Effective from Session: 2024-2025								
Course Code	ES101	Title of the Course	Environmental Studies		L	T	P	C
Year	I	Semester	I		2	1	0	3
Pre-Requisite	10+2	C						
		o-requisite						
Course Objectives	To study about the Environment and the Ecosystem. To study about the Natural Resources. To study about Biodiversity and Conservation. To study Environmental pollution, its policies and practices. To study Human Population and Environmental Ethics.							

Course Outcomes	
CO1	Gain knowledge about environment and ecosystem
CO2	Students will learn about natural resource, its importance and environmental impacts of human activities on natural resource
CO3	Gain knowledge about the conservation of biodiversity and its importance
CO4	Aware students about problems of environmental pollution, its impact on human and ecosystem and control measures
CO5	Students will learn about increase in population growth and its impact on environment.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1.	Introduction to Environment and Ecosystem	Environment, its components and segments, Multidisciplinary nature of Environmental studies, Concept of Sustainability and sustainable development, Environmental movements, Ecosystem, Structure & Function, Energy flow in the Ecosystem, Ecological Pyramids and Ecological Succession.	8	CO1
2	Natural Resources	Renewable and non- renewable, Soil erosion and desertification, Deforestation, Water: Use and over exploitation, Impacts of large Dams, Case studies	8	CO2
3	Biodiversity and Conservation	Levels of biological diversity, Hot spots of biodiversity, India as a Mega Diversity Nation, Endangered and endemic species of India, Threats to Biodiversity, Conservation of Biodiversity, Ecosystem and biodiversity services.	8	CO3
4	Environmental Pollution, Policies and Practices	Environmental pollution, Solid waste management, Ill effects of fireworks, Climate change, Ozone layer depletion, acid rain and impacts on human communities and Environment, Environmental Laws: Environment Protection Act, Wildlife protection Act, Forest conservation Act, Convention on Biological Diversity (CBD), Tribal rights, Human wildlife conflicts.	8	CO4
5	Human Population and the Environment	Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons, Environmental ethics, Environmental communication and public awareness, case studies.	8	CO5

Reference Books:

1) Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd. Bikaner.
2) Bharucha Erach, The Biodiversity of India, Mapin Pub. Pvt. Ltd., Ahemdabad-380, India
3) Brunner R.C. 1989. Hazardous waste incineration, Mc Graw Hill
4) Clark R.S. Marine Pollution, Clanderon Press Oxford (TB)
5) Cunningham W.P.2001.Cooper, T.H. Gorhani, E & Hepworth, Environmental encyclopedia, Jaicob Publication House, Mumbai
6) De. A.K. Environmental chemistry Willey Eastern Limited.
7) Glick, H.P.1993 water in crisis, Pacific Institute for studies in dev, Environment & security, Stockholm Env, Institute, Oxford Univ, Press 473 p.
8) Hawkins R .E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay
9) Heywood, V.H. & Watson, R. T.1995.Global biodiversity Assessment.Cambridge Univ. Press 1140 p
10) Jadhave, H. and Bhosale, V. M. 1995 Environmental protection and laws, Himalaya pub. house, Delhi.284 p.
11) Mckinnery, M.L. and School, R. M.1996 Environmental science systems and solutions, web enhanced edition 639 p   12) Mhaskar A.K. Matter Hazardous, Techno Science Pub (TM)
13) Miller T.G. Jr, Environmental Ecology, W. B. Saunders Co.USA,574 p. 16
14) Odum, E.P.1997.Fundamental chemistry, Goel Pub House Meerut
15) Survey of the Environment, The Hindu (M)
16) 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.

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

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

Integral University, Lucknow

Effective from Session: 2015-16							
Course Code	MT112	Title of the Course	Mathematics II	L	T	P	C
Year	1st	Semester	2nd	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 them into successful engineering graduate. • The topics introduced will serve as basic tools for specializedstudies in science field					

Course Outcomes	
CO1	Solve first order linear equations and higher order differential equation of certain types and interpret the solutions.
CO2	To use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients.
CO3	Able to determine given function in terms of sine and cosine terms in Fourier series.
CO4	Apply problem-solving using concepts and techniques from PDE'S and Fourier analysis applied todiverse situations in physics, engineering, financial mathematics and in other mathematical contexts.
CO5	Apply method of least squares to find the curve of best fit for the given data

