Integral University, Lucknow

Effective from Session: 2025-26 (NEP)							
Course Code	LN132	**Title of the Course**	Communication Skills: Theory and Practices	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	3	0	2	4
Pre-Requisite	10+2	**Co-Requisite**	None				
Course Objectives	• The course aims to educate the students in the artistry and utility of the English language for professional purposes by studying language. • The key component of the various types of professional communication is communication in English, which is now a global language. • The Department of Languages caters to the needs of the students aspiring for training, expertise, and excellence in professional communication with a marked emphasis on English for Specific/Special Purposes (ESP).						

Course Outcomes	
CO1	Students will be introduced to the basic understanding of communication and Professional Communication. Knowledge of Professional, cultural, and cross-cultural communication will be imparted. The meaning and process of communication, verbal and nonverbal communication will be focused. A basic understanding of questions will be provided. They will also learn & practice how to introduce themselves in a professional setting & how to manage speaking anxiety.
CO2	Students will develop an understanding of the concept and theory of Lingua Franca ELF, Its Importance and its use as a means of communication between populations speaking vernaculars that are not mutually intelligible. Students will develop an understanding of IPA symbols and improve pronunciation through practice
CO3	Basic tools of communication and improvement in communicative competence. Oral Communication techniques through situational conversations.
CO4	Understanding the structural and functional grammar and basic structure of language. Students will also develop the ability for group discussion and debate.
CO5	Enhancement of writing skills in English i.e., writing applications, reports, and various types of letters. Preparing PowerPoint Presentations and practicing for oral presentations to develop competency-based professional skills.

THEORY

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Professional Communication	Professional Communication: It's Meaning and Importance, Essentials of Effective Communication, Barriers to Effective Communication.	6	CO1
2	Oral Communication Skills (Speaking Skills)	English as Lingua Franca: From Theory to Practice , Importance of Spoken English Status of Spoken English in India	6	CO2
3	Basic Vocabulary	Euphemism, One-word Substitution, Synonyms, Antonyms, Homophones, Idioms and Phrases, Common Mistakes, Confusable Words and Expressions, Portmanteau Words, Foreign Words and Expressions.	6	CO3
4	Basic Grammar	Articles, Prepositions, Tenses, Concord, (Subject-Verb agreement), Modal Auxiliaries, Verbs: its Kinds and uses, Degrees of Comparison, Punctuation.	6	CO4
5	Basic Composition	Report Writing: What is report? Kinds and Objectives of reports, writing reports, Business Letter writing; Introduction to Business Letters, Layout of Business letters, Letters of Enquiry/Complaint Proposal writing. (Theory)	6	CO5

PRACTICAL				
S. No.	**Title of Experiments**	**List of Experiments**	**Contact Hrs.**	**Mapped CO**
1	Professional Communication	• Introduction (SWOT Analysis) • Framing Questions (Yes/No Questions, Why-Questions, Question tags, Rhetorical Questions)	2	CO1
2	Oral Communication Skills (Speaking Skills)	• International Phonetic Alphabets (IPA) Symbols • Spelling and Pronunciation	2	CO2
3	Basic Vocabulary	Oral Communication Practice: - Asking for and giving information • Congratulating people on their success • Expressing condolences • Apologizing and forgiving	2	CO3
4	Basic Grammar	Oral Practice: • Group Discussion (Based on Topic and Case Study) • Debate (Topic Based)	2	CO4
5	Basic Composition	• Oral Presentation through PPT (Topic based)	2	CO5

Reference Books:

