME
SEMESTER-IV

Sl. No.	Subject Codes	Subject Name	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	AAS0402	Engineering Mathematics-IV	3	1	0	30	20	50		100		150	4
2	AASL0401	Technical Communication	2	1	0	30	20	50		100		150	3
3	ACSE0403B	Operating Systems	3	0	0	30	20	50		100		150	3
4	ACSAI0402	Database Management Systems	3	1	0	30	20	50		100		150	4
5	ACSIOT0401	Mobile Application Development	3	0	0	30	20	50		100		150	3
6	ACSE0404	Theory of Automata and Formal Languages	3	0	0	30	20	50		100		150	3
7	ACSE0453B	Operating Systems Lab	0	0	2				25		25	50	1
8	ACSAI0452	Database Management Systems Lab	0	0	2				25		25	50	1
9	ACSIOT0451	Mobile Application Development 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	30	20	50		50		100	
		MOOCs (For B.Tech. Hons. Degree)											
		GRAND TOTAL										**1100**	**24**

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	No of Hours	Credits
1	AMC0038	Interfacing with the Raspberry Pi	University of California, Irvine	12	0.5
2	AMC0037	The Raspberry Pi Platform and Python Programming for the Raspberry Pi	University of California, Irvine	11	0.5

PLEASE NOTE:-

- **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 to18 =1 Credit
3. For 19 to 24 =1.5 Credit
4. For 25 to 30 =2 Credit
5. For 30 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	**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, Co sets, Lagrange's theorem, Normal Subgroups, Permutation and Symmetric Groups, Group Homo morphisms, 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: Introduction to trees, application of trees.
Graphs: Definition and terminology, Representation of Graphs, Various types of Graphs, Connectivity, Isomorphism and Homeomorphism of Graphs, Planar Graphs, Euler and Hamiltonian Paths, Graph Coloring

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

Unit 1	Apply the basic principles of sets, relations & functions and mathematical induction in computer science & engineering related problems.	K3
Unit 2	Understand the algebraic structures and its properties to solve complex problems.	K2
Unit 3	Describe lattices and its types and apply Boolean algebra to simplify digital circuit.	K2, K3
Unit 4	Infer the validity of statements and construct proofs using predicate logic formulas.	K3, K5
Unit 5	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=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=9
	https://www.youtube.com/watch?v=rGcTcGFx9_s&list=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=10
	https://www.youtube.com/watch?v=oU60TuGHxe0&list=PL0862D1A947252D20&index=11
Unit 2	https://www.youtube.com/watch?v=M8nh83bFJAA&list=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=38
	https://www.youtube.com/watch?v=CjmWE-f3vEc&list=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=41
Unit 3	https://www.youtube.com/watch?v=c6ARWh6lVgc&list=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=24
	https://www.youtube.com/watch?v=QKP6sOnu1vg&list=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=22
Unit 4	https://www.youtube.com/watch?v=hklHg9oMkGA&list=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=3
	https://www.youtube.com/watch?v=ASDaXWCExzo&list=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=4
Unit 5	https://www.youtube.com/watch?v=AtDgXyluW-Y&list=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=12
	https://www.youtube.com/watch?v=cwbZUjfz_I0&list=PLwdnzlV3ogoVxVxCTlI45pDVM1aoYoMHf&index=13

B.TECH SECOND YEAR			
Course Code	**AEC0304**	**L T P**	**Credits**
Course Title	**Sensors and its Applications**	**3 1 0**	**4**

Course Objectives:

Concept and the use of sensors for measurement of displacement force and pressure. Commonly used sensors in industry for measurement of temperature, position, accelerometer, vibration sensor, flow and level. The use of virtual instrumentation in automation industries. Identification of appropriate data acquisition methods. The applications of smart and advanced sensors for industrial automation.

Pre-requisites: Basic Electrical Engineering

Course Contents / Syllabus

UNIT-I	**Sensors & Transducers**	**8 Hours**

Sensors & Transducers: Definition, Classification of sensors, Measurement of displacement using Potentiometer, LVDT & Optical Encoder, Measurement of force using strain gauge, Measurement of pressure using LVDT based diaphragm & piezoelectric sensor, Introduction to sensors most widely used in computer and mobile phones: Temperature, Pressure, Humidity, Toxic Gas, pH sensor, sound sensor, magnetic field sensor, Motion (Infra-red) sensor, barometer, and Gyroscope.

