NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR

(AN AUTONOMOUS INSTITUTE)

NIET Greater Noida
An Autonomous Institute
Estd.2001
Get Future Ready

Affiliated to

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

Evaluation Scheme & Syllabus

For

Bachelor of Technology

Computer Science and Business Systems

First Year

(Effective from the Session: 2026-27)

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR

(AN AUTONOMOUS INSTITUTE)

Bachelor of Technology

Computer Science and Business Systems

Evaluation Scheme

SEMESTER-I

Sl. No.	Subject	Subject Name	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	DCSBS0106	Discrete Mathematics	Mandatory	3	0	0	30	20	50		100		150	3
2	DCSBS0105	Introductory Topics in Statistics, Probability and Calculus	Mandatory	3	0	0	30	20	50		100		150	3
3	DCSBS0103	Fundamentals of Computer Science	Mandatory	2	1	0	30	20	50		100		150	3
4	DCSBS0102	Principles of Electrical Engineering	Mandatory	2	0	0	30	20	50		50		100	2
5	DCSBS0101	Fundamentals of Physics	Mandatory	3	0	0	30	20	50		100		150	3
6	DCSBS0107	Indian Knowledge System (IKS)	Mandatory	2	0	0	30	20	50		50		100	2
7	DCSBS0104	Business Communication & Value Science – I	Mandatory	0	0	2				25		25	50	1
8	DCSBS0158	Problem Solving using Python	Mandatory	0	0	4				50		50	100	2
9	DCSBS0153	Fundamentals of Computer Science Lab	Mandatory	0	0	2				25		25	50	1
10	DCSBS0152	Principles of Electrical Engineering Lab	Mandatory	0	0	2				25		25	50	1
11	DCSBS0151	Fundamentals of Physics Lab	Mandatory	0	0	2				25		25	50	1
12		*Massive Open Online Courses (ForB.Tech. Hons. Degree)	*MOOCs											
		TOTAL		**15**	**1**	**12**							**1100**	**22**

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

S. No.	Subject Code	Course Name	University/ Industry Partner Name	N. of Hours	Credits
1.	DMC0001	Digital Edge 101	NASSCOM	30 h	2
2.	DMC0002	Programming Fundamentals using Python	Infosys Wingspan (Infosys Springboard)	66h 10m	4

PLEASE NOTE: -

- **A 3-4 weeks Internship shall be conducted during summer break after semester-II and will be assessed during semester-III**
- **Compulsory Audit (CA) Courses (Non-Credit - - Subject Code)**
  - All Compulsory Audit Courses (a qualifying exam) do not require any credit.
  - The 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.,
CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,
MOOCs: Massive Open Online Courses.

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Bachelor of Technology

Computer Science and Business Systems

Evaluation Scheme

SEMESTER-II

Sl. No.	Subject Codes	Subject	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	DCSBS0205	Linear Algebra	Mandatory	3	0	0	30	20	50		100		150	3
2	DCSBS0201	Statistical Methods	Mandatory	3	0	0	30	20	50		100		150	3
3	DCSBS0203	Object Oriented Programming	Mandatory	2	1	0	30	20	50		100		150	3
4	DCSBS0202	Principles of Electronics	Mandatory	3	0	0	30	20	50		100		100	3
5	DCSBS0206	Fundamentals of Economics	Mandatory	2	0	0	30	20	50		50		100	2
6	DCSBS0207	Universal Human Values & Professional Ethics	Mandatory	3	0	0	30	20	50		50		100	3
7	DCSBS0204	Professional English	Mandatory	2	0	0				25		25	50	2
9	DCSBS0253	Object Oriented Programming Lab	Mandatory	0	0	2				25		25	50	1
10	DCSBS0252	Principles of Electronics Lab	Mandatory	0	0	2				25		25	50	1
11	DNC0203	Essence of Indian Traditional Knowledge	Compulsory Audit	2	0	0	30	20	50			50	100	
		*Massive Open Online Courses (ForB.Tech. Hons. Degree)	*MOOCs											
		TOTAL		**18**	**1**	**4**							**1000**	**21**

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

S. No.	Subject Code	Course Name	University/ Industry Partner Name	N. of Hours	Credits
1.	DMC0003	Probability and Statistics	NASSCOM	30 h	2
2.	DMC0004	Object Oriented Programming Using Python	Infosys Wingspan (Infosys Springboard)	46h 13m	3.5

PLEASE NOTE: -

- **A 3-4 weeks Internship shall be conducted during summer break after semester-II and will be assessed during semester-III**

Compulsory Audit (CA) Courses (Non-Credit - DNC0203)

- All Compulsory Audit Courses (a qualifying exam) do not require any credit.
- The 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.,
CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,
MOOCs: Massive Open Online Courses.

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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 31 to 35 =2.5 Credit
6. For 36 to 41 =3 Credit
7. For 42 to 47 =3.5 Credit
8. For 48 and above =4 Credit

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

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

i. If he / she secures 7.50 as above CGPA.

ii. Passed each subject of that degree program in the single attempt without any grace.

iii. Successful completion of MOOCs based 20 credit

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
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Course Code: DCSBS0106	Course Name: Discrete Mathematics	L	T	P	C
Course Offered in: B.Tech -First Semester CSBS		**3**	**0**	**0**	**3**

Pre-requisite: Knowledge of Mathematics

Course Objectives: The course covers 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 Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Apply the basic principles of Boolean algebra and implementation of K Map	K3
CO2	Apply the fundamental concepts of sets, relations, and functions, and analyze the algebraic structures	K3,K4
CO3	To solve counting problem using recursive function theory.	K3
CO4	To design and use of non-linear data structure like trees and graph for circuit and network designing.	K6
CO5	Infer the validity of statements and construct proofs using predicate logic formulas.	K5

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3		3				1		2	3	2	
CO2	3	3		2		2					2	3		2
CO3	3	3		3	2						3	3		2
CO4	3	2	3	3	3	2		2	1		2	3	3	3
CO5	-	3		2			3		2		2			2

Course Contents / Syllabus

Unit 1	**Introduction to Boolean algebra**	**9 hours**

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

Unit 2	**Abstract algebra and Advanced algebra**	**9 hours**

Introduction to sets, types of sets, types of relations and functions, Group, rings, field

Unit 3	**Combinatorics and Recurrence relation**	**9 hours**

Basic counting, balls and bins problems, probability and combination, Solution of recurrences using generating function and characteristic equation, principle of mathematical induction, pigeonhole principle.

Unit 4	**Graph Theory and Trees**	**9 hours**

Graphs and digraphs, complement, isomorphism, connectedness and reach-ability, adjacency matrix, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs and tournaments, Planar graphs, Euler's formula, dual of a planer graph, independence number and clique number, chromatic number, statement of Four-color theorem, BFS, DFS, tree traversals

Unit 5	**Logics and Predicates**	**9 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.

Total Lecture Hours	**45 hours**

Textbook:

S.No	Book Title	Author
1	Topics in Algebra, John Wiley and Sons.	I. N. Herstein
2	Digital Logic & Computer Design, Pearson.	M. Morris Mano
3	Elements of Discrete Mathematics, (Second Edition) McGraw Hill, New Delhi.	C. L. Liu
4	Graph Theory with Applications, Macmillan Press, London.	J. A. Bondy and U. S. R. Murty
5	Mathematical Logic for Computer Science, World Scientific, Singapore.	L. Zhongwan

Reference Books:

S.No	Book Title	Author
1	Introduction to linear algebra.	Gilbert Strang
2	Introductory Combinatorics, North-Holland, New York.	R. A. Brualdi
3	Graph Theory with Applications to Engineering and Computer Science	N. Deo, Prentice Hall, Englewood Cliffs
4	Introduction to Mathematical Logic, (Second Edition), London.	E. Mendelsohn, Van-Nostrand

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://www.nptel.ac.in/courses https://nptel.ac.in/courses/106104573 https://onlinecourses.nptel.ac.in/e-learning/preview/noc25_cs26	40hrs 40hrs 40hrs
Video Lectures	**Unit 1** https://www.youtube.com/results?search_query=Gate+Smashers+Boolean+Algebra **Unit 2** https://www.youtube.com/results?search_query=Neso+Academy+Sets+Relations **Unit 3** https://www.youtube.com/results?search_query=Gate+Smashers+Combinatorics **Unit 4** https://www.youtube.com/results?search_query=Gate+Smashers+Graph+Theory **Unit 5** https://www.youtube.com/results?search_query=Neso+Academy+Predicate+Logic	35m 30m 35m 30m 30m
Web References	**1. NPTEL – Discrete Mathematics (IIT Roorkee)** https://nptel.ac.in/courses/111107058 **2. NPTEL – Discrete Mathematics for Computer Science (IIT Kanpur)** https://nptel.ac.in/courses/106104573 **3. GeeksforGeeks – Discrete Mathematics Tutorial** https://www.geeksforgeeks.org/engineering-mathematics/discrete-mathematics-tutorial/ **4. TPoint Tech – Discrete Mathematics Tutorial** https://www.tpointtech.com/discrete-mathematics-tutorial **5. MIT OpenCourseWare – Mathematics for Computer Science** https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-fall-2010/	

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
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Course Code: DCSBS0105	Course Name: Introductory Topics in Statistics, Probability and Calculus	L	T	P	C
Course Offered in: B.Tech -First Semester CSBS		3	0	0	3

Pre-requisite: Knowledge of Mathematics

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

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Explain types of statistical data, population, and sample.	K2
CO2	Apply the concept of measures of central tendency and dispersion to solve statistical problems.	K3
CO3	Explain the concept of combinatorial and conditional probability and Baye's theorem.	K2
CO4	Apply the concept of probability distribution and its properties to solve statistical problems.	K3
CO5	Apply the concept of differential and integral calculus to evaluate the double and triple integral.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	2	2				-				
CO2	3	3	3	3	2			2	1	1			
CO3	3	3	3	3	2			2	1	1	2		
CO4	3	3	3	3	2	2		2	1	1	2		
CO5	3	3	3	3	2	3			-	1	2		

Course Contents / Syllabus

Unit 1	**Introduction to Statistics**	**9 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 2	**Descriptive Statistics**	**9 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 3	**Probability**	**9 hours**

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

Unit 4	**Probability distributions**	**9 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 5	**Calculus**	**9 hours**

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

	Total Lecture Hours	**45 hours**

Textbook:

S.No	Book Title	Author
1	Introduction of Probability Models, , Academic Press, N.Y	S. M. Ross
2	Fundamentals of Statistics, vol. I & II, World Press.	A. Goon, M. Gupta and B. Dasgupta
3	Higher Engineering Mathematics, Khanna Publication, Delhi.	B. S. Grewal

Reference Books:

S.No	Book Title	Author
1	A first course in Probability, Prentice Hall.	S. M. Ross
2	Probability and Statistics for Engineers, (Fourth Edition), PHI.	I. R. Miller, J.E. Freund and R. Johnson
3	Introduction to the Theory of Statistics, McGraw Hill Education.	A. M. Mood, F.A. Graybill and D.C. Boes
4	Advanced Engineering Mathematics, (Seventh Edition), Thomson Learning.	Peter V. O'Neil
5	Advanced Engineering Mathematics, (Second Edition) Pearson Education.	M. D. Greenberg
6	Applied Mathematics, Vol. I & II, Vidyarthi Prakashan.	P. N. Wartikar and J. N. Wartikar

