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

(AN AUTONOMOUS INSTITUTE)

Affiliated to

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

Evaluation Scheme & Syllabus

For

Bachelor of Technology

Biotechnology

First Year

(Effective from the Session: 2025-26)

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

(AN AUTONOMOUS INSTITUTE)

Bachelor of Technology

Biotechnology

Evaluation Scheme

SEMESTER-I

Sl. No.	Subject code	Subject	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	CBT0101/ CBT0103	Elementary Mathematics / Remedial Biology	Mandatory	3	1	0	30	20	50		100		150	4
2	CAS0101B	Engineering Physics	Mandatory	3	0	0	30	20	50		100		150	3
3	CCSAI0101	Fundamentals of Artificial Intelligence	Mandatory	2	0	0	30	20	50		50		100	2
4	CAS0151B	Engineering Physics Lab	Mandatory	0	0	2				25		25	50	1
5	CCSE0151	C Programming	Mandatory	0	0	4				50		50	100	2
6	CME0151	CAD and Digital Manufacturing Lab	Mandatory	0	0	2				25		25	50	1
7	CBT0152	Good Manufacturing and Laboratory Practices	Mandatory	0	0	2				25		25	50	1
8	CASL0151	Acquiring Business Communication (ABC) Lab	Mandatory	0	0	4				50		50	100	2
9	CASCC0101	Design Thinking-I	Mandatory	2	0	0	60	40	100				100	2
10	CNC0103/ CNC0102	Essence of Indian Traditional Knowledge / Constitution of India, Law and Engineering	Compulsory Audit	2	0	0	30	20	50				50	NA
		*Massive Open Online Courses (For B.Tech. Hons. Degree)	*MOOCs											
		TOTAL		13	1	14			250	175	250	175	850	18

*List of MOOCs Based Recommended Courses for First Year (Semester-I)					
S. No.	**Subject Code**	**Course Name**	**University / Industry Partner Name**	**No of Hours**	**Credits**
1	CMC0008	Microsoft Excel 2016	Infosys Wingspan (Infosys Springboard)	10h 7 m	0.5
2	CMC0007	Programming in C	Infosys Wingspan (Infosys Springboard)	17h 7m	1

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 - CNC0103/CNC0102)**
  - 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.

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

(AN AUTONOMOUS INSTITUTE)

Bachelor of Technology

Biotechnology

Evaluation Scheme

SEMESTER-II

Sl. No.	Subject code	Subject	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	CAS0201	Biostatistics	Mandatory	3	1	0	30	20	50		100		150	4
2	CCSIOT0202	IoT in Life Sciences	Mandatory	3	0	0	30	20	50		100		150	3
3	CCSE0204	Data analytics	Mandatory	3	0	0	30	20	50		100		150	3
4	CBT0201	Fundamentals of Bioengineering	Mandatory	2	0	0	30	20	50		50		100	2
5		Foreign Language	Core Elective	2	0	0	60	40	100				100	2
6	CCSIOT0252	IoT in Life Sciences Lab	Mandatory	0	0	2				25		25	50	1
7	CCSE0254	Data analytics Lab	Mandatory	0	0	4				50		50	100	2
8	CCSE0252	Problem Solving using Python	Mandatory	0	0	6				50		100	150	3
9	CASL0251	Communication for Career Enhancement	Mandatory	0	0	4				50		50	100	2
10	CMB0201	Innovation and Entrepreneurship	Mandatory	2	0	0	60	40	100				100	2
11	CNC0202/ CNC0203	Constitution of India, Law and Engineering/ Essence of Indian Traditional Knowledge	Compulsory Audit	2	0	0	30	20	50				50	NA
		*Massive Open Online Courses (For B.Tech. Hons. Degree)	*MOOCs											
		TOTAL		16	1	16			400	175	350	225	**1150**	**24**

Foreign Language:

S. No.	Subject Code	Course Name	Types of Subjects
1.	CASL0202	French	Core Elective
2.	CASL0203	German	Core Elective
3.	CASL0204	Japanese	Core Elective

***List of MOOCs Based Recommended Courses for First Year (Semester-II)**

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	CMC0009	AI Artificial Intelligence with Python	Infosys Wingspan (Infosys Springboard)	7h 21 min	0.5
2	CMC0003	Programming Fundamentals using Python - Science Graduates - Foundation Program	Infosys Wingspan (Infosys Springboard)	66 h 10 m	4

PLEASE NOTE: -

- **Compulsory Audit (CA) Courses (Non-Credit - CNC0202/CNC0203)**
  - 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 credits

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

Course Code: CBT0101	Course Name: Elementary Mathematics	L	T	P	C
Course Offered in: B.Tech- First Semester BT		3	1	0	4

Pre-requisite: Knowledge of Mathematics up to 12th standard

Course Objectives:

The objective of this course is to familiarize the graduate engineers of Biotechnology with techniques in basic algebra, differential calculus, integration and solving Ordinary Differential Equations of first order. It aims to equip the students with standard concepts and tools from basic to intermediate level that will enable them to tackle more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Apply concept of equation to solve quadratic equations and system of linear inequality in two variables.	K3
CO2	Apply the concept of differentiation to find the derivative of different type functions, rate of change and maxima and minima.	K3
CO3	Apply concept of integration to evaluate integrals and definite integrals.	K3
CO4	Apply the concept of differentiation and integration to find the solution of differential equations.	K3
CO5	Apply the concept of matrix and determinants to find the solution of system of linear equation.	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	1	1	-	-	-	-	1	1		
CO2	3	3	3	1	1	-	-	-	-	-	1		
CO3	3	3	3	1	1	-	-	-	-	-	1		
CO4	3	3	3	1	1	-	-	-	-	1	1		
CO5	3	3	3	1	1	-	-	-	-	-	1		

Course Contents / Syllabus

Module 1	**Algebra**	**10 hours**

Statement of Fundamental Theorem of Algebra, solution of quadratic equations in the complex number system. Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables. Solution of system of linear inequalities in two variables graphically.

Module 2	**Differential Calculus**	**9 hours**

Functions, Limit, Continuity and Differentiability. Definition of derivative, physical and geometrical significance of derivative, derivative by first principal. Derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions,

derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit function. Concept of exponential and logarithmic functions and their derivative. Logarithmic differentiation. Derivative of functions expressed in parametric

forms. Second order derivatives. Applications of Derivatives: rate of change, maxima and minima (second derivative test only). Simple problems (that illustrate basic principles and understanding of the subject as well as real life situations).

Module 3	**Integral Calculus**	**9 hours**

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, only simple integrals of the type to be evaluated. Basic properties of definite integrals and evaluation of definite integrals. Applications of the Integrals: Applications in finding the area under simple curves, especially lines, areas of circles/parabolas/ellipses (in standard form only).

Module 4	**Differential Equations**	**10 hours**

Definition, order and degree, general and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations of first order and first degree by method of separation of variables, homogeneous differential equations. Solutions of linear differential equation of the type: $\frac{dy}{dx} + py = q$, where p and q are functions of x.

Module 5	**Matrices and Determinants**	**10 hours**

MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Determinants: Definition, Minors, Cofactors, Properties of Determinants. Adjoint, Inverse and solution of system of linear equations.

	Total Lecture Hours	**48 hours**

Textbook:

S.No	**Book Title**	**Author**
1	Mathematics - Textbook for Class XI, NCERT Publication	NCERT
2	Mathematics Part I - Textbook for Class XII, NCERT Publication	NCERT
3	Mathematics Part II - Textbook for Class XII, NCERT Publication	NCERT

Reference Books:

S.No	**Book Title**	**Author**
1	Higher engineering mathematics (Tata Macgraw Hill)	B.V.Ramana
2	Advanced modern engineering mathemtics (pearson education)	Glyn james

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=Ujs30gztM5E https://www.youtube.com/watch?v=9MFjoGm06dg https://www.youtube.com/watch?v=l1Xri-tvd6g https://www.youtube.com/watch?v=NHx_-vE-zQo https://www.youtube.com/watch?v=gI3y4OWlLO4
Module 2	https://youtu.be/hswdwcNhQ0g https://youtu.be/EkkATH3W1Mo https://youtu.be/r031pzhBP5c

	https://www.youtube.com/watch?v=lTtsFrkBsOI https://www.youtube.com/watch?v=_9MVn-Jw2G4 https://www.youtube.com/watch?v=HrymMfWU_x0 https://www.youtube.com/watch?v=dEPr5D6CqQQ https://www.youtube.com/watch?v=XzIypjhzj8c https://www.youtube.com/watch?v=ZqHPcKq6VNI
Module 3	https://www.youtube.com/playlist?list=PLbu_fGT0MPstBzAW5gGWLltksM_yAs3si https://youtu.be/z0ajJjA3_Ns
Module 4	https://youtu.be/f-4tMNFUqyU https://youtu.be/AX_0jNDIi9I https://youtu.be/BHdXOPD4cvo https://youtu.be/OET0qwat15o
Module 5	**https://youtu.be/VRZWYl24ggU?si=LcQdsV7i2ZyhaYqf** **https://youtu.be/W9Sg4YGAqp8?si=VgmyIxb6vy-xgeGH** **https://youtu.be/nm6rAUOXZ6E?si=tvrXU_Imf1bskfRr** **https://youtu.be/OPSqnhSCJ4U?si=c8azShG7m_FpFD1m** **https://youtu.be/Qw4mDt92S6g?si=0HGJ_2aaTW8w51zG**

Mode of Evaluation

CIE						ESE	Total
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**Attendance**		
			5	**5**	**10**		
30			**20**			**100**	**150**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CBT0103	**Course Name: Remedial Biology**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- First Semester BT		**3**	**1**	**0**	**4**

Pre-requisite: Basic knowledge of **high school-level science** (especially chemistry and biology).

Course Objectives:

To introduce students' basic knowledge about structure and function of biomolecules. develop understanding about cell biology, and nucleic acids and understand the morphology and anatomy of plants

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	To understand the basics of living systems	K1, K2
CO2	To understand key common features of living organisms & its classification	K1, K2
CO3	To know the anatomy and functions of plants	K1, K2
CO4	To know the concepts of alleles and genes	K1, K2
CO5	To understand the plant physiology	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	PSO3
CO1	3	2	2	2	2	3	3	1	1	1	2	2	3	2
CO2	3	3	2	2	2	3	2	1	2	1	2	2	3	3
CO3	3	3	3	3	2	2	2	1	2	1	2	3	3	3
CO4	3	3	3	3	2	2	1	2	2	1	2	3	3	3
CO5	3	3	3	2	2	3	3	3	3	1	2	3	3	3

Course Contents / Syllabus

Module 1	**Cell Biology**	**09 hours**

The cell concept, structure of prokaryotic, eukaryotic cells, plant cells and animal cells, Structure and function of cell membrane, cell organelles and their function. Structure and use of compound microscope, Macro and micro molecules, Basic chemical constituents of living body. Carbohydrates Classification of carbohydrates, functions of carbohydrates, Lipids-Classification and functions of lipids, Proteins Structure and functions of proteins, Enzymes- Chemical nature, classification and properties of enzymes, mechanism of enzyme activity.

Module 2	**Classification n of living organisms**	**08 hours**

Classification of living organisms (Five kingdom classification, major groups and principles of classification in each kingdom), Salient features of kingdom Monera, Protista and Fungi. Importance of microbiology, Importance of microorganisms in various fields, Classification and features of microorganisms. Systematic and binomial system of nomenclature, Concept of animal and plant classification.

Module 3	**Morphology and anatomy of plants**	**08 hours**

Tissues in animal and plants, Morphology, anatomy and functions of different parts of plants: Root, stem, leaf, inflorescence, flower, fruit and seed, Concepts of botanical garden, herbaria, zoological park and museums.

Module 4	**Cell division and Genetics**	**08 hours**

Concepts of alleles and genes, Mendelian Experiments, Cell cycle (Elementary Idea), mitosis and meiosis, techniques to study mitosis and meiosis.

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Module 5	Plant Physiology	08 hours
Plant Physiology: Concepts of diffusion, osmosis, imbibition, Movement of water, food, nutrients and gases, Photosynthesis, plant growth and development.		
	Total Lecture Hours	**40 hours**

Textbook:

S.No	Book Title	Author
1	Biology-Textbook of Class XI, NCERT Publication	NCERT Publication
2	Biology-Textbook of Class XII, NCERT Publication	NCERT Publication
3	Together With Biology Study Material for Class 12	

Reference Books:

S.No	Book Title	Author
1	Biology 12th Edition, Mc Grail Publications	Raven, George Johnson, Kenneth Mason, Jonathan Losos & Tod Duncan
2	TEXTBOOK OF BIOTECHNOLOGY, McGraw Hill	PATNAIK
3	Basic Biotechnology 3rd Edition, Cambridge University Press	Colin Ratledge & Bjorn Kristiansen

NPTEL/ Youtube/ Faculty Video Link:

Module 1	Links: https://www.youtube.com/watch?v=_WM2hJmjctI https://www.youtube.com/watch?v=ZyWYID2cTK0&t=2s https://www.youtube.com/watch?v=URUJD5NEXC8&t=28s
Module 2	https://www.youtube.com/watch?v=qlOOGk7ryxc https://www.youtube.com/watch?v=b8MfRHfV4Q4
Module 3	https://www.youtube.com/watch?v=w6yyWyzwqhg
Module 4	https://www.youtube.com/watch?v=EJEd3WhE5-I&t=62shttps://www.youtube.com/watch?v=HyJ86mS2Naohttps://www.youtube.com/watch?v=UD0n3gfZ0yg
Module 5	https://www.youtube.com/watch?v=WVaRdAGV11M&t=1111s https://www.youtube.com/watch?v=9tf42ruBr4g&t=969shttps://www.youtube.com/watch?v=9tf42ruBr4g&list=RDCMUCtKAQhsa1D_zKbc3yZmwARQ&start_radio=1&t=1012

Mode of Evaluation

CIE						ESE	Total
ST1	ST2	ST3	TA1* 5	TA2* 5	Attendance 10		
30			20			100	150

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CAS0101B	**Course Name: Engineering Physics**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- First Semester BT		**3**	**0**	**0**	**3**

Pre-requisite:

1. Unit and dimensions.
2. Atomic structure and atomic spectra.
3. Properties of matter.
4. Basics of heat and thermodynamics.
5. Basics of biological systems.

