NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute)

Affiliated to

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

Evaluation Scheme & Syllabus

For

B. Tech in Computer Science and Business System (CSBS) First Year

(Effective from the Session: 2020-21)

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 ENGINEERING & TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute)

B. TECH (CSBS)

Evaluation Scheme

Sl. No.	Subject Codes	Subject	Periods			Evaluation Schemes				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
3 WEEKS COMPULSORY INDUCTION PROGRAM													
1	ACSBS0106	Discrete Mathematics	3	1	0	30	20	50		100		150	**4**
2	ACSBS0105	Introductory Topics in Statistics, Probability and Calculus	3	0	0	30	20	50		100		150	**3**
3	ACSBS0103	Fundamentals of Computer Science	3	0	0	30	20	50		100		150	**3**
4	ACSBS0102	Principles of Electrical Engineering	2	0	0	30	20	50		50		100	**2**
5	ACSBS0101	Physics for Computing Science	2	0	0	30	20	50		50		100	**2**
6	ACSBS0104	Business Communication & Value Science – I	2	0	0	30	20	50		50		100	**2**
7	ACSBS0153	Fundamentals of Computer Science Lab	0	0	4				25		25	50	**2**
8	ACSBS0151	Physics for Computing Science Lab	0	0	2				25		25	50	**1**
9	ACSBS0152	Principles of Electrical Engineering Lab	0	0	2				25		25	50	**1**
		MOOCs (For B.Tech. Hons. Degree)											
		TOTAL										**900**	**20**

SEMESTER-I

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NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA
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B. TECH (CSBS)
Evaluation Scheme
SEMESTER II

Sl. No.	Subject Codes	Subject	Periods			Evaluation Schemes				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	ACSBS0205	Linear Algebra	3	1	0	30	20	50		100		150	4
2	ACSBS0201	Statistical Methods	3	0	0	30	20	50		100		150	3
3	ACSBS0203	Data Structures & Algorithms	3	1	0	30	20	50		100		150	4
4	ACSBS0202	Principles of Electronics	2	0	0	30	20	50		50		100	2
5	ACSBS0206	Fundamentals of Economics	2	0	0	30	20	50		50		100	2
6	ACSBS0204	Business Communication & Value Science – II	2	0	0	30	20	50		50		100	2
7	ACSBS0251	Statistical Methods Lab	0	0	2				25		25	50	1
8	ACSBS0253	Data Structures & Algorithms Lab	0	0	4				25		25	50	2
9	ACSBS0252	Principles of Electronics Lab	0	0	2				25		25	50	1
10	ANC0201	Environmental Sciences	2	0	0	30	20	50		50		100	0
		MOOCs (For B.Tech. Hons. Degree)											
		TOTAL										**1000**	**21**
Mini Project or Internship (3-4 weeks) shall be conducted during summer break after II semester and will be assessed during III semester													

*** List of MOOCs (NPTEL) Based Recommended Courses for first year B. Tech Students**

1. Developing Soft Skills and personality-Odd Semester-8 Weeks-3 Credits
2. Enhancing Soft Skills and personality-Even Semester-8 Weeks-3 Credits

*** AICTE Guidelines in Model Curriculum:**

After successful completion of 160 credits, a student shall be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honours only, if he/she completes additional university recommended courses only (Equivalent to 20 credits; NPTEL Courses of 4 Weeks, 8 Weeks and 12 Weeks shall be of 2, 3 and 4 Credits respectively) through MOOCs. For

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registration to MOOCs Courses, the students shall follow NPTEL Site http://nptel.ac.in/ as per the NPTEL policy and norms. The students can register for these courses through NPTEL directly as per the course offering in Odd/Even Semesters at NPTEL. These NPTEL courses (recommended by the University) may be cleared during the B. Tech degree program (not necessary one course in each semester). After successful completion of these MooCs courses the students, shall, provide their successful completion NPTEL status/certificates to the University (COE) through their college of study only. The student shall be awarded Hons. Degree (on successful completion of MOOCS based 20 credit) only if he/she secures 7.50 or above CGPA and passed each subject of that Degree Programme in single attempt without any grace marks.

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B. TECH FIRST YEAR

Course Code	ACSBS0106	L T P	Credits
Course Title	Discrete Mathematics	3 1 0	4

Course objective:

The course covers the basic logic, set theory and core ideas in combinatorial mathematics. The course aims to enhance one's ability to develop logical thinking and ability to problem solving.

Course Contents / Syllabus

UNIT-I	Boolean Algebra	8 HOURS

Introduction of Boolean algebra, truth table, basic logic gate, basic postulates of Boolean algebra, principle of duality, canonical form, Karnaugh map.

UNIT-II	Abstract Algebra	7 HOURS

Abstract algebra: Algebraic Structures, Set, theory, relation theory, group theory, ring theory, field theory, Binary Operations

UNIT-III	Combinatorics	8 HOURS

Basic counting, balls and bins problems, generating functions, recurrence relations. Proof techniques, principle of mathematical induction, pigeonhole principle.

UNIT-IV	Graph Theory	10 HOURS

Graphs and digraphs, complement, isomorphism, connectedness and reachability, adjacency matrix, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs and tournaments, trees, Planar graphs, Euler's formula, dual of a planer graph, independence number and clique number, chromatic number, statement of Four-color theorem.

UNIT-V	Logics	7 HOURS

Propositional calculus - propositions and connectives, syntax, Semantics - truth assignments and truth tables, validity and satisfiability, tautology, Adequate set of connectives, Equivalence and normal forms, Compactness and resolution, Formal reducibility - natural deduction system and axiom system, Soundness and completeness.

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

CO 1	Apply the basic principles of Boolean algebra and implementation of K Map.	K3
CO 2	Define the algebraic structure of a system.	K1
CO 3	Solve counting problem using recursive function theory.	K3
CO 4	Design and use non-linear data structure like trees and graph for circuit and network designing.	K3, K6
CO 5	Infer the validity of statements and construct proofs using predicate logic formulas.	K4, K6

Text books

1. I. N. Herstein, Topics in Algebra, 1975, 2nd Edition, John Wiley and Sons.

2.M. Morris Mano,Digital Logic & Computer Design, 1979, 1st Edition, Pearson.

3.C. L. Liu, Elements of Discrete Mathematics, 1985, 2nd edition, McGraw Hill, New Delhi.

4. J. A. Bondy and U. S. R. Murty, Graph Theory with Applications, 1976, Macmillan Press,

London.
5. L. Zhongwan, Mathematical Logic for Computer Science, 1989, World Scientific, Singapore.
Reference Books
1.Gilbert Strang, Introduction to linear algebra, 2016, 5th Edition, Wellesley Publishers 2. R. A. Brualdi, Introductory Combinatorics, 1977, North-Holland, New York. 3. N. Deo, Graph Theory with Applications to Engineering and Computer Science, 1974, Prentice Hall, Englewood Cliffs. 4. E. Mendelsohn, Introduction to Mathematical Logic, 1979, 2nd Edition, Van-Nostrand, London.

B. TECH FIRST YEAR

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Course Code	ACSBS0105	L T P	Credits
Course Title	Introductory Topics in Statistics, Probability and Calculus	3 0 0	03

Course objectives:

- The objective of this course is to familiarize the engineers with concept of Statistics, probability distribution, differential and Integral calculus and its application.
- It aims to show case the students with standard concepts and tools from B. Tech to deal with advanced level of mathematics and applications that would be essential for their disciplines.