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Differential Equations	Linear differential equations of first order, Linear differential equations of higher order with constant coefficients, Complementary functions and particular integrals, Simultaneous linear differential equations, Solution ofsecond order differential equations by changing dependent and independent variables, Method of variation ofparameters, Applications to engineering problems (without derivation).	8	CO1
2	Laplace Transform	Laplace transform, Existence theorem. Laplace transform of derivatives and integrals, Unit stepfunction, Dirac-delta function, Laplace transform of periodic functions, Inverse Laplace transform, Convolutiontheorem, Applications to solve simple linear and simultaneous differential equations.	8	CO2
3	Fourier Series and Partial Differential Equations	Periodic functions, trigonometric series, Fourier series of period 2 n. Euler's formulac, functions havingarbitrary period, change of interval, Even and odd functions, Half range sine and cosine series. Introduction of partial differential equations, linear partial differential equations with constant coefficients ofsecond order and their classifications to parabolic, elliptic and hyperbolic forms with illustrative examples.	8	CO3
4	Applications of Partial Differential Equations	Method of separation of variables for solving partial differential equations, Wave equation up to two-dimensions,Laplace equation in two-dimensions, Heat conduction equations up to two dimensions, Equations of transmissionLines.	8	CO4
5	Curve fitting and Solution of Equations	Method of least squares, curve fitting of straight line and parabola, Solution of cubic and biquadratic equations.	8	CO5

Reference Books:
1. E. Kreyszig Advanced Engineering Mathematics, Wiley Eastern Ltd.
2. Jaggi and Mathur Advanced Engineering Mathematics, Khanna Pub.
3. B. S. Grewal Higher Engineering Mathematics, Khanna Pub.
4. Dennis G. Zill Advanced Engineering Mathematics, CBS Pub.
e-Learning Source:

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	3	2	1	1	3						3	3	3	2	3		
CO2	3	3	3	2	1	1						2	3	2	2	3		
CO3	3	2	1	1	2	2	3					3	2	2	2	3		
CO4	3	2	2	2	3	3						2	3	2	2	3		
CO5	3	1	1	1	1	2	1					2	3	2	2	3		

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

Integral University, Lucknow

Effective from Session: **2024-25**							
Course Code	LN132	**Title of the Course**	Communication Skills: Theory and Practices	L	T	P	C
Year	I^st	**Semester**	I/I	3	0	1	4
Pre-Requisite	10+2	**Co-requisite**	Graduation				
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.

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. (Theory)	6	CO 1
		Lab-1 Introduction (SWOT Analysis) Framing Questions (Yes/No Questions, Why-Questions, Question tags, Rhetorical Questions)	2	
2	**Oral Communication Skills (Speaking Skills)**	English as Lingua Franca: From Theory to Practice Importance of Spoken English Status of Spoken English in India (Theory)	6	CO 2
		Lab-2 International Phonetic Alphabets (IPA) Symbols Spelling and Pronunciation (Practical)	2	
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. (Theory)	6	CO 3
		Lab-3 **Oral Communication Practice**: - Asking for and giving information Congratulating people on their success Expressing condolences Apologizing and forgiving (Practical)	2	
4	**Basic Grammar**	Articles, Prepositions, Tenses, Concord, (Subject-Verb agreement), Modal Auxiliaries, Verbs: its Kinds and uses, Degrees of	6	CO 4

		Lab-4 **Oral Practice:** Group Discussion (Based on Topic and Case Study) Debate (Topic Based) (Practical)	**2**	
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**	**CO 5**
		Lab-5 Oral Presentation through PPT (Topic based) (Practical)	**2**	

Reference Books:

1. Gerson, Sharon J. *Technical Writing: Process and Product* (5th edition). Prentice Hall, 2005.

2. K. Floyd, *Interpersonal Communication: The Whole Story*. McGraw Hill, 2009.

3. Greenbaum, Sidney and Nelson Gerald, *An Introduction to English Grammar*. Routledge, 2009.

4. Swan, Michael, *Practical English Usage*. OUP, 2005.

5. Murphy, Raymond. *English Grammar in Use*. Cambridge University Press, 2019.

6. Kumar, Sanjay and Pushp Lata., Communication Skills. Oxford University Press, Oxford 2011.

7. Raman, Meenakshi, and Sangeeta Sharma. Technical Communication: Principals and Practice. Second Edition, Oxford University Press, 2012.