Course Objectives:

1.To provide the knowledge of measurement and errors and their uses in engineering applications

2.To provide the knowledge of motions and their uses in engineering applications.

3.To provide the knowledge of the basic concept of thermodynamics and its uses to engineering applications.

4.To provide the knowledge of Crystallography and its uses to engineering applications.

5. To provide the basic knowledge of fundamental principles underlying the physical properties and behavior of biological systems.

Course Outcome: After completion of the course, the student will be able to:		Bloom's Knowledge Level (KL)
CO1	Implement various measurement techniques to engineering applications.	K3
CO2	Describe the knowledge of kinematics and dynamics.	K2
CO3	Use the phenomenon of thermodynamics in engineering applications.	K3
CO4	Calculate the various parameters of crystal structures	K3
CO5	Explain fundamental principles underlying the physical properties and behavior of biological systems.	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	-	2	1	-	-	-	-	2	-	-
CO2	3	2	1	-	2	1	-	-	-	-	2	-	-
CO3	3	2	1	-	2	1	-	-	-	-	2	-	-
CO4	3	2	2	-	1	1	-	-	-	-	2	-	-
CO5	3	2	2	-	1	1	-	-	-	-	2	-	-

Course Contents / Syllabus

Module 1	**Measurement and errors**	**8 hours**

Introduction to Measurement, Systems of Units and standards, Measurement Errors and Uncertainty, Types of Error, Statistical Analysis, Probability of Errors, Limiting Errors. Calibration and Standards, Data Recording and Analysis, Relevant problems, Instruments of measurements.

Module 2	**Kinematics and Dynamics**	**8 hours**

Introduction to motion (definition of kinematics and its relation to mechanics), Velocity, Acceleration, Types of motion (rectilinear, curvilinear, relative), Coordinate system, Graphical representation of motion.

Newton's law of motion, Mass and Weight, Work energy theorem, Impulse and momentum, Rotational dynamics (Torque, moment of inertia, Angular momentum, K.E of rotation.

Module 3	**Thermodynamics**	**8 hours**
Zeroth law of Thermodynamics, First law of Thermodynamics & its applications, Second law of Thermodynamics, Concept of Engine, Efficiency of Engine, Third law of Thermodynamics, Entropy, Change in entropy in reversible and irreversible processes		
Module 4	**Crystal Physics**	**8 hours**
Crystalline and Non-Crystalline Materials, Crystal systems and Bravais lattices, Space lattices of Cubic systems, Miller indices, Relation between inter-planer distance and cube edge, Crystal structure of NaCl and Diamond, Atomic Packing Factor of the Cubic system, Relation between Lattice constant and Density. Diffraction of X-rays by crystal planes, Bragg's law.		
Module 5	**Introduction to Biophysical Concepts**	**8 hours**
Basics of Membrane Physics (surface tension, permeability), Electrical properties of Biological Cells (basic bioelectricity), Molecular forces in Biology (van der Waals, hydrogen bonding), Overview of Optical and Electrical Bioinstrumentation, Concept of Molecular Machines and Motors.		
	Total Lecture Hours	**40 hours**

Textbook:

S.No	Book Title	Author
1	Engineering Physics	R. K. Gaur and S. L. Gupta

Reference Books:

S.No	Book Title	Author
1	Measurements and Instrumentation	A. K. Sawhney
2	Engineering Metrology and Measurements	Krishnamurthy and Raghavendra
3	Theory of Machines	S.S. Rattan
4	Materials Science and Engineering	V. Raghavan
5	Heat and Thermodynamics	Mark Zemansky
6	Engineering Thermodynamics	P. K. Nag
7	Biophysics: An Introduction	Rodney Cotterill

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=kJQOlZDnLdk
Module 2	https://www.youtube.com/watch?v=2QC2EW8b_Ww
Module 3	https://www.youtube.com/watch?v=BjVTdZ_htu8
Module 4	https://www.youtube.com/watch?v=vlzYLk5ll14
Module 5	https://youtu.be/h_LJNPrJtPM?si=8c5JeDFQfx-AhWJH

Mode of Evaluation

CIE						ESE	Total
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**Attendance**		
			5	**5**	**10**		
30			**20**			**100**	**150**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

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Course Code: CCSAI0101	**Course Name: Fundamentals of Artificial Intelligence**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- First Semester BT		**2**	**0**	**0**	**2**

Pre-requisite: Basic Programming, Basic Data Interpretation Skills

Course Objectives: This subject aims to introduce students to the core principles, branches, applications, tools, and ethical considerations of Artificial Intelligence, empowering them with essential theoretical knowledge and practical skills to explore intelligent systems and pursue advanced AI research and development.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Explain the foundations of Artificial Intelligence and its historical evolution	K2
CO2	Interpret and differentiate types of data	K3
CO3	Develop Python-based data processing workflows	K3
CO4	Analyze the impact and real-world applications of AI	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	1	2
CO2	2	3	-	-	2	-	-	-	-	-	-	1	1	2
CO3	2	2	2	2	3	-	-	-	-	-	-	1	2	2
CO4	2	2	2	2	3	2	1	2	-	-	-	1	1	2

Course Contents / Syllabus

Module 1	**Introduction to AI**	**8 hours**

Introduction to AI – History, Approaches and Philosophy, Application of AI, Intelligent Agent, Types of Agent, Domains of AI- Machine Learning, Deep Learning, Natural Language Processing, Computer Vision, Generative AI

Module 2	**Data Literacy and Analysis**	**8 hours**

Importance of Data, Information, Knowledge, Wisdom, Types of Data [Unstructured, Structured], Data Collection, Data Processing, Data Analysis – Descriptive and Inferential.

Module 3	**Compute, Analysis and Visualization**	**10 hours**

Introduction to Python, Libraries (Pandas, NumPy, Matplotlib), Import and Export of Data, IDE, Google Colab, Kaggle Kernel.

Module 4	**Applications of AI**	**4 hours**

AI in Healthcare, Finance, Agriculture, Transportation, Retail and E-commerce, Entertainment and Media, Smart Homes and IoT, Robotics and Automation

Total Lecture Hours	**30 hours**

Textbook:

S.No	**Book Title**	Author
1	Artificial Intelligence: A Modern Approach, Pearson Education, 4th Edition, 2020	Stuart Russell & Peter Norvig
2	Artificial Intelligence, McGraw-Hill Education, 3rd Edition, 2009	Elaine Rich, Kevin Knight, Shivashankar B. Nair

Reference Books:

S.No	Book Title	Author
1	Artificial Intelligence and Machine Learning, Dreamtech Press, 1st Edition, 2020	P. S. Deshpande
2	Python Data Analytics: With Pandas, Numpy, and Matplotlib, Apress; 2nd edition (1 January 2018)	Wolfgang Ertel

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=fV2k2ivttL0&ab_channel=nptelhrd
Module 2	https://www.youtube.com/watch?v=dJYGatp4SvA&ab_channel=MichiganOnline
Module 3	https://www.youtube.com/watch?v=VX6kCjwdNPw
Module 4	https://www.youtube.com/watch?v=kaI20cdbMjo

Mode of Evaluation

CIE						ESE	Total
ST1	ST2	ST3	TA1*	TA2*	Attendance		
			5	5	10		
30			20			50	100

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

LAB Course Code: CAS0151B	LAB Course Name: Engineering Physics Lab	L	T	P	C
Course Offered in: B.Tech- First Semester BT		0	0	2	1
Pre-requisite: Least count, Screw gauge, Vernier calipers					

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Course Objectives:

1. To provide the practical knowledge of the thermal and electrical conductivity.
2. To provide the practical knowledge of the measuring techniques.
3. To provide the practical knowledge of the flow of liquid and electrochemical equivalent.
4. To provide the practical knowledge of the ultrasonic waves and X-rays.
5. To provide the practical knowledge of nanoparticles and thin films.

Course Outcome: After completion of the course, the student will be able to:		Bloom's Knowledge Level (KL)
CO1	Understand the practical knowledge of the thermal and electrical conductivity.	K2
CO2	Apply the practical knowledge of the measuring instruments.	K3
CO3	Analyze the flow of liquid and electrochemical equivalent.	K4
CO4	Understand the practical knowledge of the ultrasonic waves and X rays.	K2
CO5	Create the nanoparticles and thin films.	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 determine the thermal conductivity of a metallic rod by Searle's method.
2. Use of Vernier Calipers to (i) measure diameter of a small spherical/cylindrical body, (ii) measure the dimensions of a given regular body of known mass and hence to determine its density; and (iii) measure the internal diameter and depth of a given cylindrical object and hence to calculate its volume.
3. To measure the thickness of the given glass plate using Screw Gauge.
4. To measure the thickness of the given glass plate using Spherometer
5. To determine the value of 'g' by using a Simple Pendulum.
6. To determine E. C. E. of copper using tangent galvanometer.
7. Calibration of voltmeter/ammeter using potentiometer.
8. Determination of ultrasonic waves velocity in liquid media.
9. To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).

10. To determine the Coefficient of viscosity of a liquid.
11. Determine mechanical equivalent of heat by electrical method.
12. Thermal conductivity of a metal by Forbe's method.
13. Analysis of crystal structure of X ray diffractogram.
14. Synthesis of Nanoparticles by chemical route.
15. To synthesize the Thin Films using Sol-Gel Spin Coating system.
Total Hours: 24 hrs.

Mode of Evaluation

CIE			PE	Total
PS1	PS2	PS3	(If mentioned in curriculum)	
5	10	10		
25			25	50

LAB Course Code: CCSE0151	LAB Course Name: C Programming	L	T	P	C
Course Offered in: B.Tech- First Semester		0	0	4	2

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CSE/CSE-TWIN/CSE(R)/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/ AIML-TWIN/CYS/ECE/ECE(VLSI)/ME/M.Tech(Integrated)/MCT				

Pre-requisite: Basic Mathematics and Number Systems

Course Objectives: The objective of a C programming course is to provide students with a solid foundation about writing syntax, concepts, and principles as well as develop their ability to write efficient and effective code.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Understand the fundamentals, flowcharts, program structure.	K2
CO2	Apply modular and efficient programs using conditional branching, loops, and functions.	K3
CO3	Implement and manipulate one-dimensional and two-dimensional arrays and strings, applying them to solve problems like searching, sorting, matrix operations, structures, unions, 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	PSO4
CO1	3	2	1	2	2	1	1	1	2	1	3	3	2	1	2
CO2	3	2	3	2	2	1	1	1	1	1	2	3	2	1	2
CO3	3	2	3	2	3	2	1	1	1	1	2	3	2	1	2

Course Contents / Syllabus

Module 1	**Introduction to Algorithm and C Program**	**9 hours**

Programming using C: Concepts of Algorithm and Flowchart, Translators and its types, and its types, 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, runtime errors, object and executable code, Keywords, identifiers, constants, and data types. Operators and their types, Arithmetic expressions and precedence: operators, operator precedence and associativity, type conversion, and mixed operands.

Module 2	**Control Statement**	**10 hours**

Conditional Branching (if, else-if, nested if else, switch statements) use of break, and default with switch, Iteration and loops: Concept of loops, for, while, and do-while; while, multiple-loop variables; use of break and continue statements; nested loop. Managing Input and Output Operations: Reading a Character, Writing a Character, Formatted Input, Formatted Output. Functions: Concept of sub programming, function, types of functions, passing parameters to functions: call by value Definition, Recursion: Definition, Types of Recursive Functions Tower of Hanoi problem, Storage: scope of variable, local and global variables, Nesting of scope Storage classes: Auto, Register, static, and Extern. Pointers: defining and declaring pointer, pointer arithmetic and scaling, pointer aliasing, and Aliasing, call by reference.

Module 3	**Array**	**9 hours**

Array notation and one-dimensional arrays, Declaration of one-dimensional arrays, initialization of one-dimensional arrays, Example programs: (searching and sorting), Two-dimensional arrays, declaration of Two-dimensional arrays, Initialization of Two-dimensional Arrays, Example programs: Matrix multiplication, transpose of a matrix.

Strings: Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, String-handling Functions, Example Programs (with and without using built-in string functions)

Module 4	**Structure**	**10 hours**

Introduction, Initializing, defining, and declaring structure, accessing members, Operations on individual Structure within structures Array of structure.

Union: Introduction, Initializing, defining, and declaring structure, Accessing members, Operations on individual members, Operations on the union, Difference between Structure and Union, Dynamic Memory Allocation: Introduction, Library functions malloc, calloc, realloc, and free.

Module 5	**File Handling and Object Oriented Programming**	**10 hours**

File Handling: Introductory Concepts of File Stream.

Introduction to Object-oriented programming: Introduction to User-Defined Data datatype, Fundamentals of the object-oriented approach, introduction to class and its components, constructors, referring to objects of a class, static members, classes and Their Friends, Introduction to STL and application.