- ✓ Gerson, Sharon J. *Technical Writing: Process and Product* (5th edition). Prentice Hall, 2005.
- ✓ K. Floyd, Interpersonal Communication: The Whole Story. McGraw Hill, 2009.
- ✓ Greenbaum, Sidney and Nelson Gerald, An Introduction to English Grammar. Routledge, 2009.
- ✓ Swan, Michael, Practical English Usage. OUP, 2005.
- ✓ Murphy, Raymond. English Grammar in Use. Cambridge University Press, 2019.
- ✓ Kumar, Sanjay and Pushp Lata., Communication Skills. Oxford University Press, Oxford 2011.
- ✓ Raman, Meenakshi, and Sangeeta Sharma. Technical Communication: Principals and Practice. Second Edition, Oxford University Press, 2012.
- ✓ Gerson, Sharon J. Technical Communication: Process and Product (9th edition). Longman Pub., 2016.

e-Learning Source:

- ✓ http://www.uptunotes.com/notes-professional-communication-unit-i-nas-
- ✓ https://www.docsity.com/en/subjects/professional-communication/
- ✓ https://lecturenotes.in/download/note/22690-note-for-communication-skills-for-profession.

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO- PSO ⟹ / CO ⬇	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	1	2	1	2	1	3	3	3	3	2	3	2	2	1		
CO2	1	1	1	1	1	3	1	3	3	3	3	3	1	1	1	1		
CO3	1	1	2	2	1	3	2	3	3	3	2	2	1	1	1	1		
CO4	1	1	1	2	1	2	2	3	2	3	2	1	1	1	1	1		
CO5													1	3	2	3		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Integral University, Lucknow

Effective from Session: 2025-26 (NEP)							
Course Code	CA110	**Title of the Course**	Computer Fundamentals and C Programming	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	3	0	2	4
Pre-Requisite	None	**Co-Requisite**	None				
Course Objectives	• To learn basics of Computer fundamentals, Networks, Internet and operating system. • To understand the basics of programming paradigms and C Programming. • To be able to develop logics in order to create programs and applications using C language. • To learn decision-making statements in order to solve problems. • To understand the use of functions and pointer in C programming. • To learn and implement the concept of arrays, structure & union. • After learning the C programming, they can easily switch over to any other language.						

Course Outcomes	
CO1	Understand the basic knowledge of Computer fundamental and its application in computers.
CO2	Understand the basic concepts of C programming language and able to identify the need and use of programming in real world environment.
CO3	Design and develop various programming problems using basic concepts of C programming.
CO4	Implement concept of functions, pointers, array and string to resolve real world problems.
CO5	Understand advance C programming concepts like structure, union and enumeration etc.

THEORY				
Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Introduction to Computer Systems**	Introduction and History of Computers, Generations of Computers, Types of Computers, Basic Block Diagram and Functions of Various Components of a Computer, Concept of Hardware and Software, Types of Software, Compiler and Interpreter, Memory and its Types, Elementary Concept of Operating System, Basics of Networks and Internet, Number Systems (Binary, Octal, Decimal, Hexadecimal), Input and Output Devices, Data Representation and Storage, Introduction to Programming Concepts.	8	CO1
2	**Introduction of C Language**	Introduction and History of C Programming Language, Salient features of C, Structure of C Programs, Execution and Compilation of C programs. Fundamentals of C Language: Character Set, C Tokens, Keywords, Identifiers, Modifiers, Variables: Declaration and Initialization of Variables, Scope of Variables, Data Types, Error, Types of Error.	8	CO2
3	**Operators & Expressions**	Types of Operators: Unary and Binary Operators, Assignment, Arithmetic, Relational & Logical Operators, Increment and Decrement Operators, Conditional Operators, sizeof() Operator, Comma Operator, Conditional Operator & Bit wise operators, Type Conversion, Types of Expression. Control Structures: Simple statements, Decision Making Statements, Looping statements, Nesting of Control Structures, Break and Continue statement, goto Statement	8	CO3
4	**Function**	Built-in and User-Defined Function, Types of User Defined Function, Function Prototype Declaration, Function Call, and Function Definition, Nesting of Functions, Recursive Functions, Macros and C Preprocessor, Storage Classes. Pointers: Introduction to Pointer Operators (&,*), Pointer Arithmetic, Parameter Passing: Call by Value, Call by Reference, Pointer to Pointer, Dynamic Memory Allocation, calloc() and malloc() Functions.	8	CO4