Pre-requisites:Knowledge of Mathematics of 12th standard

Course Contents / Syllabus

UNIT-I	Introduction to Statistics	8 hours

Definition of Statistics. Basic objectives. Applications in various branches of science with examples. Collection of Data: Internal and external data, Primary and secondary Data. Population and sample, Representative sample.

UNIT-II	Descriptive Statistics	8 hours

Classification and tabulation of univariate data, graphical representation, Frequency curves. Descriptive measures - central tendency and dispersion. Bivariate data. Summarization, marginal and conditional frequency distribution.

UNIT-III	Probability	8 hours

Concept of experiments, sample space, event. Definition of Combinatorial Probability. Conditional Probability, Bayes Theorem.

UNIT-IV	Probability distributions	8 hours

discrete & continuous distributions, Binomial, Poisson and Geometric distributions, Uniform, Exponential, Normal, Chi-square, t, F distributions. Expected values and moments: mathematical expectation and its properties, Moments (including variance) and their properties, interpretation, Moment generating function.

UNIT-V	Calculus	8 hours

Basic concepts of Differential and integral calculus, application of double and triple integral.

Course Outcomes: After completion of this course students are able to

CO 1	Explain types of statistical data, population and sample.	K_1, K_3
CO 2	Apply the concept of measures of central tendency and dispersion to solve statistical problems.	K_1, K_3
CO 3	Explain the concept of combinatorial and conditional probability and Baye's theorem.	K_3, K_4
CO 4	Apply the concept of probability distribution and its properties to solve statistical problems.	K_2
CO 5	Apply the concept of differential and integral calculus to evaluate double and triple integral.	K_2

Text Books

1. Introduction of Probability Models, S. M. Ross, Academic Press, N.Y.
2. Fundamentals of Statistics, vol. I & II, A. Goon, M. Gupta and B. Dasgupta, World Press.
3. Higher Engineering Mathematics, B. S. Grewal, Khanna Publication, Delhi.

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Reference Books
1. A first course in Probability, S. M. Ross, Prentice Hall. 2. Probability and Statistics for Engineers, (Fourth Edition), I. R. Miller, J.E. Freund and R. Johnson, PHI. 3. Introduction to the Theory of Statistics, A. M. Mood, F.A. Graybill and D.C. Boes, McGraw Hill Education. 4. Advanced Engineering Mathematics, (Seventh Edition), Peter V. O'Neil, Thomson Learning. 5. Advanced Engineering Mathematics, (Second Edition) M. D. Greenberg, Pearson Education. 6. Applied Mathematics, Vol. I & II, P. N. Wartikar and J. N. Wartikar, VidyarthiPrakashan. 7. G.B Thomas, R L Finney, Calculus and Analytical Geometry, Ninth Edition Pearson.

B. TECH FIRST YEAR			
Course Code	**ACSBS0103**	**L T P**	**Credits**

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Course Title	Fundamentals of Computer Science	3 0 0	03

Course objective:

The course covers various operations, conditional statements and looping constructs in C. The course aims to solve complex problems using functions and arrays in C.

Pre-requisites: Basic Knowledge of Computer

Course Contents / Syllabus

UNIT-I	General problem Solving concepts	5 hours

Algorithm, and Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops.

Programming using C: applications of C programming, Structure of C program, Overview of compilation and execution process in an IDE, transition from algorithm to program, Syntax, logical errors and Run time errors, object and executable code

UNIT-II	Imperative languages&Operators	7 hours

Introduction to imperative language; syntax and constructs of a specific language (ANSI C)

Types Operator and Expressions with discussion of variable naming and Hungarian Notation: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, proper variable naming and Hungarian Notation.

UNIT-III	Control Flow	6 hours

Control Flow with discussion on structured and unstructured programming: Statements and Blocks, If-Else-If, Switch, Loops – while, do, for, break and continue, goto labels, structured and un-structured programming.

UNIT-IV	Functions and Program Structure	8 hours

Functions and Program Structure with discussion on standard library: Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Pre-processor, Standard Library Functions and return types.

UNIT-V	Pointers and Arrays	8 hours

Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialization of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.

Structures: Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral structures, Table look up, typedef, unions, Bit-fields

UNIT-VI	Input and Output:	6 Hours

Standard I/O, Formatted Output – printf, Formated Input – scanf, Variable length argument list, file access including FILE structure, fopen, stdin, stdout and stderr, Error Handling including exit, perror and error.h, Line I/O, related miscellaneous functions.

Unix system Interface: File Descriptor, Low level I/O – read and write, open, create, close and unlink, Random access – seek, Discussions on Listing Directory, Storage allocator.

Programming Method: Debugging, Macro, User Defined Header, User Defined Library Function,

makefile utility		
Course outcome: At the end of course, the student will be able to		
CO 1	Acquire a broad perspective about the uses of computers in engineering industry.	K2
CO 2	Understand the concept of computers, algorithm and algorithmic thinking.	K2
CO 3	Apply conditional statements and looping constructs.	K3
CO 4	Implement array and perform operations on it.	K3
CO 5	Understand the more advanced features of the C language	K2
Text Books		
1. B. W. Kernighan and D. M. Ritchi, The C Programming Language, 1988, 2nd Edition, PHI. 2. B. Gottfried, Programming in C, Schaum Outline Series, 1996, 2ndEdition, McGraw Hill Companies Inc.		
Reference Books		
1. Herbert Schildt, C: The Complete Reference, 2000, 4th edition, McGraw Hill. 2. YashavantKanetkar, Let Us C, 2017, 15th edition, BPB Publications.		

B. TECH FIRST YEAR			
Course Code	**ACSBS0102**	**L T P**	**Credit**
Course Title	**Principles of Electrical Engineering**	**2 0 0**	**2**

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Course objective:	
1	To provide concept for the analysis of basic DC and AC (Single phase and Three phase) electrical circuits.
2	To study the concept of Electrostatics, magnetic circuit,transformer and to Impart elementary knowledge of distribution system Components, Earthing, and wiring.
3	To understand the concept and applications of sensor/transducer and measurement of electrical parameters.

Pre-requisites: **Basic knowledge of 12th Physics and Mathematics**

Course Contents / Syllabus

UNIT-I	Introduction	6 Hours

Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, Terminology and symbols in order to describe electric networks, voltage source and current sources, ideal and practical sources, concept of dependent and independent sources, Kirchhoff-s laws and applications to network solutions using mesh and nodal analysis, Concept of work, power, energy, and conversion of energy.

UNIT-II	DC Circuits	6 Hours

Current-voltage relations of the electric network by mathematical equations to analyze the network (Thevenin's theorem, Norton's Theorem, Maximum Power Transfer theorem) Simplifications of networks using series-parallel, Star/Delta transformation. Superposition theorem.

UNIT-III	AC Circuits	6 Hours

AC waveform definitions, form factor, peak factor, study of R-L, R-C,RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits (⅄-Δ & ⅄-⅄).

UNIT-IV	Electrostatics and Electro-Mechanics	6 Hours

Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors, Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion.