Total Lecture Hours	**48 hours**

Textbook:

S.No	Book Title	Author
1	C: The Complete Reference, McGrawHill,4thEdition,2002	Herbert Schildt
2	Programming in C, McGrawHill	E Balaguruswami
3	Let Us C , BPB publication	Yashwant P.Kanetkar
4	Mastering C	K.R Venugopal
5	Working with C	Yashwant P. Kanetkar

Reference Books:

S.No	Book Title	Author
1	The C programming , Pearson Education	Kernighan Brain W.and Ritchie Dennis
2	Computer Science-A Structured Programming Approach Using C, Third Edition, Cengage Learning-2007.	Behrouz A. Forouzan, RichardF. Gilberg
3	Computer Basics and C Programming , PHI Learning pvt. Limited,2015.	V.Rajaraman
4	Schrum's Outline of Programming with C , McGraw-Hill	Byron ,Gottfried
5	Computer Fundamentals and Programming in C, Oxford Publication	Reema Thareja

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://en.wikibooks.org/wiki/C_Programming
Module 2	https://en.wikibooks.org/wiki/A_Little_C_Primer
Module 3	https://youtu.be/XM7f5x94068
Module 4	https://youtu.be/FYdYkiIHvRQ
Module 5	https://youtu.be/lVD74GSU-3w

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

1. Write a C Program to implement a half pyramid of *

2. Write a C Program to implement a Half pyramid of numbers
3. Write a C Program to implement a half pyramid of alphabets
4. Write a C Program to implement an inverted half pyramid of *
5. Write a C Program to implement an inverted half pyramid of numbers
6. Write a C Program to implement a full pyramid of *
7. Write a C Program to implement a full pyramid of numbers
8. Write a C Program to implement an inverted full pyramid of *
9. Write a C Program to implement Pascal's triangle
10. Write a C Program to implement Floyd's triangle
11. C Program to Print Diamond Pattern
12. C Program to Print Floyd's Triangle
13. C Program to Print Pascal Triangle
14. Star Pattern Programs in C
15. Pyramid Patterns in C
16. Write a C program for a matchstick game being played between the computer and a user. Your program should ensure that the computer always wins. Rules for the game are as follows: There are 21 matchsticks. The computer asks the player to pick 1, 2, 3 or 4 matchsticks. After the person picks, the computer does its picking. – Whoever is forced to pick up the last matchstick loses the game.
17. Write a program that plays tic-tac-toe. The tic-tac-toe game is played on a 3x3 grid the game is played by two players, who take turns. The first player marks move with a circle, the second with a cross. The player who has formed a horizontal, vertical, or diagonal sequence of three marks wins. Your program should draw the game board, ask the user for the coordinates of the next mark, change the players after every successful move, and pronounce the winner.
18. Design a calculator that performs Number system conversion
19. C Program to Simulate a Simple arithmetic Calculator
20. C Program to Evaluate the Given Polynomial Equation
21. C Program to Find Mean, Variance and Standard Deviation
22. C Program to Add Two Complex Numbers
23. C Program to Find Power of a Number
24. C Program to Calculate Pow (x,n)
25. C program to Find the Sum of Arithmetic Progression Series
26. C program to Find the Sum of Geometric Progression Series
27. C program to Find the Sum of Harmonic Progression Series
28. C Program to Find Sum of Series 1 + 1/2 + 1/3 + 1/4 + ……. + 1/N
29. C Program to Find Sum of Series 1^2 + 2^2 + …. + n^2
30. C Program to Find Sum of Series 1^3 + 2^3 + 3^3 + … + n^3
31. C Program to Find Sum of the Series 1/1! + 2/2! + 3/3! + ……1/N!

32. Design a program which displays following options on screen

1. Figure
2. Exit
3. Enter Choice

Once valid choice is entered it executes further.

If choice one is entered, then it should display

1. TRAINGLE
2. SQUARE
3. RHOMBUS
4. TRAPEZIUM
5. RETURN TO PREVIOUS MENU

ENTER CHOICE

Once valid choice is entered it executes further.

After that it ask for specific data and prints the area and volume and perimeter/circumference of the respective figure.

After that a choice is to be asked for

Do you wish to continue (Y/N)? And should work accordingly. Before every menu, the screen should be cleared.

33. C Program to Find the Largest Number Among Three Numbers
34. C Program to Find the Roots of a Quadratic Equation
35. C Program to Check Leap Year. Evaluate all the cases.
36. C Program to Check Whether a Number is Positive or Negative
37. C Program to Check Whether a Character is an Alphabet or not
38. C Program to Calculate the Sum of Natural Numbers
39. C Program to Find Factorial of a Number
40. C Program to Generate Multiplication Table
41. C Program to Display Fibonacci Sequence
42. C Program to Find GCD of two Numbers
43. C Program to Find LCM of two Numbers
44. C Program to Display Characters from A to Z Using Loop
45. C Program to Reverse a Number using looping concepts
46. C Program to Check Whether a Number is Palindrome or Not
47. C Program to Check Whether a Number is Prime or Not
48. C Program to Check Armstrong Number
49. C Program to Display Armstrong Number Between Two Intervals
50. C Program to Display Factors of a Number
51. C Program to Reverse a Number using looping concepts
52. C Program to Check Whether a Number is Palindrome or Not
53. C Program to Check Whether a Number is Prime or Not
54. C Program to Check Armstrong Number
55. C Program to Display Armstrong Number Between Two Intervals
56. C Program to Display Factors of a Number
57. C Program to Make a Simple Calculator Using switch...case
58. C Program to Check Whether a Number is Even or Odd
59. C Program to Check Whether a Character is a Vowel or Consonant

60. C Program to Find the Largest Number Among Three Numbers
61. C Program to Check Whether a Number is Positive or Negative
62. C Program to Calculate the Sum of Natural Numbers
63. C Program to Find Factorial of a Number
64. C Program to Generate Multiplication Table
65. C Program to Display Fibonacci Sequence
66. C Program to Display Prime Numbers Between Intervals Using Function
67. C Program to Check Prime or Armstrong Number Using User-defined Function
68. C Program to Check Whether a Number can be Expressed as Sum of Two Prime Numbers
69. C Program to Find the Sum of Natural Numbers using Recursion
70. C Program to Find Factorial of a Number Using Recursion
71. C Program to Find G.C.D Using Recursion
72. C Program to Convert Binary Number to Decimal and vice-versa
73. C program to calculate the power using recursion
74. C Program to Check Prime or Armstrong Number Using User-defined Function
75. C Program to Find the Sum of Natural Numbers using Recursion
76. Design a calculator

Design a Menu Driven program which performs the functions as per the menu
Add Details of students
Search the student data
   a. Display the records Name must not be blank, and first letter should be alphabet
Student details should contain Name. Age, Class, Roll-No
Exit
   Enter the Choice:
Note: Choice must be between 1-4 Only. Other than that, an error message must be displayed and entry should be done again

77. C Program to Add Two Numbers Using Recursion.
78. C Program to find the sum of digits of a number using recursion.
79. Write a method in C that will remove any given character from a string.
80. C Program to Calculate Average Using Arrays
81. C Program to Find Largest Element in an Array
82. C Program to search an element
83. C Program to Add Two Matrices Using Multi-dimensional Arrays
84. C Program to Multiply Two Matrices Using Multi- dimensional Arrays
85. C Program to Find Transpose of a Matrix
86. C program to illustrate Point Arithmetic
87. C Program to Access Array Elements Using Pointer
88. C Program to Find Largest Number Using Dynamic Memory Allocation
89. C Program to Calculate Average Using Arrays
90. C Program to Find Largest Element in an Array
91. C Program to Calculate Standard Deviation
92. C Program to Find the Frequency of Characters in a String
93. C Program to Count the Number of Vowels, Consonants and so on

94. C Program to Remove all Characters in a String Except Alphabets
95. C Program to Find the Length of a String
96. C Program to Concatenate Two Strings
97. C Program to Copy String Without Using strcpy()
98. C Program to Sort Elements in Lexicographical Order (Dictionary Order)
99. C Program to Find the Frequency of Characters in a String
100. Write a method in C which will remove any given character from a String.
101. Write a program in C to count occurrence of a given character in a String.
102. Write a program in C to check if two Strings are Anagram.
103. Write a program in C to check a String is palindrome or not.
104. C program to check given character is vowel or consonant.
105. C program to check given character is digit or not.
106. C program to replace the string space with a given character.
107. C program to convert lowercase char to uppercase of string.
108. C program to convert lowercase vowel to uppercase in string.
109. C program to delete vowels in a given string.
110. C program to count Occurrence Of Vowels & Consonants in a String.
111. C program to print the highest frequency character in a String.
112. C program to Replace First Occurrence Of Vowel With '-' in String.
113. C program to count alphabets, digits and special characters.
114. C program to separate characters in a given string.
115. C program to remove blank space from string.
116. C program to count blank space from string.
117. C program to concatenate two strings.
118. C program to remove repeated character from string.
119. C program to calculate sum of integers in string.
120. C program to print all non-repeating character in string.
121. C program to copy one string to another string.
122. C Program to sort characters of string.
123. C Program to sort character of string in descending order.
124. Write a program in C for, In array 1-100 numbers are stored, one number is missing how do you find it.
125. Write a program in C for, In a array 1-100 multiple numbers are duplicates, how do you find it.
126. Write a program in C to find first duplicate number in a given array.
127. Write a program in C to remove duplicate elements form array in C.
128. Write a program in C for, Given two arrays 1,2,3,4,5 and 2,3,1,0,5 find which number is not present in the second array.
129. Write a program in C for, How to compare two array is equal in size or not.
130. Write a program in C to find largest and smallest number in array.
131. Write a program in C to find second highest number in an integer array.
132. Write a program in C to find top two maximum number in array?

133.C program to print array in reverse Order.
134.C program to reverse an Array in two ways.
135.C Program to calculate length of an array.
136.C program to insert an element at end of an Array.
137.C program to insert element at a given location in Array.
138.C Program to delete element at end of Array.
139.C Program to delete given element from Array.
140.C Program to delete element from array at given index.
141.C Program to find sum of array elements.
142.C Program to print all even numbers in array.
143.C Program to print all odd numbers in array.
144.C program to perform left rotation of array elements by two positions.
145.C program to perform right rotation in array by 2 positions.
146.C Program to merge two arrays.
147.C Program to find highest frequency element in array.
148.C Program to Store Information of a Student Using Structure
149.C Program to Store Information of Students Using Structure
150.C Program to Store Data in Structures Dynamically
151.C Program to Store Information of a Student Using Structure
152.C Program to Add Two Distances (in inch-feet system) using Structures
153.Snake Game Mini Project in C is a basic console program with no graphics. You may play the famous "Snake Game" in this project exactly as you would anywhere else. To move the snake, use the up, down, right, and left arrows. Food is placed at various co-ordinates on the screen for the snake to consume. The snake's length and score will both rise by one element each time it consumes the food.
154.C Program to Write a Sentence to a File
155.C Program to Read the First Line From a File
156.C Program to showcase use of DMA
157.C Program to Write a record to a File
158.C Program to Read the last Line From a File
159.Program to create a file using command line argument
160.Program to copy one file into another
161.Implement macro handling
162.Program to write a structure into a file and display its content
163.Program to search a record in a file
164.Program to implement multi line macro and Conditional Macros
165.Program to draw Circle/Rectangle/Triangle/ A Hut/with colors in it
166.Program to shut down/ sleep a system if not component is being touched
167.Write a program in C to create and store information in a text file.
168.Write a program in C to read an existing file.:

169. Write a program in C to write multiple lines to a text file.:
170. Write a program in C to read the file and store the lines in an array.
171. Write a program in C to find the number of lines in a text file.
172. Write a program in C to find the content of a file and the number of lines in a text file.
173. Write a program in C to count the number of words and characters in a file.
174. C Program to list all files and sub-directories in a directory
175. C Program to count number of lines in a file
176. C Program to print contents of file
177. C Program to copy contents of one file to another file
178. C Program to merge contents of two files into a third file
179. C Program to read records from a data file
180. C Program to count number of lines, words, characters, blank space in a file
181. C Program to Illustrate how User Authentication is Done
182. C Program to Shutdown Computer in Linux
183. C Program to Compute First N Fibonacci Numbers using Command Line Arguments
184. C Program to Generate Fibonacci Series using Command Line Argument
185. Design an ATM Simulation using C manage the information of workers working in a firm or organization using this Employee Management System. The file handling technique is used here to save the data in a particular file, and you get the notion of this project as soon as you hear the name. This project uses the Insert, Edit, and Delete file actions, but the sole constraint is that you can only display the data, not search for any data item in particular. If you have more experience with C, you may alter this program by using the searching strategies.
186. The following modules are included in this project. Add Employee Details Edit Employee details Modify Employee Delete Employee Create a Database using C file structure
187. A Library in charge is facing problems in handling books and customers. Design a solution using C regarding his problem
188. Design a Simple Result System in the C programming language. You can keep track of the pupils' grades and update them at any time. Students might be given marks based on their performance in each subject. The project is straightforward and straightforward to use. The system is written entirely in the C programming language.

Mode of Evaluation

CIE			PE	Total
PS1 **10**	**PS2** **20**	**PS3** **20**	**(If mentioned in curriculum)**	
50			**50**	**100**

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

LAB Course Code: CME0151	**LAB Course Name: CAD & Digital Manufacturing**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- First Semester BT		**0**	**0**	**2**	**1**

Pre-requisite: NIL

Course Objectives: The objective of this lab is to enable students to understand and apply the fundamentals of CAD and digital manufacturing, including 2D drafting, 3D modeling, and 3D printing processes. Students will gain hands-on experience with design tools, slicing software, and post-processing techniques to develop functional digital-to-physical prototypes.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Understand the principles of 2D geometry and orthographic projection and apply them to manual and computer-aided drafting.	K3
CO2	Develop 3D models of components using CAD tools and apply appropriate dimensioning and modeling techniques.	K3
CO3	Identify the components of a 3D printer and understand the workflow from CAD file preparation to STL conversion for 3D printing.	K2
CO4	Use slicing software to generate G-code from 3D models and analyze the slicing parameters, support structures, and print previews.	K3
CO5	Perform 3D printing of parts and assemblies and demonstrate post-processing techniques to enhance surface finish, fit, and function.	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	-	-	2	1	1	1	1	1	1	2	2	3
CO2	3	1	-	1	3	2	1	1	1	1	1	2	3	3
CO3	3	2	2	1	3	3	1	1	2	1	1	2	3	2
CO4	3	1	-	-	2	3	2	1	2	1	1	2	2	2
CO5	3	2	2	1	3	3	2	1	2	1	1	2	3	3

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

1. To introduce the user interface of CAD software and its elements/tools/commands.
2. To draw the sheet layout and title block using aligned system of dimensioning.
3. To apply the Aligned Dimensioning System to precisely reproduce the given 2D drawings using CAD software.
4. To accurately create and represent the given 2D drawing in CAD, utilizing the Aligned System of dimensioning.
5. To design the given 3D Component in CAD software, utilizing the Aligned System of dimensioning.
6. To design the given 3D Component in CAD software, utilizing the Unidirectional System of dimensioning and Layer Properties.
7. Introduction to 3D printer and explore features and specifications like Machine setting (e.g., Nozzle, Print Bed, etc.) for FDM 3D printer.
8. To upload the part and set up the position and orientation of the model (use of various commands like Move, Scale, Rotate, Mirror etc.) in slicing software.