8. Gerson, Sharon J. *Technical Communication: Process and Product* (9th edition). Longman Pub., 2016.

e-Learning Source:

1. http://www.uptunotes.com/notes-professional-communication-unit-i-nas-
2. https://www.docsity.com/en/subjects/professional-communication/
3. 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
CO 1	1	1	1	2	1	2	1	3	3	3	3	2	3	2	2	1	-
CO 2	1	1	1	1	1	3	1	3	3	3	3	3	1	1	1	1	-
CO 3	1	1	2	2	1	3	2	3	3	3	2	2	1	1	1	1	-
CO 4	1	1	1	2	1	2	2	3	2	3	2	1	1	1	1	1	-
CO 5	1	1	1	2	3	3	2	3	3	3	2	3	1	3	2	3	-

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

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

Integral University, Lucknow

Effective from Session:2024-25							
Course Code	CS101	**Title of the Course**	Computer Programming	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	3	0	2	4
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	• To give knowledge of computers, networks, algorithms & flowcharts. • To provide fundamental concepts of programming language 'C'. • To show the use of functions and pointers to different problems. • To study the implementation of arrays, matrices and strings. • To give concepts of user defined datatypes, structure & union						

Course Outcomes	
CO1	Understanding basic concepts of computer, networks and formulation of algorithmic solutions to problems.
CO2	Understanding of programming concepts of C language and their implementation.
CO3	Analyze and develop programs on pointers and functions.
CO4	Acquire the knowledge and develop programs on different operations on arrays, matrices & strings.
CO5	Implementation of programs on structure, union & dynamic memory allocation.

THEORY

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Introduction to Computers**	Generation of computers, Characteristic and classifications of computers. Components of Computer: CPU, Various I/O Devices, Memory & its types, (Memory Hierarchy, Storage Media), Computer Software and their types, Operating System. Computer Networks & Communication: LAN, MAN, WAN, Network Topologies, Modes of Data Communication. Introduction to Internet and its Safeguard: Internet Addresses, Domain Name System, URL, Web Browsers Search Engines, Firewalls, Anti-Virus, Translators. Algorithm and flowchart: Algorithm and flow chart characteristics, Sketching Flowcharts of various problems.	9	1
2	**Introduction to C**	Standard I/O in 'C', 'C' Fundamental, C Character set, Constants, Variables, Keywords and Identifiers, Data types, Declaration. Operators and Expressions, Conditional statements (If, If-else), Nesting of if- else statement, switch statement, The? operator, goto statement. Decision making and Looping (While, Do-While, for), Break and Continue statements, Case Control Structures (Switch), C programs based on above concepts.	8	2
3	**Pointers & Functions**	Declaration and initialization of pointers, accessing the address of the variable, accessing the variable through the pointer, chain of pointers, pointers operators, pointer arithmetic Introduction to Functions: Need of "C" function, User Defined and Library Functions, Prototype of Function, Call by Value; Call by Reference; Nesting of Functions, Recursion. Pointers with function, C program based on above concept.	9	3
4	**Array**	Concept of One Dimensional and Multi-Dimensional arrays, Declaration, Operations: insert, delete, search, traverse, and merge, matrix operations, Sorting: Bubble sort, merge sort, insertion sort. Character array and strings: declaring and initializing strings variable, reading and writing a character, reading and writing strings from terminal, Arithmetic operations on characters, string handling functions. Application of pointers, and function on array, C program based on above concept.	10	4
5	**Structures**	Defining Structure, Declaration of Structure Variable, Accessing Structure members, copying and comparing structure variable, operation on individual member, nesting of structures, Array of structures. Application of pointers and function on Structures. Union Defining Union Declaration of Union, difference between structure and Union, Introduction of Static and Dynamic memory allocation- The process of Dynamic memory allocation, C program based on above concept.	8	5