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://www.coursera.org/learn/stanford-statistics	13 Hrs
Video Lectures	**Unit 1** https://media.dev.nptel.ac.in/content/mp4/110/107/110107114/MP4/mod01lec01.mp4 https://media.dev.nptel.ac.in/content/mp4/110/107/110107114/MP4/mod01lec02.mp4 https://media.dev.nptel.ac.in/content/mp4/110/107/110107114/MP4/mod01lec03.mp4 https://media.dev.nptel.ac.in/content/mp4/110/107/110107114/MP4/mod01lec04.mp4 https://media.dev.nptel.ac.in/content/mp4/106/104/106104846/MP4/mod02lec10.mp4 https://media.dev.nptel.ac.in/content/mp4/106/104/106104846/MP4/mod02lec11.mp4 https://youtu.be/VDLyk6z8uCg?si=M7mMgoDkOY3NUJhv **Unit 2** https://media.dev.nptel.ac.in/content/mp4/106/104/106104846/MP4/mod02lec12.mp4 https://media.dev.nptel.ac.in/content/mp4/106/104/106104846/MP4/mod03lec15.mp4 https://youtu.be/miIpYdJqyiQ?si=f8PeubLwjM8JYfP_ https://media.dev.nptel.ac.in/content/mp4/106/104/106104846/MP4/mod03lec18.mp4 https://media.dev.nptel.ac.in/content/mp4/106/104/106104846/MP4/mod05lec24.mp4 https://media.dev.nptel.ac.in/content/mp4/106/104/106104846/MP4/mod05lec26.mp4 https://media.dev.nptel.ac.in/content/mp4/106/104/106104846/MP4/mod06lec30.mp4 https://media.dev.nptel.ac.in/content/mp4/106/104/106104846/MP4/mod08lec38.mp4 **Unit 3** https://media.dev.nptel.ac.in/content/mp4/110/107/110107114/MP4/mod01lec01.mp4 https://media.dev.nptel.ac.in/content/mp4/110/107/110107114/MP4/mod03lec13.mp4 https://media.dev.nptel.ac.in/content/mp4/110/107/110107114/MP4/mod03lec14.mp4	29.24m 31.04m 30.19m 28.20m 28:20m 21:22m 32:30m 37:20m 30:20m 3:20m 30:51m 29:20m 25:31m 36:37m 29:32m 29:58m 29:38m 33:26m

	https://media.dev.nptel.ac.in/content/mp4/110/107/110107114/MP4/mod03lec15.mp4	35:42m
	https://media.dev.nptel.ac.in/content/mp4/110/107/110107114/MP4/mod04lec17.mp4	30:20m
	https://www.nptel.ac.in/courses/110107114	2:02m
	Unit 4	
	https://youtu.be/V3iEsLPAD68?si=_KRgPtuof-BDketV	8:00m
	https://youtu.be/7MJ3b_J_ZCE?si=Ff_o76HEYlQoHMbg	18:30m
	https://youtu.be/l0ecMiNUZu8?si=3_NERUCSy4RGDIZ2	21:22m
	https://youtu.be/H2Ji-Q4MfqU?si=9yDpptqILf7uqDJC	12:48m
	https://youtu.be/L0zWnBrjhng?si=x6NELXQ_Zy8rgVlN	20:45m
	https://youtu.be/C8DLKwVRQeE?si=5bMCrg-Svsen0Ktw	16:15m
	https://youtu.be/m9a6rg0tNSM?si=15tJDX2Y9eQObb79	17:37m
	https://youtu.be/wDXMYRPup0Y?si=n86mUhxIW9MoM2iS	19:20m
	Unit 5	
	https://youtu.be/4KexRa716Co?si=2UmSiVP6zHhvpOC9	12:02m
	https://youtu.be/NfAXZXZHovY?si=69QK0vYffduNpIld	10:13m
	https://youtu.be/L7XAkC4NrEU?si=jAiTJ0thSzkDqEXB	10:12m
	https://youtu.be/L7XAkC4NrEU?si=G9vZpp8HqVTHkaph	10:17m
	https://youtu.be/9B5UDTdFdX4?si=qce8ZXMMh_C8mbZu	11:23m
	https://youtu.be/wiD15pJfh00?si=UMesXOZ9ITm_YX2Z	12:50m
	https://youtu.be/wiD15pJfh00?si=UqgwM3f8n8-TTPTb	10:08m
	https://youtu.be/76Boe8diTTc?si=ANQblJq8tqfRFhrJ	10:18m
	https://youtu.be/eocAMQYpjak?si=Yaexm8rRKpT7iZWh	15:02m
	https://youtu.be/ICzzjOYTzrc?si=BL2hxR3uz94BEG81	16:54m
	https://youtu.be/ICzzjOYTzrc?si=h8RtQM_bj2cqUUd7	12:54m
Web References		

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

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Course Code: DCSBS0103	**Course Name: Fundamentals of Computer Science**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech -First Semester CSBS		**2**	**1**	**0**	**3**

Pre-requisite: Basic knowledge of computers.

Course Objectives: 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.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Acquire a broad perspective about the uses of computers in engineering industry.	K1
CO2	Understand the concept of computers, algorithms, and algorithmic thinking.	K2
CO3	Apply conditional statements and looping constructs to solve basic programming problems.	K3
CO4	Implement arrays and perform operations such as traversal, search, and sorting.	K3
CO5	Apply more advanced features of C language like functions, pointers, and file handling.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	2	2	3	2	2
CO2	3	3	2	-	-	-	-	-	-	-	-	3	2	1
CO3	3	3	3	2	-	-	-	-	1	-	-	2	3	3
CO4	3	2	3	2	1	-	-	-	1	-	-	2	3	3
CO5	3	2	3	2	2	-	1	-	-	2	2	3	3	3

Course Contents / Syllabus

Unit 1	**Problem Solving and Introduction to C**	**9 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 2	**Data Types, Operators, and Expressions**	**9 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 3	**Control Flow and Functions**	**9 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.

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 4	**Arrays and Pointers**	**9 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 5	**Input/Output and File Handling**	**9 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, make file utility.

	Total Lecture Hours	**45 hours**

Textbook:

S.No	**Book Title**	**Author**
1	*Programming in ANSI C*, 8th Edition, McGraw Hill Education, 2021.	E. Balagurusamy,
2	*Computer Science: A Structured Programming Approach Using C*, 3rd Edition, Cengage Learning, 2019.	Behrouz A. Forouzan & Richard F. Gilberg,

Reference Books:

S.No	**Book Title**	**Author**
1	The C Programming Language*, 2nd Edition, Pearson Education, 2022 (Reprint).*	Brian W. Kernighan & Dennis M. Ritchie,
2	Programming in C*, 2nd Edition, Oxford University Press, 2021.*	Reema Thareja,

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://nptel.ac.in/courses/106/105/106105171/	40-42 hrs.
Video Lectures	https://youtu.be/IdXrCPzNnkU?si=-0iwaDVvMorMfZVt https://youtu.be/TZ_FrgbHqGk?si=Sc3fIuIvTq7aJEPl https://youtu.be/r0TLaa3KIvI?si=rnqbcjhdhtX3W2aB https://youtu.be/50kKQUQc1Qs?si=l_YzeDKn22IfQQXa https://youtu.be/t9WKOcRB63Q?si=jnoLxdSSAxltEXPr	35m 30m 29m 30m 29m
Web References	1. https://en.cppreference.com/w/c 2. https://www.gnu.org/software/c-intro-and-ref/manual/ 3. https://www.geeksforgeeks.org/c-programming-language/ 4. https://www.programiz.com/c-programming 5. https://nptel.ac.in/courses/106104128	

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
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Course Code: DCSBS0102	Course Name: Principles of Electrical Engineering	L	T	P	C
Course Offered in: B.Tech -First Semester CSBS		2	0	0	2

Pre-requisite: Physics and mathematics

Course Objectives: The student will learn about the various electrical elements, laws and theorems used for analysis of electrical circuits along with steady state behaviour of single phase and three phase AC electrical circuits, Electrostatics, Magnetic Circuit and different types of safety devices, measuring instruments and sensors, earthing, wiring and working application of batteries.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Describe the basics of electrical parameters and apply concept of KVL/KCL in solving DC circuits.	K1, K2
CO2	Apply the concepts of theorems in solving DC circuits.	K2,K3,K5
CO3	Analyze the steady state behavior of single phase and three phase AC electrical circuits.	K4
CO4	Explain the concept of Electrostatics and Magnetic Circuit.	K2, K4
CO5	Describe concept of sensor/transducer, Components of distribution system, earthing and wiring.	K1, K2

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	-	1	1	2	-	-	-	2	2	2
CO2	3	2	1	-	1	2	2	-	-	-	2	2	2
CO3	3	3	2	-	2	2	2	-	-	-	2	2	2
CO4	3	3	2	-	2	3	2	-	-	-	2	2	2
CO5	3	3	2	-	3	3	2	-	-	-	2	2	2

Course Contents / Syllabus

Unit 1	**Introduction**	**6 hours**

Fundamental linear passive and active elements to their functional current-voltage relation, voltage source and current sources, ideal and practical sources, Kirchhoff-s laws and applications to network solutions using mesh and nodal analysis, Concept of work, power, energy, and conversion of energy.

Unit 2	**Basic network**	**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 3	**Concept of AC**	**6 hours**

AC waveform definitions, form factor, peak factor, phasor representation in polar and rectangular form, concept of impedance, admittance, complex power, power factor, Study of R-L, R-C, RLC series circuit, R-L-C parallel circuit, single phase and three phase concept.

Unit 4	**Electrostatics and Electro-Mechanics**	**6 hours**

Electrostatic field, electric field strength, concept of permittivity in dielectrics, energy stored in capacitors, charging and discharging of capacitors. Electro Magnetism, magnetic field and Faraday's law, Magnetic materials and B-H curve, Self and mutual inductance, Ampere's law, Electromechanical energy conversion.

Unit 5	**Measurements and Sensors**	**6 hours**

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). Concept of indicating and integrating instruments.

Practical considerations: Electrical Wiring types and accessories, Illumination system, Basic layout of the distribution system, Types of earthing, Safety devices & systems. Battery principles and types.

Total Lecture Hours	**30 hours**

Textbook:

S.No	Book Title	Author
1	Electric Machinery,(Sixth Edition)	A.E. Fitzgerald, Kingsely Jr Charles
2	A Textbook of Electrical Technology,(vol. I)	B. L. Theraja
3	Basic Electrical Engineering	V. K. Mehta
4	Theory and problems of Basic Electrical Engineering, (SecondEdition)	J. Nagrath and Kothari

Reference Books:

S.No	Book Title	Author
1	Basic of Electrical Engineering	T. K. Nagsarkar and M. S. Sukhija
2	Introduction to Electrodynamics	D. J. Griffiths
3	Engineering Circuit Analysis	William H. Hayt& Jack E. Kemmerly

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://nptel.ac.in/courses/117106108	20hrs
Video Lectures	**Unit 1**	
	https://youtu.be/ypoNMq1sLmw?si=47bpze9NjtcOxLcl	35m
	https://youtu.be/HoedRcK9xGs?si=J56lvw_73cs3ER8N	23m
	https://youtu.be/lxU3M8EHyRs?si=sO-Qeq1AJYioV3-e	1hr10m
	https://youtu.be/KtHqOtCVAvc?si=M14WyKB8JVnnpcic	28m
	Unit 2	
	https://youtu.be/O35H8vaNb0M?si=mcsaOxAplPmgH_Di	11m
	https://youtu.be/7tocmbZDx_Q?si=zFvSqeYJfP27EA_v	15m
	https://youtu.be/Sk2z3K4l-m8?si=1ERjqrx6ci1XcTGW	25m
	https://youtu.be/8MfWtUrvy5w?si=o52XiEsDYnDHoUo6	17m
	https://youtu.be/EN4QU2OczQI?si=3kJf9g0cDIx0NV4e	17m
	Unit 3	
	https://youtu.be/vPAm_s7Roac?si=4ZD8NTy-UUuO4rYU	24m
	https://youtu.be/ZMJY6BRjx2c?si=C0IQpGsw48fYo9b5	7m
	https://youtu.be/ys94M28_C04?si=T8b6DIlOa1D1BkJN	9m
	https://youtu.be/_clkt8Ash-Y?si=wdD5ArmqquNgDnd6	7m
	https://youtu.be/nynQb1oB9KI?si=3Bf0EhCUB8xBZacx	4m
	https://youtu.be/r97cKTLoS74?si=FdX8wcKwmuZV3IGY	20m
	https://youtu.be/nuRrCY7bbSk?si=OgSbmHXKjzZx_eEc	22m
	https://youtu.be/KylJ2v1_c-o?si=4_2-jGnaD_sqXsIu	27m

	https://youtu.be/YLGrugmDvc0?si=q_R6PkYQafbBCrvp	20m
	https://youtu.be/V7oiaN9LutI?si=NMsLDUosovW44Kka	12m
	https://youtu.be/ivP_8w4FegE?si=1WL5OF7csuHxAn_q	8m
	https://youtu.be/Posaa5Ok76Q?si=0sLuzFlM58wkv2JO	21m
	Unit 4	
	https://youtu.be/CBZDHV2DRQY?si=DIJua0f7DiC9cz0n	70m
	https://youtu.be/Ln-q_blQnAE?si=R8tMnqnjV7VPBQyy	7m
	https://youtu.be/EysqPTxInvo?si=oMMzyjF-ib--mxqX	7m
	https://youtu.be/kc-SCAkOcO4?si=XIswvM3ClYCQgale	65m
	https://youtu.be/XoVW7CRR5JY?si=kYnRGdyygqSlzqct	15m
	https://youtu.be/npls3sQP7xk?si=oYJmf41sBBx9ETep	3m
	https://youtu.be/hoTInTKij0o?si=cR-Ia4v_mruGZ-RR	11m
	https://youtu.be/6E19al9dEno?si=98lEX9kXY3BADj3T	12m
	https://youtu.be/FZ3saUFpDHM?si=qIjBcesfYRVyVzIb	3m
	https://youtu.be/OsJa_P2k8m4?si=1G_hCKTqdlWh29rT	2m
	Unit 5	
	https://youtu.be/qxqGIGjyYTU?si=WL8tQRqb1cKxypPC	7m
	https://youtu.be/UAGbmctio0M?si=YoMYEQmuh3US6_7N	14m
	https://youtu.be/UONBW3fTS5s?si=bPrMa8KIydV_N9wG	25m
	https://youtu.be/9H9Atf9NkVY?si=97N5C2MJUHLQp0hK	8m
	https://youtu.be/eMR1rT8p-oA?si=9FYcloaiuc-hdBZ_	5m
	https://youtu.be/1VbKExNbqqk?si=CKCpOcNYRAO5A-0Q	13m
	https://youtu.be/PMxlCyYs7S4?si=27gKFugZtX_8zbx-	13m
Web References		

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
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Course Code: DCSBS0101	Course Name: Fundamentals of Physics	L	T	P	C
Course Offered in: B.Tech -First Semester CSBS		3	0	0	3

Pre-requisite:

1. Newton's law of motion.
2. Scalar and vector (gard, div. and curl)
3. Basic laws of optics.
4. Basic laws of electricity and magnetism.
5. Atomic structure and atomic spectra.
6. Properties of matter.
7. Basics of Heat and thermodynamics.