9. To use slicing software for converting a 3D CAD model into a G code on cloud based slicing software and adding the reinforcing of layers of composites within slicing software.

10. To create the G-code file for 3D printing purpose using raft, brim and skirt in the slicing software to fulfill the adaptive need of 3d printer.

11. A case study on different types of 3D printers.

Mode of Evaluation:

CIE			PE	Total
PS1	**PS2**	**PS3**	**(If mentioned in curriculum)**	
5	**10**	**10**		
25			**25**	**50**

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

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LAB Course Code: CBT0152	LAB Course Name: Good Manufacturing and Laboratory Practices	L	T	P	C
Course Offered in: B.Tech- First Semester BT		0	0	2	1

Pre-requisite: Basics of Science

Course Objectives

1. Understand the basics of data analytics and its relevance in biological research.
2. Perform data cleaning, normalization, and transformation on biological datasets.
3. Apply statistical tools to summarize and interpret experimental data.
4. Use Python/R/Excel for biological data visualization and correlation analysis.
5. Execute small-scale analytics projects involving real-world biological datasets.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Import, clean, and preprocess biological datasets using standard data analysis tools.	
CO2	Apply basic statistical measures and correlation analysis to biological data.	
CO3	Normalize and transform data to make it suitable for biological interpretation.	
CO4	Visualize biological datasets using graphs and plots to identify trends and anomalies.	
CO5	Conduct a complete bio-data analysis project and present insights effectively.	

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	-	-	-	2	-	2	2	-	3
CO2	3	3	-	3	3	-	-	-	2	-	2	2	-	3
CO3	3	3	-	3	3	-	-	-	2	-	2	2	-	3
CO4	3	2	-	2	3	-	-	-	2	-	2	2	-	3
CO5	3	3	2	3	3	-	-	2	3	2	3	2	-	3

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

1. Introduction to GLP and GMP: Group discussion on real-world importance of GLP/GMP
2. Evolution of Regulatory Frameworks: Timeline creation of major global regulatory milestones
3. es & Responsibilities in Compliant Units: Role-play activity: "Who does what?" in a GMP-compliant facility
4. Laboratory Design and Safety: Lab sketching and simulation of emergency response scenarios
5. Documentation and Record Keeping (GLP): Design and fill a mock SOP and logbook entry
6. Sample Management: Hands-on demo: prepare sample labels and storage logs
7. Cleanroom & Facility Design (GMP): Design a cleanroom layout using chart paper or software
8. Equipment Validation and Calibration : Group work: create a mock validation protocol for an instrument
9. Raw Material and BMR Documentation: Simulate a BMR entry for a biotech product
10. QA vs QC Practices: Case study analysis of a quality failure and root cause assessment

11. Audits and Compliance : Conduct a peer-to-peer internal mock audit using checklist
12. Risk Assessment in GMP/GLP: Workshop: Perform a mini-FMEA for a laboratory or process scenario.

Mode of Evaluation:

CIE			PE	
PS1	**PS2**	**PS3**	**(If mentioned in curriculum)**	**Total**
5	**10**	**10**		
25			**25**	**50**

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

LAB Course Code: CASL0151	LAB Course Name: Acquiring Business Communication (ABC) Lab	L	T	P	C
Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/CSE(R)/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/ AIML-TWIN/CYS/ECE/ECE(VLSI)/ME/M.Tech(Integrated)/MCT		0	0	4	2

Pre-requisite: Comprehension of basic English language

Course Objectives:

1. To improve proficiency in the English language to the Intermediate level of CEFR (Common European Framework of Languages).
2. To motivate students to look within and create a better version of 'self.'
3. To introduce the key concepts of etiquette and soft skills.

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

S. No	Course Outcome	Bloom's Knowledge Level (KL)
CO1	Identify essential soft skills for the workplace	K1
CO2	Apply effective listening skills	K3
CO3	Acquire fluency and clarity of speech	K3
CO4	Understand and analyse written texts	K4
CO5	Create clear, correct, and concise written content	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	-	-	1	1	1	1	1	1	2	3	1		
CO2	1	1	1	1	1	1	1	1	2	3	1		
CO3	1	1	1	1	1	1	1	1	2	3	1		
CO4	1	2	2	2	2	2	2	1	2	3	1		
CO5	2	1	2	1	2	1	2	1	2	3	1		

List Of Practical

1. **Orientation**

a. Introduction to the course

b. Introduction to the evaluation scheme & the British Council EnglishScore Tests

Developing Communication Skills

- Confidence building activities
- Overcoming initial hesitations

2. ***Anubhav*** **Activity**

- The Students will share their own reservations and expectations from the course.

Showcasing talents

- Participants will gain confidence in expressing themselves through song/dance, overcome inhibitions, and develop a sense of freedom and creativity.

3. **Developing active listening and accurate communication skills**

- The students will enhance their listening skills, practice conveying information accurately, and understand the importance of clear communication and active listening.

4. **Language Toolbox 1: Vocabulary enrichment**

- The students will be exposed to General Service List (GSL) by West and Academic Word List (AWL); the students will be asked to keep a journal of new words learnt every day.

5. **Think-Pair-Share for Reading Comprehension**

- The students will actively interact with the reading material by engaging in this activity, collaborating with their peers, and refining their comprehension skills.

6. **Essentials of Writing – Requisites of a good sentence**

- The students will learn to construct sentences which showcase clarity, consistency and correctness in structure, word usage and punctuation through activities like picture prompts and verbal clues.

7**. Professional Introductions (Video recorded)**

- The students will practice professional introductions with emphasis on clarity, correctness, voice modulation, and engaging content.

8**. Listen and write**

- The students will practice writing exactly what they hear.

Listen and Repeat

- The students will practice speaking, with correct pronunciation and intonation, what they hear.

9. **Pronunciation**

- Vowel & Consonant sounds which are difficult for Indian speakers
- Syllable division & accent

10. **Reading Techniques for Time Management**

- The students will be able to identify keywords, headings, and topic sentences. Further, they will be able to analyze and synthesize information from the selected texts.

11. **Paragraph Writing (Unity, Cohesion, Emphasis)**

- The students will learn to write with emphasis on correctness of grammatical structure, concord, voice, and tenses.

12. **Language Toolbox 3: Vocabulary Building – Homophones, homonyms, synonyms, antonyms, phrases & idioms**

- The students will be able to bring in variety in the usage of words.

13. **Building formal attitude through language, dress, and behavior**

- The students will understand the importance of formal dressing and professional behavior in academic and workplace settings.

14. **Clarity in articulation**

- The students will practice accent, rhythm, and intonation in connected speech (Ref. English Score – Speaking/ SVAR/ Versant/etc.)

15. **Listening to follow directions and instructions precisely**

- The students will improve their listening comprehension and enhance their ability to follow instructions & directions.

16. **Speaking in front of an audience**

JAM, Extempore

- The students will develop the ability to speak confidently and fluently in front of an audience by organizing their thoughts quickly, expressing ideas clearly, managing time effectively, and using appropriate body language, voice modulation, and eye contact to overcome stage fear and hesitation.

17. **Analysing Caselets**

- The students will improve their analytical and speaking skills by analysing & providing solutions to the issues in the caselets.

18. **Basics of Email Writing**

- The students will be able to write letters/applications on topics from real life scenarios.

19. ***Anubhav* Activity**

- The students will talk about their key takeaways from the sessions/test scores this far.

20. **Analysing Speech/ Ted Talks**

- The students will be able to improve their listening by analysing speeches by famous personalities/Ted Talks.

21. **Sharing views in a group discussion**

- The students will enhance their ability to express their opinions, actively listen to others, and engage in constructive discussions to develop well-rounded perspectives.

22. **Decoding infographics**

- The students will improve their ability to interpret and analyse information presented in diagrams, graphs, and pie charts.

23. **Writing Essay**

- The students will practice writing coherently, logically, precisely, and correctly on a wide variety of topics.

24. ***Anubhav* Activity**

The students will reflect on the semester and the road map ahead.

Total Hours: 48 hrs.

Mode of Evaluation

CIE			PE	Total
PS1 **10**	**PS2** **20**	**PS3** **20**		
50			**50**	**100**

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CASCC0101	**Course Name: Design Thinking-I**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- First Semester BT		**2**	**0**	**0**	**2**

Pre-requisite:

Course Objectives: The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Develop a strong understanding of the design process and apply it in a variety of business settings	K1
CO2	Analyze self, culture, and teamwork to work in a multidisciplinary environment and exhibit empathetic behavior	K3
CO3	Formulate specific problem statements of real time issues and generate innovative ideas using design tools	K4
CO4	Apply critical thinking skills to arrive at the root cause from a set of likely causes	K4
CO5	Demonstrate an enhanced ability to apply design thinking skills for evaluation of claims and arguments	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	1	2	2	1	1	1	2	1	2	2	2		
CO2	1	2	1	1	1	2	1	2	2	2	1		
CO3	1	2	1	2	2	1	2	1	2	2	1		
CO4	1	2	1	1	1	1	1	1	1	1	1		
CO5	1	2	1	1	1	1	1	1	1	1	1		

Course Contents / Syllabus

Module 1	**Introduction**	**6 hours**

An overview of future skills, introduction to design thinking, traditional problem solving versus design thinking, history of design thinking, wicked problems. Innovation and creativity, the role of innovation and creativity in organizations, creativity in teams and their environments, design mindset. Introduction to elements and principles of design, 13 Musical Notes for Design Mindset, Examples of Great Design, Design Approaches across the world.

Case Studies: Mumbai Dabbawallas, Gillette, Singapore, Bengaluru, Bahubali, Google, Embrace Incubator

Activity: Observation, Wicked Problem

Module 2	**Ethical Values and Empathy**	**6 hours**

Understanding humans as a combination of I (self) and body, basic physical needs up to actualization, prosperity, the gap between desires and actualization. Understanding culture in family, society, institution, startup, socialization process. Ethical behavior: effects on self, society, understanding core values and feelings, negative sentiments and how to overcome them, definite human conduct: universal human goal, developing human consciousness in values, policy, and character.

Understanding stakeholders, techniques to empathize with, identify key user problems. Empathy tools- Interviews, empathy maps, persona, emotional mapping, immersion and observations, Emotional Intelligence, customer journey maps, classifying insights after Observations, Classifying Stakeholders.

Case Studies: Pure-it, Royal Enfield, Big Basket, Air-bnb.

Activity: Moccasin Walk, Persona, Empathy map, Journey Map

Module 3	**Problem Statement and Ideation**	**6 hours**

Defining the problem statement, creating personas, Point of View (POV) statements. Research identifying drivers, information gathering, target groups, samples, and feedbacks. Idea Generation basic design directions, Themes of Thinking, inspirations and references, brainstorming, inclusion, sketching and presenting ideas, idea evaluation, double diamond approach, analyze – four W's, 5 why's, "How Might We", Defining the problem using Ice-Cream Sticks, Metaphor & Random Association Technique, Mind-Map, ideation activity games - six thinking hats, million-dollar idea, introduction to visual collaboration and brainstorming tools - Mural, JamBoard, Introduction to AI Tools.

Case Studies: The Good Kitchen, Flipkart, Uber, Redbus, Big Bazaar

Activity: 5 Why, HMW, Brainstorming, Six Thinking Hats, 30 Circles, paper prototype

Module 4	**Critical Thinking**	**6 hours**

Fundamental concepts of critical thinking, the difference between critical and ordinary thinking, characteristics of critical thinkers, critical thinking skills- linking ideas, structuring arguments, recognizing incongruences, five pillars of critical thinking, argumentation versus rhetoric, cognitive bias, tribalism, and politics. Case study on applying critical thinking on different scenarios.

Case Studies: Byju's, Maggi noodles, Tata Nano

Activity: debate, role play

Module 5	**Logic and Argumentation**	**6 hours**

The argument, claim, and statement, identifying premises and conclusion, truth and logic conditions, valid/invalid arguments, strong/weak arguments, deductive argument, argument diagrams, logical reasoning, scientific reasoning, logical fallacies, propositional logic, probability, and judgment, obstacles to critical thinking. Group activity/role plays on evaluating arguments.