PRACTICAL

S. No.	List of Experiments	Contact Hrs.	Mapped CO
1	Write a Program to print sum and multiply of two numbers.	2	1
2	WAP that calculates the Simple Interest and Compound Interest. The Principal, Amount, Rate of Interest and Time are entered through the keyboard.	2	1
3	Write a Program to enter the temperature in Celsius(c) then count it into Fahrenheit.	2	1
4	Write a Program to swap the number taking the help of third variable.	2	1
5	Write a Program to convert Decimal to Binary in C.	2	1
6	Write a Program to find the greater number enter by user.	2	2
7	Write a Program to check a year is leap year not.	2	2
8	Write a Program to print number is even or odd.	2	2
9	Write a C program to design calculator with basic operations using Switch case.	2	2
10	Write a Program to print the no is positive or negative.	2	2
11	Write a C program to print Fibonacci Series without using Recursion and using Recursion.	2	3

12	WAP to find a Factorial in C.	2	3
13	Write a Program to enter any no and check whether the given no is palindrome or not.	2	3
14	Write a Program to enter any no. and check whether the given no. is Armstrong or not.	2	3
15	Write a Program to Print Pattern * * * * * * * * * *	2	3
16	Write a Program to Print Pattern1 2 3 4 1 2 3 1 2 1	2	3
17	Write a C program to form Pascal Triangle using numbers.	2	3
18	Write a program to find in C to design the report card of 5 subject according to the following condition if the totalpercentage are. >=35 and <45 III Div >=45 and <60 II Div >=60 I Div If any students score <35 in any of the subject display fail	2	3
19	Write a Program to create 2-D array or order M*N and insert the element and display it.	2	4
20	Write a Program to find the addition of two matrix of order M*N.	2	4
21	Write a Program to find the Transpose of the matrix.	2	4
22	WAP to find Reverse of an Array using Functions in C.	2	4
23	Write a Program to swap two number using function pointers.	2	5
24	WAP to demonstrate Student Record System in C.	2	5

Reference Books:

1. Foundation of Information Technology by 'D.S. Yadav'- New age International

2. Programming in 'C' by 'E Balagurusamy'. -TMH Publication.

3. Let us 'C' by 'Yashwant Kanitkar'-BPB Publication.

4. The C Programming Essentials by Dey- Pearson Publication.

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

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

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	PY101	**Title of the Course**	Physics	**L**	**T**	**P**	**C**
Year	First	**Semester**	First	3	0	2	4
Pre-Requisite	10+2 with Physics and Mathematics	**Co-requisite**	None				
Course Objectives	The purpose of this undergraduate course is to impart basic knowledge of fundamental concept of physics which is necessary for a strong engineering knowledge base and to support this knowledge through its various experiments.						

Theory

Course Outcomes	
CO1	To realize that apparently different ideas of Optics such as Interference and Diffraction have interrelationship between them.
CO2	To grow in ideas of different aspect of light and develop connection between daily life applications and science
CO3	To grow in developing connection between philosophy and science and realize that seemingly different ideas such as Relativity and Mechanics have interrelationship between them.
CO4	To grow in developing the connection between philosophy and science and realize that seemingly different ideas such as Compton Effect and Quantum Theory have interrelationship between them.
CO5	To grow in developing connection between daily life utility and material science and to evaluate that how totally different manifestation of Modern Science leads to new technology.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Wave Optics	**Interference:** Methods of formation of coherent sources, theory of interference fringes, fringe width, Fresnel's Biprism, thin film interference, Newton's ring and its application in determination of wavelength of light. **Diffraction:** Theory of Fraunhoffer's diffraction at single slit, Intensity distribution curve, (No derivation), Introduction to the grating grating equation and its application in determination of wavelength of light, Resolving Power of Optical Instruments and Rayleigh's criterion of resolution.	8	1
2	Optical Activity and Modern Optics	**Polarization:** Production of plane polarized light by reflection, Double refraction, Nicol prism, Optical activity, specific rotation, polarimeter (Laurentz and Biquartz) and its application in determination of specific rotation. **Optical Fiber:** Principle of fiber optics, numerical aperture. **LASER:** Main components of laser, Einstein's coefficients, He-Ne laser, Nd-YAG laser and their applications.	8	2
3	Relativistic Mechanics	Brief Introduction to the Michelson-Morley Experiment (Negative results and their explanation), Galilean Transformation Equations, Lorentz Transformation Equations and their consequences (Length Contraction, Time Dilation and Velocity Addition Theorem), Energy-Mass Relation, Relativistic Kinetic Energy.	8	3
4	Quantum Physics	Compton Effect, de-Broglie Hypothesis, Heisenberg's uncertainty principle (no derivation) and its applications (non-existence of electron in nucleus), Wave function and its physical admissibility, orthogonality of wavefunctions, normalization of wave functions, Schrodinger's equation (Time dependent and Time independent) and its application (particle in one dimensional potential box).	8	4
5	Physics of Materials	**Magnetic Properties:** Magnetization, Origin of magnetic moment, Langevin's theory for diamagnetic material, Phenomena of hysteresis and its applications. **Superconductors:** Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, Type I and Type II superconductors, **Nano-Materials:** Basic Principle of Nanoscience and Technology, Structure, Properties and uses of Fullerene and Carbon Nanotubes, Applications of Nanotechnology	8	5