5	**Array & String**	Defining Array, Types of Array, Declaration and Initialization of Linear and Multidimensional Arrays, Array and Functions, Passing Arrays to Functions, Character Arrays, Arrays and Strings, String Manipulation, String Functions. Structure and Union: Defining Structure and Union, Declaration and Initialization of Structure and Union Variables, Differences between Structure and Union, Enumeration.	8	CO5

PRACTICAL

S. No.	Title of Experiments	List of Experiments	Contact Hrs.	Mapped CO
1	**Introduction to Computer Hardware and Peripherals**	• Demonstration of RAM, Storage Devices (HDD, SSD) • Demonstration of Optical Storage Technology: CD/DVD, and Pen Drive • Motherboard Components and Their Roles • Power Supply and System Boot Process • Exploring Input and Output Devices	3	CO1
2	**Basic Programming & Control Statement**	• Basic Introduction to C program and VS Code C setup (Compile/Run program) • Program using if/else/if-else/nested if-else • Program using operators (++,--, %, &,|, etc.) • Switch case programs • Programs of loops (while loop, do…while loop) • Program of Nested loops (patterns using for loop) • Programs using goto statements	3	CO2
3	**Function & Advanced features of the Function and Array**	• Program of Functions (no parameter, no return value) • Program of Functions (parameter, no return value) • Program of Functions (no parameter, return a value) • Program of Functions (parameter, return value) • Program for scope of functions (global, local, static, register) • Simple program of one-Dimensional array (searching, sorting) • Programs of two-dimensional array (addition/multiplication of matrix)	3	CO3
4	**Function with Array and Pointer**	• Program of array and function • String Programs (using string function) • String Programs (without using string function) • Simple program using pointer (display value and its address) • Program of pointer and array	3	CO4
5	**Function and Pointer**	• Program of pointer using function • Simple program of structure (read values and display the values) • Program of structure using functions • Program of structure using pointers • Simple program of union (read values and display the values)	3	CO5

Reference Books:

- ✓ Brian W. Kernighan, Dennis M. Ritchie, “The C Programming Language 2e 2nd Edition”, Pearson
- ✓ V. Rajaraman, "Fundamentals of Computers", PHI
- ✓ Peter Norton's, "Introduction to Computers", TMH
- ✓ Hahn, "The Internet complete reference", TMH
- ✓ Gottfried, "Programming in C", Schaum's Series, Tata McGraw Hill.

e-Learning Source:

- ✓ https://onlinecourses.swayam2.ac.in/cec19_cs06/preview
- ✓ https://onlinecourses.nptel.ac.in/noc22_cs40/preview

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO- PSO ⟹ / CO ⇩	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1				1		1					3	1				
CO2		3	1	1				1					2	1				
CO3	1	3	2	2		2	1	3					1	3				
CO4	1	1	2	3			1						2	2				
CO5		2	3	2		2	1	2					2	1				

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Integral University, Lucknow

Effective from Session: 2025-26 (NEP)							
Course Code	CA114	**Title of the Course**	Introduction to IT Industry	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	3	0	2	4
Pre-Requisite	None	**Co-Requisite**	None				
Course Objectives	• Understanding the foundational concepts of Information Technology • Identify and understand the core components of IT systems • Understanding IT Infrastructure and Analyzing Associated Challenges • Analyzing Challenges in IT Project Management and SDLC • Exploring Roles in Digital Transformation and Understanding Information Flow						

Course Outcomes	
CO1	Explore the fundamental concepts of Information Technology.
CO2	Identify key IT components and recognize the importance of ethical practices.
CO3	Analyze IT infrastructure and common organizational challenges.
CO4	Outline the IT industry hierarchy and associated professional roles.
CO5	Review major IT certifications and their relevance to career paths.