UNIT-V	Measurements and Sensors	6 Hours

Introduction to measuring devices/sensors and transducers (Piezoelectric and thermo-couple) related to electrical signals, Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-phase power). Electrical Wiring and Illumination system: Basic layout of the distribution system, Types of Wiring System &Wiring Accessories, Necessity of earthing, Types of earthing, Safety devices & system.

For Further Reading - Principle of batteries, types, construction and application, Magnetic material and B-H Curve, Basic concept of indicating and integrating instruments.

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

CO 1	Describe the basics of electrical parameters and apply concept of KVL/KCL in solving DC circuits.
CO 2	Apply the concepts of theorems in solving DC circuits.
CO 3	Analyze the steady state behavior of single phase and three phase AC electrical circuits

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CO 4	Explain the concept of Electrostatics, Magnetic Circuit and calculate efficiency and voltage regulation of transformer.
CO 5	Describe concept of sensor/transducer,Components of distribution system, earthing and wiring

Text Books

1. Electric Machinery, (Sixth Edition) A. E. Fitzgerald, Kingsely Jr Charles, D. Umans Stephen, Tata McGraw Hill.
2. A Textbook of Electrical Technology, (vol. I), B. L. Theraja, Chand and Company Ltd., New Delhi.
3. Basic Electrical Engineering, V. K. Mehta, S. Chand and Company Ltd., New Delhi.
4. Theory and problems of Basic Electrical Engineering, (Second Edition), J. Nagrath and Kothari, Prentice Hall of India Pvt. Ltd.

Reference Books

1. Basic of Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press. T. K. Nagsarkar and M. S. Sukhija, Basic of Electrical Engineering, Oxford University Press, 2011.
2. Introduction to Electrodynamics, D. J. Griffiths, (Fourth Edition), Cambridge University Press.
3. Engineering Circuit Analysis, William H. Hayt& Jack E. Kemmerly, McGraw-Hill Book Company Inc.
4. Fundamentals of Electrical and Electronics Engineering, Smarjith Ghosh, Prentice Hall (India) Pvt. Ltd.

B. TECH FIRST YEAR

Course Code	**ACSBS0101**	**L T P**	**Credit**
Course Title	**Physics For Computing Science**	**2 0 0**	**02**

Course Objectives:

1	To provide the knowledge of different wave motions and their uses in engineering applications.

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2	To provide the knowledge of law of optics.
3	To provide the knowledge of Quantum Mechanics and to explore possible engineering utilization.
4	To provide the knowledge of Crystallography and its uses to engineering applications.
5	To provide the basic knowledge of Optical Fiber and Laser which is necessary to understand the working of modern engineering tools and techniques.

Pre-requisites: Newton's laws of motions, scalar and vectors, electricity and magnetism, basic laws of optics.

Course Contents / Syllabus

UNIT-I	**Oscillation**	**9 Hours**

Periodic motion-simple harmonic motion-characteristics of simple harmonic motionvibration of simple spring mass system. Resonance-definition., damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators.

Basic Idea of Electromagnetisms: Continuity equation for current densities, Maxwell's equation in vacuum and non-conducting medium.

UNIT-II	**Interference, Diffraction& Polarization**	**9 Hours**

Interference-principle of superposition-Young's experiment, Theory of interference fringes,types of interference, Fresnel's biprism, Newton's rings, **Diffraction**-Two kinds of diffractionDifference between interference and diffraction-Fresnel's half period zone and zone plate,Fraunhofer diffraction at single slit, plane diffraction grating. Temporal and Spatial Coherence.

Polarization - Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction

UNIT-III	**Quantum Mechanics**	**6 Hours**

Introduction - Planck's quantum theory- Matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box, Heisenberg Picture.

UNIT-IV	**Crystallography**	**6 Hours**

Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, Atomic packing factor for SC, BCC, FCC and HCP structures

Semiconductor Physics: Conductor, Semiconductor and Insulator; Basic concept of Band theory.

UNIT-V	**Laser and Fiber optics**	**6 Hours**

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO2 and Neodymium lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in engineering. Fiber optics and Applications, Types of optical fibers.

Thermodynamics: Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law, second law of thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes.

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

CO 1	Understand the different types of wave motions and their uses in engineering

	applications.
CO 2	Apply the laws of optics.
CO 3	Apply the concept of quantum mechanics.
CO 4	Define the phenomenon of crystallography &to apply the ideas in engineering applications.
CO 5	Predict the working of modern engineering tools and techniques of optical fiber and laser.

Text books

1. A Beiser, Concepts of Modern Physics, (Fifth Edition) McGraw Hill International.
2. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, Wileyplus.

Reference Books

1. AjoyGhatak,Optics, (Fifth Edition), Tata McGraw Hill.
2. Sears &Zemansky, University Physics, Addison-Wesley.
3. Jenkins and White, Fundamentals of Optics, (Third Edition) McGraw-Hill.

B. TECH. FIRST YEAR			
Course Code	**ACSBS0104**	**L T P**	**Credit**
Course Title	**Business Communication & Value Science – I**	**2 0 0**	**02**

Course objective:

1	Understand what life skills are and their importance in leading a happy and well-adjusted life
2	Motivate students to look within and create a better version of self
3	Introduce them to key concepts of values, life skills and business communication

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Pre-requisites:Basic Knowledge of high school English		
Course Contents / Syllabus		
		48 hours
• Overview of the course with immersion activity • Overview of biz communication • Self-awareness, confidence and communication • Essentials of Business communication • Application of communication skills • Application of Life Skills • Assignment		
Course Contents / Syllabus		
UNIT-I	**Introduction and overview of the course**	**9.5 Hours**
Overview of LOL (include activity on introducing self) **Class activity** – presentation on favourite cricket captain in IPL and the skills and values they demonstrate **Self-work with immersion** – interview a maid, watchman, sweeper, cab driver, beggar and narrate what you think are the values that drive them. **Overview of business communication** Lecture with videos **Activity:**Write a newspaper report on an IPL match **Activity:**Record a conversation between a celebrity and an interviewer **Self-awareness** – identity, body awareness, stress management **Quiz** **Activity**: Record a conversation between a celebrity and an interview **Activity**:Anubhaav Activities		
UNIT-II	Application of communication skills, and Self-awareness	**10.5 Hours**
Essential Grammar – I: Refresher on Parts of Speech – Listen to an audio clip and note down the different parts of speech followed by discussion Tenses: Applications of tenses in Functional Grammar – Take a quiz and then discuss **Sentence formation** (General & Technical), Common errors, Voices: Show sequence from film where a character uses wrong sentence structure (e.g.Zindagi Na MilegiDobara where the characters use 'the' before every word) **Communication Skills**: Overview of Communication Skills Barriers of communication, Effective communication		

Types of communication- verbal and non – verbal – Role-play based learning

Importance of Questioning

Listening Skills: Law of nature, Importance of listening skills, Difference between listening and hearing, Types of listening.