Reference Books:

1. Fundamentals of Optics by Jenkins and White.
2. Optical Fiber Communication by Gerd Keiser.
3. Concepts of Modern Physics by Arthur Beiser.
4. Introduction to Special Theory of Relativity by Robert Resnick.
5. Quantum Physics by Eisberg.
6. Introduction to Nanotechnology by Poole Owens, Wiley India.
7. Solid State Physics by S.O. Pillai, New Age Publications

e-Learning Source:

1. https://nptel.ac.in/courses/115/101/115101011/
2. https://nptel.ac.in/courses/115/107/115107095/
3. https://nptel.ac.in/courses/113/106/113106093/
4. https://nptel.ac.in/courses/115/101/115101107/

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

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

Practicals

Course Outcomes	
CO1	To demonstrate how interference takes place by division of amplitude and by division of wavefront.
CO2	To demonstrate the practical applications of polarization phenomenon in finding the specific rotation, TIR in refractive index calculation.
CO3	To demonstrate the practical application of Fraunhoffer diffraction in wavelength determination and application of Carey Foster's bridge in resistivity determination.
CO4	To demonstrate the magnetic and heating effect of current in finding the magnetic field and Stefan's constant.
CO5	To demonstrate how to calculate the energy band gap of a semiconductor material and viscosity of a liquid.

Experiment No.	Title of the Experiment	Aim of the Experiment (*Offline)	Contact Hrs.	Mapped CO
1	Newton's Ring	To determine the wave length of monochromatic light by Newton's ring.	4	CO1
2	Fresnel's Biprism	To determine the wave length of monochromatic light with the help of Fresnel's Biprism.	4	CO1
3	Refractive Index	To determine the refractive index of a liquid using laser.	4	CO2
4	Polarimeter	To determine the specific rotation of cane sugar solution using Half Shade polarimeter.	4	CO2
5	Diffraction Grating	To determine the wavelength of prominent spectral lines by plane diffraction grating.	4	CO3
6	Carey Foster's Bridge	To determine the resistance per unit length of Carey Foster's bridge wire and (i) to prepare one ohm coil (ii) to determine the specific resistance of given wire.	4	CO3
7	Variation of Magnetic Field	Plot the graph showing variation of magnetic field with distance along the axis of a circular current carrying coil and then to determine the radius of the coil from it.	4	CO4
8	Stefan's Law	To verify Stefan's law by electrical method.	4	CO4
9	Energy Band Gap	To determine the energy band gap of a semiconductor using a PN junction diode.	4	CO5
10	Viscosity of water	To determine the coefficient of viscosity of water by Poiseuille's method.	4	CO5

Reference Books:

1. Practical Physics. by R. K. Shukla, New Age International Private Limited; Third edition.
2. B.Sc. Practical Physics by Harnam Singh and Hemne, S. Chand and Company.
3. B. Sc. Practical Physics by CL Arora, S Chand and Company
4. Practical Physics by Kumar P.R.S., Prentice Hall India Learning Private Limited
5. Engineering Physics Practical by S.K. Gupta, Krishna Prakashan

e-Learning Source:

1. https://youtu.be/fWhgguWc8rk
2. https://youtu.be/Bf0Tg-fNWjQ
3. https://youtu.be/dDp_Insp_p0
4. https://youtu.be/N0lxwqANsd4
5. https://youtu.be/G8Rqd2HNhuk
6. https://youtu.be/7Mq4isproEE
7. https://youtu.be/G8Rqd2HNhuk
8. https://youtu.be/NtfbmAw62Hw

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

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