THEORY

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Information Technology**	**Information Technology:** Evolution, IT Industry Classification, IT Governance Frameworks, IT Roles in Digital Transformation, Information flow in IT, Storage Technology in IT. The Nature of Information Technology Projects , Why IT Projects Fail, The Context of Project Management, The Project Life Cycle and IT Development, Extreme Project Management, Evolution of Software Development Methodologies, SDLC an Introduction : Planning, Analysis, Design, Implementation, Maintenance, SDLC - IT Perspective. **Industry 4.0 and 5.0:** Overview of Industry 4.0 (Cyber-Physical Systems, IoT, Automation, Smart Factories)**,** Transition to Industry 5.0 (Human-centric computing, collaboration between humans and AI, sustainability goals)**,** IT's role in enabling smart, connected, and adaptive industries	8	CO1
2	**IT Components**	**IT Components:** Components of IT Infrastructure, IT Applications, Client-Server Model, Cloud: SaaS, PaaS, IaaS, IoT. Software Development: Frontend and Backend Technologies, Content Management Systems, Application Package Interface, Continuous integration, Continuous delivery and Continuous deployment. Enterprise Level IT Components. IT Ethics: Cyber Ethics, Intellectual Property, Privacy and Law, Computer Forensics, Ethics and Internet, Cyber Crimes Indian IT Act.	8	CO2
3	**IT Infrastructure**	**IT Infrastructure:** Introduction, challenges, design issues in IT organization and IT infrastructure, Determining customer's requirements, IT systems, management process, IT service management process, Information system design process, patterns for IT systems management, IT infrastructure library	8	CO3
4	**Hierarchy in IT**	**IT Hierarchy:** Qualification/Skill Set, Organization structure, Reporting manager, Project type, Role, Performance metrics, SLA (Service Level Agreement), Technology & knowledge, Job Layers: Software Layer, Hardware Layer, Network Layer, Security Layer, Storage Layer. Roles in IT: IT supports staff, System Administrator, IT Analyst, IT Specialist, IT Project Manager, and Chief Technical Officer, IT Architect, Product Manager, Project Manager, Tester, Quality Assurance Engineers, Business Analyst, Data Engineer, Data Scientist, DevOps Engineer, Scrum Master, Frontend Developer, Backend Developer, Full Stack Developer, Mobile Application Developer, UI & UX Designer, System Administrator, SEO	8	CO4

		Specialist, Database Administrator, Cloud Architect, Network Engineer, Big Data Engineer.		
5	**Certifications in IT Industry**	**Basic IT Certification:** Google's IT Support Professional Certificate. Cyber Security: Certified Information Security Manager (CISM), CompTIA Security+, Certified Information Systems Auditor (CISA). Systems Security Certified Practitioner (SSCP). Network and Systems: CompTIA Server+, Cisco Certified Network Associate (CCNA). Data Analyst: IBM Data Analyst Professional Certificate, Google Data Analytics Professional Certificate. Cloud: AWS Solutions Architect, Red Hat Certified System Administrator (RHCSA), Microsoft Certified Windows Server Fundamentals, Microsoft Certified Azure Fundamentals, Oracle Certified Associate (OCA) - Oracle Database SQL, Google Associate Cloud Engineer.	8	CO5