UNIT-II	**Measurement of physical parameters**	**8 Hours**

Measurement of temperature using Thermistors, Thermocouple & RTD, Concept of thermal imaging, Measurement of position using Hall effect sensors, Proximity sensors: Inductive & Capacitive, Use of proximity sensor as accelerometer and vibration sensor, Working Principles of Flow Sensors: Ultrasonic & Laser, Level Sensors: Ultrasonic & Capacitive.

UNIT-III	**Virtual Instrumentation**	**8 Hours**

Virtual Instrumentation: Graphical programming techniques, Data types, Advantage of Virtual Instrumentation techniques, Concept of WHILE & FOR loops, Arrays, Clusters & graphs, Structures: Case, Sequence & Formula nodes, Need of software based instruments for industrial automation.

UNIT-IV	**Data Acquisition Methods**	**8 Hours**

Data Acquisition Methods: Basic block diagram, Analog and Digital IO, Counters, Timers, Types of ADC: successive approximation and sigma-delta, Types of DAC: Weighted Resistor and R-2RLadder type, Use of Data Sockets for Networked Communication.

UNIT-V	**Advanced Sensors**	**8 Hours**

Intelligent Sensors: General Structure of smart sensors & its components, Characteristic of smart sensors: Self calibration, Self-testing & self-communicating, Selection of Sensors for Practical Applications, Application of smart sensors: Automatic robot control & automobile engine control.

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

CO 1	Use the sensors for measurement of displacement, force, and pressure.	K3
CO 2	Employ and analyze commonly used sensors in industry for measurement of temperature, position, accelerometer, vibration sensor, flow, and level.	K4
CO 3	Use virtual instrumentation in automation industries.	K1, K3
CO 4	Identify appropriate data acquisition methods for smart systems.	K1, K2

CO 5	Design various real time products using smart sensors.	K2, K5

Text books:

1. DVS Murthy, Transducers and Instrumentation, PHI 2nd Edition 2013

2. D Patrana bis, Sensors and Transducers, PHI 2nd Edition 2013.

3. S. Gupta, J.P. Gupta / PC interfacing for Data Acquisition & Process Control, 2nd ED / Instrument Society of America, 1994

4.Gary Johnson / Lab VIEW Graphical Programing II Edition / McGraw Hill 1997.

Reference Books:

1.Arun K. Ghosh, Introduction to measurements and Instrumentation, PHI, 4th Edition 2012.

2. A.D. Helfrick and W.D. cooper, Modern Electronic Instrumentation & Measurement Techniques, PHI – 2001

3. Hermann K.P. Neubert, "Instrument Transducers" 2nd Edition 2012, Oxford University Press.

4. John P. Bentley, Principles of measurement Systems, Pearson Education. 5. S. M. Sze, Semiconductor sensors, John Wiley & Sons Inc.

5. E. A. Doebelin, Measurement systems: application & design, Mc Graw Hill.

6. S. M. Sze, Semiconductor sensors, John Wiley & Sons Inc.

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:

- 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.	K3, 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	ACSIOT0302	L T P	Credit
Course Title	Logic Design & Microcontroller	3 0 0	3

Course objectives:

To teach the fundamental concepts of logic systems and various logic circuit optimization techniques. Student will understand techniques for the designing of combinational & sequential circuits. Providing insights of Complete architecture of 8085 Microprocessor with assembly level programming in addition with the architecture of 8051 microcontroller. Also, students will analyze the interfacing of 8051 Microcontroller with various I/O devices.

Course Contents / Syllabus

UNIT-I	Minimization of Boolean functions and Combinational Logic	8 Hours

Minimization of Boolean functions: Karnaugh Map Method - Up to Six Variables, Don't Care Map Entries, Quine McCluskey (Tabular) Method.

Combinational Logic Circuits: Adders, Subtractors, Comparators, Multiplexers, Demultiplexers, Encoders, Decoders and Code converters, Hazards.

UNIT-II	Sequential Logic Circuits	8 Hours

Basic Building Blocks of Sequential circuits like SR Latch, Flip Flops: SR, JK, JK Master Slave, D and T Type Flip Flops, Excitation and characteristics Table of all Flip Flops, Conversion from one type of Flip-Flop to another. Shift Registers, Design and Operation of Asynchronous Counters, Ring and Twisted Ring Counter. Synthesis of Synchronous Sequential Circuits- Synchronous Modulo N –Counters.