Course Objectives:

1.To provide the knowledge of different wave motions and their uses in engineering applications.
2. To provide the knowledge of law of optics.
3. To provide the knowledge of the basic concept of Electromagnetics and semiconductors.
4. To provide the knowledge of the basic concept of thermodynamics 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.

Course Outcome: After completion of the course, the student will be able to:		Bloom's Knowledge Level (KL)
CO1	Understand the different types of wave motions and their uses in engineering applications.	K2
CO2	Apply the laws of optics.	K3
CO3	Apply the concept of electromagnetics and semiconductors.	K3
CO4	Define the phenomenon of thermodynamics & to apply the ideas in engineering applications.	K1
CO5	Predict the working of modern engineering tools and techniques of optical fiber and laser.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	-	2	2	-	-	-	-	2	-	-
CO2	3	2	1	-	1	2	-	-	-	-	2	-	-
CO3	3	3	1	-	2	2	-	-	-	-	2	-	-
CO4	3	2	2	-	2	3	-	-	-	-	2	-	-
CO5	3	2	2	-	2	2	-	-	-	-	2	-	-

Course Contents / Syllabus

Unit 1	**Oscillation**	**9 hours**

Periodic motion-simple harmonic motion-characteristics of simple harmonic motion-vibration 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.

Unit 2	**Interference, Diffraction & Polarization**	**9 hours**

Interference-principle of super position-Young's experiment, Theory of interference fringes-types of interference-Fresnel's prism-Newton's rings, Diffraction-Two kinds of diffraction-Difference 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 of light: 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 3	**Basic Idea of Electromagnetisms and Semiconductor Physics**	**9 hours**

Continuity equation for current densities, Maxwell's equation in vacuum and non-conducting medium.
Conductor, Semiconductor and Insulator; Basic concept of Band theory.

Unit 4	**Thermodynamics**	**9 hours**

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.

Unit 5	**Laser and Fiber optics**	**9 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.

	Total Lecture Hours	**45 hours**

Textbook:

S.No	**Book Title**	**Author**
1	Concepts of Modern Physics	A. Beiser
2	Fundamentals of Physics	David Halliday, Robert Resnick and Jearl Walker

Reference Books:

S.No	**Book Title**	**Author**
1	Optics, (Fifth Edition),	Ajoy Ghatak
2	University Physics	Sears & Zemansky
3	Fundamentals of Optics	Jenkins and White

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://www.coursera.org/learn/physics-fundamentals-oscillations	11:18hrs
	https://www.coursera.org/learn/light-materials?specialization=waves-optics	17hrs
	https://www.coursera.org/learn/geometrical-physical-optics?specialization=waves-optics	20hrs
Video Lectures	**Unit 1 (Oscillation)**	
	http://digimat.in/nptel/courses/video/115106119/L01.html	00:27:10
	http://kcl.digimat.in/nptel/courses/video/122104015/L27.html	00:59:21
	http://kcl.digimat.in/nptel/courses/video/122104015/L28.html	0:58:50
	http://kcl.digimat.in/nptel/courses/video/122104015/L29.html	01:03:25
	http://digimat.in/nptel/courses/video/115106119/L12.html	00:32:25
	http://digimat.in/nptel/courses/video/115106119/L06.html	00:23:41
	http://digimat.in/nptel/courses/video/115106119/L07.html	00:34:58
	http://digimat.in/nptel/courses/video/115106119/L13.html	00:42:41
	http://digimat.in/nptel/courses/video/115106119/L08.html	00:30:48
	http://digimat.in/nptel/courses/video/115106119/L10.html	00:27:08
	http://digimat.in/nptel/courses/video/115106119/L11.html	00:33:41
	Unit 2 (Interference, Diffraction & Polarization)	
	http://acl.digimat.in/nptel/courses/video/115105537/L06.html	00:33:21
	https://nptel.ac.in/courses/115107131	00:32:38

	http://acl.digimat.in/nptel/courses/video/115105537/L18.html	00:38:46
	https://www.youtube.com/watch?v=yN9ZkCtPGAc	00:33:48
	https://nptel.ac.in/courses/115105120	00:41:44
	https://nptel.ac.in/courses/115107131	00:40:17
	https://nptel.ac.in/courses/115105120	00:35:29
	https://nptel.ac.in/courses/115105120	00:36:23
	https://nptel.ac.in/courses/115107131	00:28:29
	http://acl.digimat.in/nptel/courses/video/115105537/L22.html	00:31:15
	http://acl.digimat.in/nptel/courses/video/115105537/L23.html	00:34:49
	http://acl.digimat.in/nptel/courses/video/115105537/L30.html	00:32:11
	https://nptel.ac.in/courses/115107131	01:04:07
	http://acl.digimat.in/nptel/courses/video/115105537/L45.html	00:30:39
	http://acl.digimat.in/nptel/courses/video/115105537/L46.html	00:32:07
	https://nptel.ac.in/courses/115107131	00:29:02
	http://acl.digimat.in/nptel/courses/video/115105537/L34.html	00:33:51
	https://nptel.ac.in/courses/115107131	00:21:50
	http://acl.digimat.in/nptel/courses/video/115105537/L39.html	00:30:49
	https://www.youtube.com/watch?v=JZQP6stcFTU	00:51:23
	http://acl.digimat.in/nptel/courses/video/115105537/L52.html	00:37:57
	https://nptel.ac.in/courses/115107131	00:25:11
	https://nptel.ac.in/courses/115107131	00:26:01
	https://nptel.ac.in/courses/115107131	00:36:36
	Unit 3 (Basic Idea of Electromagnetisms and Semiconductor Physics)	
	https://www.youtube.com/watch?v=8wM7_vgBSQA	00:41:39
	http://www.digimat.in/nptel/courses/video/115105132/L63.html	00:29:47
	https://nptel.ac.in/courses/108104087	00:26:23
	http://www.digimat.in/nptel/courses/video/115105132/L64.html	00:39:32
	https://www.youtube.com/watch?v=tnFhzva16wE	00:31:46
	https://nptel.ac.in/courses/115105099	00:33:55
	Unit 4 (Thermodynamics)	
	https://www.youtube.com/watch?v=ZjMVUSp2LLM	00:29:36
	http://www.digimat.in/nptel/courses/video/127106135/L15.html	00:14:05
	https://nptel.ac.in/courses/101104063	00:47:56
	http://www.digimat.in/nptel/courses/video/127106135/L20.html	00:29:00
	nptel.ac.in/courses/101104063	00:55:47
	https://nptel.ac.in/courses/101104063	00:45:37
	http://www.digimat.in/nptel/courses/video/127106135/L63.html	00:24:34
	http://www.digimat.in/nptel/courses/video/127106135/L59.html	00:16:42
	http://www.digimat.in/nptel/courses/video/127106135/L60.html	00:35:46
	http://www.digimat.in/nptel/courses/video/127106135/L61.html	00:11:31
	https://nptel.ac.in/courses/101104063	00:54:56

	Unit 5 (Laser and Fiber optics)	
	http://www.digimat.in/nptel/courses/video/115102124/L03.html	00:38:57
	https://nptel.ac.in/courses/115101639	00:30:17
	http://www.digimat.in/nptel/courses/video/115101639/L23.html	00:29:15
	https://nptel.ac.in/courses/115101639	00:29:44
	https://nptel.ac.in/courses/115101639	00:26:52
	https://nptel.ac.in/courses/104104085	00:28:11
	https://nptel.ac.in/courses/104104085	00:31:42
	https://nptel.ac.in/courses/104104085	00:32:26
	https://nptel.ac.in/courses/115107095	00:32:45
	https://nptel.ac.in/courses/108104113	00:28:24
Web References		

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
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Course Code: DCSBS0107	Course Name: Indian Knowledge System (IKS)	L	T	P	C
Course Offered in: B.Tech -First Semester CSBS		2	0	0	2

Pre-requisite: Basic understanding of Indian Culture and system

Course Objectives:

- To provide students with a comprehensive understanding of Indian culture, its knowledge systems, and historical roots, fostering analytical skills to evaluate cultural concepts.
- To enhance students' knowledge of India's rich heritage, including its history, engineering technology, architecture, and traditional wisdom, while exploring their relevance to modern living ideals.
- To understand the approaches in Indian Traditional Knowledge on Environmental Protection and Sustainable growth
- To integrate ancient Indian wisdom with modern scientific paradigms, enabling students to recognize its scientific value and compare it with contemporary knowledge systems.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Demonstrate an in-depth understanding of Indian cultural heritage, knowledge systems, and historical developments, with the ability to critically analyze their relevance in contemporary contexts.	K1
CO2	Apply insights from ancient Indian wisdom to enhance scientific thinking, ethical decision-making, and sustainable living practices in alignment with modern societal needs.	K2
CO3	Adopt sustainable growth approach of the Indian Knowledge System in modern scientific and technological practices.	K3
CO4	Integrate ancient Indian wisdom with modern scientific paradigms recognizing its scientific value.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	1	2	1	1	2	1	3	
CO2	-	-	-	-	-	1	2	1	1	2	1	3	
CO3	-	-	-	-	-	-	2	-	1	2		3	
CO4	-	-	-	-	-	-	2	-	1	2		3	

Course Contents / Syllabus

Unit 1	Introduction to Indian Knowledge System	8 hours

Introduction:

Indian Traditional/Indigenous Knowledge: Definition, Types, Scope and Importance 14 branches of learning in ancient India- purāṇa, nyāya, mīmāṁsā, dharmaśāstra, six vedānga-s: (śikṣā, vyākaraṇa, nirukta,chanda, jyotiṣa, kalpa) and four Vedas- rigveda, yajurveda, sāmaveda and atharvaveda;Upaveda-s; śāstra-s, 18 purāṇāsa-s, their names and five general characteristics of purāṇa-s - sarga, pratisarga, vaṃśa, manvantara and *vaṃśānucarita*. *Vedāngs* **IKS as a Multidisciplinary Domain**: Philosophy, Science, Technology, Arts and literature. **Traditional Education System**: Takshashila and Nalanda University; Pedagogical Methods: Gurukula system, Oral traditions, and Experiential learning. **Indian Culture**: Definition, Characteristics, Importance, and Scope; Influence of Historical Invasions, Trade, and Colonization on Indian Culture; Influence of Geography on Indian Cultural Practices. **Sources of Knowledge on Indian Culture**: Archaeological, Literary, and Traditional Practices. **Civilization and Technological Advances**: Pre-Harappan and

Saraswathi Civilization, Sindhu Valley Civilization - Town planning, drainage systems, water conservation, and marine technology. **Influence of Social and Political Structures** on Cultural Growth and Knowledge Transmission; Concepts of Purusharthas, Varnashrama dharma, Chatur ashrama dharma		
Unit 2	**IKS in Economy, Health and Environmental Sustainability**	**8 hours**
Scientific and Technological Sustainability Practices: Vedic and Post-Vedic Records, Architectural Principles, Water Harvesting Systems, Agricultural Techniques, and Environmental Sustainability Practices. **Economic and Industrial Contribution's**. **IKS's role in Pharmaceuticals, Agriculture, Textiles** Handicrafts, Cosmetics, and Eco-friendly Innovations. **Holistic Healthcare and Ayurveda**: Origins, Core Philosophy, and Concepts of Tridosha (Vata, Pitta, Kapha); Facets of Yoga, Ayurvedic Healing, Panchakarma, and Rejuvenation Practices. **Sustainability and Innovation**: Traditional Knowledge (TK) as a Driver in Environmental Conservation and Green Technologies **Government Initiatives and Community Empowerment**: Role of TKDL, AYUSH Ministry, and NIF in Preserving and Promoting Traditional Knowledge - Geographical Indications (GI)		
Unit 3	**IKS in Engineering, Science, and Technological Innovations**	**6 hours**
Mathematical Innovations: Contributions of Aryabhata, Brahmagupta, and Bhaskara I & II; Decimal System, Zero, Algebra, Trigonometry, Calculus, and Vedic Mathematics **Material Science and Metallurgy**: The Iron Pillar of Delhi, Wootz Steel, Zinc Extraction, and Laboratory developments **Science and Astronomy**: Fundamental Concepts in Matter, Life, and the Universe; Panchabhutas: Ancient Indian Understanding of Natural Elements; Gravity, Sage Agastya's model of the battery. **Astronomy and Cosmology**: Vedic Cosmology, Celestial mechanics, timekeeping, planetary models, solar/lunar phenomena, and the velocity of light in ancient texts. **Historically significant theories or texts**: Vimanika Shastra (Aeronautics) and Ancient Indian Theories on Flight and Propulsion		
Unit 4	**IKS in Cultural Heritage and Artistic Expressions**	**8 hours**
Literature and Intellectual Traditions: Vedas, Upanisads, Puranas, Ramayana Mahabhartha; Classical Literature: Kalidasa, Banabhatta, Tirukkural, Panchatantra, Jataka Tales and Hitopadesha; Dravidian Languages and Literary Heritage Kannada, Tamil (Sangama), Malayalam, Telugu **Ethical and Value-Based Knowledge** in Sacred Texts and Cultural Narratives **Art and Architecture**: Indus Valley Artifacts and Symbols; Temple Architecture: Nagara, Dravidian, and Vesara Styles; Folk Art and Craft Traditions **Performing Arts and Music**: Classical Dance Forms; Classical Music Traditions; Traditional Theatre; Folk Arts		
	Total Lecture Hours	**30 hours**

Textbook:

S. No	Book Title	Author
1	Traditional Knowledge System in India, Atlantic Publishers, 2002.	Jha, A.

Reference Books:

S. No	Book Title	Author
1	Knowledge Traditions and Practices of India, 2012	Kapoor, K., & Danino, M.

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://iks.cdxonline.in/ https://iks.iitgn.ac.in/	
Video Lectures	https://iks.iitgn.ac.in/ https://iksindia.org/	10hrs
Web References	Official IKS Division Portal (Ministry of Education) IIT Gandhinagar IKS Centre Repository [Videofile]. Retrieved from https://www.youtube.com/watch?v=LZP1StpYEPM	

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Course Code: DCSBS0104	Course Name: Business Communication & Value Science - I	L	T	P	C
Course Offered in: B.Tech -First Semester CSBS		0	0	2	1

Pre-requisite: Comprehension of Basic English Language

Course Objectives:

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

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Recognize the need for life skills, values, and own strengths and weaknesses.	K2
CO2	Apply life skills to different situations.	K3
CO3	Understand the basic tenets of communication.	K3
CO4	Apply the basic communication practices in different types of communication.	K2

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	1	-	2	1	1	1		
CO2	1	-	-	-	-	1	-	2	2	1	1		
CO3	1	1	1	-	-	1	1	2	2	2	1		
CO4	1	1	1	1	1	1	1	2	1	3	1		

Course Contents / Syllabus

Unit 1	**Foundations of the Business Communication**	**3 hours**

Overview of LOL: Leadership Oriented Learning (include activity on introducing self)

Overview of business communication Lecture with videos

Self-awareness – Identity, body awareness, stress management

Quiz

Unit 2	**Applications of Business Communication**	**3 hours**

Understanding Life Skills: Introduction to life skills, what are the critical life skills

Life skills: Stress management, working with rhythm and balance, colors, and teamwork

Expressing self: Connecting with emotions, visualizing and experiencing purpose

Unit 3	**Effective Business Communication**	**5 hours**

Essential Grammar - I: Tenses: Applications of tenses in Functional Grammar - Take a quiz and then discuss

Sentence formation (General & Technical)

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

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

Evaluation on Listening skills - Listen to recording and answer questions based on them

Unit 4	**Business Communication for Professional Growth**	**4 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. **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

Total Lecture Hours	**15 hours**

Textbook:

S. No	Book Title	Author
1	ABC Workbook, Meerut, 2023	NIET Publishing House

Reference Books:

S. No	Book Title	Author
1	English vocabulary in use	Alan McCarthy 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

Required Software and tools

British Council English Score Mobile App

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	**Listening** https://www.youtube.com/watch?v=Snve4Y8dMno https://www.youtube.com/watch?v=d27bn5k9Mjw&t=101s	59m 1hr
	Speaking https://www.youtube.com/watch?v=pImF1JkpAjo&list=PLLy_2iUCG87Dz7sxcJrCV2xbjw-x46g7w&index=7 https://www.youtube.com/watch?v=STVxfk_relw&list=PLp02GGDX5DIoMkblgrYhq91rF7_JZsf4-&index=25	58m 1hr
	Reading https://www.youtube.com/watch?v=2h1Oaifi8mw&list=PLzf4HHlsQFwIDV-HfgMEYY7f5Jw6FmxrK&index=3 https://www.youtube.com/watch?v=jJUXEcMR6Ys&list=PLzJaFd3A7DZtnTdtOxvjO3GLPd1WVe6oq&index=6	56m 1hr
	Writing https://www.youtube.com/watch?v=RASpQtZI06E&list=PLLy_2iUCG87AuIWZ3qnjA1GriD-IGF3Za&index=9 https://www.youtube.com/watch?v=ekFRWnPV6lc&t=535s	59m 1hr
Video Lectures	https://www.youtube.com/watch?v=JlKU_WT0Bls https://www.youtube.com/watch?v=HAnw168huqA https://www.youtube.com/watch?v=Unzc731iCUY	55m 1hr 1hr

	https://www.youtube.com/watch?v=1SUOWEy04l8 https://www.youtube.com/watch?v=Z4K2v3kRZrY https://www.youtube.com/watch?v=8o8rK9n1c3Y https://www.youtube.com/watch?v=Hdi1S52bhNg https://www.youtube.com/watch?v=U9M2g7RZ6mQ https://www.youtube.com/watch?v=Q8x9G0X8Y7E	1hr 50m 45m 1hr 55m 45m
Web References	**Listening** https://www.researchgate.net/publication/394276570_Developing_Listening_Comprehension_Using_Podcasts_in_Second_Language_Education_A_Systematic_Overview_of_Recent_Pedagogical_Innovations_2019-2025 https://www.tandfonline.com/doi/full/10.1080/10904018.2013.813234#d1e729 **Speaking** https://files.eric.ed.gov/fulltext/EJ1460111.pdf https://www.jetir.org/papers/JETIR2410126.pdf **Reading** https://ijrpr.com/uploads/V6ISSUE2/IJRPR38781.pdf https://files.eric.ed.gov/fulltext/EJ1332254.pdf **Writing** https://www.sciencedirect.com/science/article/pii/S2405844024129076 https://files.eric.ed.gov/fulltext/EJ1329510.pdf	

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LAB Course Code: DCSBS0158	LAB Course Name: Problem Solving using Python	L	T	P	C
Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/CYS/ AIML-TWIN/ECE/ECE(VLSI)/ME/M.Tech(Integrated)/CSBS		0	0	4	2

Pre-requisite: Basic Computer Knowledge, Logical Thinking & Basic Mathematics

Course Objectives: To provide Basic knowledge of Python programming and to implement programming skill for solving real world problems

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Apply basic Python constructs (variables, data types, control flow)	K2
CO2	Develop modular programs using functions, recursion, and modules.	K4
CO3	Use data structures, file operations, and exception handling in Python.	K5
CO4	Implement object-oriented concepts	K4
CO5	Build GUI applications using Tkinter and OOP techniques.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	1	-	2	-	-	1	-	-	2			
CO2	3	2	2	1	2	-	-	1	-	-	2			
CO3	2	2	2	1	1	-	-	1	-	-	2			
CO4	3	3	2	1	2	-	-	1	-	-	2			
CO5	3	3	2	-	2	-	-	1	-	2	2			

Course Contents / Syllabus

Unit 1	**Introduction**	**14 hours**

Introduction: A Brief History of Python, Applications areas of python, Keywords and Identifiers, variables, data types and type conversion, Indexing and Slicing, operators in python, Operator precedence and associativity, Conditional Statements: if statement, if-else statement, Nested-if statement and elif statements. Loops: Purpose and working of loops, while loop, for loop, else with loop statement, Nested Loops, break, continue and pass statement.

Unit 2	**Function and Modules**	**15 hours**

Function: Built in function, user defined function, Function arguments, passing functions to a function, recursion, Lambda functions, Namespaces. Functional Programming: higher order functions, Map, filter, Reduce. Closures and its characteristics, Decorators, decorating function with argument and iterator, Modules and Packages: Importing Modules, writing own modules, Standard library modules, Packages in Python.

Unit 3	**Basic Data structures, Exception and File Handling**	**14 hours**

Python Basic Data Structures: Strings, Basic operations of strings, comparing strings, string formatting, Built-in string methods and function, Lists, Tuples, Sets and Dictionaries with built-in methods, List Comprehension. Exception Handling: Errors, Run Time Errors, Try-except statement, Raise, Assert. Files and Directories: Open a File, Reading and Writing data from files close a File, Read and Write operation.

Unit 4	Object Oriented Concepts	14 hours
Object-oriented programming: User-defined classes, Object as an argument, Class variables and Instance variables, Constructor, Parameterized constructor, Encapsulation: Introduction, Data hiding, Instance methods, Class method, Static methods, property method, Magic Methods in python, Instances as Return Values.		
Unit 5	**Advanced Object-Oriented Techniques and GUI Programming**	**15 hours**
Introduction to inheritance, Types of inheritance, super () function, Abstract class, Polymorphism: Method overriding, Method Overloading. Tkinter: Creating a GUI Application, Widgets: Frame, Label, Button, Entry, Radio button, Check button, Canvas, and Menu.		
Total Lecture Hours		**72 hours**

Textbook:

S.No	Book Title	Author
1	"Beginning Python-From Novice to Professional"—Third Edition, Apress	Magnus Lie Hetland
2	Python Programming using Problem solving approach by OXFORD Higher education	Reema Thareja

Reference Books:

S.No	Book Title	Author
1.	Introduction to Computation and Programming Using Python ‘‘, Revised and expanded Edition, MIT Press.	John V Guttag
2.	Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition.	Charles Dierbach
3.	“Think Python: How to Think Like a Computer Scientist”, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers.	Allen B. Downey,
4.	Introduction to Programming in Python: An Inter- disciplinary Approach, Pearson India Education Services Pvt. Ltd.,2016.	Robert Sedgewick, Kevin Wayne, Robert Dondero:
5.	An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd.	Guido van Rossum and Fred L. Drake Jr,

Self-Study Content Links:		Duration (in Hrs)
MOOCs	Unit 1: https://nptel.ac.in/courses/106106145 Unit 2: https://nptel.ac.in/courses/106106145 Unit 3: https://nptel.ac.in/courses/106106145 Unit 4: https://nptel.ac.in/courses/106106145 Unit 5: https://nptel.ac.in/courses/106106145	60hrs
Video Lectures	Unit 1: https://www.youtube.com/watch?v=PqFKRqpHrjw Unit 2: https://www.youtube.com/watch?v=oSPMmeaiQ68&t=2s Unit 3: https://www.youtube.com/watch?v=m9n2f9lhtrw https://www.youtube.com/watch?v=ixEeeNjjOJ0&t=4s https://www.youtube.com/watch?v=NMTEjQ8-AJM Unit 4: https://www.youtube.com/watch?v=JeznW_7DlB0 Unit 5: https://www.youtube.com/watch?v=ibf5cx221hk	15m 39m 39m 31m 21m 53m 38m
Web References	1.https://www.python.org/ 2. https://www.w3schools.com/python/ 3. https://www.kaggle.com/learn/python	

List of Practical's

Sr. No	Program Title	CO Mapping
1	Print "Hello, World!" and perform basic arithmetic operations.	CO1
2	Display Python keywords and identifiers.	CO1
3	Program to demonstrate variable declaration and type conversion.	CO1
4	Demonstrate indexing and slicing on a list and string.	CO1
5	Use arithmetic, relational, and logical operators in a program.	CO1
6	Show operator precedence and associativity with example expressions.	CO1
7	Write a program using `if` and `if-else` conditions.	CO1
8	Implement nested `if` and `elif` statements to categorize age groups.	CO1
9	Write a program using a `while` loop to generate Fibonacci series.	CO1
10	Use a `for` loop to print the multiplication table of a number.	CO1
11	Create and call a user-defined function for factorial.	CO2
12	Write a function to compute GCD of two numbers using recursion.	CO2
13	Program with all types of function arguments (default, keyword, variable-length).	CO2
14	Use lambda function to sort a list of tuples by second element.	CO2
15	Implement higher-order functions: `map`, `filter`, and `reduce`.	CO2
16	Create a closure that captures the outer function's variable.	CO2
17	Write and use a simple decorator to log function execution.	CO2
18	Import and use built-in module `math` and `datetime`.	CO2
19	Create and import a user-defined module.	CO2
20	Create a package with multiple modules and use them in a script.	CO2
21	Perform basic operations on strings and demonstrate built-in string methods.	CO3
22	Compare strings and demonstrate different string formatting styles.	CO3
23	Create a list and demonstrate slicing, appending, and sorting.	CO3
24	Implement tuple packing and unpacking with basic operations.	CO3
25	Create a set, add/remove items, and perform set operations.	CO3
26	Create and manipulate a dictionary with nested structures.	CO3
27	Demonstrate list comprehension to generate a square number list.	CO3
28	Handle exceptions using `try-except-finally` blocks.	CO3
29	Raise custom exceptions with `raise` and validate input with `assert`.	CO3
30	Read a file line by line and count the frequency of each word.	CO3
31	Create a class with instance variables and methods.	CO4
32	Implement constructor and parameterized constructor in a class.	CO4
33	Show encapsulation using private attributes and getter/setter.	CO4

34	Demonstrate class method, static method, and property decorator.	CO4
35	Override `__str__` and `__len__` magic methods for a custom class.	CO4
36	Create and return class instances from another class.	CO4
37	Demonstrate single and multiple inheritance with method overriding.	CO4
38	Use `super()` to invoke parent methods from a subclass.	CO4
39	Create an abstract class and implement it in a derived class.	CO4
40	Show polymorphism with method overloading (via default args) and overriding.	CO4
41	Reuse inheritance examples and show hierarchical/multilevel inheritance.	CO5
42	Create a basic GUI window using Tkinter.	CO5
43	Add Labels, Buttons, and Entry fields to a GUI form.	CO5
44	Implement Radio buttons and Check buttons with event handling.	CO5
45	**Personal Expense Tracker:** A Python app to record and categorize daily expenses for better budgeting.	CO5
46	**Library Management System:** A GUI-based tool to manage book issue, return, and inventory for small libraries.	CO5
47	**Weather Forecast App:** A real-time weather dashboard using API to display city-wise conditions.	CO5
48	**Quiz Application:** An interactive Python quiz system with scoring and question randomization.	CO5
49	**File Organizer:** A desktop utility to auto-sort files into folders based on their extensions.	CO5
50	**Personal Expense Tracker:** A Python app to record and categorize daily expenses for better budgeting.	CO5

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

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LAB Course Code: DCSBS0153	LAB Course Name: Fundamentals of Computer Science Lab	L	T	P	C
Course Offered in: B.Tech -First Semester CSBS		0	0	2	1

Pre-requisite: Basic knowledge of computers.

Course Objectives:

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

Course Outcome: After completion of this course students will be able to:		Bloom's Knowledge Level (KL)
CO1	Understand and trace the execution of C programs involving basic programming constructs.	K2
CO2	Develop and implement C programs using arrays, strings, functions, pointers, and structures.	K3
CO3	Apply problem-solving skills to implement modular programs for real-time applications in C.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	1	-	-	-	1	2	1	3	2	1
CO2	3	3	2	2	2	-	-	-	1	2	1	3	3	1
CO3	3	3	3	2	2	-	-	-	2	2	2	3	3	2

List Of Practical's (Indicative & Not Limited To)

Algorithm and flowcharts of small problems like GCD	1. Algorithm to find the sum of two numbers 2. Algorithm to find the smallest of two numbers 3. Algorithm to print multiplication Table of a number 4. Algorithm to find GCD of numbers.	**CO1**
Structured code writing with: **i. Small but tricky codes**	1. WAP in C to implement the use of all arithmetic operators. 2. WAP in C to find the Area and Circumference of a circle, where radius r is input by user. 3. WAP in C to swap the values of 2 variables without using third variable. 4. WAP in C to print the digit at ones place of a number. 5. WAP in C to calculate the total amount of money in the piggybank, given the coins of Rs 10, Rs 5, Rs 2 and Rs 1. 6. WAP in C to Enter the marks of 5 subjects (i.e. Physics, Chemistry, Maths, Hindi & English) of a student & display the Total Marks and Percentage and grade achieved. Grading Criteria: percentage >= 90 then Grade A	**CO1**

	percentage >=80 and <90 then Grade B percentage >=70 and <80 then Grade C percentage >=60 and <70 then Grade D else Grade E 7. WAP in C to check whether a year is Leap Year or not. 8. WAP in C to print day of week name using switch case. 9. WAP in C to print total number of days in a month using switch case. 10. WAP in C to calculate the sum of first 10 numbers. 11. WAP in C to print multiplication table of any number. 12. WAP in C to display a Fibonacci series. 13. WAP in C to find sum of digits of a number. 14. WAP in C to reverse a number. 15. Pattern Printing programs.	
ii. Proper parameter passing	WAP in C to demonstrate call by value and call by reference.	**CO2**
iii. Command line Arguments	WAP in C to demonstrate command line arguments.	**CO2**
iv. Variable parameter	1. WAP in C to add two number using user defined function add() 2. WAP in C to find the largest of three number using user defined function largest() 3. WAP in C to calculate the factorial of a number using recursion. 4. Program to calculate the exponent using recursion.	**CO2**
v. Pointer to functions	1. WAP in C that uses pointer to point address of a function. 2. WAP in C that passes function as a parameter using pointer.	**CO2**
vi. User defined header	1. WAP in C to create a user defined header file and use it in to some other programs.	**CO3**
vii. Make file utility	WAP in C to implement all make file utility commands.	**CO3**
viii. Multi file program and user defined libraries	Program to demonstrate how to use multiple c files in one program.	**CO3**
ix. Interesting substring matching / searching programs	1. C Program to Implement Knuth-Morris-Pratt Algorithm for Pattern Searching. 2. C Program to Implement KMP Pattern Searching Algorithm. 3. C Program to Implement Rabin-Karp Method for Pattern Searching.	**CO3**
x. Parsing related assignments	Create a program that takes a user input string in the form of "operand1 operator operand2" (e.g., "5 + 3" or "10 * 2") and parses it to perform the corresponding mathematical operation. Display the result to the user.	**CO3**

Total Hours: 30 hrs.

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
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LAB Course Code: DCSBS0152	LAB Course Name: Principles of Electrical Engineering Lab	L	T	P	C
Course Offered in: B.Tech -First Semester CSBS		0	0	2	1

Pre-requisite: Physics and mathematics

Course Objectives:

The student will learn about the various electrical elements, measuring instruments and sensors, laws and theorems used for analysis of electrical circuits along with steady state behaviour of R-L-C series circuits.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO 1	Demonstrate the working of various electrical elements, measuring instruments and sensors.	K2
CO2	Conduct experiments illustrating the application of KVL/KCL and Network theorems to DC electrical circuits.	K3
CO3	Conduct experiments illustrating the steady state behaviour of R-L-C series circuits.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	-	-	2	1	1	1	-	3	2	2
CO2	3	2	1	-	-	2	1	1	1	-	3	2	2
CO3	3	2	1	-	-	2	1	1	1	-	3	2	2

List Of Practical's (Indicative & Not Limited To)

1. Familiarization of electrical circuits: sources, measuring devices and transducers.
2. Determination of resistance temperature coefficient.
3. Verification of Network Theorem
   - Superposition
   - Thevenin
   - Norton
   - Maximum Power Transfer theorem
4. Simulation of R-L-C series circuits for $X_L > X_C$, $X_L < X_C$.
5. Simulation of Time response of RC circuit.
6. Demonstration of measurement of electrical quantities in DC and AC systems.

Total Hours: 30 hrs.

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
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LAB Course Code: DCSBS0151	LAB Course Name: Fundamentals of Physics Lab	L	T	P	C
Course Offered in: B.Tech -First Semester CSBS		0	0	2	1

Pre-requisite: Least count, Screw gauge, Vernier calipers

Course Objectives:

1. To provide the practical knowledge of the measurement techniques of magnetism.

2. To provide the practical knowledge of the charge mobility, carrier concentration and Hall coefficient of semiconductor.

3. To provide the practical knowledge of the phenomenon of interference, diffraction and modern optics.

4. To provide the practical knowledge of Calculate Stefan's and Plank's constant.

Course Outcome: After completion of the course, the student will be able to:		Bloom's Knowledge Level (KL)
CO1	Develop the measurement techniques of magnetism.	K6
CO2	Calculate the charge mobility, carrier concentration and Hall coefficient of semiconductor.	K2
CO3	Apply the practical knowledge of the phenomenon of interference, diffraction and modern optics.	K3
CO4	Calculate Stefan's and Plank's constant.	K2
CO5	Develop the measurement techniques of magnetism.	K6

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	-	-	-	2	-	2	1	2	1	1	-	-
CO2	3	-	-	-	2	-	1	1	2	1	1	-	-
CO3	3	-	-	-	2	-	1	1	2	1	1	-	-
CO4	2	-	-	-	2	-	1	1	2	1	1	-	-
CO5	3	-	-	-	2	-	1	1	2	1	1	-	-

List Of Practical's (Indicative & Not Limited To)

1. To study the magnetic field along the axis of current carrying coil by Stewart and Gee method
2. To determine the Hall coefficient of semi-conductor
3. To determine the Plank constant
4. To determine the wave length of light by Laser diffraction method
5. To determine the wave length of light by Newton's Ring method
6. To determine laser and optical fiber parameters
7. To determine the Stefan's Constant.

Total Hours: 30 hrs.

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
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Course Code: DCSBS0205	Course Name: Linear Algebra	L	T	P	C
Course Offered in: B.Tech -Second Semester CSBS		3	0	0	3

Pre-requisite: Knowledge of Mathematics

Course Objectives:

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.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Apply the concept of matrices and determinants to solve linear system of equations.	K3
CO2	Apply the concept of rank and LU decomposition to solve linear system of equation.	K3
CO3	Explain the concept of vector space, orthogonalization and QR decomposition.	K4
CO4	Explain the concept of Eigenvalues and Eigenvectors, linear transformation and complex matrices.	K4
CO5	Apply the concept of singular value decomposition and principal component analysis in image processing and machine learning.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	3	3	1				1	2		
CO2	3	3	3	2	2					1	2		
CO3	3	2	3	2	3	1				1	2		
CO4	3	2	3	2	3	1				1	2		
CO5	1	1	1	1	1					1	2		

Course Contents / Syllabus

Unit 1	**Introduction**	**9 hours**

Introduction to Matrices and Determinants; Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.

Unit 2	**Vectors and linear combinations**	**9 hours**

Vectors and linear combinations; Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices.

Unit 3	**Vector Space**	**9 hours**

Vector space; Dimension; Basis; Orthogonality; Projections; Gram-Schmidt orthogonalization and QR decomposition.

Unit 4	**Eigen Values and Eigen Vectors**	**9 hours**

Eigenvalues and Eigenvectors; Positive definite matrices; Linear transformations; Hermitian and unitary matrices.

Unit 5	**Principal Component Analysis**	**9 hours**

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Singular value decomposition and Principal component analysis (Non-credit and optional); Introduction to their applications in Image Processing and Machine Learning (one or two classes).

Total Lecture Hours	**45 hours**

Textbook:

S.No	Book Title	Author
1	Higher Engineering Mathematics, Khanna Publishers.	B. S. Grewal
2	Linear Algebra and Matrices, Ram Prasad Publication, Agra.	Hari Kishan and Manju Sharma

Reference Books:

S.No	Book Title	Author
1	Advanced Engineering Mathematics, (Seventh Edition), Cengage Learning.	Peter V. O'Neil
2	Advanced Engineering Mathematics, (Second Edition), Pearson.	Michael. D. Greenberg
3	Introduction to linear algebra, (Fifth Edition), Wellesley-Cambridge Press.	Gilbert Strang
4	Applied Mathematics (Vol. I & II), Pune Vidyarthi Griha Prakashan.	P. N. Wartikar & J. N. Wartikar
5	Digital Image Processing, Pearson.	R C Gonzalez and R E Woods
6	https://machinelearningmastery.com/introduction-matrices-machine-learning/	

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	Linear Algebra from Elementary to Advanced | Coursera	34 hrs
Video Lectures	**Unit 1** https://www.youtube.com/watch?v=cfn2ZUuWPd0 https://www.youtube.com/watch?v=vF7eyJ2g3kU **Unit 2** https://www.youtube.com/watch?v=p-OCvUJVxS8 **Unit 3** https://www.youtube.com/watch?v=_6oRqxY6O5w&t=66s https://www.youtube.com/watch?v=PZ0AvH5VKBk https://www.youtube.com/watch?v=26IIMABe9MY **Unit 4** https://www.youtube.com/watch?v=G4N8vJpf7hM https://www.youtube.com/watch?v=r5dIXpssvrA https://youtu.be/ZX5YnDMzwbs https://www.youtube.com/watch?v=EL3fXu9FFII&t=1072s **Unit 5** https://www.youtube.com/watch?v=kw9R0nD69OU Lec-46: Principal Component Analysis (PCA) Explained | Machine Learning	12.49m 50.40m 8.52m 25.12m 5.55m 24.21m 5.26m 28.04m 44.07m 25.26m 4.22m 14.06m
Web References		

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: DCSBS0201	**Course Name: Statistical Methods**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech -Second Semester CSBS		**3**	**0**	**0**	**3**

Pre-requisite: Knowledge of Mathematics

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.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Explain the concept of sampling and sampling distribution.	K1
CO2	Apply the concept of correlation, regression and ANOVA to statistical data.	K3
CO3	Apply the concept of estimation theory to evaluate statistical parameters.	K4
CO4	Apply the concept of hypothesis testing to statistical problems.	K4
CO5	Explain the concept of time series and forecasting.	K4

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	3	2	2	1			1	1	1	1		
CO2	3	3	3	3	2	1		1	1	1	2		
CO3	3	3	2	2	1			1	1	1	1		
CO4	3	3	2	3	2	2		2	1	1	2		
CO5	3	2	2	3	1			1	1	1	2		

Course Contents / Syllabus

Unit 1	**Sampling Techniques**	**10 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 2	**Linear Statistical Models**	**9 hours**

Scatter diagram. Linear regression and correlation. Least squares method. Rank correlation. Standard multiple regression models with emphasis on detection of collinearity, outliers, non-normality and autocorrelation, Validation of model assumptions. Multiple correlation, Analysis of variance (one way, two way with as well as without interaction).

Unit 3	**Estimation**	**9 hours**

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

Unit 4	**Test of hypothesis**	**10 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.

Unit 5	Basics of Time Series Analysis & Forecasting	7 hours
Stationary, ARIMA Models: Identification, Estimation and Forecasting.		
	Total Lecture Hours	45 hours

Textbook:

S.No	Book Title	Author
1	Probability and Statistics for Engineers (Fourth Edition), Prentice Hall India Learning Private Limited.	I.R. Miller, J.E. Freund and R. Johnson
2	Fundamentals of Statistics (vol. I & vol. II), World Press.	A. Goon, M. Gupta and B. Dasgupta
3	The Analysis of Time Series: An Introduction, Chapman & Hall/CRC	Chris Chatfield

Reference Books:

S.No	Book Title	Author
1	Introduction to Linear Regression Analysis, Wiley-Interscience.	D.C. Montgomery and E. Peck
2	Introduction to the Theory of Statistics, McGraw Hill.	A.M. Mood, F. A. Graybill and D.C. Boes
3	Applied Regression Analysis, Wiley-Interscience.	N. Draper and H. Smith
4	Hands-on Programming with R, O'Reilly.	Garrett Grolemund
5	R for Everyone: Advanced Analytics and Graphics, Addison-Wesley Professional.	Jared P. Lander

Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://www.nptel.ac.in/courses/110107114	27:04:02
Video Lectures	**Unit 1**	
	https://www.youtube.com/watch?v=_VFnFX29m60	30:34
	https://www.youtube.com/watch?v=l9rfMOZXk0Y	36:50
	https://www.youtube.com/watch?v=6-OCD5_9Qpw&t=1701s	31:18
	https://www.youtube.com/watch?v=qZ_QQ9--VTE&t=7s	37:16
	Unit 2	
	https://www.youtube.com/watch?v=wWT6IUn88GY	32:39
	https://www.youtube.com/watch?v=ugidzgLMZyA	17:46
	https://www.nptel.ac.in/courses/111104120	31:19
	https://www.youtube.com/watch?v=dbYgmb6rCCA	58:58
	https://www.youtube.com/watch?v=75V2vBp4Q4s	29:18
	https://www.youtube.com/watch?v=CiKLi3RagMk	31:48
	Unit 3	
	https://www.youtube.com/watch?v=7C3sGj4Uqpo	31:36
	https://www.youtube.com/watch?v=TOPQnjSd23o&t=3s	28:58
	Unit 4	
	https://www.youtube.com/watch?v=W0SpckgykgE	34:08
	https://www.youtube.com/watch?v=LawmUqn_NuQ&t=38s	32:11
	https://nptel.ac.in/courses/103106120	58:23
	https://www.youtube.com/watch?v=UUdYD5Y2tDI	1:05:33

	https://www.youtube.com/watch?v=QDsdNwtfL24&t=1010s	1:06:31
	https://www.youtube.com/watch?v=jxaT9K8PqJE&t=3455s	1:01:31
	https://nptel.ac.in/courses/111102143	1:02:23
	Unit 5	
	https://www.youtube.com/watch?v=VvjO0Tn2VxU	29:25
	https://www.youtube.com/watch?v=DRjybZLNFS4	26:33
	https://www.youtube.com/watch?v=03zDPbUpkpc	31:16
	https://www.youtube.com/watch?v=xLT181rEvY8&t=1s	29:44
Web References	http://vassarstats.net/anova1u.html	

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: DCSBS0203	**Course Name: Object Oriented Programming**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech -Second Semester CSBS		**2**	**1**	**0**	**3**

Pre-requisite: Understand basic programming, data structures, and logic; grasp OOP concepts like classes, objects, and inheritance; and practice debugging.

Course Objectives:

Students are able to gain a comprehensive understanding of procedural programming in C and object-oriented programming in C++ and Java. They will grasp fundamental OOP concepts, design and develop models using UML tools, and demonstrate standard techniques such as modularity and I/O operations, essential for effective software development.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Identify the concepts of procedural programming and its features.	K2
CO2	Demonstrate the concept of procedural and object-oriented languages.	K3
CO3	Implement fundamental concepts of object-oriented programming using classes and objects.	K3
CO4	Implement reusability and data hiding concepts using C++ and demonstrate generic programming concepts.	K3
CO5	Analyze object-oriented models using UML diagrams.	K4

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	–	–	2	–	–	–	–	–	1	2	1	1
CO2	3	3	2	1	2	–	–	–	–	–	1	3	2	1
CO3	3	2	2	1	2	–	–	–	–	–	1	3	2	1
CO4	3	3	2	2	2	1	–	–	–	–	2	3	2	2
CO5	3	3	3	2	3	1	–	–	–	–	2	3	3	2

Course Contents / Syllabus

Unit 1	**C Foundations & C++ Evolution**	**12 hours**

Procedural programming, An Overview of C: Types Operator and Expressions, Scope and Lifetime, Constants, Pointers, Arrays, and References, Control Flow, Functions and Program Structure, Namespaces, error handling, Input and Output (*C*-way), Library Functions (*string*, *math*, *stdlib*), Command line arguments, Pre-processor directive

Some difference between C and C++: Single line comments, Local variable declaration within function scope, function declaration, function overloading, stronger type checking, Reference variable, parameter passing – value vs reference, passing pointer by value or reference, #define constant vs const, Operator new and delete, the typecasting operator, Inline Functions in contrast to macro, default arguments.

Unit 2	**The Fundamentals of OOP and OOP Facilities**	**11 hours**

The Fundamentals of Object-Oriented Programming: Necessity for OOP, Data Hiding, Data Abstraction, Encapsulation, Procedural Abstraction, Class and Object.

More extensions to C in C++ to provide OOP Facilities: Scope of Class and Scope Resolution Operator, Member Function of a Class, private, protected and public Access Specifier, this Keyword, Constructors and Destructors, friend class, error handling (exception)

Unit 3	Essentials of Object-Oriented Programming and Generic Programming	11 hours

Essentials of Object-Oriented Programming: Operator overloading, Inheritance – Single and Multiple, Class Hierarchy, Pointers to Objects, Assignment of an Object to another Object, Polymorphism through dynamic binding, Virtual Functions, Overloading, overriding and hiding, Error Handling

Generic Programming: Template concept, class template, function template, template specialization

Unit 4	Object Oriented Design and Modeling	11 hours

Input and Output: Streams, Files, Library functions, formatted output

Object Oriented Design and Modelling: UML concept, Use case for requirement capturing, Class diagram, Activity diagram and Sequence Diagram for design, Corresponding C++ code from design

Total Lecture Hours	**45 hours**

Textbook:

S.No	Book Title	Author
1	"Object Oriented Modeling and Design", PHI	James Rumbaugh et. Al
2	Object Oriented Programming with C++	E Balagurusamy, TMH

Reference Books:

S.No	Book Title	Author
1	Programming – Principles and Practice Using ++ 2nd Edition	Bjarne Stroustrup, Addison Wesley
2	The Design and Evolution of C++, 1st Edition	Bjarne Stroustrup, Addison Wesley

Self-Study Content Links:		Duration (in Hrs)
MOOCS	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01297200240671948837_shared/overview https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013294704351592448243 30_shared/overview	24hr 18m 6hr 44m
Video Lectures	https://www.youtube.com/watch?v=mlIUKyZIUUU https://www.youtube.com/watch?v=bIzTKJzs92w https://www.youtube.com/watch?v=pRC09Tz9iVE https://www.youtube.com/watch?v=rr7HVs4d1Qo	2hr 4m 4m 46s 8m 21s 16m 7s
Web References	Microsoft Learn – C++ Documentation IBM C++ Documentation	

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
GREATER NOIDA-201306
(An Autonomous Institute)

Course Code: DCSBS0202	Course Name: Principles of Electronics	L	T	P	C
Course Offered in: B.Tech -Second Semester CSBS		3	0	0	3

Pre-requisite: Physics and mathematics

Course Objectives: The student will learn about semiconductors diodes applications, analysis of BJT and FET including fundamentals of digital electronics with applications and operational amplifiers circuits.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Explain and analyze the energy band theory, semiconductor, Formation of P-N junction with V-I characteristics.	K2, K4
CO2	Analyze the diodes and their applications.	K4
CO3	Explain the characteristics of BJT.	K2, K4
CO4	Explain the operation and characteristics of FET and fundamental of digital electronics.	K2, K4
CO5	Explain and analyze the types op-amp circuits.	K2, K4

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	3	1	2	3	2	-	-	-	-	-	2	2
CO2	3	2	2	3	1	2	-	-	-	-	-	2	2
CO3	2	3	3	2	3	3	-	-	-	-	-	2	2
CO4	3	2	2	3	2	3	-	-	-	-	-	2	2
CO5	3	1	1	2	3	3	-	-	-	-	-	2	2

Course Contents / Syllabus

Unit 1	**Introductory idea of semiconductors**	**8 hours**

Energy band theory, classifications of solids with their electrical properties, types of semiconductors and concept of diffusion and drift, Formation of P-N junction, energy band diagram, built-in-potential, formation of depletion zone, forward and reverse biased P-N junction, V-I characteristics.

Unit 2	**Diodes and Diode Circuits**	**9 hours**

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 3	**Transistors and transistor circuits**	**9 hours**

Transistor mechanism and principle of transistors, Formation of PNP / NPN junctions, energy band diagram, Transistor Action, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode.

Unit 4	**Field Effect Transistor and Digital electronics**	**10 hours**

Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type, CMOS: Basic Principles

Basic ideas of Digital electronics: Basic idea of switching circuit, Realization of Logic gates, half and full adder/subtractor, multiplexers and demultiplexers and Counters.

Unit 5	**Operational amplifier basics**	**9 hours**

Introduction to integrated circuits, operational amplifier and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Proportional, Adder, subtractor, Integral, Derivative circuits.

	Total Lecture Hours	**45 hours**

Textbook:

S.No	**Book Title**	**Author**
1	Microelectronics Circuits	Adel S. Sedra and Kenneth Carless Smith
2	Millman's Integrated Electronics	Jacob Millman, Christos Halkias, Chetan Parikh
3	Digital Logic & Computer Design	M. Morris Mano

Reference Books:

S.No	**Book Title**	**Author**
1	Electronic Devices and Circuit Theory	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 Schillin, C Belove, TA pelewicz, R Saccardi
5	Microelectronics	Jacob Millman, Arvin Grabel.

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://nptel.ac.in/courses/117103063	42hr
Video Lectures	**Unit 1** https://youtu.be/4jqQrC00PrY?si=mcioamft8UhsuB_Y https://youtu.be/qQDvzjo5mH0?si=Q4AOAmz0uPY_J5I0 https://youtu.be/8LUL2cBoJ48?si=ajw_saoIFQ48TWR7 https://youtu.be/0jwC_m6S6Nk?si=o8TdBIrX0sej0zII https://youtu.be/_1OJCbm2Je0?si=yGZa2NZfFVaesOoD https://youtu.be/OkyKCNvKJI4?si=0bQaa3ZOzSe0GefO **Unit 2** https://youtu.be/EzlSafjMltc?si=uhdgbZcS14UvlRT2 https://youtu.be/0rLXDB6yLSg?si=3xpqdxeAZipvUeH- https://youtu.be/n0--LbESNy8?si=q8aoZU9dMhn3tGFe https://youtu.be/ErFoNfwtY6M?si=Rqn8PF5eNIx3phzh https://youtu.be/TaTGnbxIMdY?si=ITqkdrfNLBOgBQOL https://youtu.be/ochZrxUj2fs?si=VktfPahgTwg6mHQz https://youtu.be/JlhesUAziA0?si=nLO7cmTE4kmK8k-4 https://youtu.be/nBrU-XJmZ2c?si=zoAorGWHxV5BhIvd **Unit 3** https://youtu.be/08jcU8rb9SU?si=co92mV--DnsAyu84 https://youtu.be/Lx3ApgmyQlc?si=0Z-XpsDtmAzYfYCZ https://youtu.be/cflSirgSMYM?si=hqi6ViBbyY2HJDyG https://youtu.be/z-DnS_s6Fas?si=kJ62W9G88JuLT1Cf https://youtu.be/x8WxZjKrvTc?si=G2Xnpyzdstc58wZk https://youtu.be/xMWc8n7eB4w?si=CiJ1UWxxCthynCSA **Unit 4** https://youtu.be/cOICDYuY-gA?si=-xxe9q5iAajJsPNv https://youtu.be/cOICDYuY-gA?si=w8upEy9IUgbyxm1N https://youtu.be/OFW7MVdmKCM?si=atbUObZimF0uzaIg https://youtu.be/XqGBNyhImV4?si=6V_zp3RljRRQq2pr https://youtu.be/l9LBIy9Ioxo?si=sHL6kY_ziOeHOeEH https://youtu.be/XrzvIUR0fxg?si=xBTytXn2bJhdf09F	4m 7m 9m 2m 9m 9m 10m 10m 13m 7m 7m 16m 22m 30m 14m 6m 27m 9m 16m 10m 8m 8m 16m 12m 14m 7m

	https://youtu.be/IzVvMyVBxgo?si=iCAVXihRGswJXfx_ https://youtu.be/GItLxgrzIPs?si=ljp7G3tOjpnPYNdD https://youtu.be/CAvQ3F0mpFk?si=3ughfo3yk7zd57y0 https://youtu.be/yUkBGL8YAFU?si=_8j07jpvAg5EENHP https://youtu.be/wqbpR_GVwfA?si=0W1yclgZVSCzMQLE https://youtu.be/KChbcXoZO4U?si=h9mY2Xz-YcZAE_3K https://youtu.be/xq1OSx_Bzt0?si=t9yp3OGdKiv9ZKYn https://youtu.be/NTCrCYPoA5A?si=BFWdhx995AsCuz-m **Unit 5** https://youtu.be/zyryXbH6a5E?si=VyXJC_0yLaa3tdFJ https://youtu.be/q3qqKuMl5e0?si=1JnJUI9xDTtE-Ouf https://youtu.be/uEpiNnUBOE8?si=CcISFEwTGF8M83U6 https://youtu.be/SLkSlsZHJ5w?si=t8Frv1KLcw5GaYBU https://youtu.be/7B_aMPIIKRI?si=FQ1mIgORyjF7JIrk https://youtu.be/IDWA04FuVdc?si=S8BejMJhGnphIJUm https://youtu.be/_vNUppwVzYk?si=0lexfrzufn9GBOEG	17m 8m 14m 11m 12m 10m 10m 13m 14m 12m 10m 15m 7m 13m 3m
Web References		

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
GREATER NOIDA-201306
(An Autonomous Institute)

Course Code: DCSBS0206	Course Name: Fundamentals of Economics	L	T	P	C
Course Offered in: B.Tech -Second Semester CSBS		2	0	0	2

Pre-requisite: Introductory Economics, Statistics, Basic Mathematics, Interest in Current Event

Course Objectives: This course will help the student in understand the relative importance of Economics. It also supports in knowing the application of the principles of managerial economics that can aid in achievement of business objectives. Student can understand the modern managerial decision rules and optimization techniques and can be equipped with the tools necessary in analysis of consumer behaviour as well as in forecasting product demand. It also helps in understanding, how to apply latest pricing strategies and analyse the macro environment affecting the business decision making

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Students will be able to understand the factors affecting demand and supply.	K2
CO2	The students would be able to understand and evaluate the production function and different cost affecting the operations of a business organization.	K5
CO3	The students would be able to apply various macro economics concepts in various business situations.	K3
CO4	The students would be able to analyse various economic policies and their impact on economy.	K4

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2	1	1	2	2	1	1	1	2	2		
CO2	2	3	2	2	2	2	2	1	1	2	3		
CO3	2	3	2	2	2	2	2	1	1	2	3		
CO4	2	3	2	1	2	3	2	2	1	3	3		
CO5	2	2	2	1	1	3	2	2	1	2	2		

Course Contents / Syllabus

Unit 1	**Microeconomics**	**8 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 2	**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 3	**Macro economics**	**7 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 4	**Demand for Money**	**7 hours**

Demand for Money - Transitionary 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.

	Total Lecture Hours	**30 hours**

Textbook:

S.No	**Book Title**	**Author**
1	Microeconomics	Pindyck, Robert S., and Daniel L. Rubinfeld.

Reference Books:

S.No	**Book Title**	**Author**
1	Intermediate Microeconomics:A Modern Approach	Hal R, Varian.

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://www.nptel.ac.in/courses/110105075?	10
Video Lectures	https://www.coursera.org/learn/principles-of-economics-macroeconomics?	10
Web References	https://www.coursera.org/learn/basics-economics?	10

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
GREATER NOIDA-201306
(An Autonomous Institute)

Course Code: DCSBS0207	Course Name: Universal Human Values & Professional Ethics	L	T	P	C
Course Offered in: B.Tech -Second Semester CSBS		3	0	0	3

Pre-requisite: Computer block diagram, Generation of programming languages, Translators, Flowchart

Course Objectives:

1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Describe the need, basic guidelines, content and process for value education.	K2
CO2	Associate the role of harmony in family and society leading to Undivided Society/ Universal Order.	K3
CO3	Identify engineering ethics, theories and strategies to resolve ethical dilemmas.	K1
CO4	Illustrate global issues related to multinational corporations, environmental ethics, and professional ethics.	K2
CO5	Utilize the value-based essays with their ethical understanding in personal & professional contexts.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	3	2	2	-	3	-	-
CO2	-	-	-	-	-	2	3	3	2	2	-	3	-	-
CO3	-	-	-	-	-	3	3	3	2	2	-	3	-	-
CO4	-	-	-	-	-	2	3	3	2	2	-	3	-	-
CO5	-	-	-	-	-	3	3	3	2	2	-	3	-	-

Course Contents / Syllabus

Unit 1	Introduction - Need, Basic Guidelines, Content and Process for Value Education	9 hours

Introduction:

- Understanding the need, basic guidelines, content and process for Value Education
- Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority

- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

Unit 2	Understanding Harmony in the Human Being - Harmony in Myself	9 hours

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha
- Understanding the Body as an instrument of 'I' (I being the seer, seer and enjoyer)
- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure Sanyam and Swasthya
- Practice Exercises and Case Studies will be taken up in Practice Sessions

Unit 3	Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship	9 hours

- Understanding Harmony in the family – the basic unit of human interaction
- Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship
- Understanding the meaning of Vishwas; Difference between intention and competence
- Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) from family to world family
- Practice Exercises and Case Studies will be taken in Practice Sessions.

Unit 4	Understanding Harmony in the Nature and Existence - Whole existence as Co-existence	9 hours

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfillment among the four orders of nature recyclability and self-regulation in nature
- Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space
- Holistic perception of harmony at all levels of existence
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

Unit 5	Implications of the above Holistic Understanding of Harmony on Professional Ethics	9 hours

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people-friendly and ecofriendly production systems, c) Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems

- Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers b) At the level of society: as mutually enriching institutions and organizations
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

Total Lecture Hours	**45 hours**

Textbook:

S. No	Book Title	Author
1	A foundation course in Human Values and professional Ethics, Third Revised Edition, UHV Publications, New Delhi, 2023, ISBN 978-81-957703-7-3 (Printed Copy), 978-81-957703-6-6 (e-book).	R.R Gaur, R Asthana, G P Bagaria

Reference Books:

S. No	Book Title	Author
1	Indian Ethos and Modern Management, New Royal Book Co, Lucknow, Reprinted 2008.	B L Bajpai
2	Science and Humanism, Commonwealth Purblishers.	PL Dhar, RR Gaur
3	How the Other Half Dies, Penguin Press. Reprinted 1986, 1991	Sussan George
4	Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA	Ivan Illich
5	Limits to Growth, Club of Rome's Report, Universe Books.	Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III
6	How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.	Subhas Palekar
7	Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.	A Nagraj
8	Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.	E.F. Schumacher
9	Human Values, New Age International Publishers.	A.N. Tripathy

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://creativecommons.org/publicdomain/zero/1.0 https://onlinecourses.swayam2.ac.in/e-learning/preview/imb26_mg296	12 weeks
Video Lectures	https://www.youtube.com/c/UniversalHumanValues	
Web References	https://uhv.org.in/	

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
GREATER NOIDA-201306
(An Autonomous Institute)

Course Code: DCSBS0204	Course Name: Professional English	L	T	P	C
Course Offered in: B.Tech -Second Semester CSBS		2	0	0	2

Pre-requisite: Basic proficiency in English language communication

Course Objectives:

4. Enhance Listening, Speaking, Reading, and Writing (LSRW) skills for academic and workplace communication.
5. Develop professional English language proficiency aligned with CEFRB1/B2 levels.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Demonstrate effective listening and comprehension skills in professional contexts.	K3
CO2	Deliver confident oral communication in professional and collaborative settings.	K3
CO3	Analyze and interpret academic and professional texts effectively.	K4
CO4	Develop clear and professional written communication.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO11	PSO1	PSO2
CO1	-	1	-	-	-	2	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	2	-	1	-	-	-	-	-	-
CO3	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	1	-	-	-	2	-	1	-	-	-	-	-	-
CO5														

Course Contents / Syllabus

Unit 1	**Active Listening**	**7 hours**

• Listening comprehension
• Speech analysis
• Listening-based problem-solving tasks

Unit 2	**Impactful Speaking**	**9 hours**

• Pronunciation Drills
• Accent, Rhythm, and Intonation
• Fundamentals of Professional Speaking
• JAM Sessions
• Extempore Speeches

Unit 3	**Strategic Reading**	**7 hours**

• Skim and scan
• Information gap exercises
• Critical reading
• Reading comprehension
• Reading tables & graphs

Unit 4	**Writing with Clarity and Purpose**	**7 hours**

• Technical vocabulary building exercises
• Sentence construction
• Paragraph and Picture Prompts
• Email drafting

NIET Greater Noida Autonomous Institute	**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY** **GREATER NOIDA-201306** **(An Autonomous Institute)**

		Total Lecture Hours	**30 hours**
Textbook:			
S. No	**Book Title**	**Author**	
1	ABC Workbook, Meerut, 2023	NIET Publishing House	
Reference Books:			
S. No	**Book Title**	**Author**	
1	Cambridge English Business Benchmark (Pre-intermediate to Intermediate), 2nd edition, Norman Whitby, Cambridge University Press, 2013, UK.	Norman Whitby	
2	Listening in the Language Classroom, Cambridge University Press, 2021, UK.	by John Field	
3	Speaking: Second Language Acquisition, from Theory to Practice, Cambridge University Press, 2022, UK.	William Littlewood	
4	IELTS 11: General Training with answers. Cambridge English, 2018.		

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	**Listening**	
	https://www.youtube.com/watch?v=Snve4Y8dMno	59m
	https://www.youtube.com/watch?v=d27bn5k9Mjw&t=101s	1hr
	Speaking	
	https://www.youtube.com/watch?v=pImF1JkpAjo&list=PLLy_2iUCG87Dz7sxcJrCV2xbjw-x46g7w&index=7	58m
	https://www.youtube.com/watch?v=STVxfk_relw&list=PLp02GGDX5DIoMkblgrYhq91rF7_JZsf4-&index=25	1hr
	Reading	
	https://www.youtube.com/watch?v=2h1Oaifi8mw&list=PLzf4HHlsQFwIDV-HfgMEYY7f5Jw6FmxrK&index=3	56m
	https://www.youtube.com/watch?v=jJUXEcMR6Ys&list=PLzJaFd3A7DZtnTdtOxvjO3GLPd1WVe6oq&index=6	1hr
	Writing	
	https://www.youtube.com/watch?v=RASpQtZI06E&list=PLLy_2iUCG87AuIWZ3qnjA1GriD-IGF3Za&index=9	59m
	https://www.youtube.com/watch?v=ekFRWnPV6lc&t=535s	1hr
Video Lectures	https://www.youtube.com/watch?v=JIKU_WT0Bls	55m
	https://www.youtube.com/watch?v=HAnw168huqA	1hr
	https://www.youtube.com/watch?v=R1vskiVDwl4	56m
	https://www.youtube.com/watch?v=z-ce7fcKe1E	1hr
	https://www.youtube.com/watch?v=Unzc731iCUY	58m
	https://www.youtube.com/watch?v=V8eLdbKXGzk	
	https://www.youtube.com/watch?v=8o8rK9n1c3Y	1hr
	https://www.youtube.com/watch?v=O3tVctBzqvA	1hr
	https://www.youtube.com/watch?v=Hdi1S52bhNg	45m

	https://www.youtube.com/watch?v=U9M2g7RZ6mQ https://www.youtube.com/watch?v=Q8x9G0X8Y7E https://www.youtube.com/watch=RSoX6rYk6kY	1hr 55m 1hr 57m
Web References	**Listening:** https://www.researchgate.net/publication/394276570_Developing_Listening_Comprehension_Using_Podcasts_in_Second_Language_Education_A_Systematic_Overview_of_Recent_Pedagogical_Innovations_2019-2025 https://www.tandfonline.com/doi/full/10.1080/10904018.2013.813234#d1e729 **Speaking:** https://files.eric.ed.gov/fulltext/EJ1460111.pdf https://www.jetir.org/papers/JETIR2410126.pdf **Reading:** https://ijrpr.com/uploads/V6ISSUE2/IJRPR38781.pdf https://files.eric.ed.gov/fulltext/EJ1332254.pdf **Writing:** https://www.sciencedirect.com/science/article/pii/S2405844024129076 https://files.eric.ed.gov/fulltext/EJ1329510.pdf	

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
GREATER NOIDA-201306
(An Autonomous Institute)

LAB Course Code: DCSBS0253	LAB Course Name: Object Oriented Programming Lab	L	T	P	C
Course Offered in: : B.Tech -Second Semester CSBS		**0**	**0**	**2**	**1**

Pre-requisite: Understand basic programming, data structures, and logic; grasp OOP concepts like classes, objects, and inheritance; and practice debugging

Course Objectives:

Students are able to provide students with hands-on experience in implementing object-oriented programming concepts using C++ and Java. This includes designing and developing applications that emphasize key principles such as inheritance, polymorphism, and encapsulation.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Implement classes, objects, inheritance, and polymorphism using C++.	**K3**
CO2	Develop object-oriented applications using UML and OOP principles.	**K3**
CO3	Analyze, debug, and test object-oriented programs for correctness.	**K4**

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	–	3	–	–	–	–	–	1	3	2	1
CO2	2	2	3	2	2	–	–	1	1	1	1	3	3	2
CO3	2	3	2	3	3	–	–	–	1	1	2	2	3	2

List Of Practical's (Indicative & Not Limited To)

Exp. No.	Experiment Title	CO
1	Implement parameter passing by value, by reference, and passing arrays as constant pointers.	CO1
2	Implement function overloading for string operations (strcat, strncat, strcpy, strncpy).	CO1
3	Implement dynamic memory allocation and deallocation using pointers.	CO3
4	Implement a Complex class with constructor, destructor, copy constructor, and assignment operator using pointer data members.	CO1
5	Implement a Vector class with constructor, destructor, copy constructor, and assignment operator.	CO1
6	Implement a Matrix class with constructor, destructor, copy constructor, and assignment operator.	CO1
7	Implement a Matrix class using Vector with constructor, destructor, copy constructor, and assignment operator.	CO2

8	Implement Stack, Queue, Linked List, Array, and Set classes using access specifiers.	CO1
9	Implement operator overloading for a Complex class (>, =, <=, ==, ++, +, +=, ()).	CO1
10	Implement operator overloading for a Vector class.	CO1
11	Implement operator overloading for a Matrix class.	CO2
12	Implement operator overloading for a Matrix class using Vector.	CO2
13	Implement Stack and Queue classes using inheritance from an Array class.	CO1
14	Implement a template-based Array class with constructor, destructor, copy constructor, assignment operator, and index operator.	CO3
15	Implement template functions for comparison and sorting algorithms (Bubble, Insertion, Merge Sort).	CO3
16	Demonstrate C++ output formatting using manipulators (setw, setprecision, fixed).	CO3
17	Demonstrate C++ input manipulators using getline() and whitespace handling for different data types.	CO3
18	Implement input/output operator overloading (<<, >>) for a Complex class.	CO1
19	Design UML class diagrams and implement Complex, Student, and Book classes.	CO2
20	Design Sequence and Activity Diagrams for a login–logout workflow.	CO2
21	Implement student record management using manipulators and overloaded operators for formatted output.	CO2
22	Implement a custom C++ manipulator for formatting dates (DD-MM-YYYY).	CO3
TOTAL		**30hr**

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

LAB Course Code: DCSBS0252	LAB Course Name: Principles of Electronics Lab	L	T	P	C
Course Offered in: B.Tech -Second Semester CSBS		0	0	2	1

Pre-requisite: Physics and mathematics

Course Objectives:

Students will demonstrate the characteristics & use of different semiconductor devices.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Demonstrate the diode V-I characteristics and input/output waveforms of rectifier circuits.	K2
CO2	Demonstrate the input and output characteristics of BJT.	K2
CO3	Draw the transfer and drain characteristics of FET.	K1
CO4	Explain the operational amplifier and demonstrate op-amp as adder and subtractor.	K2, K4

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	-	-	2	1	1	1	-	3	2	2
CO2	3	2	1	-	-	2	1	1	1	-	3	2	2
CO3	3	2	1	-	-	2	1	1	1	-	3	2	2
CO4	3	2	1			2	1	1	1		3	2	2

List Of Practical's (Indicative & Not Limited To)

1. To study the data sheet to understand specifications of – Diodes.
2. To draw the V-I Characteristics of Diode.
3. To build half wave and Full wave rectifier circuits using diode.
4. To study the data sheet to understand specifications of – BJT.
5. To draw the V-I Characteristics of BJT in CE configuration.
6. To study the data sheet to understand specifications of – FET.
7. To draw the Drain and transfer Characteristics of FET in CS configuration.
8. To study the data sheet to understand specifications of – OPAMP.
9. To build and test OPAMP as an Adder and Subtractor.

Total Hours: 30 hrs.

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
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Course Code: DNC0203	Course Name: Essence of Indian Traditional Knowledge	L	T	P	C
Course Offered in: B.Tech- Second Semester CSBS		2	0	0	NC

Pre-requisite: Philosophical Systems, Spiritual Practices, Cultural Heritage, Ayurveda and Traditional Medicine, Architecture

Course Objectives: To enable the students to understand the importance of our surroundings and encourage them to contribute towards sustainable development.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Understand the basics of past Indian politics and state polity.	K2
CO2	Understand the Vedas, Upanishads, languages & literature of Indian society.	K2
CO3	Know the different religions and religious movements in India.	K4
CO4	Identify and explore the basic knowledge about the ancient history of Indian agriculture, science & technology, and ayurveda.	K4
CO5	Identify Indian dances, fairs & festivals, and cinema.	K1

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	1	2	2	1	1	3	2	2	2	1	2		
CO2	1	1	2	1	1	3	2	2	2	1	2		
CO3	1	1	2	1	1	3	2	3	3	2	2		
CO4	2	2	3	2	2	3	3	2	2	1	2		
CO5	1	1	2	1	1	3	2	2	2	2	3		

Course Contents / Syllabus

Unit 1	**Society State and Polity in India**	**6 hours**

State in Ancient India: Evolutionary Theory, Force Theory, Mystical Theory Contract Theory, Stages of State Formation in Ancient India, Kingship , Council of Ministers Administration Political Ideals in Ancient India Conditions' of the Welfare of Societies, The Seven Limbs of the State, Society in Ancient India, Purusārtha, Varnāshrama System, Āshrama or the Stages of Life, Marriage, Understanding Gender as a social category, The representation of Women in Historical traditions, Challenges faced by Women.

Unit 2	**Indian Literature, Culture, Tradition, and Practice**	**6 hours**

Evolution of script and languages in India: Harappan Script and Brahmi Script. The Vedas, the Upanishads, the Ramayana and the Mahabharata, Puranas, Buddhist And Jain Literature in Pali,Prakrit And Sanskrit, **Sikh Literature**, Kautilya's Arthashastra, Famous Sanskrit Authors, Telugu Literature, Kannada Literature,Malayalam Literature ,Sangama Literature Northern Indian Languages & Literature, Persian And Urdu ,Hindi Literature.

Unit 3	**Indian Religion, Philosophy, and Practices**	**6 hours**

Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy, Shankaracharya, Various Philosophical Doctrines , Other Heterodox Sects, Bhakti Movement, Sufi movement, Socio religious reform movement of 19th century, Modern religious practices.

Unit 4	**Science, Management and Indian Knowledge System**	**6 hours**

Astronomy in India, Chemistry in India, Mathematics in India, Physics in India, Agriculture in India, Medicine in India , Metallurgy in India, Geography, Biology, Harappan Technologies, Water Management in India, Textile Technology in India ,Writing Technology in India Pyrotechnics in India Trade in Ancient India/,India's Dominance up to Pre-colonial Times.

Unit 5	**Cultural Heritage and Performing Arts**	**6 hours**

Indian Architect, Engineering and Architecture in Ancient India, Sculptures, Pottery, Painting, Indian Handicraft, UNESCO'S List of World Heritage sites in India, Seals, coins, Puppetry, Dance, Music, Theatre, drama, Martial Arts Traditions, Fairs and Festivals, UNESCO'S List of Intangible Cultural Heritage, Calenders, Current developments in Arts and Cultural, Indian's Cultural Contribution to the World. Indian Cinema

	Total Lecture Hours	**30 hours**

Textbook:

S.No	**Book Title**	**Author**
1.	Indian Art and Culture: for civil services and other competitive Examinations	Nitin Singhania

Reference Books:

S.No	**Book Title**	**Author**
1.	The Wonder that was India (34th impression)	A. L. Basham

Self-Study Content Links:		**Duration (in Hrs)**
MOOCs	https://www.classcentral.com/course/swayam-indian-popular-culture-292678 https://www.udemy.com/course/indian-history-chronology/	24.00 1.50
Video Lectures	https://youtu.be/xUphsn5b1w8?si=P8PqTnYUrNP3aWU7 https://youtu.be/SeTjQHzLci0?si=E-DEaKnWJEPN8yHj https://youtu.be/32XmLQxwhlQ?si=Ew7hFEL12E_3rPkh https://youtu.be/iof_dTG4cnQ?si=QWhHFeacVcYZ7mmR https://youtu.be/xmtM0ilhBIU?si=w9MQv8HSdzBXD321 https://youtu.be/7dT2eg3ekk0?si=YIDa9kfxJfTAyK1l https://youtu.be/xhqP7rPGNu4?si=WxdcjHKqmD3HGWge https://youtu.be/qE23vA4dHkk?si=6D9q-hKN57UVjUUV	1.00 0.09 0.23 1.05 1.09 1.26 0.26 0.33
Web References	https://en.wikipedia.org/wiki/Indian_religions	