Case Studies: Aadhaar Card, Demonetization, Odd-Even Policy, Jio

Activity: Logical Fallacy Detective, Fact-Checking Challenge

	Total Lecture Hours	**30 hours**

Textbook:

S.No	**Book Title**	**Author**
1.	UnMukt : Science & Art of Design Thinking	Arun Jain
2.	Solving Problems with Design Thinking – Ten Stories of What Works	Jeanne Liedta
3.	A Foundation Course in Human Values and Professional Ethics	R R Gaur, R Sangal, G P Bagaria
4.	Critical Thinking: An Introduction	Fisher

Reference Books:

S.No	**Book Title**	**Author**
1.	101 Design Methods	Vijay Kumar
2.	Change by Design	Tim Brown

3.	How to improve your critical thinking & reflective kills	McMillan
4.	Design of Business	Roger L. Martin

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://youtu.be/rUUuhnLkJ2s?si=_XCHnDbt_U1z0Frx https://www.youtube.com/watch?v=ldYzbV0NDp8 https://www.youtube.com/watch?v=0Fi83BHQsMA
Module 2	https://www.youtube.com/watch?v=q654-kmF3Pc http://www.uhv.org.in/ https://swayam.gov.in/nd1_noc19_mg60/preview
Module 3	https://www.udemy.com/course/design-thinking-for-beginners/ https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them
Module 4	https://www.forbes.com/sites/sap/2016/08/25/innovation-with-design-thinking-demands-critical-thinking/#340511486908 https://www.criticalthinking.org/pages/defining-critical-thinking/766
Module 5	https://www.udemy.com/course/critical-thinker-academy/ https://swayam.gov.in/nd2_aic19_ma06/preview

Mode of Evaluation

CIE							ESE	Total
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**TA3***	**Attendance**		
			10	**10**	**10**	**10**		
60			**40**					**100**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

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

Course Code: CNC0103	Course Name: Essence of Indian Traditional Knowledge	L	T	P	C
Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/CSE(R)/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/ AIML-TWIN/CYS/ECE/ECE(VLSI)/ME/M.Tech(Integrated)/MCT		**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

Module 1	**Society State and Polity in India**	**8 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.

Module 2	**Indian Literature, Culture, Tradition, and Practice**	**8 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.

Module 3	**Indian Religion, Philosophy, and Practices**	**8 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.

Module 4	**Science, Management and Indian Knowledge System**	**8 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.

Module 5	**Cultural Heritage and Performing Arts**	**8 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	**40 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**

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=cjh7vCAvKhc
Module 2	https://www.youtube.com/watch?v=fCiOPDZW-30
Module 3	https://www.youtube.com/watch?v=JnFeKp0T3AQ
Module 4	https://www.youtube.com/watch?v=_d8N2hKMpw8
Module 5	https://www.youtube.com/watch?v=8D6UyaVj1tY

Mode of Evaluation

CIE						**ESE**	**Total**
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**Attendance**		
			5	**5**	**10**		
30			**20**				**50**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

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

Course Code: CNC0102	Course Name: Constitution of India, Law And Engineering	L	T	P	C
Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/CSE(R)/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/ AIML-TWIN/CYS/ECE/ECE(VLSI)/ME/M.Tech(Integrated)/MCT		**2**	**0**	**0**	**NC**

Pre-requisite: Basic understanding of political science

Course Objectives: Acquaint the students with legacies of constitutional development in India and help those to understand the most diversified legal document of India and philosophy behind it.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Identify and explore the basic features and modalities about Indian constitution.	K1
CO2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level	K2
CO3	Differentiate different aspects of Indian Legal System and its related bodies.	K4
CO4	Discover and apply different laws and regulations related to engineering practices.	K4
CO5	Correlate role of engineers with different organizations and governance models.	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	1	1	2	1	1	3	2	2	1	2	1		
CO2	1	2	2	1	1	3	2	2	2	2	1		
CO3	1	2	2	1	1	3	2	3	1	2	1		
CO4	2	2	3	2	2	3	3	3	2	2	2		
CO5	2	2	3	2	1	3	2	3	2	3	2		

Course Contents / Syllabus

Module 1	**Introduction and Basic Information about Indian Constitution**	**8 hours**

Meaning of the constitution law and constitutionalism, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947,Enforcement of the Constitution, Indian Constitution and its Salient Features, The Preamble of the Constitution, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Parliamentary System, Federal System, Centre-State Relations, Amendment of the Constitutional Powers and Procedure, The historical perspectives of the constitutional amendments in India, Emergency Provisions: National Emergency, President Rule, Financial Emergency, and Local Self Government – Constitutional Scheme in India.

Module 2	**Union Executive and State Executive**	**8 hours**

Powers of Indian Parliament Functions of Rajya Sabha, Functions of Lok Sabha, Powers and Functions of the President, Comparison of powers of Indian President with the United States, Powers and Functions of Vice-President, Powers and Functions of the Prime Minister, Judiciary – The Independence of the Supreme Court, Appointment of Judges, Judicial Review, Public Interest Litigation, Judicial Activism, LokPal, Lok Ayukta, The Lokpal and Lok ayuktas Act 2013, State Executives – Powers and Functions of the Governor, Powers and Functions of the Chief Minister, Functions of State Cabinet, Functions of State Legislature, Functions of High Court and Subordinate Courts.

Module 3	**Introduction and Basic Information about Legal System**	**8 hours**

The Legal System: Sources of Law and the Court Structure: Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law, Principles taken from decisions of judges constitute binding legal rules. The Court System in India and Foreign Courtiers (District Court, District Consumer Forum, Tribunals, High Courts, Supreme Court). Arbitration: As an alternative to resolving disputes in the normal courts, parties who are in dispute can agree that this will instead be referred to arbitration. Contract law, Tort, Law at workplace.

Module 4	**Intellectual Property Laws and Regulation to Information**	**8 hours**

Intellectual Property Laws: Introduction, Legal Aspects of Patents, Filing of Patent Applications, Rights from Patents, Infringement of Patents, Copyright and its Ownership, Infringement of Copyright, Civil Remedies for Infringement, Regulation to Information, Introduction, Right to Information Act, 2005, Information Technology Act, 2000, Electronic Governance, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Offences, Limitations of the Information Technology Act.

Module 5	**Business Organizations and E-Governance**	**8 hours**

Sole Traders, Partnerships: Companies: The Company's Act: Introduction, Formation of a Company, Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, General Meetings and Proceedings, Auditor, Winding up. E-Governance and role of engineers in E-Governance, Need for reformed engineering serving at the Union and State level, Role of I.T. professionals in Judiciary, Problem of Alienation and Secessionism in few states creating hurdles in Industrial development.

Total Lecture Hours	**40 hours**

Textbook:

S.No	**Book Title**	**Author**
1.	Introduction to the Indian Constitution	Brij Kishore Sharma

Reference Books:

S.No	**Book Title**	**Author**
1.	The Indian Constitution	Madhav Khosla

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=nTlEN7K8aAU
Module 2	https://www.youtube.com/watch?v=UrnObUbUSUc
Module 3	https://www.youtube.com/watch?v=RyxvZWEJBos
Module 4	https://www.youtube.com/watch?v=uGmYOelffrI
Module 5	https://www.youtube.com/watch?v=BBMD2YLbb_c

Mode of Evaluation

CIE						**ESE**	**Total**
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**Attendance**		
			5	**5**	**10**		
30			**20**				**50**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CAS201	**Course Name: Biostatistics**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- Second Semester BT		**3**	**1**	**0**	**4**

Pre-requisite: Knowledge of Mathematics up to 12th standard

Course Objectives:

- Understand the basic concept / fundamentals of statistics.
- Understand the importance of measures of Descriptive statistics and their implication in field of bio technology.
- Understand the concept of random variables, probability distribution in field of bio technology.
- Understand the concept of testing of hypothesis and apply Knowledge to analyze data.
- Understand the concept of statistical quality control and apply Knowledge to create control charts.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Understand the basic concept of fundamentals of statistics and its role descriptive analytics.	K2
CO2	Understand the basic concept of Measures of central tendency and Skewness and kurtosis.	K2
CO3	Apply the concept of random variables and probability distributions in field of bio technology.	K3
CO4	Apply the concept of testing of hypothesis and analyze the data.	K3
CO5	Apply the concept of statistical quality control to create control charts.	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	2	2	1					2			
CO2	3	2	2	3	1			1	1	2	1		
CO3	3	2	1	2	-				1	2	1		
CO4	3	2	2	3	1	1		1	1	2	1		
CO5	2	2	2	3	1	1		1	1	2	1		

Course Contents / Syllabus

Module 1	**Descriptive Statistics - I**	**10 hours**

Statistics: Definition, Importance & Limitation. Collection of data and formation of frequency distribution. Graphical presentation of frequency distribution – Bar Diagram, Histogram, Frequency curve, Frequency polygon, Ogive. Types of Sampling, Techniques of Sampling, Probability Sampling Techniques, Non-Probability Sampling, Determination of Sample Size.

Module 2	**Descriptive Statistics - II**	**10 hours**

Measures of central tendency, Moments, Skewness and Kurtosis, Curve fitting for linear equation, nonlinear and multiple linear. Correlation, Rank Correlation and Regression analysis for linear, nonlinear and multiple linear.

Module 3	**Random Variable and Probability Distributions**	**10 hours**

Random variables, Probability Distributions: Binomial, Poisson and Normal Distribution.

Module 4	**Testing Of Hypothesis**	**8 hours**

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

Module 5	**Statistical Techniques**	**8 hours**

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

Total Lecture Hours	**46 hours**

Textbook:

S.No	Book Title	Author
1	Statistical Methods, Sultan Chand & Sons	S.P. Gupta
2	Business Statistics, Pearson Education, New Delhi.	Sharma, J.K.,
3	Mathematical Statistics; S. Chand & Sons Company Limited, New Delhi.	J.N. Kapur
4	Higher Engineering Mathematics, Khanna Publisher.	B. S. Grewal

Reference Books:

S.No	Book Title	Author
1	Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.	Erwin Kreyszig
2	Mathematics for Management, Tata McGraw Hill, 2004. Levin &	M. Raghava Chari
3	Statistics for Management, Prentice Hall.	David Rubin:
4	Quantitative Analysis for Management, Pearson Education.	Render, Barry, Stair, R.M., Hanna, M.E., & Badri
5	Quantitative Techniques in Management, McGraw Hill Education.	Vohra N.D.
6	Business Statistics and Applied Orientation, Pearson Education	Vishwanathan, P.K.

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/live/Sd6Bxicnlks?si=06ek06IY81lgtzUe https://youtu.be/8SsY8M7KI-U?si=j7r-JpB4cCei4DM_ https://youtu.be/4R4ZoB9wLd0?si=qyq0wYynUaAmi7Ja https://youtu.be/qNqrHO3woyE?si=jz8sBZESmUptnp5y https://youtu.be/QM7WZkE-JuU?si=07SxJznHgt-PrvC2
Module 2	https://archive.nptel.ac.in/courses/111/105/111105042/ https://archive.nptel.ac.in/courses/110/107/110107114/
Module 3	https://youtu.be/bpKarwfDRIk?si=ssDTaDaZW3Xhhtzn https://youtu.be/EbxKvA0O9J4?si=yZt196CmB1EylUh_ https://youtu.be/8MpgZJHcB8w?si=IhJHqMlmg_bdEWRq https://youtu.be/OZ_SA8H6JXU?si=p8LJLStoJYwTrnAM
Module 4	https://archive.nptel.ac.in/courses/103/106/103106120/
Module 5	https://archive.nptel.ac.in/courses/103/106/103106120/

Mode of Evaluation

CIE						ESE	Total
ST1	ST2	ST3	TA1* 5	TA2* 5	Attendance 10		
30			20			100	150

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CCSIOT0202	**Course Name: IoT in Lifesciences**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- Second Semester BT		**3**	**0**	**0**	**3**

Pre-requisite: NA

Course Objectives:

1. To introduce the fundamental concepts, architecture, and interdisciplinary significance of the Internet of Things (IoT) in life sciences, including biotechnology, healthcare, agriculture, and environmental monitoring.
2. To provide knowledge on various IoT devices and biosensors, including their design, implementation, and integration in biological systems for diagnostics, patient monitoring, and lab automation.
3. To develop an understanding of data acquisition, storage, processing, and analysis techniques relevant to biological applications of IoT, including the use of cloud computing, machine learning, and data visualization.
4. To explore practical applications of IoT in domains such as precision agriculture, remote healthcare, drug development, and environmental surveillance with real-world case studies.
5. To sensitize learners to the challenges, ethical issues, and regulatory frameworks surrounding IoT implementation in life sciences, and encourage forward-thinking through future perspectives and innovations.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Recall and describe the fundamental architecture, components, and relevance of IoT in various life sciences domains including healthcare, agriculture, and environmental monitoring.	K1
CO2	Explain the types and functions of sensors and IoT devices used in biological applications, including data acquisition techniques and microfluidic integrations.	K2
CO3	Describe common techniques for data processing, cleaning, and transformation to ensure data quality and usability.	K1
CO4	Explain the application of IoT technologies in smart agriculture, including crop monitoring, soil analysis, and efficient resource utilization.	K2
CO5	Identify and explain the challenges, ethical issues, and future directions associated with IoT deployment in life sciences, focusing on security, privacy, and regulatory concerns.	K2

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

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

Course Contents / Syllabus

Module 1	**Introduction to IoT and Its Relevance in Life Sciences**	**09 hours**

Definition and characteristics of IoT- IoT architecture: perception, network, and application layers- Role of IoT in biotechnology, healthcare, agriculture, and environmental monitoring- Case studies demonstrating IoT's impact on life sciences

Module 2	**IoT Devices and Sensors in Biological Applications**	**09 hours**

Types of sensors used in life sciences (e.g., biosensors, environmental sensors)- Data acquisition methods for biological data- Design and application of wearable and implantable devices for patient monitoring and diagnostics- Integration of microfluidics and IoT in Lab-on-a-Chip systems		
Module 3	**Data Management and Analytics in IoT-Enabled Life Sciences**	**09 hours**
Data storage solutions and cloud computing for IoT-generated data- Techniques for data processing, cleaning, and interpretation- Application of machine learning and AI for predictive analytics in life sciences- Tools and methods for effective data visualization.		
Module 4	**Applications of IoT in Biotechnology and Healthcare**	**09 hours**
Implementation of IoT in smart agriculture: crop monitoring, soil analysis, resource optimization- Remote patient monitoring and personalized medicine and disease detection through IoT devices- Utilization of IoT in drug development, manufacturing, and supply chain management- Environmental monitoring using IoT for pollution levels, biodiversity, and ecosystem health		
Module 5	**Challenges, Ethics, and Future Perspectives**	**09 hours**
Addressing security and privacy concerns in IoT networks- Understanding regulatory frameworks governing IoT in life sciences- Ethical considerations: data ownership, privacy, consent, and accessibility- Exploring future trends and emerging technologies in IoT applications within life sciences		
	Total Lecture Hours	**45 hours**