Expressing self, connecting with emotions, visualizing and experiencing purpose

Activity: Skit based on communication skills **Evaluation on Listening skills** – listen to recording and answer questions based on them

UNIT-III	Essentials of Business communication	**10 Hours**

Email writing: Formal and informal emails, activity **Verbal communication**: Pronunciation, clarity of speech

Vocabulary Enrichment: Exposure to words from General Service List (GSL) by West, Academic word list (AWL) technical specific terms related to the field of technology, phrases, idioms, significant abbreviations formal business vocabulary – Read Economic Times, Reader's Digest, National Geographic and take part in a GD, using the words you learnt/liked from the articles. Group discussion using words learnt

Practice: Toastmaster style Table Topics speech with evaluation

Written Communication: Summary writing, story writing

Build your CV – start writing your comprehensive CV including every achievement in your life, no format, no page limit

Project: Create a podcast on a topic that will interest college students

Life skill: Stress management, working with rhythm and balance, colours, and teamwork

Project: Create a musical using the learning from unit

UNIT-IV	**Application of Life Skills**	**14Hours**

Understanding Life Skills: Movie based learning – **Pursuit of Happiness**. What are the skills and values you can identify, what can you relate to?

Introduction to life skills what are the critical life skills

Multiple Intelligences Embracing diversity – Activity on appreciation of diversity

Life skill: Community service – work with an NGO and make a presentation

OR (complete any one of these two)

Life skill: Join a trek – Values to be learned: Leadership, teamwork, dealing with ambiguity, managing stress, motivating people, creativity, result orientation

Course Outcomes: Upon completion of the course, students shall have ability to

C1.6.1	Recognize the need for life skills and values	[U]
C1.6.2	Recognize own strengths and opportunities	[U]
C1.6.3	Apply the life skills to different situations	[AP]
C1.6.4	Understand the basic tenets of communication	[U]
C1.6.5	Apply the basic communication practices in different types of communication	[AP]

Text Book

There are no prescribed texts for Semester 1 – there will be handouts and reference links shared.

Reference Books

1.English vocabulary in use – Alan Mc'carthy and O'dell
2 APAART: Speak Well 1 (English language and communication)
3 APAART: Speak Well 2 (Soft Skills)
4 Business Communication – Dr. Saroj Hiremath -Hill.

Web References:

1 Train your mind to perform under pressure- Simon sinek
https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-underpressure-capture-your-flag/
2 Brilliant way one CEO rallied his team in the middle of layoffs
https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-beforenumbers.html
3 Will Smith's Top Ten rules for success https://www.youtube.com/watch?v=bBsT9omTeh0

Online Resources:

1 https://www.coursera.org/learn/learning-how-to-learn
2 https://www.coursera.org/specializations/effective-business-communication

B. TECH FIRST YEAR			
Course Code	**ACSBS0153**	**L T P**	**Credit**
Course Title	**Fundamentals of Computer Science Lab**	**0 0 4**	**2**
Suggested List of Experiments			**CO**
1. Algorithm and flowcharts of small problems like GCD			1

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2. Structured code writing with:		1
i. Small but tricky codes		1
ii. Proper parameter passing		1
iii. Command line Arguments		1
iv. Variable parameter		2
v. Pointer to functions		2
vi. User defined header		3
vii. Make file utility		3
viii. Multi file program and user defined libraries		4
ix. Interesting substring matching / searching programs		4
x. Parsing related assignments		4
Lab Course Outcome:		
CO 1	Read, understand and trace the execution of programs written in C language.	K2
CO 2	Write the C code for a given algorithm.	K2
CO 3	Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.	K3
CO 4	Write programs that perform operations using derived data types.	K2
CO5	Implement String Handling	K3

B. TECH FIRST YEAR			
Course Code	ACSBS0151	**L T P**	**Credit**
Course Title	**Physics For Computing Science Lab**	**0 0 2**	**01**
Name of Experiment (Minimum Ten experiments should be performed)			

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.

1) Magnetic field along the axis of current carrying coil – Stewart and Gee	
2) Determination of Hall coefficient of semi-conductor	
3) Determination of Plank constant	
4) Determination of wave length of light by Laser diffraction method	
5) Determination of wave length of light by Newton's Ring method	
6) Determination of laser and optical fiber parameters	
7) Determination of Stefan's Constant.	
8) To determine the focal length of two lenses by nodal slide and to verify the formula for the focal length of combination of two lenses.	
9) To determine the specific rotation of cane sugar solution using Polarimeter.	
10) To determine the specific resistance of a given wire using Carey Foster's bridge.	
11) To determine the coefficient of viscosity of a liquid.	
12) Calibration of a voltmeter with a potentiometer.	
13) Calibration of a ammeter with a potentiometer.	
14) To determine E.C.E. of copper using Tangent or Helmholtz galvanometer.	
15) To determine the magnetic susceptibility of a ferromagnetic salt ($FeCl_3$) by using Quincke's tube method.	
16) To study the hysteresis curve and then to estimate the retentively and coercivity of a given ferromagnetic material.	
17) To determine the angle of divergence of laser beam using He-Ne Laser.	
18) To determine the wavelength of spectral lines using plane transmission Grating.	

Lab Course Outcome: After completion of this course students willbeable to:	
CO 1	Develop the measurement techniques of magnetism.
CO 2	Calculate the charge mobility, carrier concentration and Hall coefficient of semiconductor.
CO 3	Apply the practical knowledge of the phenomenon of interference, diffraction and modern optics.
CO 4	Calculate Stefan's and Plank's constant.

B. TECH FIRST YEAR			
Course Code	ACSBS0152	**L T P**	**Credit**
Course Title	**Principles of Electrical Engineering Lab**	**0 0 2**	**1**
Name of Experiment		**CO**	

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.

1. Familiarization of electrical Elements, sources, measuring devices and transducers related to electrical circuits	1
2. Verification of Superposition Theorem	2
3. Verification of Thevenin's and Maximum Power Transfer Theorem	2
4.Verification of Norton's Theorem	2
5. To study the phenomenon of series RLC circuit and obtain resonant frequency	2
6. Determination of efficiency of a single phase transformer by direct load test.	3
7. Study and calibration of a single phase energy meter.	3
8. Demonstration of measurement of electrical quantities in DC and AC systems.	3
9. Measurement of power factor and its improvement in a single phase ac series inductive circuit	3
10. Study of different types of safety devices used in electrical systems.	4

Course outcome: At the end of the course students will be able to	
CO 1	Demonstrate the working of various electrical elements, measuring instruments and sensors.
CO 2	Conduct experiments illustrating the application of KVL/KCL and Network theorems to DC electrical circuits.
CO 3	Conduct experiments illustrating the steady state behaviour of single phase and three phase AC electrical circuits. Working behaviour of transformer
CO 4	Explain different types of safety devices, working and application of batteries.

B. TECH FIRST YEAR			
Course Code	**ACSBS0205**	**L T P**	**Credit**
Course Title	**Linear Algebra**	**3 1 0**	**04**
Course Objectives:			

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.

The objective of this course is to familiarize the engineers with concept of Matrices, determinants, solution of system of linear equation, vector space, linear transformation, Singular value decomposition and Principal component analysis.It aims to show case the students with standard concepts and tools from B. Tech to deal with advanced level of mathematics and applications that would be essential for their disciplines.

Pre-requisites: Knowledge of Mathematics of 12th standard

Course Contents / Syllabus

UNIT-I	**Introduction**	**8 Hours**
Introduction to Matrices and Determinants; Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.		
UNIT-II	**Vectors and linear combinations**	**8 Hours**
Vectors and linear combinations; Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices.		
UNIT-III	**Vector space**	**8 Hours**
Vector space, Dimension, Basis, Orthogonality, Projections, Gram-Schmidt orthogonalization and QR decomposition.		
UNIT-IV	**Eigenvalues and Eigenvectors;**	**8 Hours**
Eigenvalues and Eigenvectors; Positive definite matrices; Linear transformations; Hermitian and unitary matrices		
UNIT-V	**Principal Component Analysis**	**8 Hours**
Singular value decomposition and Principal component analysis; Introduction to their applications in Image Processing and Machine Learning.		

Note: Assignments & tutorials covering the following: Vectors and linear combinations, Matrices, Linear transformations, Complete solution to Ax = b, Determinants, Eigenvalues and Eigenvectors

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

CO 1	Apply the concept of matrices and determinants to solve linear system of equations.
CO 2	Apply the concept of rank and LU decomposition to solve linear system of equation.
CO 3	Explain the concept of vector space, orthogonalization and QR decomposition.
CO 4	Explain the concept of Eigenvalues and Eigenvectors, linear transformation and complex matrices.
CO 5	Apply the concept of singular value decomposition and principal component analysis in image processing and machine learning.

Text book

Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers.

Reference Books

1. Advanced Engineering Mathematics, (Seventh Edition), Peter V. O'Neil, Cengage Learning.
2. Advanced Engineering Mathematics, (Second Edition), Michael. D. Greenberg, Pearson.
3. Introduction to linear algebra, (Fifth Edition), Gilbert Strang, Wellesley-Cambridge Press.
4. Applied Mathematics (Vol. I & II), P. N. Wartikar& J. N. Wartikar, Pune VidyarthiGrihaPrakashan.
5. Digital Image Processing, R C Gonzalez and R E Woods, Pearson.
6. https://machinelearningmastery.com/introduction-matrices-machine-learning/

B. TECH FIRST YEAR			
Course Code	**ACSBS0201**	**L T P**	**Credits**
Course Title	**Statistical Methods**	**3 0 0**	**03**

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.

Course Objectives:

- The objective of this course is to familiarize the engineers with basic concept of sampling techniques, linear correlation, regression, estimation theory, test of hypothesis testing,time series and forecasting.
- It aims to show case the students with standard concepts and tools from B. Tech to deal with advanced level of mathematics and applications that would be essential for their disciplines.

Pre-requisites: Knowledge of Mathematics of 12th standard

Course Contents / Syllabus

UNIT-I	Sampling Techniques	8 Hours

Random sampling. Sampling from finite and infinite populations. Estimates and standard error (sampling with replacement and sampling without replacement), Sampling distribution of sample mean, stratified random sampling.

UNIT-II	Linear Statistical Models	8 Hours

Scatter diagram. Linear regression and correlation. Least squares method. Rank correlation. Multiple regression& multiple correlation, Analysis of variance (one way, two way with as well as without interaction).

UNIT-III	Estimation	8 Hours

Point estimation, criteria for good estimates (un-biasedness, consistency), Methods of estimation including maximum likelihood estimation

Sufficient Statistic: Concept & examples, complete sufficiency, their application in estimation.

UNIT-IV	Test of hypothesis	8 Hours

Concept & formulation, Type I and Type II errors, Neyman Pearson lemma, Procedures of testing.
Non-parametric Inference:
Comparison with parametric inference, Use of order statistics. Sign test, Wilcoxon signed rank test, Mann Whitney test, Run test, Kolmogorov-Smirnov test. Spearman's and Kendall's test. Tolerance region.

UNIT-V	Basics of Time Series Analysis & Forecasting	8 Hours

Stationary, ARIMA Models: Identification, Estimation and Forecasting.

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

CO 1	Explain the concept of sampling and sampling distribution.
CO 2	Apply the concept of correlation, regression and ANOVA to statistical data.
CO 3	Apply the concept of estimation theory to evaluate statistical parameters.
CO 4	Apply the concept of hypothesis testing to statistical problems.
CO 5	Explain the concept of time series and forecasting.

Text books

1. Probability and Statistics for Engineers (Fourth Edition), I.R. Miller, J.E. Freund and R. Johnson, Prentice Hall India Learning Private Limited.
2. Fundamentals of Statistics (vol. I & vol. II), A. Goon, M. Gupta and B. Dasgupta, World Press.
3. The Analysis of Time Series: An Introduction, Chris Chatfield, Chapman & Hall/CRC

Reference Books
1. Introduction to Linear Regression Analysis, D.C. Montgomery and E. Peck, WileyInterscience. 2. Introduction to the Theory of Statistics, A.M. Mood, F. A. Graybill and D.C. Boes, McGraw Hill. 3. Applied Regression Analysis, N. Draper and H. Smith, Wiley-Interscience. 4. Hands-on Programming with R, Garrett Grolemund, O′Reilly. 5. R for Everyone: Advanced Analytics and Graphics, Jared P. Lander, Addison-Wesley Professional.

B. TECH FIRST YEAR			
Course Code	**ACSBS0203**	**L T P**	**Credits**
Course Title	**Data Structures and Algorithms**	**3 1 0**	**04**

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.

Course Objectives:

The course covers the basic data structures, algorithm, and efficiency of algorithm, introduction to array, stack, Queue, link list and their implementation. The course aims to give understanding of various searching and sorting algorithms and implementation of tree data structure.

Pre-requisites: Basics of C programming &algorithm

Course Contents / Syllabus

UNIT-I	**Basic Terminologies and Introduction to Algorithm & Data Organization**	**8 hours**

Algorithm specification, Recursion, Performance analysis, Asymptotic Notation - The Big-O, Omega and Theta notation, Programming Style, Refinement of Coding - Time-Space Trade Off, Testing, Data Abstraction

UNIT-II	**Linear Data Structure**	**8 hours**

Array, Stack, Queue, Linked-list and its types, Various Representations, Operations & Applications of Linear Data Structures

UNIT-III	**Non-linear Data Structure**	**8 hours**

Trees (Binary Tree, Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, Splay Tree) and Introduction of Graphs (Directed, Undirected), Various Representations, Operations & Applications of Trees

UNIT-IV	**Searching and Sorting on Various Data Structures**	**8 hours**

Sequential Search, Binary Search, Comparison Trees, Breadth First Search, Depth First Search Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer Sort, Merge Sort, Quick Sort, Heapsort, Introduction to Hashing

UNIT-V	**File & Graph**	**8 hours**

File: Organization (Sequential, Direct, Indexed Sequential, Hashed) and various types of accessing schemes.

Graph: Basic Terminologies, Representations, Operations and Applications of Graphs, Graph search and traversal algorithms and complexity analysis.

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

CO1	Analyzeand implement arrays, linked lists, stacks, queues to solve complex problems.	K3, K4
CO2	Compare the computational efficiency of the sorting and searching algorithms.	K4
CO3	Assessthe memory representation oftree and perform various operations on these data structure.	K3
CO4	Apply the concept of recursion to solve the real-world problems.	K3
CO5	Develop the algorithms using graph data structures.	K6

Text Books

1. E. Horowitz, S. Sahni, S. A-Freed, Fundamentals of Data Structures, 2008, Universities Press.
2. A. V. Aho, J. E. Hopperoft, J. D. UIlman,Data Structures and Algorithms, 1983, Pearson.