UNIT-III	Introduction of Microprocessor	8 Hours

Architecture of 8085 Microprocessor, Address / Data Bus multiplexing and demultiplexing. Status and Control signal generation, Instruction set of 8085 Microprocessor, Classification of instructions, addressing modes, timing diagram of the instructions. Interrupts of 8085 microprocessor: Classification of interrupts, Programming using interrupts.

UNIT-IV	8051 Microcontroller	8 Hours

Introduction, Microcontrollers and Embedded systems, Overview of the 8051, Inside the 8051; Addressing modes, assembly programming, 8051 data types and directives, instruction set of 8051, classification of interrupt, programming using interrupt.

UNIT-V	Interfacing with 8051 Microcontroller	8 Hours

Programming of 8051 timers, Serial Port, Interfacing of 8051 with LCD, DAC, ADC and sensors, Memory, Relay and Stepper Motor.

Course outcomes: At the end of this course students will demonstrate the ability to

CO1	Apply the optimization techniques to implement logic functions.	K3
CO2	Design and analyze combinational & Sequential logic circuits	K4
CO3	Apply the knowledge of 8085 Microprocessor for writing assembly level programming.	K3
CO4	Understand the fundamentals of 8051 and embedded systems.	K1
CO5	Implement 8051 microcontroller for designing various applications.	K3

Textbooks:

1) R.P. Jain, "Modern digital Electronics", Tata McGraw Hill, 4th edition, 2009.

2) Morris Mano," Digital Design, 3rd Edition" Prentice Hall India

3) Ramesh Gaonkar, "Microprocessor Architecture, Programming, and Applications with the 8085", Penram International Publication (India) Pvt. Ltd.

4) Mazidi Ali Muhammad, MazidiGillispie Janice, and McKinlayRolin D "The 8051 Microcontroller and Embedded Systems using Assembly and C", Pearson Publication.

Reference Books:

1) John F Wakerly, Digital Design: Principles and Practices, Pearson, (2000).

2) W.H. Gothmann, "Digital Electronics- An introduction to theory and practice", PHI, 2nd edition ,2006.

3) Douglas V. Hall: Microprocessors and Interfacing, Revised 2nd Edition, TMH, 2006.

4) Fundamentals of Logic Design", Cengage Learning, 5th, Edition, 2004.

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	K3

	situation calls for it.	
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, YedidyahLangsam 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. Coreman, 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 ÉvaTardos, 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",FirstEdition,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=PLDN4rrl48XKpZkf03iYFl-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=PLDN4rrl48XKpZkf03iYFl-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	**ACSIOT0303**	**L T P**	**Credits**
Course Title	**Introduction to IoT**	**3 0 0**	**3**

Course Objective:

To study about introduction of IoT technology, Components, architecture, network communications and applications protocols of IoT. Course also aims at understanding various hardware for IoT, programming concepts using Arduino and Raspberry Pi and study about applications of IoT.

Pre-requisites: History of Internet, Basics of programming.

Course Contents / Syllabus

UNIT-I	**Introduction of IoT and Design Principles**	**8 Hours**

Vision, Definition, Characteristics of IoT, Components of the IoT, Conceptual Framework, Architectural Framework, Technology behind IoT,M2M Communication, IoT/M2M systems layers and design standardization, Difference between IoT and M2M, IoT Examples, Data enrichment and consolidation. Introduction to Integrated Developed Environments, Tools and Programming.

UNIT-II	**Hardware Components**	**8 Hours**

Sensors, different types of Sensors, Transducer, Actuators, Radio Frequency Identification (RFID) Technology. Overview of IOT supported Hardware Computational platforms such as Arduino, NetArduino, Raspberry pi, Node MCU and ARM cortex and its Architecture.

UNIT-III	**Programming Arduino and Raspberry Pi**	**8 Hours**

Arduino platform boards anatomy, Arduino IDE coding, using emulator, using libraries, arithmetic addition in Arduino IDE, programming the Arduino for IoT. Programming with Node MCU, Introduction to Raspberry Pi Board. Interfacing and programming the various sensors, IO's etc. with different platforms.

UNIT-IV	**Network & Communication Aspects in IoT**	**8 Hours**

Application Protocols: Layered Architecture of IoT Protocols, Communication Technologies, Low range protocols: BLE, ZigBee. Long range protocols: LoRa and its programing.

Wireless sensor networks, Wireless medium access issues, Sensor deployment & Node discovery, Data aggregation & Dissemination.

UNIT-V	**IoT Applications**	**8 Hours**

Smart metering, e-health, Smart city automation, Automotive applications, home automation, communicating data with H/W units, mobiles, tablets, Designing of smart streetlights in smart city. Ideation of Mini Project.

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

CO 1	recall vision, definition, conceptual framework, architecture of IoT and M2M Communication.	K1
CO 2	describe Sensors, actuators and microcontrollers used in IoT implementation.	K2
CO 3	Execute programs with the help of Arduino, Node MCU and Raspberry pi	K3

CO 4	connect the hardware with network and basic knowledge about network protocols and data dissemination.	K3
CO 5	analyze applications like Smart metering system, Smart streetlights, home automation and smart city applications.	K4

Textbooks:

1. Michael Miller "The Internet of Things" by Pearson. 1st Edition March 2015
2. Raj Kamal "INTERNET OF THINGS", McGraw-Hill, 1st Edition, May 2017.
3. Jeeva Jose, Internet of Things, Khanna Publicatiosn. 1st Edition Jan 2018

Reference Books:

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1stEdition, VPT, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
3. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
4. Olivier Hersent, David Boswarthick, Omar Elloumi "The Internet of Things key applications and protocols". 2nd Edition Dec 2011.

NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A/videos
Unit 2	https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A/videos
Unit 3	https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A/videos
Unit 4	https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A/videos
Unit 5	https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A/videos

B. TECH. SECOND YEAR			
Course Code	**ACSIOT0352**	**L T P**	**Credit**
Course Title	**Logic Design & Microcontroller Lab**	**0 0 2**	**1**

List of Experiments:

Sr. No.	Name of Experiment	CO
1	Implementation of 4-bit parallel adder using 7483 IC and verify the output for the given inputs. (i) A = 1011, B = 1001 (ii) A = 0011, B = 0010	CO1
2	Implementation of 4:1 multiplexer and 1:4 demultiplexer/Decoder using logic gates (AND gate-7408, NOT gate-7404 and OR gate-7432) and verify their truth table.	CO1
3	Verification of truth tables of RS, JK, T and D flip-flops using NAND gate (7400) & NOR gates (7402).	CO2
4	Design 4-bit synchronous and asynchronous counter using JK flipflops (7476) and AND gates (7408) and verify their truth table.	CO2
5	Write a program using 8085 Microprocessor for Decimal, Hexadecimal addition, and subtraction of following two Numbers. i. 20 & 33, 57 & 87 ii. ABH & 27H, 2AH & C2H	CO3
6	To perform multiplication and division of following two 8-bit numbers using 8085. i. 65H & 22H ii. A3H & 35H	CO3
7	Write a program of flashing LED connected to port of the 8051 Micro Controller.	CO4
8	Write a program to generate 10 kHz square wave using 8051 microcontrollers.	CO4
9	Write a program to show the use of INT0 and INT1 of 8051 microcontrollers.	CO4
10	Interfacing of sensors and display devices like Serial Communication Code, Bluetooth, seven segments with 8051 microcontrollers.	CO5
11	Interfacing of Relay & Stepper Motor with 8051 microcontrollers.	CO5

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

CO 1	Design & analyse modular combinational circuits with MUX/DEMUX, decoder.	K4
CO 2	Design & verify truth table of various types of flipflops and counters.	K3
CO 3	Apply the knowledge of 8085 Microprocessor for writing assembly level language.	K3

CO 4	Implement timer in 8051 microcontrollers for generating waveforms.	K3
CO 5	Analyze the interfacing of I/O devices with programming.	K4

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	**ACSIOT0353**	**L**	**T**	**P**	**Credit**
Course Title	**IoT Lab using Arduino and NodeMCU Platform**	**0**	**0**	**2**	**1**

List of Experiments:

Sr. No.	Name of Experiment	CO
1.	**Describing hardware in IoT** a. Hardware Architecture of Arduino UNO Board b. Types of Arduino Board c. Hardware Architecture of Node MCU d. Introduction Various types of Sensors	CO1
2.	**Fundamentals of Arduino Programming** a. Installation of Arduino IDE b. Working with structures c. Variables d. Flow control e. Digital i/o f. Analog i/o g. Time h. Math i. Random j. Serial	CO2
3.	**Interfacing Arduino with I/O Devices.** a. LED b. Ultrasonic Sensor c. Temperature Sensor d. Humidity Sensor e. GAS Sensor f. LDR Sensor g. Potentiometer h. LCD i. Interfacing Bluetooth Module with Arduino	CO2
4.	**Connecting NODE MCU with Internet** Connecting Node MCU with Wifi Hotspots Sending Data to Thingspeak Server using Node MCU	CO2
5.	**Develop real-time projects with Arduino** a. Detection of LPG Gas using MQ6 b. Controlling LED with Node MCU using Blink.	CO3
6.	**Development of Mini Project**	CO3

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

CO 1	Describe hardware Components including Arduino, Node MCU Microcontrollers and basic sensors like Ultrasonic, LDR, DHT 11 MQ	K2

	6 MQ 135	
CO 2	Create programs in Arduino IDE using Arduino NodeMCU and Sensor.	K6
CO 3	Develop real time mini projects using Microcontrollers along with sensors and actuators.	K6

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-attackand 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, 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, Access Control, CCTV and Intrusion Detection Systems, Backup Security Measures.

UNIT-IV	Cryptography And Network Security	8 Hours

Public key cryptography: RSA Public Key Crypto with implementation in Python,Digital Signature Hash Functions,Public Key Distribution.

Symmetric key cryptography: DES (Data Encryption Standard), AES (Advanced Encryption Standard), Secure hash algorithm(SHA-1).

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

UNIT-V	Security Policy	8 Hours

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.
Resent trends in security.

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

CO 1	Analyze the cyber security needs of an organization.	K4
CO 2	Identify and examine software vulnerabilities and security solutions.	K1,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.	K3, K5
CO 5	Understand and apply cyber security methods and policies to enhance current scenario security.	K2, K3

Text books:

1) Charles P. Pfleeger, Shari LawerancePfleeger, "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-iqn834VGI9faVXGIGSDXZMGp8
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 recourses 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 Pubtiotion2005.

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, Prenitice 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=qt8AMjKKPDohttps://www.youtube.com/watch?v=yAK-m91Nxrshttps://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=7qkaz8ChelI, 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-WpeyGlV9Y, https://www.youtube.com/watch?v=EDmtawhADnY

B. TECH. SECOND YEAR

Course Code	AAS0402	L T P	Credit
Course Title	Engineering Mathematics-IV	3 1 0	4

Course objective:

The objective of this course is to familiarize the students with statistical techniques. It aims to present the students with standard concepts and tools at an intermediate to superior level that will provide them well towards undertaking a variety of problems in the discipline.

Pre-requisites: Knowledge of Mathematics I and II of B. Tech or equivalent

Course Contents / Syllabus

UNIT-I	Statistical Techniques-I	8Hours

Introduction: Measures of central tendency: Mean, Median, Mode, Moment, Skewness, Kurtosis, Curve Fitting ,Method of least squares, Fitting of straight lines, Fitting of second degree parabola, Exponential curves ,Correlation and Rank correlation, Linear regression, nonlinear regression and multiple linear regression

UNIT-II	Statistical Techniques-II	8Hours

Testing a Hypothesis, Null hypothesis, Alternative hypothesis, Level of significance, Confidence limits, p-value, Test of significance of difference of means, Z-test, t-test and Chi-square test, F-test, ANOVA: One way and Two way

Statistical Quality Control (SQC), Control Charts, Control Charts for variables (Mean and Range Charts), Control Charts for Variables (p, np and C charts).

UNIT-III	Probability and Random Variable	8Hours

Random Variable: Definition of a Random Variable, Discrete Random Variable, Continuous Random Variable, Probability mass function, Probability Density Function, Distribution functions.

Multiple Random Variables: Joint density and distribution Function, Properties of Joint Distribution function, Marginal density Functions, Conditional Distribution and Density, Statistical Independence, Central Limit Theorem (Proof not expected).

UNIT-IV	Expectations and Probability Distribution	8Hours

Operation on One Random Variable – Expectations: Introduction, Expected Value of a Random Variable, Mean, Variance, Moment Generating Function, Binomial, Poisson, Normal, Exponential distribution.

UNIT-V	Wavelets and applications and Aptitude-IV	8Hours

Wavelet Transform, wavelet series. Basic wavelets (Haar/Shannon/Daubechies), orthogonal wavelets, multi-resolution analysis, reconstruction of wavelets and applications.

Number System, Permutation & Combination, Probability, Function, Data Interpretation, Syllogism.

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

CO 1	Understand the concept of correlation, moments, skewness and kurtosis and curve fitting.	K1, K3
CO 2	Apply the concept of hypothesis testing and statistical quality control to create control charts.	K1, K3
CO 3	Remember the concept of probability to evaluate probability distributions.	K3, K4
CO 4	Understand the concept of MathematicalExpectations and Probability Distribution.	K2

CO 5	Remember the concept of Wavelet Transform and Solve the problems of Number System, Permutation & Combination, Probability, Function, Data Interpretation, Syllogism.	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.

(4)HaitaoGuo, Ramesh A. Gopinath, C.S. Burrus, IVAN W AUTOR SELESNICK, JAN E AUTOR ODEGARD, SidnyBurrus.

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; Kitab Mahal Distributers, New Delhi.

(6) Wavelet Transforms & Time-Frequency Signal Analysis by Lokenath Debnath.

Link:

Unit 1	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/lBB4stn3exM https://youtu.be/0WejW9MiTGg https://youtu.be/QAEZOhE13Wg https://youtu.be/ddYNq1TxtM0 https://youtu.be/YciBHHeswBM
Unit 2	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/lZFmFuZGQTk https://youtu.be/qb3mvJ1gb9g https://youtu.be/FgEs-ZY9-tI https://youtu.be/FgEs-ZY9-tI https://youtu.be/O5qDp-SdyKQ https://youtu.be/4if0vZjnaK4
Unit 3	https://youtu.be/bhp4nVkqA9o 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/Y_8latNXVt0 https://youtu.be/L0zWnBrjhng https://youtu.be/vy24j1ZJoRc https://youtu.be/5hI36fCxFxg https://youtu.be/PXWNc_6zWsY https://youtu.be/DgZLz6WnmcI https://youtu.be/C8DLKwVRQeE https://youtu.be/d_9KT2abCAY https://youtu.be/RqiqhrZE6Uk https://youtu.be/qUBlhsJpf1g
Unit 4	https://youtu.be/H2Ji-Q4MfqU https://youtu.be/TwN79BuwiMM https://youtu.be/yXsvMlqoiK4 https://youtu.be/cbmfYoepHPk https://youtu.be/gT26Y_VJmOM https://youtu.be/onFv73Btdno https://youtu.be/mYFygtQrDxc https://youtu.be/S8YrED3mf5s https://youtu.be/z5gongqrMv8
Unit 5	https://youtu.be/fYG0avmRokg https://youtu.be/fYG0avmRokg https://youtu.be/etba-RPCEmM https://youtu.be/HEUhSbD4P5c https://youtu.be/ZFQteSfxMss https://youtu.be/5kpBz5pV_8Q https://youtu.be/juJR_JDJRa0 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:

- 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

- Fundamentals of technical communication
- Role of technical communication
- Reading Comprehension - central idea, tone, and intention
- Critical reading strategies

UNIT-II — Technical Writing 1 — 5 Hours

- Characteristics of technical writing; technical vocabulary, etymology
- Business letters /emails – types, format, style and language
- Notices, agenda and minutes
- Job application, CV and resume

UNIT-III — Technical Writing 2 — 5 Hours

- Technical reports – types & formats
- Structure of a report
- Technical Proposal - structure and types
- Technical/ Scientific paper writing

UNIT-IV — Public Speaking — 5 Hours

- Components of effective speaking (emphasis on voice dynamics)
- Seminar and conference presentation
- Conducting/ participating in meetings
- Appearing for a job interview
- Mobile etiquettes

UNIT-V — Manuscript Preparation — 5 Hours

- 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, 1st edition.

9. Technical writing and communication, R S Sharma, V.P. Publication, 1st edition.

10. Business Communication for Managers by Payal Mehra, Pearson Publication, Delhi.

B. TECH. SECOND YEAR

Course Code	ACSE0403B	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	Disk Scheduling& Operating System Customization	8 Hours

Disk Storage: Seek Time, Rotational Latency, Data Transfer Time, Average Access Time and Controller Time, Disk Storage Strategies, Disk Scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK and C-LOOK. Directory and Directory Structure, File System.

Introduction to Raspbian Operating System, History of Linux, Introduction of Linux, Architecture of Linux, Shell & Types of Linux Shell, File and directory structure, Introduction to Linux Distributions or Distros, Need of Linux Distros, Linux Customization.
Case Study: - Real Time Operating System with IOT.

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

CO 1	Understand the fundamentals of 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 analyzedisk scheduling and real time application.	K2, K4

Text books:

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

2) Linux the Complete Reference, Richard Petersen, Sixth Edition, Mc Graw Hill.