Textbook:

S.No	Book Title	Author
1	*Internet of Things: Principles and Paradigms*. Morgan Kaufmann, 2016.	R. Buyya and A. V. Dastjerdi
2	*Internet of Things in Biomedical Engineering*. Academic Press, 2020.	V. E. Balas, A. M. Grumezescu, and A. H. Alavi
3	*Internet of Things for Smart Agriculture: Technologies, Practices and Future Direction*. CRC Press, 2022.	P. Jaiswal, V. Kansal, and R. C. Poonia

Reference Books:

S.No	Book Title	Author
1	*Internet of Things: A Hands-On-Approach*. VPT, 2014.	A. Bahga and V. Madisetti
2	*Smart Biosensors in Medical Care*. Elsevier, 2022.	A. Mendez-Vilas, Ed.
3	*IoT and Analytics for Agriculture*. Springer, 2022.	S. D. Sawant, A. S. Mohite, and P. S. Shinde

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=peNkYXtjtKs&pp=ygU2SW50cm9kdWN0aW9uIHRvIElvVCBhbmQgSXRzIFJlbGV2YW5jZSBpbiBMaWZlIFNjaWVuY2Vz
Module 2	https://www.youtube.com/watch?v=0qGPy9NkOZA&pp=ygUySW9UIERldmljZXMgYW5kIFNlbnNvcnMgaW4gQmlvbG9naWNhbCBBcHBsaWNhdGlvbnM%3D

Module 3	https://www.youtube.com/watch?v=TM6VrbMQ-SE&pp=ygU6RGF0YSBNYW5hZ2VtZW50IGFuZCBBbmFseXRpY3MgaW4gSW9ULUVuYWJsZWQgTGlmZSBTY2llbmNlcw%3D%3D
Module 4	https://www.youtube.com/watch?v=qapMima2LDA&pp=ygUzQXBwbGljYXRpb25zIG9mIElvVCBpbiBCaW90ZWNobm9sb2d5IGFuZCBIZWFsdGhjYXJl
Module 5	https://www.youtube.com/watch?v=H9Esi2kDUsc&pp=ygUrQ2hhbGxlbmdlcywgRXRoaWNzLCBhbmQgRnV0dXJlIFBlcnNwZWN0aXZlcw%3D%3D

Mode of Evaluation

CIE						ESE	Total
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**Attendance**		
			5	**5**	**10**		
30			**20**			**100**	**150**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CCSE0204	Course Name: Data analytics	L	T	P	C
Course Offered in: B.Tech- Second Semester BT		3	0	0	3

Pre-requisite: NA

Course Objectives:

1. To introduce the basic concepts of data analytics and its applications in biotechnology.
2. To familiarize students with tools and techniques used to analyze biological datasets.
3. To develop skills for interpreting data using statistical methods and basic programming.
4. To provide hands-on experience using data analysis tools such as Excel, Python, or R.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Recall the stages of the data lifecycle and identify various data sources commonly found in life sciences.	K1,K2
CO2	List basic data preprocessing techniques including handling missing values, duplicates, and data normalization methods.	K1
CO3	Recall the types of data visualization tools such as bar charts, histograms, boxplots, and scatter plots used in biological data interpretation.	K1
CO4	Explain the concept of data normalization and differentiate between normalization and standardization techniques used in biological data analysis.	K2
CO5	Explain the significance and applications of bioinformatics databases and tools in the context of life science research.	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	PSO3
CO1	3	2	-	-	2	-	-	1	2	-	3	2	-	3
CO2	3	3	-	2	3	-	-	1	2	-	3	2	-	3
CO3	3	3	2	3	3	-	-	-	1	-	3	2	-	3
CO4	3	3	1	2	3	-	-	-	1	-	2	2	-	3
CO5	3	3	2	3	3	-	-	1	2	2	3	2	-	3

Course Contents / Syllabus

Module 1	**Introduction to Data Analytics**	**09 hours**

Data Analytics Introduction, Types of data: Structured, Unstructured, Semi-structured, Role of data analytics in biotechnology, Overview of data lifecycle, Data sources in life sciences.

Module 2	**Data Collection and Preprocessing**	**09 hours**

Data formats: CSV, Excel, FASTA, JSON, Data cleaning: handling missing values, duplicates, Data transformation and normalization, Basic exploratory data analysis (EDA).

Module 3	**Descriptive Statistics and Data Visualization using different tools**	**09 hours**

Measures of central tendency (mean, median, mode), Measures of dispersion (range, variance, standard deviation), Correlation and covariance, Visualization tools: bar charts, histograms, boxplots, scatter plots, Introduction to data dashboards using Excel or Python (Matplotlib/Seaborn).

Module 4	**Data Normalization and Transformation Techniques**	**09 hours**

Introduction to Data Normalization, Difference between normalization and standardization, Types of Normalization Techniques, Min-Max Normalization, Z-score Standardization, Log Transformation, Quantile Normalization, TPM/RPKM/FPKM (for gene expression data).

Module 5	**Introduction to Biological Data Analysis Tools**	**09 hours**

Overview of bioinformatics databases and tools, Introduction to Python/R for data analysis, Working with biological sequences and expression data, Case study: Analyzing gene expression datasets from GEO.

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		Total Lecture Hours	**45 hours**
Textbook:			
S.No	**Book Title**	**Author**	
1	Data Science for Beginners	Andrew Park	
Reference Books:			
S.No	**Book Title**	**Author**	
1	Bioinformatics Data Skills	Vince Buffalo	
2	Statistics for Biologists	Campbell & Heyer	

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=yZvFH7B6gKI&pp=ygUeSW50cm9kdWN0aW9uIHRvIERhdGEgQW5hbHl0aWNz
Module 2	https://www.youtube.com/watch?v=tDu_KIlXaB0&pp=ygUhRGF0YSBDb2xsZWN0aW9uIGFuZCBQcmVwcm9jZXNzaW5n
Module 3	https://www.youtube.com/watch?v=txNvZ3Zndak&pp=ygVERGVzY3JpcHRpdmUgU3RhdGlzdGljcyBhbmQgRGF0YSBWaXN1YWxpemF0aW9uIHVzaW5nIGRpZmZlcmVudCB0b29scyA%3D
Module 4	https://www.youtube.com/watch?v=lggqjmQzsGI&pp=ygUwRGF0YSBOb3JtYWxpemF0aW9uIGFuZCBUcmFuc2Zvcm1hdGlvbiBUZWNobmlxdWVz
Module 5	https://www.youtube.com/watch?v=VQcg8-Sd2eY&pp=ygUuSW50cm9kdWN0aW9uIHRvIEJpb2xvZ2ljYWwgRGF0YSBBbmFseXNpcyBUb29scw%3D%3D

Mode of Evaluation

CIE						**ESE**	**Total**
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**Attendance**		
			5	**5**	**10**		
30			**20**			**100**	**150**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CBT0201	**Course Name: Fundamentals of Bio-Engineering**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- Second Semester BT		**2**	**0**	**0**	**2**

Pre-requisite: Basic Biology, Physics, Chemistry, and Mathematics

Course Objectives:

1. To introduce the scope, significance, and interdisciplinary nature of bioengineering and its real-world applications.
2. To apply basic engineering concepts like mass balance, transport phenomena, and thermodynamics to biological systems.
3. To understand the properties, classification, and biocompatibility of biomaterials and the basics of biomechanics in biological tissues.
4. To explore the principles and applications of bioinstrumentation and biosensors in diagnostics and monitoring.
5. To introduce microbial kinetics, bioreactor basics, and fundamentals of metabolic and systems biology.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Define the concept of bioengineering and describe its interdisciplinary nature and applications in healthcare, agriculture, environment, and industry.	K1
CO2	Recall fundamental engineering principles such as mass and energy balances, transport phenomena, and thermodynamics and explain their application in biological systems.	K1,K2
CO3	Identify key concepts in biomechanics and describe stress-strain relationships in biological tissues along with their application in prosthetics and implants.	K1,K2
CO4	Describe the basic components and working principles of bioinstrumentation and biosensors, and explain their applications in diagnostics and health monitoring.	K1,K2
CO5	Recall the basics of bioprocess engineering and systems biology, and summarize the role of microbial growth kinetics, bioreactors, and computational modeling in biological research.	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**	**PSO3**
CO1	2	2	2	1	-	3	3	3	2	2	1	2	1	-
CO2	3	3	2	1	2	-	-	-	-	1	2	3	-	-
CO3	3	3	3	2	2	2	1	-	2	2	1	2	3	-
CO4	3	2	2	3	3	2	-	-	2	2	1	2	-	3
CO5	3	2	2	3	2	2	2	-	-	1	1	3	3	3

Course Contents / Syllabus

Module 1	**Introduction to Bio-Engineering**	**06 hours**

Introduction to Bioengineering: Definition, scope and significance of bio-engineering, Historical development and modern trends, Interdisciplinary nature: biology, chemistry, physics, mathematics, and engineering,

Overview of applications: healthcare (diagnostics, therapeutics, prosthetics), agriculture (GMOs, biosensors), environment (bioremediation, waste treatment), and industry (biomanufacturing), Ethical, safety, and regulatory aspects of bioengineering innovations.

Module 2	**Engineering Principles in Biology**	**06 hours**
Engineering Principles in Biology: Mass and energy balances in biological systems, Transport phenomena (momentum, mass, heat) in cells and tissues, Fluid mechanics in circulation and organ systems, Application of thermodynamics in biological reactions, Modelling of simple biological systems: introduction to system equations and steady-state approximations.		
Module 3	**Biomechanics**	**06 hours**
Biomechanics: Introduction to biomechanics: fundamental principles of biomechanics, stress-strain relationships in tissues, Applications in prosthetics and implants		
Module 4	**Bioinstrumentation and Biosensors**	**06 hours**
Bioinstrumentation: Basics of bioinstrumentation, Transducers, signal acquisition and processing, **Biosensors:** Principles of biosensors: optical, electrochemical, piezoelectric, thermal, Performance parameters: sensitivity, specificity, response time, Applications in diagnostics and monitoring systems (glucose monitoring, pregnancy tests, wearable sensors, lab-on-a-chip systems).		
Module 5	**Bioprocess and Systems Biology**	**06 hours**
Bioprocess and Systems Biology: Basics of microbial growth kinetics, Introduction to bioreactors and scale-up, Fundamentals of metabolic and systems biology, Computational modeling of biological networks.		
	Total Lecture Hours	**30 hours**

Textbook:

S.No	Book Title	Author
1	Bioengineering: Fundamentals, Pearson Education	Ann Saterbak, Ka-Yiu San, Larry V McIntire
2	Introduction to Biomedical Engineering, Elsevier	John Enderle & Joseph Bronzino
3	Biosensors: Fundamentals and Applications 1st ed. 1987; Oxford: Oxford University Press.	Anthony P.F. Turner, Isao Karube, G.S. Wilson

Reference Books:

S.No	Book Title	Author
1	Bioprocess Engineering: Basic Concepts	Michael L. Shuler and Fikret Kargi
2	Biomedical Engineering Principles	Arthur T. Johnson
3	Handbook of Biosensors and Biochips 1st ed. 2007:, Howard H. Weetall (Editors); Chichester, UK: Wiley	Robert S. Marks, David C. Cullen, Istvan Karube, Christopher R. Lowe
4	Bioinstrumentation 1st ed. 2004	John G. Webster; Hoboken, NJ: John Wiley & Sons
5	Relevant classic and recent research articles, review papers.	

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=GfoM-s9ZKrI
Module 2	https://www.youtube.com/watch?v=3XPlLr9aaU0 https://www.youtube.com/watch?v=92vVWl2tP48 https://www.youtube.com/watch?v=s2-nKa7WPOM
Module 3	https://www.youtube.com/watch?v=glcO_0gPad4

Module 4	https://www.youtube.com/watch?v=f50YqzCRznw https://www.youtube.com/watch?v=btu-WJpL5zI
Module 5	https://www.youtube.com/watch?v=nZO2XR7AsAI https://www.youtube.com/watch?v=nN3ZL-Hqbsc

Mode of Evaluation

CIE						ESE	Total
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**Attendance**		
			5	**5**	**10**		
30			**20**			**50**	**100**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

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Course Offered in: B.Tech- Second Semester BT	**0**	**0**	**2**	**1**

Pre-requisite: Basics of Science

Course Objectives:

To equip students with the knowledge and practical skills to design, implement, and analyze IoT-based systems tailored for life sciences applications, focusing on healthcare monitoring, environmental sensing, and bioprocess automation.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Understand the basic concepts, architecture, and protocols of IoT and their relevance in life sciences.	K2
CO2	Identify the steps involved in connecting and transmitting data from sensors (e.g., temperature, humidity, pH, TDS, heart rate) to cloud platforms such as ThingSpeak, Blynk, or Firebase.	K1,K2
CO3	Describe the use of IoT and microcontroller-based systems in real-time monitoring applications such as soil moisture, water quality, and patient health tracking.	K1
CO4	Explain the basics of data analytics and visualization using Python for interpreting sensor data and recognize key ethical and data security considerations in IoT-based healthcare systems.	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**	**PSO3**
CO1	3	2	2	1	3	-	-	1	1	-	2	2	1	2
CO2	3	3	3	2	3	2	-	1	1	1	2	3	2	3
CO3	2	2	3	2	3	2	-	1	2	2	2	2	2	3
CO4	2	3	2	3	3	2	-	1	2	1	3	2	2	3
CO5	2	2	2	2	2	3	3	2	2	2	3	2	2	3