PRACTICAL				
S. No.	**Title of Experiments**	**List of Experiments**	**Contact Hrs.**	**Mapped CO**
1	**Basics of Windows and MS-DOS**	• Understanding Windows elements and file management. • Navigating pop-up windows and menu bars. • Windows desktop elements: icons, taskbar, start menu, system tray • File Explorer: drives, folders, file path, file extensions • Creating, renaming, moving, and deleting files/folders • Using Recycle Bin, search tools, and file properties • Introduction to MS-DOS, including internal and external commands (e.g., Autoexec.bat, Config.sys).	2	CO1
2	**Introduction to MS-Word**	• Learning core features of Microsoft Word. • Formatting tables, paragraphs, and columns. • Reviewing documents using track changes and comments. • Spell check, grammar check, page layout, and Mail Merge. • Creating bulleted and numbered lists. • Creating a resume with photographs.	2	CO2
3	**Introduction to MS-Excel**	• Building Excel sheets with multiple features. • Working with formulas and functions. • Use Excel functions to automate calculations (subtotal, tax, total) • Design a professional invoice template. • Sorting and filtering data (auto and advanced). • Using 2D and 3D charts. • Adding comments and password protection.	2	CO3
4	**Introduction to MS-PowerPoint**	• Creating and formatting presentation slides. • Master slide design with logos, footers, and fonts. • Adding notes, backgrounds, images, and transitions. • Using animations and visual effects. • Adding slide transitions (fade, wipe, push, etc.) • Applying animations to text, images, and charts	2	CO4
5	**Introduction to Internet**	• Understanding the World Wide Web and search engines. • Email and basic internet communication. • Downloading and storing data. • Internet safety (firewalls, antivirus). • Basics of e-commerce. • Use of Google Workspace tools (Docs, Sheets, Forms)	2	CO5

Reference Books:

- ✓ V. Rajaraman, Neeharika Adabala, “Fundamentals of Computers”, PHI
- ✓ William C. Miller, “Computer Applications for Beginners: A Complete Guide to Microsoft Office and Internet Usage”, TMH

✓ Faithe Wempen, “Computing Fundamentals : Introduction to Computers”, Wiley
E-Learning Source:
✓ https://www.udemy.com/course/understanding-the-it-industry/
✓ https://www.udemy.com/course/beginner-to-information-technology-it-a-must-know-course/
✓ https://onlinecourses.swayam2.ac.in/nou25_cs01/preview

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO- PSO ➡ **CO ⬇**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CO1	3	1			1	2	-	1	-	-	-	-	2	2				
CO2	2	1	1		1	2	-	1	-	-	-	-	2	2				
CO3	1	2	2	3		2	1	2	-	-	-	-	2	3				
CO4	2	1			2	2	1	2	-	-	-	-	1	2				
CO5	1	1			2	3		3	-	-	-	-	2	3				

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Integral University, Lucknow

Effective from Session: 2025-26 (NEP)							
Course Code	ES103	**Title of the Course**	Environmental Studies and Sustainability	**L**	**T**	**P**	**C**
Year	1	**Semester**	1	**3**	**0**	**0**	**3**
Pre-Requisite	None	**Co-Requisite**	None				
Course Objectives	The course is designed to introduce undergraduate students to the fundamental concepts of environmental studies and sustainability. It aims to foster awareness and understanding of natural systems, human impacts on the environment, and the importance of sustainable development. Through an interdisciplinary approach, the course encourages students to explore environmental challenges such as pollution, climate change, resource depletion, and biodiversity loss, while also learning about sustainable solutions, environmental policies, and individual and collective responsibilities towards a more sustainable future.						

Course Outcomes	
CO1	To introduce students to the structure and functioning of natural ecosystems and the interdependence between biotic and abiotic components, enabling a scientific understanding of the environment.
CO2	To create awareness about major environmental issues such as air and water pollution, climate change, deforestation, biodiversity loss, and waste management, along with their causes and consequences
CO3	To familiarize students with the principles and practices of sustainable development, focusing on balancing environmental protection, economic growth, and social equity.
CO4	To equipped students with a critical understanding of environmental protection laws and policies in India
CO5	Adopt sustainability as a practice rules and regulations, in life, society, and industry

