



Subject Name	L	T	P	Credits
Environmental Studies	3	1	-	4

Course Objectives:

- To give students an understanding of how science and the scientific method work to address environmental problems.
- To get familiar with earth's eco systems and to understand their functioning
- Students will learn about the interaction of human society (urban sprawl, energy use/generation, resource consumption and economics) with the Earth's systems.

Unit I

Introduction: Domestic and Global Environmental concerns, principles of sustainable development, Sustainable agriculture, organic farming, bio-fuels, Threats for sustainability.

Unit II

Environmental Ethics & Legislations: Enforcement of Environment laws in India – The water act, The Air (Prevention and Control of Pollution) Act, 1981, The Environment (Protection) Act, 1986, Environmental Auditing, value education – HIV/AIDS- Women and child welfare.

Unit III

Environmental Pollution: Air Pollution – sources, types of air pollutants, National Ambient Air Quality Standards, Controlling Air Pollution. Water pollution – sources, types of water pollutants, water quality indicators, water quality standards. Soil Pollution - types of soil pollutants: industrial wastes, pesticides ,fertilizers and manures, salination of soil, Controlling Soil Pollution. Noise: Sources of noise pollution Measurements of noise and indices, effect of metrological parameters on noise propagation, Noise exposure levels and Standards. Noise control and battement measures. Impact of noise on human health.

Unit IV

Environmental Challenges: Local Challenges - Solid Waste – Impact of solid waste on natural resources, Deforestation; Global Challenges - climate change and global warming, Kyoto Protocol Greenhouse Gases, Ways to reduce Greenhouse gases emissions, Carbon Footprint, ways to reduce carbon footprint, Carbon Trading.

Unit V

Sustainable habitat, industrialization and urbanization: Concept of Green Building, Volatile Organic Compounds (VOC), GRIHA Rating, LEED Rating, HVAC, Hybrid Car Technology, Industrial ecology, India's renewable energy capacity. *Green Technology & Green Business:* Green Business, Green Computing, E-waste management.

Reference Books:

1. R. Rajagopalan, Environmental Studies, Oxford IBH Pub, 2011.



2. Kogent Learning Solutions Inc., Energy, Environment, Ecology and Society, Dreamtech, 2012.
3. Rag, R. L, Ramesh, Lekshmi Dinachandran, Introduction to sustainable engineering.

Course Outcomes:

1. This course is designed to give a basic understanding of the Earth's life-supporting, ecological systems and the threats to those systems.
2. To acquire knowledge of the origin and functioning of the natural system and its correlation with the living world
3. To develop an awareness of the need and responsibility to keep the natural system in a condition that it sustains life.
4. To develop sensitivity in personal attitudes to environmental issues.
5. To develop an understanding of how local environment contributes to the global environment.

Subject Name	L	T	P	Credits
Physics-II (Electricity and Magnetism)	3	1	4	6

Course Objectives:

- The students will introduce about the various concepts related to vectors.
- To explain the various concepts related to electrostatics and their theorems.
- The course will give knowledge about the magnetic field; dielectric and magnetic properties of materials.
- To explain the various concepts related to explain the various concepts related to electromagnetic induction and their laws.

Unit-1

Vector Analysis: gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors

Unit-2

Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics, Applications of Gauss theorem- Electric field due to point charge, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, Calculation of electric field from potential, Capacitance of an isolated spherical conductor, Parallel plate, spherical and cylindrical condenser, Dielectric medium, Polarisation, Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.

Unit-3

Magnetism:

Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Ampere's circuital law.

Unit-4

Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, Brief introduction of dia, Para and Ferro magnetic materials.

Unit-5

Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field.

Maxwell's equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement current, Maxwell's equations, polarization.

Textbooks:

1. Schaums Outline of Beginning Physics II: Electricity and Magnetism, A Halpern, E Erlbach, McGraw Hill
2. Berkley Physics Course Electricity and Magnetism, E. M. Purcell, McGraw Hill

Course Outcomes:

- On completion of this course, the students will be able to
- The use of Coulomb's law and Gauss' law for the electrostatic force.
- The relationship between electrostatic field and electrostatic potential.
- The use of Ampere's law to calculate magnetic fields.
- The use of Faraday's law in induction problems.
- The use of the Lorentz force law for the magnetic force.

References:

1. Physics Volume 2, D. Halliday and R. Resnick. Wiley
2. Introduction to Electrodynamics, D.J Griffiths, Printice Hall.
3. Electricity and Magnetism, Edward Mills Purcell, Cambridge University Press.
4. Unified Physics IV Semester, R. P. Goyal, Shival Agrawal and Company Publishers.
5. Concepts of Physics I, H.C. Varma, Bharati Bhavan Publishers
6. Concepts of Physics II, H.C. Varma, Bharati Bhavan Publishers

List of Experiments:-

1. Measurement of capacitance using impedance at different frequencies
2. Response curve for LCR circuits and response frequencies
3. Sensitivity of a Cathode-ray oscilloscope
4. Use of vibration magnetometer to study a field
5. Study of magnetic field due to current using tangent galvanometer
6. Study of decay of currents in RC circuits
- 7 Study of decay of currents in LR circuits
8. Study of Lissajous figures using CRO

Subject Name (Code)	L	T	P	Credit
Mathematics-II	3	1	0	4

Course Objectives:

- To know about the uses of differential equations in practical problems.
- To know about the uses of Second-Order linear differential equations in practical problems.
- To learn about the various types of Partial differential equations with different methods.
- Revise basic knowledge of Heat Equation, Wave Equation and Laplace Equation.
- To understand the basics of Laplace Transform, Inverse Laplace Transform and their methods.

Unit-I

Ordinary Differential Equations: First-order differential equations (Separable, Homogeneous, Linear, Exact), Linear differential equations of higher order with constant coefficients solvable for x , y and p , Clairaut's form, Homogeneous differential equations, Simultaneous linear differential equations.

Unit-II

Second-Order Linear Differential Equations with Variable Coefficients: Solution by Method of Undetermined Coefficients, Removal of First Derivative, Change of Independent Variable and Variation of Parameters. Series solution of a second order linear ordinary differential equation (an ordinary point and a regular singular point).

Unit-III

Partial Differential Equations: Definition, Formulation, Solution of PDE (By Direct Integration method & Lagrange's method), Non-Linear Partial differential equation of first order {Standard I, II, III & IV}, Charpit's general method of solution for Partial differential equations.

Unit-IV

Partial Differential Equations with Constant Coefficients: Second and higher orders homogeneous and non-homogeneous equations, partial differential equations reducible to equations with constant coefficients, the method of separation of variables, one dimensional heat and wave equation and its solution

Unit-V

Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, Second shifting property, Laplace Transform of the derivative, Inverse Laplace Transform & its properties, Convolution Theorem, Applications of L.T. to solve the ordinary differential equations.

Reference Books:

1. N. Finizio and G. Ladas, "An Introduction to Differential equation" Wadsworth Publishing Company
Belmont, California.
2. Dean G. Duffy, Advanced Engineering Mathematics with MATLAB, CRC Press.

3. S.L. Ross, Differential equation, John Wiley and Sons, Inc.
4. Peter J. Collins, "Differential and integral Equation", Oxford University Press.

Course Outcomes:

- Student will learn about the basic application of differential equations in various practical problems and further uses.
- Useful for transforms and series type problems.
- Useful for the field of EMT, Co-relation, Physics.
- Student learns about the use of PDE in daily life, various practical problems and further uses.
- Useful for the field of Control Systems, Circuit Analysis, Signal Processing.

Subject Name	L	T	P	Credits
Database Concepts & RDBMS	3	1	-	4

Course Objectives:

- To describe a sound introduction to the discipline of database management systems.
- To give a good formal foundation on the relational model of data and usage of Relational Algebra.
- To introduce the concepts of basic SQL as a universal Database language.
- To enhance knowledge to advanced SQL & PL/SQL topics
- To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization.

Unit I

Introduction to DBMS: Basic concepts, Comparison between DBMS & Conventional file system, Role of DBMS, Advantages and Disadvantages of DBMS, Schema and Instance, Data Independence, Database Languages, Database Administrator, Database Users, Architecture of DBMS, Applications of DBMS, **Data Models:** Entity Relationship model, Elements–Entities, Attributes, Relationships, Key, Type of Keys, ER Diagram, Various data models.

Unit II

Relational Data models: Basic terminology of relational model, Kinds of relation, Relational database, DBMS v/s RDBMS, Relational algebra, Relational calculus, Functional & Additional operations, Functional dependencies, Multivalued dependencies, Normalization, Types of normalizations.

Unit III

Database Integrity: Definition, Transaction, ACID properties, Transaction state, Concurrency, Concurrency control, Recovery, Distributed database, Data storage, Data Warehousing and Mining, Introduction to oracle and its tools, Client/Server computing.

Unit IV

Introduction to SQL: Characteristics of SQL, Basic structure, Data types, SQL Commands, Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL), SQL Operators - Arithmetic Operator, Logical Operators, Pattern Matching, Data Constraints, Different Clauses, Joins.

Unit V

PL/SQL: Indexes, Views, Granting & Revoking permissions, PL/SQL-Block structure, Variables, Constants, Controls & Loops, Transactions- Commit & Rollback, Locks, Error handling in PL/SQL, Procedure & Functions, Database Triggers.

Reference Books:

1. Database System Concepts, Silberschatz Korth, Sudarshan, MH
2. Ullman, "principles of database systems", (2nd ed. Galgotia, 1984).



3. Naveen Prakash, Introduction to database management”, TMH, 1993.
4. Ivan Bayross, SQL, PL/SQL ” The Programming Language of Oracle” (2nd Revised ed.), BPB Publications

Course Outcomes:

- Explain the features of database management systems and Relational database.
- Design conceptual models of a database using ER modeling for real life applications and also construct queries in Relational Algebra.
- Create RDBMS with constraints and keys, using SQL.
- Retrieve any type of information from a data base by formulating complex queries in SQL.
- Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.
- Build indexing mechanisms for efficient retrieval of information from a database.

Subject Name	L	T	P	Credits
Programming in Python	3	1	4	6

Course Objectives:

- To get Familiar with Python environment, data types, operators used in Python.
- To learn about module and packages.
- To learn modular programming
- To understand sequences in Python.
- To learn numpy module in python.

Unit-I

Introduction, Origin, Comparison, Comments, Operators and operator precedence, Data types and variables, Command line argument, Data input, if Statement, while Loop, for Loop and the range().

Unit-II

Module: Import module using import statement, Use from... import statement, Use from ... import * statement, Math Module, Random Module, While loop, For loop, Break & continue, Else clause. **Packages:** Installing packages using PIP, constructing and distributing packages, packages vs. directories, the role of the `__init__.py` file.

Unit-III

Function: Define a function, Pass arguments, Arguments with default values, Arbitrary arguments, Local and global variables Return a value from function, yield, none keywords, Return multiple values, Documentation Strings

Unit-IV

Lists and Tuple: Introduction to List and Tuple, Accessing List and Tuple, Operations, working with List and Tuple, Function and Methods. Dictionaries: Working with dictionaries, properties and functions, working with Strings.

Unit-V

Numpy: Introduction, Data Types, Array, Array Indexing, Array Slicing, Array concatenation, Array Manipulation Linear Algebra functions, Mathematical Functions, random numbers, Arithmetic Operations, Statistical Functions, Matplotlib, Histogram Using Matplotlib, I/O with NumPy.

Reference Books:

- “Head First Python 2e: A Brain-Friendly Guide” by Paul Barry.
- “Introduction to Machine Learning with Python: A Guide for Data Scientists” by Andreas C. Müller & Sarah Guido
- Python in a Nutshell, A. Martelli, A. Ravenscroft, S. Holden, OREILLY.

Course Outcomes:

- Student will learn fundamentals of python.
- Student will learn about inbuilt module and using modules.
- Student will understand modular programming in python.
- Student will understand sequences in python.
- Student will learn numpy module.

List of Experiments

1. Demonstrate the working of 'id' and 'type' functions.
2. Write a program to determine whether a triangle is isosceles or not?
3. Write a program to convert temperature from Fahrenheit to Celsius depending upon user choice.
4. Compute sum, subtraction, multiplication, division and exponent of given variables input by the user.
5. Compute area of following shapes: circle, rectangle, triangle, square, trapezoid and parallelogram.
6. Write a program to compare three numbers and print the largest one.
7. Write a program to check whether the input number is even or odd.
8. Compute sum of natural numbers from one to n number
9. Compute factorial of a given number.
10. Print multiplication table of a number input by the user.
11. Count occurrence of a digit 5 in a given integer number input by the user.
12. Print all possible combinations of 4, 5, and 6
13. Write a program to check whether given no is prime or not.
14. To find the Max of three numbers using functions.
15. Multiply all the numbers in a list using functions.
16. Write a Python program to find all prime numbers within a given range.
17. Print multiplication table of a number input by the user.
18. Write a program to import module and use it.
19. Compute the GCD of two numbers.
20. Find the square root of a number (Newton's method)
21. Exponentiation (power of a number)
22. Find the maximum of a list of numbers



23. Write a program to use dictionary and its functions in python.
24. Write a program to implement list and use its methods.
25. Write a program to implement tuple and use its methods.
26. Count occurrence of vowels.
27. Count total number of vowels in a word.
28. Determine whether a string is palindrome or not.

MANDSAUR UNIVERSITY



Subject Name	L	T	P	CREDIT
Information and Communication Technology-2	-	-	2	0

Course Objectives:-

The course is designed to aim at imparting a basic level programme for students. After completing the course students will be able to use computer technology.

Contents:

Unit-1

Introduction to Internet, WWW and Web Browsers:

Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting, World Wide Web; Web Browsing softwares, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website

ERP for various works:

Filling examination form , View Academic History , Submit Fee ,View Results

Unit-2

Communications and collaboration:

Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging.






Email Etiquette:

Use a Professional Email Address , Use a Formal Salutation , Lead With a Clear Subject Line , Be Clear, Polite, and Succinct , Sign Off with a Thank You , Boost Your Image with a Strong Email Signature .

Unit-3

Google Drive:

What is Google Drive? , Creating files on Google Drive,Uploading existing office files on Google Drive. Make PDF with Google Drive.

-  Documents: For composing letters, flyers, essays, and other text-based files (similar to Microsoft Word documents)
-  Spreadsheets: For storing and organizing information (similar to Microsoft Excel workbooks)
-  Presentations: For creating slideshows (similar to Microsoft PowerPoint presentations)
-  Forms: For Quiz,collecting and organizing data
-  Drawings: For creating simple vector graphics or diagrams

Unit-4

Making Small Presentation:

Basics of presentation software; Creating Presentation; Preparation and Presentation of Slides; Slide Show; Taking printouts of presentation / handouts.

Course Outcome:-

At the end of course, students will be able to

1. Understand the basics of the internet.
2. Understand basic internet vocabulary
3. Create email id.
4. Send an email in a professional way.
5. Create documents in google drive.
6. Create good presentations.

Activities:

SN	Activity
1.	Difference between LAN , WAN and MAN
2.	Practice browsing of different sites using search engine

3.	Practice and understand different e-mail services – outlook, yahoo mail, rediffmail etc
4.	Practice creating e-mail accounts, sending, receiving & storing of mails.
5.	<ol style="list-style-type: none"> 1. Basic operations of power point, create ppt and inset and delete slides 2. Create project presentations, lecture presentations. 3. Apply basic formatting features in presentation like font, font size, font colour, text fill, spacing and line spacing formatting text boxes, word arts, styles bullet and numbering 4. Working with drawing tools, applying shape or picture styles, applying object borders, object fill, object effects. 5. Working with video, link to video and sound files. 6. Creating hyperlinks, using action buttons
6.	Create google doc , Spreadsheets and share with other users.
7.	Create quiz in google form