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

1. Describe Pinouts of Arduino and Node/MCU.
2. Interfacing temperature and humidity sensor with Arduino/Node/MCU
3. Sending Sensor Data to Cloud (Thing Speak/Blynk/Google Firebase)
4. Biosensor Simulation: Heart Rate and Body Temperature Monitoring with Arduino/Node/MCU
5. Interfacing IoT-Based Soil Moisture Monitoring System with Arduino/Node/MCU
6. IoT-Based Water Quality Monitoring Using pH and TDS Sensors
7. Patient Health Monitoring Dashboard using IoT and Mobile App (Blynk)
8. Lab-on-a-Chip Simulation using Microfluidics + IoT (Demonstration/Simulation)
9. Data Analytics and Visualization using Python (with CSV from IoT sensor logs)
10. Ethical Considerations and Data Security in IoT Devices (Case Study-Based Practical)

Mode of Evaluation

CIE			**PE (If mentioned in curriculum)**	**Total**
PS1 5	**PS2** 10	**PS3** 10		
25			**25**	**50**

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

LAB Course Code: CCSE0254	LAB Course Name: Data Analytics Lab	L	T	P	C
Course Offered in: B.Tech- Second Semester BT		0	0	4	2

Pre-requisite: Basics of Science

Course Objectives

1. Gain hands-on experience in loading, cleaning, and transforming biological datasets.
2. Apply basic data analytics and statistical methods to interpret bioscience data.
3. Learn various data normalization and visualization techniques.
4. Perform exploratory data analysis and derive insights from biological data.
5. Develop the ability to use modern analytics tools such as Python or R for practical biological applications.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Recall common data formats such as FASTA, CSV, and Excel used for storing biological data and identify their basic structure and use cases.	K1,K2
CO2	Describe the process of cleaning and normalizing gene expression data, including handling missing values and applying standardization techniques.	K1
CO3	Explain basic statistical summaries and visualization techniques used to explore biological datasets, including bar plots, box plots, and scatter plots.	K2
CO4	Recognize the significance of feature relationships in biological datasets and describe the basic idea behind clustering techniques like k-means in gene expression analysis.	K1
CO5	Summarize the steps involved in completing a full data analytics cycle on biological datasets, from importing and cleaning data to performing analysis and visualization.	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	PSO3
CO1	3	2	-	2	3	-	-	-	2	-	2	2	-	3
CO2	3	3	-	3	3	-	-	-	2	-	2	2	-	3
CO3	3	3	-	3	3	-	-	-	2	-	2	2	-	3
CO4	3	2	-	2	3	-	-	-	2	-	2	2	-	3
CO5	3	3	2	3	3	-	-	2	3	2	3	2	-	3

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

11. Import a biological dataset (e.g., gene expression or assay data) and perform initial exploration.
12. Clean a real-world gene expression dataset.
13. Apply normalization techniques to biological data.
14. Generate summary statistics for biological datasets.
15. Visualize biological data using various plotting techniques.
16. Read and analyze DNA/protein sequences in FASTA format.

17. Understand relationships between features in a dataset.
18. Apply k-means clustering to categorize gene expression profiles.
19. Create new features from existing biological attributes.
20. Conduct a full data analytics cycle on a biological dataset.

Mode of Evaluation

CIE			PE	Total
PS1	**PS2**	**PS3**	**(If mentioned**	
10	**20**	**20**	**in curriculum)**	
50			**50**	**100**

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

LAB Course Code: CCSE0252	LAB Course Name: Problem Solving using Python	L	T	P	C
Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/CSE(R)/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/ AIML-TWIN/CYS/ECE/ECE(VLSI)/ME/M.Tech(Integrated)/MCT		0	0	6	3

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

Module 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.

Module 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.

Module 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.		
Module 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.		
Module 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,

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://nptel.ac.in/courses/106/106/106106182/
Module 2	https://nptel.ac.in/courses/106/106/106106212/ https://www.youtube.com/watch?v=PqFKRqpHrjw
Module 3	https://nptel.ac.in/courses/106/106/106106145/ https://www.youtube.com/watch?v=m9n2f9lhtrw https://www.youtube.com/watch?v=oSPMmeaiQ68
Module 4	nptel.ac.in/courses/106/106/106106145/ www.youtube.com/watch?v=ixEeeNjjOJ0&t=4s
Module 5	https://nptel.ac.in/courses/106/106/106106145/ https://www.youtube.com/watch?v=NMTEjQ8-AJM

Mode of Evaluation

CIE	PE	Total
PS		
50	100	150

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

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CASL0202	**Course Name: French Language**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- Second Semester BT		**2**	**0**	**0**	**2**

Pre-requisite: Basic understanding of the English language.

Course Objectives:

1. To help the students learn to articulate in French language in day-to-day real-life situations.
2. To enable the students acquire the four basic skills LSRW (Listening, Speaking, Reading, and Writing) of language learning.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Recognize the basic sounds, letters, numbers, words, and phrases of French.	K1
CO2	Develop basic French vocabulary.	K2
CO3	Use simple vocabulary and sentences in day-to-day life.	K3
CO4	Introduce a third person	K3
CO5	Develop basic skills in writing and speaking	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	1	-	-	-	1	1	2	3	1		
CO2	-	1	1	-	-	-	1	1	2	3	2		
CO3	-	2	2	1	-	1	1	1	3	3	2		
CO4	-	2	2	1	-	1	1	1	3	3	2		
CO5	0	2	2	1	0	1	1	1	3	3	2		

Course Contents / Syllabus

Module 1	**Introduction to French**	**5 hours**

- Basic greetings
- French letters, sounds and accents
- Numbers
- The subject pronouns
- Verbs- être, avoir
- Basic adjectives (How to change into feminine form)
- Introductory questions and Self introduction

Module 2	**Vocabulary Building**	**6 hours**

- Days of the week, months of the year and date
- Colors
- Basic vocabulary
- Articles (indefinite and definite)
- How to make nouns plural
- Use of C'est and Ce sont
- Vocabulary of nationality and professions
- Introduction of a friend

Module 3	**Everyday Common Simple Sentences**	**7 hours**

- Contracted articles with à and de
- Vocabulary of transports
- Use of prepositions à and en

- Time
- Negation 3 ways to frame questions and how to reply accordingly

Module 4	**Reading & Writing**	**3 hours**

- Vocabulary of family members
- Introduction of a family member
- "ER" verbs with exceptions

Module 5	**Skilled writing**	**3 hours**

- How to fill a basic form
- How to write a brief post card in French

	Total Lecture Hours	**24 hours**

Reference Books :

S.No	**Book Title**	**Author**
1.	Edito 1 (Méthode de français/Cahiers d'exercices)	
2.	Echo A1 (Méthode de français/Cahier d'exercices)	
3.	Saison A1 (Méthode de français/Cahier d'exercices)	

Youtube/ Faculty Video Link:

Module 1	Learn French | French for Beginners |French Alphabet | L' alphabet français | Pronunciation. https://youtu.be/-7woR4auqso?si=HprcsXXS5SJCG-HF
Module 2	French numbers 1-100 (with free PDF) | French grammar for beginners (https://youtu.be/ZfSxfqCM7Hw?si=Q-FZGetSpeCPhPX2)
Module 3	French verbs (avoir; être; faire; aller) en chanson (https://youtu.be/-1RvCib-0Zg?si=KVMxpD_RWikxTbWr)
Module 4	**Les articles définis le, la les, l'** https://youtu.be/oeqs_Qbgt8Q?si=sPYnGVdqd74vUY8L
Module 5	**les articles indéfinis un, une, des** https://youtu.be/oeqs_Qbgt8Q?si=0fNCazC8okbluHgf

Mode of Evaluation

CIE							**ESE**	**Total**
ST1	**ST2**	**ST3**	**TA1* 10**	**TA2* 10**	**TA3* 10**	**Attendance 10**		
60			**40**					**100**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CASL0203	**Course Name: German**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- Second Semester BT		**2**	**0**	**0**	**2**

Pre-requisite: Basic understanding of English Language

Course Objectives:

- To help the students learn to articulate in German language in day-to-day real-life situations.
- To enable the students acquire the four basic skills LSRW (Listening, Speaking, Reading, and Writing) of language learning.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Understand and be familiar with basic German Language concepts and the culture	K1
CO2	Recognise the fundamental vocabulary	K1
CO3	Use simple vocabulary and sentences in everyday conversations	K3
CO4	Read and write simple sentences	K2
CO5	Use complex sentences and develop basic writing skills	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	1	-	-	-	1	1	2	3	1		
CO2	-	1	1	-	-	-	1	1	2	3	2		
CO3	-	2	2	1	-	1	1	1	3	3	2		
CO4	-	2	2	1	-	1	1	1	3	3	2		
CO5	-	2	2	1	-	1	1	1	3	3	2		

Course Contents / Syllabus

Module 1	**Introduction to German**	**4 hours**

- Letters and Numbers
- German Greetings and Self Introduction
- Personal Pronouns and Verb Conjugations (Regular and Irregular Verbs)
- W-Question
- Simple Sentences

Module 2	**Vocabulary building**	**4 hours**

- The concept of German Articles (Definite and Indefinite)
- Nouns and Articles
- Days, Months, & Seasons
- Adjectives
- Negation

Module 3	**Everyday common simple sentences**	**4 hours**

- Basic directions
- Imperativ
- Date and Time

• Modal Verben ¬ (Basic everyday life conversations and making appointments)		
Module 4	**Reading and Writing**	**6 hours**
• Separable Verbs • Possessive Pronouns • Sentences - Nomminativ, Akkusativ, Dativ ¬ Translations (English to German, German to English) • Short Text and Form Filling		
Module 5	**Skilled Writing**	**6 hours**
• Changeable Prepositions • Present Perfect Tense • Past Tense of – To have and To Be • Health and Body, Vacations • Leisure Activities, Celebrations ¬ • E-mail Writing		
	Total Lecture Hours	**24 hours**

Textbook:

S.No	Book Title	Author

Reference Books:

1. Netzwerk A1 (Goyal Saab Publications)

2. Studio D A1 (Goyal Saab Publications)

3. Langescheidt Dictionary

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=nd0Y_iIaJns https://www.youtube.com/watch?v=LLTX3k1gJ0A https://www.youtube.com/watch?v=1dBD8P9cCrA https://www.youtube.com/watch?v= CyME2ZobD60
Module 2	https://www.youtube.com/watch?v=8Smh9MRp2vc https://www.youtube.com/watch?v=t0uLiNMvY6o
Module 3	https://www.youtube.com/watch?v=bD4vSw6AWps
Module 4	https://www.youtube.com/watch?v=Kj_L8uAffG8 https://www.youtube.com/watch?v=nf1rzqG3nvA
Module 5	https://www.youtube.com/watch?v=Dmv2BzXv_7U https://www.youtube.com/watch?v=lN-5Z4puA6U

Mode of Evaluation

CIE							ESE	Total
ST1	**ST2**	**ST3**	**TA1* 10**	**TA2* 10**	**TA3* 10**	**Attendance 10**		
60			**40**					**100**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

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

Course Code: CASL0204	Course Name: Japanese	L	T	P	C
Course Offered in: B.Tech- Second Semester BT		2	0	0	2

Pre-requisite: NA

Course Objectives:

1. To help the students learn to articulate in Japanese language in day-to-day real-life situations.
2. To enable the students acquire the four basic skills LSRW (Listening, Speaking, Reading, and Writing) of language learning.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Understand and be familiar with basic Japanese Language concepts and the culture.	K1
CO2	Recognise the fundamental vocabulary.	K1
CO3	Use simple vocabulary and sentences in everyday conversations.	K3
CO4	Read and write simple sentences.	K2
CO5	Use complex sentences and develop basic writing skills.	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	1	-	-	-	1	1	2	3	1	-	-
CO2	-	1	1	-	-	-	1	1	2	3	2	-	-
CO3	-	2	2	1	-	1	1	1	2	3	2	-	-
CO4	-	2	2	1	-	1	1	1	3	3	2	-	-
CO5	-	2	2	1	-	1	1	1	3	3	2	-	-

Course Contents / Syllabus

Module 1	**Introduction to Japanese**	**5 hours**

General features of Japanese, Japanese scripts, Pronunciation of Japanese words, Classroom instructions, Daily greetings and expressions, Numerals, Months name Days of the week, Time & Calendar, Family members, Vocabulary lessons 1&2, Sentence pattern & Example sentences, Self-introduction (jikoshokai)

Module 2	**Vocabulary building**	**5 hours**

Country, language, and people, Basic conversations, Vocabulary lessons 3&4, Use of patterns (KO, SO, AA, and DO), Conversations between guests and hosts, Conversations between customers and shopkeepers.

Module 3	**Everyday common simple sentences**	**5 hours**

Vocabulary lessons 5&6, Grammar explanation, Colour & taste, Conversations in post office, Conversations with friends, Making a request, Making an enquiry – Railway Station, Buying Fruits & Vegetables, Names of the Animals, Question formation.

Module 4	**Reading and Writing**	**4 hours**

Scanning based Newspaper reading, Transportation, KANJI Form of Writing – 40 Characters, Shopping Counters, Basic Japanese grammar rules – particles: か (ka), は (wa),, の (no), と (to), を (o), に (ni), も(mo), が (ga), や (ya)., Kara, Soshite, Grammar - Present, Past, Future, Adjectives, Vocabulary Lessons 7&8.

Module 5	**Skilled Writing**	**5 hours**

Write short text on oneself., Grammar: Pronouns – subject, object, possessive, Modal verbs.