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Humans and the Environment**	The man-environment interaction: Humans as hunter-gatherers; Mastery of fire; Origin of agriculture; Emergence of city-states; Great ancient civilizations and the environment; Middle Ages and Renaissance; Industrial revolution and its impact on the environment; Population growth and natural resource exploitation; Global environmental change. The emergence of environmentalism: Anthropocentric and eco-centric perspectives (Major thinkers); The Club of Rome- Limits to Growth; UN Conference on Human Environment 1972; World Commission on Environment and Development and the concept of sustainable development; Rio Summit and subsequent international efforts.	9	CO1
2	**Environmental Challenges and Human Impact**	Air, water, Thermal, Marine, soil, and noise pollution: causes, effects, control measures, Waste management: solid, biomedical, and e-waste, Global environmental issues: climate change, ozone depletion, acid rain Natural disasters and human vulnerability, Case studies of environmental degradation.	9	CO2
3	**Conservation of Biodiversity and Ecosystems**	Biodiversity as a natural resource; Levels and types of biodiversity; Biodiversity in India and the world; Biodiversity hotspots. Major ecosystem types in India and their basic characteristics; Ecosystem services- classification and their significance. Threats to biodiversity and ecosystems, Major conservation policies: in-situ and ex-situ conservation approaches; National and International Instruments for biodiversity conservation; the role of traditional knowledge, community-based conservation; Gender and conservation.	8	CO1
4	**Sustainable Development and Environmental Governance**	Introduction to sustainable development, Principles of sustainability and sustainable resource use, Sustainable agriculture, water conservation, energy efficiency, and green technology, UN Sustainable Development Goals (SDGs), especially SDG 6, 7, 11, 12, 13, 14, and 1, all targets and indicators, challenges and strategies for SDGs. Traditional ecological knowledge and community-based resource management: Role of individual and institutional actions in sustainability. Environmental protection acts and policies in India (e.g., the EPA, the Forest Act, the Biodiversity Act). Role of government, NGOs, and international organizations (e.g., UNEP, IPCC), Environmental justice, ethics, and equity, Civic responsibility and environmental movements in India, Campus and community-level environmental initiatives.	9	CO3, CO4 & CO5

5	**Case Studies and Field Work**	• Discussion on one national and one international case study related to the environment and sustainable development. • Field visits to identify local/regional environmental issues, make observations, including data collection, and prepare a brief report. • Documentation of campus biodiversity. • Campus environmental management activities such as solid waste disposal, water management, and sewage treatment.	10	C01, CO2, CO3, CO4, CO5

Reference Books:

- ✓ Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd. Bikaner.
- ✓ Bharucha Erach, The Biodiversity of India, Mapin Pub. Pvt. Ltd., Ahemdabad-380, India.
- ✓ Brunner R.C. 1989. Hazardous waste incineration, Mc Graw Hill
- ✓ Clark R.S. Marine Pollution, Clanderon Press Oxford (TB)
- ✓ Cunningham W.P.2001.Cooper, T.H. Gorhani, E & Hepworth, Environmental encyclopedia, Jacob Publication House, Mumbai.
- ✓ De. A.K. Environmental chemistry Willey Eastern Limited.
- ✓ Glick, H.P.1993 water in crisis, Pacific Institute for studies in dev, Environment & security, Stockholm Env, Institute, Oxford Univ, Press 473 p.
- ✓ Hawkins R .E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay.
- ✓ Heywood, V.H. & Watson, R. T.1995.Global biodiversity Assessment.Cambridge Univ. Press 1140 p.
- ✓ Jadhave, H. and Bhosale, V. M. 1995 Environmental protection and laws, Himalaya pub, house, Delhi.284 p.
- ✓ Mckinnery, M.L. and School, R. M.1996 Environmental science systems and solutions, web enhanced edition 639 p
- ✓ Mhaskar A.K. Matter Hazardous, Techno Science Pub (TM)
- ✓ Miller T.G. Jr, Environmental Ecology, W. B. Saunders Co.USA,574 p. 16
- ✓ Odum, E.P.1997.Fundamental chemistry, Goel Pub House Meerut.
- ✓ Survey of the Environment, The Hindu (M).
- ✓ Sharma B.K.2001.Environmental Chemistry, Goel Pub House Meerut

e-Learning Source:

- ✓ https://byjus.com/biology/difference-between-environment-and-eCOsystem.
- ✓ https://www.youtube.com/watch?v=dRPl4TB8w7k
- ✓ https://www.youtube.com/watch?v=3fbEVytyJCk
- ✓ https://www.vedantu.com/biology/conservation-of-biodiversity
- ✓ https://youmatter.world/en/definition/soil-erosion-degradation-definition/
- ✓ https://byjus.com/biology/difference-between-environment-and-eCOsystem.