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-wYxbt4yCjpcfUDz-TgD_ainZ2K3MUZ&index=10
Unit 5	https://www.youtube.com/watch?v=AnGOeYJCv6s https://www.youtube.com/watch?v=U1Jpvni0Aak https://www.youtube.com/watch?v=1hf_0EeOYBY https://www.youtube.com/watch?v=LzW87BLMhNc https://www.youtube.com/watch?v=F_TrgC7h52s https://www.youtube.com/watch?v=ybHxztXXE-4 https://www.youtube.com/watch?v=kOZA_48SpsA

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, Multiplegranularity, 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, Addision 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 Ramakrishan 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=TlbJk78TqYY 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	ACSIOT0401	L T P	Credits
Course Title	Mobile Application Development	3 0 0	3

Course objective:

This course introduces students to programming technologies, design and development related to mobile applications using android/ iOS. Course also aims at mobile application development frameworks; mobile architecture, design and engineering issues, techniques, methodologies for mobile application development.

Pre-requisites: Overview of programming language: JAVA and XML.

Course Contents / Syllabus

UNIT-I — Introduction to Mobile Application and Architecture — 8 Hours

Mobile applications, History of mobile application frameworks, Characteristics and types of mobile applications, Achieving quality constraints.

Mobile Architecture- Mobile Hardware Architecture: processors used for Mobile and Handheld devices and SoC architecture; Mobile Software Architecture: Real Time Operating systems and Mobile Real Time Operating Systems, SDK's.

UNIT-II — Android Developing Environment — 6 Hours

Introduction to Android, Android ecosystem, Android SDK and Installation, Layered Architecture of Android, Android API levels (versions & version names), Android Development Tools, Basic Building blocks – Protocols, Activities, Services, Broadcast Receivers & Content providers.

UNIT-III — UI Components and Multimedia — 10 Hours

Fundamental UI design, layout and view types, Interaction with server-side applications – Using Google Maps, GPS and Wi-Fi, Integration with social media applications, Interfacing sensor data with mobile application, Accessing applications hosted in a cloud computing environment.

Multimedia Supported audio and video formats, Audio capture, Bluetooth, Animation.

UNIT-IV — Android Application Deployment — 8 Hours

Persisting data using SQLite database, Testing and debugging Android Application, Packaging and Android Application Deployment on device with Windows, Android Permissions. Testing and publishing of Mobile Applications on different app stores.

UNIT-V — iOS and Swift — 8 Hours

Introduction to Objective C, iOS features, UI implementation, Touch frameworks, Data persistence using Core Data and SQLite, Location aware applications using Core Location and Map Kit, integrating calendar and address book with social media application, using Wifi - iPhone marketplace.

Swift: Introduction to Swift, Features of swift.

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

CO 1	Recall vision, definition, conceptual framework, architecture of mobile applications.	K1
CO 2	Describe and configure android development environment, tools, and architecture.	K2
CO 3	Create and implement UI components and multimedia framework, fragments, audio capture, animation, and other activities.	K6

CO 4	Integrate and interact with server-side applications with testing and deployment of android application.	K3
CO 5	Analyze iOS and swift features, frameworks, map kit, and social media applications.	K4

Textbooks:

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
2. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012

Reference Books:

1. Bill Phillips, Chris Stewart, Brian Hardy, and Kristin Marsicano, Android Programming: The Big Nerd Ranch Guide, Big Nerd Ranch LLC, 3rd edition, 2017
2. S. Poslad, “Ubiquitous Computing: Smart Devices, Environments and Interactions,” Wiley, 2009
3. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS 6 Development: Exploring the iOS SDK”, Apress, 2013
4. Nick Lecrenski, Karli Watson, “Windows Phone 7 Application Development” version 2011
5. James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012

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:

- Discrete Mathematics
- Fundamental 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 ∈-Transition, Equivalence of NFA's with and without ∈-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. 3rdedition, 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 1	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 2	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 3	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 4	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 5	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	**ACSE0453B**	**L T P**	**Credits**
Course Title	**Operating Systems Lab**	**0 0 2**	**1**

List of Experiments:

Sr. No.	Name of Experiment	CO
1. Operating System Installation	**Lab1:** Install an Operating System on the Raspberry Pi.	CO1
2. Linux based Commands	**Lab 2:** Execute Various types of Linux Commands (Miscellaneous, File oriented, Directory oriented) **Lab 3:** Shell Programming Write a shell program, which accepts the name of a file from standard input and perform the following test on it: i. File readable ii. File writable iii. Both readable and writable	CO1
3. CPU Scheduling Algorithms	**Lab 4:** Implement CPU Scheduling Algorithms: 1. FCFS 2. SJF 3. PRIORITY **Lab 5:** 4. Round Robin 5. Multi-level Queue Scheduling	CO3
4. Deadlock Management	**Lab 6:** Implementation of Banker's algorithm for the purpose of Deadlock Avoidance.	CO3
5. Memory Management Techniques	**Lab 7:** Write a program to simulate the following contiguous memory allocation techniques: a) First fit b) Best fit c) Worst Fit **Lab 8:** a) Write a Program for implementation of Contiguous memory fixed partition technique. b) Write a program for implementation of Contiguous memory variable partition technique. **Lab 9:** Write a program to simulate page replacement algorithms: a) FIFO b) LRU c) Optimal	CO4
6. Disk Scheduling Techniques	**Lab 10:** Write a program to simulate Disk Scheduling Algorithms: a) FCFS b) SSTF **Lab 11:** c) SCAN & C-SCAN d) Look & C-LOOK	CO5
7. Process Synchronization	**Lab12:** 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,K5
CO3	Analyze and implement CPU scheduling algorithms.	K4, K5
CO4	Analyze and implement Memory allocation and Memory management techniques.	K4, K5
CO5	Analyze and implement Disk Scheduling Policies.	K4, 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. h) Hotel Management System	CO1

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

CO 1	Design and implementthe 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.	K3, 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	**ACSIOT0451**	**L**	**T**	**P**	**Credit**
Course Title	**Mobile Application Development Lab**	**0**	**0**	**2**	**1**

List of Experiments:

Sr. No.	Name of Experiment	
1	**Implementing fundamentals of Mobile Application Development** a. Case study on the architecture of personal smart phone, b. Install the Android SDK and developer tools and build a test project to confirm that those tools are properly installed and configured.	CO1
2	**Implementing UI fundamentals and layouts.** a. Develop a basic program to display Hello World on screen. a. Demonstrate a program of linear layout and absolute layout. b. Understanding frame, table, and relative layout. c. Develop a program to implement text view, edit text, button, image button, and toggle button.	CO2
3	**Implementing UI fundamentals and applications.** a. Construct a program to implement checkbox, radio button and radio group. b. Develop a program to implement Progress bar. c. Design a program to implement list view, grid, image, and scroll view. d. Construct a program to date and time picker.	CO2
4	**Implementing multimedia and animation**. a. Interfacing Bluetooth connectivity. b. Develop a program to show animation.	CO2
5	**Connecting Notifications and services** a) Develop a program to send and receive SMS. b) Develop a program to send and receive email.	CO3
6	**Develop real-time applications with Android Studio** a) Create a native calculator application. b) Develop an application that makes use of database. c) Develop a native application that uses GPS location information. d) Sending sensor data from IoT enabled smart device and publishing on mobile application.	CO3, CO4

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

CO 1	Understand configuration of Android environment and development tools.	K2
CO 2	Develop rich user interfaces by using layouts, controls, user interface components and animations.	K6
CO 3	Construct android applications using data bases and connect services.	K6
CO 4	Implement, test and publish real time Android Applications.	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 recourses 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 Pubtiotion2005.

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, Prenitice 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=qt8AMjKKPDohttps://www.youtube.com/watch?v=yAK-m91Nxrshttps://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=7qkaz8ChelI,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-WpeyGlV9Y, 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-attackand 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, 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, Access Control, CCTV and Intrusion Detection Systems, Backup Security Measures.

UNIT-IV	Cryptography And Network Security	8 Hours

Public key cryptography: RSA Public Key Crypto with implementation in Python,Digital Signature Hash Functions,Public Key Distribution.

Symmetric key cryptography: DES (Data Encryption Standard), AES (Advanced Encryption Standard), Secure hash algorithm(SHA-1).

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

UNIT-V	Security Policy	8 Hours

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.
Resent trends in security.

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

CO 1	Analyze the cyber security needs of an organization.	K4
CO 2	Identify and examine software vulnerabilities and security solutions.	K1,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.	K3, K5
CO 5	Understand and apply cyber security methods and policies to enhance current scenario security.	K2, K3

Text books:

1) Charles P. Pfleeger, Shari LawerancePfleeger, "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:

5) Schou, Shoemaker, "Information Assurance for the Enterprise", Tata McGraw Hill.
6) CHANDER, HARISH," Cyber Laws and It Protection", PHI Learning Private Limited,Delhi
7) V.K. Jain, Cryptography and Network Security, Khanna Publishing House, Delhi
8) 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-iqn834VGI9faVXGIGSDXZMGp8
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