Reference Books

1. Donald E. Knuth, The Art of Computer Programming: Volume 1: Fundamental Algorithms,

1968, Addison-Wesley.
2. Thomas, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, 2009, 3rd Edition, The MIT Press.
3. Pat Morin,Open Data Structures: An Introduction (Open Paths to Enriched Learning), 2013, 31st Edition, UBC Press.

B. TECH FIRST YEAR					
Course Code	**ACSBS0202**	**L**	**T**	**P**	**Credits**
Course Title	**Principles of Electronics**	**2**	**0**	**0**	**02**

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.

Course objective: Thestudent will learn about:	
1	Structure of crystalline materials and semiconductors.
2	Operation and characteristics of diode and its applications.
3	Operation and V-I characteristics of BJT and its applications as amplifier.
4	Operation and V-I characteristics of FET including fundamentals of digital electronics with applications.
5	Theanalysis of feedback amplifiers, oscillators and operational amplifiers circuits.

Pre-requisites: Basic knowledge of solids, semiconductor physics and logic gates.

Course Contents / Syllabus

UNIT-I	**Semiconductors**	**6 hours**

Crystalline material: Mechanical properties, Energy band theory, Fermi levels; Conductors, Semiconductors & Insulators: electrical properties, band diagrams. Semiconductors: intrinsic & extrinsic, energy band diagram, P&N-type semiconductors, drift & diffusion carriers

UNIT-II	**Diodes and Diode Circuits**	**6 hours**

Formation of P-N junction, energy band diagram, built-in-potential, forward and reverse biased P-N junction, formation of depletion zone, V-I characteristics, Zener breakdown, Avalanche breakdown and its reverse characteristics; Junction capacitance and Varactor diode. Simple diode circuits, load line, linear piecewise model; Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation

UNIT-III	**Bipolar Junction Transistors**	**6 hours**

Formation of PNP / NPN junctions, energy band diagram; transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode, transistor action, injection efficiency, base transport factor and current amplification factors for CB and CE modes. Biasing and Bias stability: calculation of stability factor.

UNIT-IV	**Field Effect Transistors**	**6 hours**

Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD configurations; CMOS: Basic Principles.
Digital Electronics Fundamentals: Difference between analog and digital signals, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers, flip-flops, shift registers, counters

UNIT-V	**Feed Back Amplifier, Oscillators and Operational Amplifiers:**	**6 hours**

Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors; topologies of feedback amplifier; effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability; effect of positive feedback: instability and oscillation, condition of oscillation, Barkhausen criteria. Introduction to integrated circuits, operational amplified and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractor, Constant-gain multiplier, Voltage follower, Comparator, Integrator, Differentiator.

Course outcome: **Aftersuccessful completion of this course students will be able to:**	
CO 1	Explain and analyze the structure of crystalline materials and semiconductors.
CO 2	Analyze the diodes and their applications.

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CO 3	Explain the characteristics of BJT and analyze different amplifier circuits.
CO 4	Explain the operation and characteristics of FET and fundamental of digital electronics.
CO5	Explain and analyze the types of feedbackamplifierand op-amp circuits.

Text Books

1. Microelectronics Circuits, Adel S. Sedra and Kenneth Carless Smith, Oxford University Press.
2. Millman's Integrated Electronics, Jacob Millman, Christos Halkias, Chetan Parikh, McGraw Hill Education.
3. Digital Logic & Computer Design, M. Morris Mano, Pearson

Reference Books

1. Electronic Devices & Circuit Theory, 11th Edition, Robert L. Boylestad, Louis Nashelsky..
2. Solid State Electronic Devices, 6th Edition, Ben. Streetman, Sanjay Banerjee
3. Electronic Principle, Albert Paul Malvino.
4. Electronics Circuits:Discrete& Integrated, D Schilling C Belove T Apelewicz R Saccardi.
5. Microelectronics, Jacob Millman, Arvin Grabel.
6. Electronics Devices & Circuits, S. Salivahanan, N. Suresh Kumar, A. Vallavaraj

B. TECH FIRST YEAR			
Course Code	**ACSBS0206**	**L T P**	**Credits**

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.

Course Title	Fundamentals of Economics	2 0 0	02

Course Objective: Objective of this course is to

1	Understand the relative importance of Economics
2	Know how the application of the principles of managerial economics can aid in achievement of business objectives
3	Understand the modern managerial decision rules and optimization techniques.
4	Be equipped with the tools necessary in analysis of consumer behavior as well as in forecasting product demand
5	Understand and be able to apply latest pricing strategies
6	Understand and analyze the macro environment affecting the business decision making

Pre-requisites:

Course Contents / Syllabus

UNIT-I	Microeconomics	6 hours

Principles of Demand and Supply - Supply Curves of Firms - Elasticity of Supply; Demand Curves of Households - Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve); Welfare Analysis - Consumers' and Producers' Surplus - Price Ceilings and Price Floors; Consumer Behaviour - Axioms of Choice - Budget Constraints and Indifference Curves

UNIT-II	Consumer's Equilibrium	8 hours

Consumer's Equilibrium - Effects of a Price Change, Income and Substitution Effects -Derivation of a Demand Curve; Applications - Tax and Subsidies - Intertemporal Consumption - Suppliers' Income Effect; Theory of Production - Production Function and Iso-quants - Cost Minimization; Cost Curves - Total, Average and Marginal Costs - Long Run and Short Run Costs; Equilibrium of a Firm Under Perfect Competition; Monopoly and Monopolistic Competition

UNIT-III	Macroeconomics	8 hours

National Income and its Components - GNP, NNP, GDP, NDP; Consumption Function; Investment; Simple Keynesian Model of Income Determination and the Keynesian Multiplier; Government Sector - Taxes and Subsidies; External Sector - Exports and Imports; Money – Definitions

UNIT-IV	Demand for Money	6 hours

Demand for Money -Transactionary and Speculative Demand; Supply of Money - Bank's Credit Creation Multiplier; Integrating Money and Commodity Markets - IS, LM Model; Business Cycles and Stabilization - Monetary and Fiscal Policy - Central Bank and the Government; The Classical Paradigm - Price and Wage Rigidities - Voluntary and Involuntary Unemployment

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

CO 1	Students will be able to remember the concepts of micro economics and also able to understand the various micro economic principles to make effective economic decisions under conditions of risk and uncertainty.
CO 2	The students would be able able to understand the law of demand & supply & their elasticities , evaluate &analyze these concepts and apply them in various changing situations in industry . Students would be able to apply various techniques to forecast demand for better utilization of resources.
CO 3	The students would be able to understand the production concept and how the production output changes with the change in inputs and able to analyze the effect of cost to business and their relation to analyze the volatility in the business world
CO 4	The students would be able to understand & evaluate the different market structure and their different equilibriums for industry as well as for consumers for the survival in the

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	industry by the application of various pricing strategic
CO5	The students would be able to analyze the macroeconomic concepts & their relation to micro economic concept & how they affect the business & economy.

Text Books

1. Microeconomics, Pindyck, Robert S., and Daniel L. Rubinfeld.
2. Macroeconomics, Dornbusch, Fischer and Startz.
3. Economics, Paul Anthony Samuelson, William D. Nordhaus.

Reference Books

1. Intermediate Microeconomics: A Modern Approach, Hal R, Varian.
2. Principles of Macroeconomics, N. Gregory Mankiw

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Course Code	ACSBS0204	L T P	Credit
Course Title	Business Communication & Value Science – II	2 0 0	02

Course objective:

1	Develop effective writing, reading, presentation and group discussion skills.
2	Help students identify personality traits and evolve as a better team player.
3	Introduce them to key concepts of a) Morality b) Behavior and beliefs c) Diversity& Inclusion

Pre-requisites: Basic Knowledge of English (verbal and written)
Completion of all units from Semester 1

Course Contents / Syllabus

		45hours

- **Identification of common errors in written communication and ways of rectification**
- **Understanding speed reading techniques – Skimming and Scanning**
- **Application of reading and writing skills**
- **Analyzing personality traits and team player style**
- **Understanding the concepts of Morality, Diversity and Inclusion**
- **Application of these concepts**
- **Creation of communication material**
- **Experiencing diversity and organizing events to support inclusion**
- **Assignment – Assimilation of concepts and present them effectively**

Course Contents / Syllabus

UNIT-I	Communication Skills and Introduction to Effective writing	12Hours 20 mins

Icebreaker. 1) Participate in 'Join Hands Movement'. Individual identification of social issues.2) Each Individual chooses one particular social issue which they would like to address. 3) Class to be divided in teams for the entire semester. All activities to be done in teams and the grades, credit points will be captured in the leader board in the class room.4) Theory to introduce the participant Slam book to be used for capturing individual learning points and observations.
Research on the social cause each group will work for.
Class discussion- Good and Bad Writing. Common errors, punctuation rules, use of words.
Group Practical – As a group, they will work on the social issue identified by them. Research, read and generate a report based on the findings.(Apply the learning and recap from the session)
Practical: Plan and design an E Magazine. Apply and assimilate the knowledge gathered from Sem-1 till date. Share objective & guideline. All members to contribute an article to the magazine, trainer to evaluate the content
Lucid Writing: Encourage the students to go through the links given about Catherine Morris and Joanie Mcmahon's writing techniques
Create themagazine
SATORI – Participants share the personal take away acquired from GD, writing and reading skills activities captured in their handbook.Share the most important learning points from the activities done so far and how that learning has brought a change.
Launching an E Magazine
Quiz time

UNIT-II	Presentation techniques and Effective Reading skills	9 Hours

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.

Each group will form an NGO. Create Vision, Mission, Value statement, tagline and Design a logo
Introduction to basic presentation skills& ORAI app
Groups to present their NGOs. Apply the learning gathered from session 2. Presentation to be recorded by the groups. feedback from the audience/ Professor
Group to come back and share their findings from the recording. Post work- individual write up to be written and evaluated for the E- magazine
Prepare and publish the Second episode of the E Magazine.
Speed Reading session: Introduction to skimming and scanning; practice the same.
SATORI – Join the dots- Participants to connect their learning gathered from AIP Unit-2 with their existing curriculum
Quiz Time

UNIT-III	Team Work and Communication	04 Hours 5 min

Ad campaign- Brain storming session- Students to discuss and explore the means of articulating and amplifying the social issue their NGOs are working for.

(1) Theory to find out from the participants their views, observations and experiences of working in a team(2) Intro of Dr. Meredith Belbin and his research on team work and how individuals contribute. Cont.

Prepare and publish the third episode of the E Magazine
SATORI – (join the dots with participants' personal life) Participants share the personal take away acquired from working in teams, GD, learning about presentations, presenting their NGOs
Quiz Time

UNIT-IV	Concepts of Morality, Diversity and Behavioural Understanding	19 Hours 15min

Ten minutes of your time – a short film on diversity. Play the video (link to be attached in the FG)
Discuss key take away of the film. Theory to connect the key take away of the film to the concept of empathy.
Touch the target (Blind man) - Debriefing of the Practical.
Film: "The fish and I'' by BabakHabibifar" (1.37mins)
Groups to create a story – 10 minutes of a person's life affected by the social issue groups are working on. Narrate the story in first person. Professors to evaluate.
Research on a book, incident or film based on the topic of your respective NGO
Session on Diversity & Inclusion- Different forms of Diversity in our society.
Teams to video record interviews of people from diverse groups (Ask 5 questions). Share the recordings in FB
Debate on the topic of diversity with an angle of ethics, morality and respect for individual (In the presence of an external moderator). Groups will be graded by the professor.
Prepared speech- Every student will narrate the challenges faced by a member of a diverse group in 4 minutes (speech in first person).
Theory to give feedback to each student.
Discussion on TCS values, Respect for Individual and Integrity.
Prepare and publish the final episode of the E Magazine.
SATORI –Participants share the personal take away acquired from working in teams, GD, learning about presentations and understanding diversity inclusion.
Revisit your resume Include your recent achievements in your resume.**This will not be the part of any PPT or FG. It will be announced in the class and done as home work.**
Quiz Time
Project-1) Each team to look for an NGO/ social group in the city which is working on the issue their college group is supporting.
2) Invite the NGO/ social group to address their university students for couple of hours. Plan the entire event, decide a suitable venue in the university, gather audience, invite faculty members etc. (they need to get their plan ratified their professor). Outcome-- Host an interactive session with the NGO spokesperson

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Course Outcomes: Upon completion of the course, students shall have ability to

C2.6.1	Understand tools of structured written communication	[U]
C2.6.2	Use tools of structured written communication	[AP]
C2.6.3	Use electronic/social media to share concepts and ideas	[AP]
C2.6.4	Develop materials to create an identity for an organization dedicated to a social cause	[C]
C2.6.5	Understand the basics of presentation	[U]
C2.6.6	Apply effective techniques to make presentations.	[AP]
C2.6.7	Assess presentations based on given criteria	[E]
C2.6.8	Understand tools for quick reading.	[U]
C2.6.9	Apply the basic concept of speed reading, skimming and scanning.	[AP]
C2.6.10	Identify individual personality types and role in a team.	[U]
C2.6.11	Recognize the concepts of outward behavior and internal behavior	[AP]
C2.6.12	Understand the basic concepts of Morality and Diversity	[U]
C2.6.13	Create communication material to share concepts and ideas	[C]
C2.6.14	Argue on a topic based on morality and diversity	[E]
C2.6.15	Articulate opinions on a topic with the objective of influencing others	[C]
C2.6.16	Organize an event to generate awareness and get support for a cause	[C]

Text Book

There are no prescribed texts for Semester 2 – there will be handouts and reference links shared.

Reference Books

1. Guiding Souls : Dialogues on the purpose of life; Dr. A.P.J Abdul Kalam ;Publishing Year-2005; Co-author--Arun Tiwari
2. The Family and the Nation; Dr. A.P.J Abdul Kalam; Publishing year: 2015; Co-author: Acharya Mahapragya
3. The Scientific India: A twenty First Century Guide to the World around Us; Dr. A.P.J Abdul Kalam; Publishing year: 2011; Co-author- Y.S.Rajan
4. Forge Your Future: Candid, Forthright, Inspiring ;Dr. A.P.J Abdul Kalam; Publishing year: 2014

Web References:

1 ETHICS FUNDAMENTALS AND APPROACHES TO ETHICS

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https://www.eolss.net/Sample-Chapters/C14/E1-37-01-00.pdf

2. A Framework for Making Ethical Decisions

https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions

3. Five Basic Approaches to Ethical Decision-http://faculty.winthrop.edu/meelerd/docs/rolos/5_Ethical_Approaches.pdf

Online Resources:

1 https://youtu.be/CsaTslhSDI

2 https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8_T95M

3 https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y

4 https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be

5https://m.youtube.com/watch?v=7sLLEdBgYYY&feature=youtu.be

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B. TECH FIRSTYEAR			
Course Code	ACSBS0251	**L T P**	**Credit**
Course Title	**Statistical Methods Lab**	**0 0 2**	**01**

Name of Experiment

R statistical programming language:
Introduction to R, Functions, Control flow and Loops, Working with Vectors and Matrices, Reading in Data, Writing Data, Working with Data, Manipulating Data, Simulation, Linear model, Data Frame, Graphics in R

Data Source: www.rbi.org.in

Lab Course Outcomes:

CO 1	Implement statistical analysis techniques on variety of data for solving practical problems.
CO 2	Explore different types of data and file formats
CO 3	Analyze and prepare raw data for processing
CO 4	Perform exploratory data analysis using R and effectively visualize the outcome
CO 5	Effectively visualize the outcome using various charts and plots

B. TECH FIRST YEAR			
Course Code	**ACSBS0253**	**L T P**	**Credit**
Course Title	**Data Structures and Algorithms Lab**	**0 0 4**	**02**

Suggested List of Experiments	**CO**
1. Program to create and display linear array	CO1
2. Program to insert a data item at any location in a linear array	CO1
3. Program to delete a data item from a linear array	CO1
4. Program to implement linear search in an Array	CO1
5. Program to implement binary search in the sortedarray without recursion	CO1, CO4
6. Program to implement binary search in the sortedarray with recursion	CO1, CO4
7. Program to implement bubble sort in a non-recursive way	CO1, CO4
8. Program to implement selection sort in a non-recursive way	CO1, CO4
9. Program to implement insertion sort in a non-recursive way	CO1, CO4
10. Program to implement merge sort in a non-recursive way	CO1, CO4
11. Program to implement merge sort in a recursive way	CO1, CO4
12. Program to implement Queue Using array	CO1, CO3
13. Program to implement Circular Queue Using array	CO1, CO3
14. Program to implement Stack Operation using array	CO1, CO3
15. Program to implement the Single Linked List a. Insertion b. Deletion c. Traversal d. Reversal e. Searching f. Updation g. Sorting h. Merging	CO1
16. Program to implement the doubly Linked List a. Insertion b. Deletion c. Traversal d. Reversal e. Searching f. Updation g. Merging	CO1
17. Program to implement the circularly Single Linked List a. Insertion b. Deletion c. Traversal d. Reversal e. Searching f. Updation	CO1
18. Program to implement Queue Using linked list	CO1, CO3
19. Program to implement Circular Queue Using linked list	CO1, CO3
20. Program to implement Priority Queue Using linked list	CO1,

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	CO3
21. Program to implement Stack Operation using Linked list	CO1, CO3
22. Program to implement Tower of Hanoi	CO2
23. Program implementing Addition of two polynomials via Linked Lists	CO1
24. Program to implement binary tree using linked list a. Insertion b. Deletion c. Traversal d. Searching	CO1, CO5
25. Program to implement binary search tree using linked list a. Insertion b. Deletion c. Traversal d. Searching	CO1, CO5
26. Program to implement heap sort in a non-recursive way	CO1, CO4
27. Program to implement BFS algorithm	CO5
28. Program to implement DFS algorithm	CO5
29. Program to implement the minimum cost spanning tree	CO5
30. Program to implement the shortest path algorithm	CO5

Lab Course Outcome: At the end of course, the student will be able to		
CO1	Write programs for solving mathematical problems using array and linked list.	K3
CO2	Implement concept of recursion to solve complex problem.	K3
CO3	Implement various operations of stack and queue data structure.	K3
CO4	Write efficient sorting, searching programs.	K3
CO5	Implement program to solve real world problem using tree and graph data structure.	K3

Course Code	ACSBS0252	L T P	Credit
Course Title	Principles of Electronics Lab	0 0 2	01

Name of Experiment	CO
1. **Semiconductor Diodes and application**	CO1
i) To study the data sheet to understand specifications of – Diodes	CO1
ii) To draw the V-I Characteristics of Diode.	CO1
iii) To build half wave and Full wave rectifier circuits using diode.	CO1
2. Transistor circuits	CO2
i) To study the data sheet to understand specifications of – BJT	CO2
ii) To draw the V-I Characteristics of BJT and test BJT as a switch.	CO2
3. FET and Oscillator	CO3
i) To study the data sheet to understand specifications of – FET	CO3
ii) To draw the Drain and transfer Characteristics of FET and demonstrate BJT/FET as an oscillator	CO3
4. Feedback and Operational Amplifier (Op-Amp)	CO4
i) To study the data sheet to understand specifications of – OPAMP	CO4
ii) To build and test OPAMP as an Adder and Subtractor	CO4

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

CO 1	Demonstrate the diode V-I characteristics and input/output waveforms of rectifier circuits.
CO 2	Demonstrate the input and output characteristics of BJT and BJT as a switch.
CO 3	Draw the transfer and drain characteristics of FET and demonstrate BJT/FET as an Oscillator.
CO 4	Explaintheoperational amplifierand demonstrate op-amp as adder and subtractor.

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Course Code	ANC0201	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 fulfillment of the aims of environmental education and educational evaluations
5	To develop the capability of using skills to fulfill the required aims, to realize and solve environmental problems through social, political, cultural and educational processes

Pre-requisites: Basic knowledge of nature

Course Contents / Syllabus

UNIT-I	Nature Of Environment & Forest Resources, Food Resources & Associated Problems	8hrs

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.

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.

UNIT-II	Water Resources, Land Resources & Energy Resources & Associated Problems	8hrs

Water resources: Introduction to surface and ground water; water table; vertical distribution of water; formation and properties of aquifers; techniques for ground water recharge; river structure and patterns; watershed and drainage basins; importance of watershed and watershed management; rain water harvesting in urban settings. Marine resources; commercial use of marine resources; threats to marine ecosystem. Land resources: Land as a resource, land degradation, man induced landslides. Equitable use of resources for sustainable lifestyles.
Nonrenewable 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	8hrs

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	Environmental Changes and Human Health	8hrs

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Air pollution: sources of air pollution, Primary and secondary air pollutants. Origin and effects of SO_X, NO_X, CO_X, 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, Chemical disasters : Bhopal gas tragedy

UNIT-V	**Environmental Protection Through Assessment and Education**	**8hrs**

Basic concepts of sustainable development, Women education, Role of NGOs regarding environmental protection, Bio indicators and their role, Natural disasters and disasters management, Environmental Impact Assessment (EIA), general guidelines for the preparation of environmental impact statement (EIS), important environmental protection Policy and legislations.

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	K1,K2
CO 2	Understand the different types of natural recourses like food, forest, Minerals and energy and their conservation	K1.K2
CO 3	Understand the importance of biodiversity, Threats of biodiversity and different methods of biodiversity conservation.	K1,K2
CO 4	Understand the different types of pollution, pollutants, their sources, effects and their control methods.	K1,K2,K3
CO 5	Understand the basic concepts of sustainable development, Environmental Impact Assessment (EIA) and different acts related to environment	K1,K2,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 McGraw 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

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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

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