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO- PSO ⟹ / CO ⇩	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	-	-	-	-	3	-	-	-	-	-	-	-	-	-				
CO2	-	-	-	-	2	1	-	-	-	-	-	-	-	2				
CO3	-	-	-	-	1	2	-	-	-	-	-	-	-	1				
CO4	-	-	-	-	1	-	-	-	-	-	-	-	-	3				
CO5	-	-	-	-	1	-	-	-	-	-	-	-	-	-				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Effective from Session: 2025 - 2026							
Course Code	MT161	**Title of the Course**	**Mathematics for Computer Applications**	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**3**	**1**	**0**	**4**
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	The course is aimed to develop the skills in mathematics which is necessary for grooming the min to successful graduate. The topics introduced will serve as basic tools for specialized studies in science field.						

Course Outcomes	
CO1	Students will be able to understand Trigonometry: Trigonometric functions of angles of any magnitude, Compound and multiple angles, Inverse circular functions and geometry of two dimensions.
CO2	Students will be able to analyze Complex Numbers: Modulus, Argument, Complex Conjugate, Algebraic operations, De-Moivre's Theorem, Root of a complex number.
CO3	Students willbeabletounderstanddifferenttypesofmatrices,Algebraicoperations,SymmetricandSkew-SymmetricMatrices, Transpose of Matrix, Orthogonal Matrix, Rank of Matrix, Determinant of a square matrix, Inverse of a square matrix, Solution of a system of Linear equations by Cramer's rule and Gauss-Elimination Method, Eigen Values and Eigen Vectors of a square matrix.
CO4	This course introduces mathematical techniques that are foundations for understanding advanced computational methods, including numerical methods
CO5	The mathematical principles introduced in this course serve as the basis for comprehending more complex computer strategies, such as optimisation.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Geometry and Trigonometry**	**Trigonometry**-Trigonometric Functions, Functions of angles of any magnitude, Compound and multiple angles, Inverse circular functions. **Geometry**- Straight Lines, Circle, Parabola, Ellipse, Hyperbola in two dimensions.	8	1
2	**Complex Numbers**	Modulus, Argument of a complex number, Polar form, Vector form, Complex Conjugate, Algebraic operations, De-Moivre's theorem, Root of a complex number.	8	2
3	**Matrix Algebra**	Types of matrices, algebra of matrices–addition, subtraction, and multiplication of matrices, determinant of a matrix, symmetric and skew-symmetric matrices, orthogonal matrix, rank of a matrix, inverse of a matrix, applications of matrices to solve system of linear equations, Eigen values and Eigen vectors, Caley-Hamilton theorem	8	3
4	**Numerical Methods**	Concept and importance of errors in numerical methods. Solution of algebraic and transcendental equations: Bisection method and Newton-Raphson methods. Numerical Interpolation: Newton's Forward and Newton's Backward interpolation formula and Lagrange's formula. Numerical Integration: Trapezoidal rule and Simpson's 1/3 rule Only formula and problem solving for all the topics mentioned above.	8	4
5	**Optimization Techniques**	Linear programming: Introduction, LP formulation, Graphical method for solving LPs with two variables, Special cases in graphical methods, Simplex method, Duality. Transportation problem: Definition, Linear form, North-west corner method, Least cost method, Vogel's approximation method for finding feasible solution, MODI method for finding optimum solution.	8	5

Reference Books:

