Mandsaur University

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 it 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 contribute to the global environment.

Mandsaur University

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, EErlbach, 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, Printiee Hall.

3. Electricity and Magnetism, Edward Mills Purcell, Cambridge University Press.

4. Unified Physics IV Semester, R. P. Goyal, Shivlal 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

Mandsaur University

Subject Name	L	T	P	Credits
Mathematics – II	3	1	-	4

Course Objectives:

- To know about the Limits and differentiation of multivariate functions and uses.
- To know about the Double and Triple integrals and uses.
- To understand the basics of Laplace Transform, Inverse Laplace Transform and their methods.
- 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.

Unit-I
Advanced Calculus–I:
Limit: Introduction, fundamental theorems on Limits, Operation on Limits, Functions in the real world Limits, Continuity, Infinity.
Partial Derivatives: Definition, Euler's Theorem for Homogeneous functions, Differentiation of implicit functions, Total differential coefficient, Transformations of independent variables, Jacobians, Approximation of errors, Maxima and Minima of functions of two variables.

Unit-II
Advanced Calculus–II:
Double integral (Area and Volume), Double integral in Polar Co-ordinates, Triple integrals (Volume and Surface area), Rectification.

Unit-III
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.

Unit-IV
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-V
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.

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References

1. Dean G. Duffy, Advanced Engineering Mathematics with MATLAB, CRC Press.
2. Potter, Goldberg & Edward, Advanced Engineering Mathematics, Oxford University Press.

Course Outcomes:

- Student will learn about the application of Partial differentiation in various fields like EMT and Physics.
- Student will learn about the basic application of Double and Triple integrals in various practical problems (Area, Surface and Volume) and further uses.
- Useful for the field of Control Systems, Circuit Analysis, Signal Processing.
- Student will learn about the basic application of differential equations in various practical problems and further uses.
- Student will learn about the basic application of differential equations in various practical problems and further uses.
- Useful for transforms and series type problems.

Mandsaur University

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.

Mandsaur University

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

Course Objectives:

- The course aims to provide exposure to problem-solving through programming.

- It aims to train the student to the basic concepts of the C-programming language.

- This course involves a lab component which is designed to give the student hands-on experience with the concepts.

- Illustrate the flowchart and design an algorithm for a given problem and to develop C programs using operators.

- Develop conditional and iterative statements to write C programs

Unit I
Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithms & flowcharts; Characteristics of a good program – accuracy, simplicity, robustness, portability, minimum resource & time requirement, modularization; Rules/conventions of coding, documentation, naming variables; Top down design; Bottom-up design.

Unit II
History of C; Structure of a C program, Data types; Constant & Variable; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case statement; Arrays; Formatted & unformatted I/O; Type modifiers & Storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

Unit III
Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, tail recursion, when to avoid recursion examples.

Unit IV
Special constructs – Break, continue, exit(), goto & labels; Pointers - & and * operators, pointer expression, pointer arithmetic, dynamic memory management functions like malloc(), calloc(), free(); String; Pointer to function, Function to parameter, Structure – basic, declaration, membership operator, pointer to structure, referential operator, Union – basic, declaration; Enumerated data type; Typedef;

Unit V
File handling and related functions; printf & scanf family; C preprocessor – basics, # Include,# define,# undef, conditional compilation directive like #if, #else, #endif, #ifdef and #ifndef; Variable argument list functions.

Reference Books:

1. Kerninghan & Richie: The C Programming language, PHI
2. Cooper Mullish: The Spirit of C, Jaico Publishing House, Delhi
3. Kanetkar Y: Let us C
4. Kanetkar Y: Pointers in C.

Course Outcomes:

- Identify situations where computational methods and computers would be useful.

- Given a computational problem, identify and abstractthe programming task involved.

- Approach the programming tasks using techniques learned and writepseudo-code.

- Choose the right data representation formats based on the requirements of the problem.

- Exercise files concept to show input and output of files in C

- Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables

- Exercise conditional and iterative statements to Write C programs

List of Experiments

1. Write a program for simple arithmetic operations?

2. Write a program for finding greatest number among two numbers?

3. Write a program for the greatest number among the three numbers?

4. Write a program for finding an even or odd number?

5. Write a program for finding leap year?

6. Write a program to swap two numbers using a third variable?

7. Write a program to swap two numbers without third variable?

8. Write a program for printing of table which is given by the user?

9. Write a program for printing of table with valid condition?

10. Write a program to print in * in the pattern pyramid?

11. Write a program to print binary number (0, 1) in pyramid pattern?

12. Write a program to find the largest number among two numbers using ternary operator?

13. Write a program to check given number is prime or not?

14. Write a program to generate the Fibonacci series?

15. Write a program for finding sum & average of array element?

16. Write a program to calculate the area of giving the shapes: 1. Circle 2. Triangle 3. Rectangle 4. Square using switch case statement?

17. Write a program to swap two numbers using a third variable to function?

18. Write a program to swap two numbers without using a third variable to function?

19. Write a program for triangle to the given pattern

```
    *
   * *
  * * *
 * * * *
* * * * *
```

20. Write a program for pyramid to the given pattern

```
   *
  * *
 * * *
* * * *
```

21. Write a program for finding reverse number which is given by the user?

22. Write a program for finding the sum of the given number?

23. Write a program to find even or odd number using functions?

24. Write a program to find largest and smallest element from an array?

25. Write a program for finding the sum of two matrices?

26. Write a program for finding the factorial number?

27. Write a program finding factorial using recursion?

28. Write a program finding power of a given number using recursion?

29. Write a program to print Fibonacci series using GOTO?

30. Write a program of special constructs using continue?

31. Write a program of special constructs using break?

32. Write a program to store information of student using structure?

33. Write a program to find the address of a variable using pointer variable?

34. Write a program finding power of a given number?

35. Write a program to connect two strings using string function?

36. Write a program to compare one string to another string using string function?

37. Write a program to calculate the length of string using string function?

38. Write a program to copy one string to another string using string function?

39. Write a program to copy one string to another string without string function?

40. Write a program to calculate the area of a circle using the macro function?

41. Write a program to include user defined header file in C Program.?

42. Write a program to check macros which is defined or not in the program?

43. Write a program to a read one character from the file using file function?

44. Write a program to a write one character to the file using file function?

45. Write a program to append one character to the file using file function?

46. Write a program to read numbers and characters from the file using file function?

47. Write a program to write numbers and characters to the file using file function?

48. Write a program to append numbers and characters to the file using file function?