	Total Lecture Hours	**24 Hours**

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

Textbook:		
S.No	**Book Title**	**Author**
1.	Minna no nihongo – N5	3A Corporation
S.No	**Book Title**	**Author**

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/@NihonGoal/community
Module 2	https://www.youtube.com/watch?v=wDpsF90DoeI&list=PLag_mhJfCJ-1-EZcPapMFPTlzVzwjz33M
Module 3	https://www.youtube.com/watch?v=z4qh8BVrb3w
Module 4	https://www.youtube.com/watch?v=W_qW904Gn3M&list=PL_Sdfd1Q7hZrDFwVYpsrxWqsridvP6kTK

Mode of Evaluation

CIE							**ESE**	**Total**
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**TA3***	**Attendance**		
			10	**10**	**10**	**10**		
60			**40**					**100**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

LAB Course Code: CASL0251	LAB Course Name: Communication for Career Enhancement	L	T	P	C
Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/CSE(R)/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/ AIML-TWIN/CYS/ECE/ECE(VLSI)/ME/M.Tech(Integrated)/MCT		**0**	**0**	**4**	**2**

Pre-requisite: The students should have completed ABC course in semester I

Course Objectives:

1. To improve proficiency in Business English to the upper-intermediate level of CEFR (Common European Framework of Reference).
2. To improve professional communication skills.

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

S. No	Course Outcome	Bloom's Knowledge Level (KL)
CO1	Apply key concepts of soft skills in real life scenarios.	K3
CO2	Understand conversations and discussions on a variety of topics.	K2
CO3	Express ideas clearly and effectively through oral communication.	K3
CO4	Understand and analyse main ideas of complex texts.	K4
CO5	Construct clear and detailed texts on a wide range of topics.	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	1	1	1	1	1	1	1	1	2	3	1		
CO2	1	1	1	1	1	1	1	1	2	3	1		
CO3	1	1	1	1	1	1	1	1	2	3	1		
CO4	1	2	2	2	2	2	1	1	2	3	1		
CO5	1	1	2	2	2	2	1	1	2	3	1		

List of Practical

1. **Introduction**
   - To the course

   ***Anubhav* Activity**

   On score improvement

2. **Listening to a variety of accents in English**
   - The students will develop their ability to comprehend English conversations with diverse speakers.

3. **Vocabulary Games**
   - The students will enhance their vocabulary through various interesting exercises and word-games.

4. **Role Play**
   - The students will practice how to meet, greet, and converse in miscellaneous professional scenarios.

5. **Deciphering the main points and summarizing**
   - The students will develop the ability to grasp the main point and summarize lengthy documents

6.. **Writing professional emails**
   - The students will practice and develop ability to write clear and concise emails.

7. **Critiquing Films/Videos**
   - The students will improve their listening and critical thinking skills, and will revise rules of reported speech.

8. **News Reports**

- The students will practice speaking with correct pronunciation and intonation.

9. **Time Bound Case Study Analysis**
   - The students will learn to focus and analyze assigned content

10. **Essay Writing**
    - The students will practice writing essays on the domain specific topics with emphasis on corrective grammar (as per the need).

11. **Presentations based on the Essay**
    - The students will learn to organize the content logically and present their ideas coherently.

12. **Vocabulary Enhancement Exercise**
    - The students will acquire domain specific terms.

13. **Listen and Repeat (**Emphasis on accepted Accent, Rhythm, Intonation)
    Read out loud (Emphasis on pauses)

14. **Passage Writing Based on Pictures**
    The students will write passages on pictures and will discuss correct grammatical structures based on the passages.

15. **Peer Talk on specific topics of general interest**
    - The students will develop conversational skills by discussing topics in pairs and will record their response to general questions asked by their peers.

16. **Responding to general questions (**Ref: ES Test)
    - The students will develop the ability to respond spontaneously to general questions.

17. **Identifying Errors**
    - The students will learn to identify & rectify structural errors.

18. **Solving Para-Jumbles**
    - The students will learn to organize ideas in a passage

19. **Language Toolbox**
    - The students will do exercises on Active & Passive Voices and cloze tests.

20. **Goal setting & Self discovery**
    - The students will set their short-term & long-term goals and will explore adjectives that best describe themselves.

21. **Extempore speeches**
    - The students will hone their spontaneous public speaking skills.

22. **Group Discussions**
    - The students will improve their ability to express their views clearly while discussing a topic in a group.

23. **Role Play Activity**
    - The students will perform role plays on campus behaviour, language, and dress sense of students.

24. ***Anubhav* Activity**
    The students will reflect on the semester and the road map ahead.

Total Hours: 48 hrs.

Mode of Evaluation

CIE			PE	Total
PS1 **10**	**PS2** **20**	**PS3** **20**		
50			**50**	**100**

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

Course Code: CMB0201	**Course Name: Innovation and Entrepreneurship**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- Second Semester BT		**2**	**0**	**0**	**2**

Pre-requisite:

Course Objectives: This course is designed to ignite the innovative and entrepreneurial spirit within students by providing them with a foundational understanding of how ideas are transformed into impactful ventures. Students will learn to identify and define different types of innovation, employ creative problem-solving techniques, and grasp the core principles of entrepreneurship and the entrepreneurial mindset.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Explain the core concepts of innovation, the innovation process, and the fundamentals of entrepreneurship.	K2
CO2	Apply techniques for idea generation, opportunity recognition, and validation for potential tech-driven ventures.	K3
CO3	Develop a basic business model and value proposition for an innovative idea, and understand the principles of MVP development.	K6
CO4	Describe the basics of Intellectual Property Rights relevant to technology and the foundational elements of startup finance and team building.	K2
CO5	Formulate and present a concise pitch for a startup concept and describe the components of the entrepreneurial ecosystem.	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	-	1	1	1	1	-	2	1	2		
CO2	2	2	2	2	2	2	2	1	1	2	2		
CO3	3	1	2	3	2	2	1	1	1	1	1		
CO4	1	2	1	2	1	-	1	-	-	1	2		
CO5	2	1	1	1	1	1	-	1	2	2	1		

Course Contents / Syllabus

Module 1	**Introduction to Innovation**	**8 hours**

Defining Innovation, Types (Product, Process, Service, Business Model), Importance in Technology, Disruptive vs. Sustaining vs. Incremental Innovation. Idea Generation Techniques (Brainstorming, SCAMPER), Design Thinking Overview, Problem Identification & Definition, Creative Problem Solving.

Module 2	**Entrepreneurship Development**	**8 hours**

Defining Entrepreneurship, Entrepreneurial Mindset & Traits, Types of Entrepreneurs (Tech, Social), Myths, Role in Economic Development. Identifying Market Needs & Gaps, Sources of Ideas, Evaluating Ideas (SWOT, PESTLE basics), Basic Market Research, Customer Discovery Introduction.

Module 3	**Developing a Minimum Viable Product (MVP)**	**8 hours**

Business Model Canvas (BMC) / Lean Canvas, Defining a Compelling Value Proposition, Understanding Target Customers, Basic Competitive Analysis. Concept of MVP for tech products/services, Prototyping (Lo-fi, Hi-fi), Importance of User Feedback, Lean Startup Principles (Briefly).

Module 4	**Intellectual Property Rights (IPR)**	**8 hours**

Basics of Patents (for inventions), Copyrights (for software/content), Trademarks (for brands), Trade Secrets. Importance for tech startups. Building a Founding Team, Bootstrapping, Sources of Early-Stage Funding (Angels, VCs - Conceptual), Basic Financial Terms (Revenue, Cost, Profit).

Module 5	**The Entrepreneurial Ecosystem**	**8 hours**

Go-to-Market Strategies (Basics), Elements of a Good Pitch, developing a Pitch Deck, Practicing the Elevator Pitch. Role of Incubators, Accelerators, Government Support Schemes, Networking. Challenges & Opportunities. Future of Tech Entrepreneurship.

Total Lecture Hours	**40 hours**

Textbook:

S.No	**Book Title with publication agency & year**	**Author**
1.	Entrepreneurship and Innovation: Theory, Practice and Context	Tim Mazzaro, Sophie Reboud
2.	Innovation and Entrepreneurship	Peter F. Drucker

Reference Books:

S.No	**Book Title with publication agency & year**	**Author**
1.	Entrepreneurship - New Venture Creation, Pearson Publications	David H Holt

NPTEL/ Youtube/ Faculty Video Link:

1	**https://www.youtube.com/watch?v=UEngvxZ11sw**
2	**https://www.youtube.com/playlist?list=PLLy_2iUCG87CUSdZ0z0ihunS1QSrNqXFN**

Mode of Evaluation

CIE							**ESE**	**Total**
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**TA2***	**Attendance**		
			10	**10**	**10**	**10**		
60			**40**					**100**

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CNC0202	**Course Name: Constitution of India, Law And Engineering**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/CSE(R)/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/ AIML-TWIN/CYS/ECE/ECE(VLSI)/ME/M.Tech(Integrated)/MCT		**2**	**0**	**0**	**NC**

Pre-requisite: Basic understanding of political science

Course Objectives: Acquaint the students with legacies of constitutional development in India and help those to understand the most diversified legal document of India and philosophy behind it.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Identify and explore the basic features and modalities about Indian constitution.	K1
CO2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level	K2
CO3	Differentiate different aspects of Indian Legal System and its related bodies.	K4
CO4	Discover and apply different laws and regulations related to engineering practices.	K4
CO5	Correlate role of engineers with different organizations and governance models.	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	1	1	2	1	1	3	2	2	1	2	1		
CO2	1	2	2	1	1	3	2	2	2	2	1		
CO3	1	2	2	1	1	3	2	3	1	2	1		
CO4	2	2	3	2	2	3	3	3	2	2	2		
CO5	2	2	3	2	1	3	2	3	2	3	2		

Course Contents / Syllabus

Module 1	**Introduction and Basic Information about Indian Constitution**	**8 hours**

Meaning of the constitution law and constitutionalism, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947,Enforcement of the Constitution, Indian Constitution and its Salient Features, The Preamble of the Constitution, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Parliamentary System, Federal System, Centre-State Relations, Amendment of the Constitutional Powers and Procedure, The historical perspectives of the constitutional amendments in India, Emergency Provisions: National Emergency, President Rule, Financial Emergency, and Local Self Government – Constitutional Scheme in India.

Module 2	**Union Executive and State Executive**	**8 hours**

Powers of Indian Parliament Functions of Rajya Sabha, Functions of Lok Sabha, Powers and Functions of the President, Comparison of powers of Indian President with the United States, Powers and Functions of Vice-President, Powers and Functions of the Prime Minister, Judiciary – The Independence of the Supreme Court, Appointment of Judges, Judicial Review, Public Interest Litigation, Judicial Activism, LokPal, Lok Ayukta, The Lokpal and Lok ayuktas Act 2013, State Executives – Powers and Functions of the Governor, Powers and Functions of the Chief Minister, Functions of State Cabinet, Functions of State Legislature, Functions of High Court and Subordinate Courts.

Module 3	Introduction and Basic Information about Legal System	8 hours

The Legal System: Sources of Law and the Court Structure: Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law, Principles taken from decisions of judges constitute binding legal rules. The Court System in India and Foreign Courtiers (District Court, District Consumer Forum, Tribunals, High Courts, Supreme Court). Arbitration: As an alternative to resolving disputes in the normal courts, parties who are in dispute can agree that this will instead be referred to arbitration. Contract law, Tort, Law at workplace.

Module 4	Intellectual Property Laws and Regulation to Information	8 hours

Intellectual Property Laws: Introduction, Legal Aspects of Patents, Filing of Patent Applications, Rights from Patents, Infringement of Patents, Copyright and its Ownership, Infringement of Copyright, Civil Remedies for Infringement, Regulation to Information, Introduction, Right to Information Act, 2005, Information Technology Act, 2000, Electronic Governance, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Offences, Limitations of the Information Technology Act.

Module 5	Business Organizations and E-Governance	8 hours

Sole Traders, Partnerships: Companies: The Company's Act: Introduction, Formation of a Company, Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, General Meetings and Proceedings, Auditor, Winding up. E-Governance and role of engineers in E-Governance, Need for reformed engineering serving at the Union and State level, Role of I.T. professionals in Judiciary, Problem of Alienation and Secessionism in few states creating hurdles in Industrial development.

	Total Lecture Hours	40 hours

Textbook:

S.No	Book Title	Author
1.	Introduction to the Indian Constitution	Brij Kishore Sharma

Reference Books:

S.No	Book Title	Author
1.	The Indian Constitution	Madhav Khosla

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=nTlEN7K8aAU
Module 2	https://www.youtube.com/watch?v=UrnObUbUSUc
Module 3	https://www.youtube.com/watch?v=RyxvZWEJBos
Module 4	https://www.youtube.com/watch?v=uGmYOelffrI
Module 5	https://www.youtube.com/watch?v=BBMD2YLbb_c

Mode of Evaluation

CIE						ESE	Total
ST1	ST2	ST3	TA1* 5	TA2* 5	Attendance 10		
30			20				50

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

Course Code: CNC0203	**Course Name: Essence of Indian Traditional Knowledge**	**L**	**T**	**P**	**C**
Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/CSE(R)/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/ AIML-TWIN/CYS/ECE/ECE(VLSI)/ME/M.Tech(Integrated)/MCT		**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

Module 1	**Society State and Polity in India**	**8 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.

Module 2	**Indian Literature, Culture, Tradition, and Practice**	**8 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

Module 3	**Indian Religion, Philosophy, and Practices**	**8 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.

Module 4	**Science, Management and Indian Knowledge System**	**8 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.

Module 5	**Cultural Heritage and Performing Arts**	**8 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	**40 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)	B. L. Basham

NPTEL/ Youtube/ Faculty Video Link:

Module 1	https://www.youtube.com/watch?v=cjh7vCAvKhc
Module 2	https://www.youtube.com/watch?v=fCiOPDZW-30
Module 3	https://www.youtube.com/watch?v=JnFeKp0T3AQ
Module 4	https://www.youtube.com/watch?v=_d8N2hKMpw8
Module 5	https://www.youtube.com/watch?v=8D6UyaVj1tY

Mode of Evaluation

CIE						**ESE**	**Total**
ST1	**ST2**	**ST3**	**TA1***	**TA2***	**Attendance**		
			5	**5**	**10**		
30			**20**				**50**

TA* - Teacher Assessment marks on the basis of defined Teaching Methodologies like Quiz, Assignment, Video Assignment, Seminar, Group discussion, PBL or any other defined by respective faculty members and may vary to subject-wise and faculty-wise