1. Advanced Engineering Mathematics, Wiley Eastern Ltd.
2. Sastry S. S., Introductory Methods of Numerical Analysis, Fifth Edition, PHL, 2022.
3. Taha Hamdy A., Operations Research: An Introduction, Eighth Edition, Pearson Prentice Hall, 2003.
4. Advanced Engineering Mathematics, CBS Publication.
5. Introduction to Engineering Mathematics-I, S. Chand & Company, New Delhi

e-Learning Source:

1. https://archive.nptel.ac.in/courses/111/108/111108157/
2. https://nptel.ac.in/courses/111105090
3. https://nptel.ac.in/courses/111103070
4. https://www.math.iitb.ac.in/~siva/si50716/SI507lecturenotes.pdf
5. https://nptel.ac.in/courses/111107127

Course Articulation Matrix: (Mapping of COs with POs and PSOs)										
PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	**1**	**-**	**2**	**2**	**-**	**1**	**2**	**2**	**2**	**2**
CO2	**1**	**-**	**2**	**2**	**-**	**2**	**2**	**1**	**2**	**2**
CO3	**1**	**-**	**3**	**3**	**-**	**2**	**3**	**3**	**3**	**2**
CO4	**1**	**2**	**3**	**3**	**-**	**2**	**2**	**2**	**3**	**2**
CO5	**1**	**2**	**3**	**2**	**-**	**2**	**1**	**2**	**2**	**2**

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-26 (NEP)							
Course Code	HM103	**Title of the Course**	Indian Knowledge System	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	2	0	0	2
Pre-Requisite	None	**Co-Requisite**	None				
Course Objectives	To develop a comprehensive understanding of Political Science by familiarizing the students with the fundamental concepts, theories and contemporary debates in the political realm encompassing the International and Domestic sphere. It would enable the students to develop an in depth understanding of the philosophical and practical underpinnings of the Discipline while critically engaging with the same.						

Course Outcomes	
CO1	To enable students about the understanding of Indian Knowledge System, including the elements of IKS and Indian culture and civilization.
CO2	Understanding the traditional Indian philosophies and its role in Indian Knowledge System.
CO3	To enable students to know about the traditional practices in agriculture and indigenous health system in India.
CO4	To know indigenous health systems of India, such as Ayurveda and yoga, and psychological traditional aspects of mind and soul.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Introduction to IKS	Meaning, Objectives and Relevance of IKS, Elements of IKS, Nature & Features Indian Culture & Civilization	8	CO1
2	Indian Philosophical System	Vedic Schools of Philosophy: Sāṃkhya and Yoga, Nyaya and Vaisesika, Purva-Mimamsa and Vedanta), Non-Vedic School of Philosophy: Carvaka, Buddhist Jain	9	CO2
3	Indian Traditional Knowledge	Traditional agricultural practices, Traditional water-harvesting practices, Traditional Forecasting, Traditional Ayurveda & plant based medicine, Traditional writing Technology	9	CO3
4	Indigenous Health & Treatment Methods	Health, Wellness & Psychology, Ayurveda Sleep and Food, Yoga way of life ,Indian approach to Psychology, the Triguṇa System, Body-Mind-Intellect-Consciousness Complex.	9	CO4

Reference Books:

- ✓ Textbook on IKS by Prof. B Mahadevan, IIM Bengaluru
- ✓ Rao, N. 1970. The Four Values in Indian Philosophy and Culture. Mysore: University of Mysore.
- ✓ M. Hiriyanna. Essentials of Indian Philosophy. London: Diane Publications, 1985.
- ✓ Potter, K.H. Encyclopaedia of Indian Philosophies, Vol.III. Delhi: Motilal Banarasidass, 2000.

e-Learning Source:

- ✓ https://iksindia.org/

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO- PSO ⟹ / CO ⇩	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1		1			2													
CO2		1			3													
CO3		1			3													
CO4					2													

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation