Basic Sciences and Humanities

Autonomous Programme Structure (Revision-1)
F. Y. B. Tech. Sem-II
Computer Engg and Information Technology Programmes
## A. Y.: 2020-21 Onwards

Course Code	Course Title	Teaching Scheme Hours / Week			Examination Scheme			Marks	Credit
		F. Y. B. Tech. Second Semester							
20BS03	Multivariate Calculus	3	1	0	50	50	0	100	4
20BS04	Physics	3	0	0	50	50	0	100	3
20ES04	Engineering Graphics	2	1	0	50	50	0	100	3
20ES05	Fundamentals of Programming Language- 2	3	0	0	50	50	0	100	3
20ES06	Geo Informatics	3	0	0	50	50	0	100	3
20BS04L	Physics Lab	0	0	2	25	0	0	25	1
20ES04L	Engineering Graphics Lab	0	0	2	25	0	0	25	1
20ES05L	Fundamentals of Programming Language- 2 Lab	0	0	2	25	0	0	25	1
20ES06L	Geo Informatics Lab	0	0	2	25	0	0	25	1
Total		14	2	8	350	250	00	600	20
Grand Total		24			600			600	20

APPROVED BY
Secretary Governing Body
MKSSS's Cummins College of Engineering
For Women, Pune-411052

Karve Nagar,
Pune 411052.
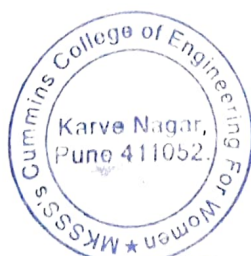
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Basic Sciences and Humanities

20BS03 Multivariate Calculus

Teaching Scheme:	**Examination Scheme:**
Lectures: 3 Hrs/Week	In-Semester: **50** Marks
Tutorial: 1 Hr/Week	End-Semester: **50** Marks
Number of Credits: 4	

Course Objectives:

1. To familiarize the students with techniques of differentiation and integration of multivariable function.

2. To equip the students to deal with advanced level of Mathematics, and applications that would be essential for their disciplines**.**

Course Outcomes:

After completion of this course, students will be able to

CO1: Calculate partial derivatives of multivariate functions.

CO2: Apply partial differentiation to applications like maxima minima, construction of linear model etc.

CO3: Solve double integral, triple integral over the region.

CO4: Determine physical parameters using double and triple integral.

Course Content:

Unit – I: Partial differentiation (09)

Function of several variables, partial derivatives, Geometrical interpretation of partial derivatives, chain rule, higher order partial derivatives, Euler's theorem.

Unit – II: Applications of partial differentiation. (07)

Maxima, minima and saddle points, second derivative test, constrained extrema and Lagrange's multipliers, applications in optimization of functions of several variables. Applications of first order partial derivatives in data fitting using the method of least squares.

Unit – III: Double integration (10)

Tracing of curves in Cartesian and Polar coordinate system, double integrals over a rectangle, double integrals over regions, change of order of integration, Introduction of Jacobian determinant for two variables, double integral in polar coordinates, The Gaussian integral.

Unit – IV: Triple integration (09)

Triple integral over a box, triple integrals by iterated integration, change of variables, Cylindrical and Spherical coordinates, The Jacobian determinant for three variables, evaluation of triple integral.

Unit – V: Applications of Double and Triple integration (07)

Applications of double integral and triple integral: Area of plane Lamina, mass of plane lamina, surface area, volume, mass of solid.

Text Books:

1. B. V. Ramana, **'Higher Engineering Mathematics',** *Tata McGraw Hill Publications,* (2007).

2. B.S. Grewal, **'Higher engineering Mathematics'**, *Khanna publishers, (*40th edition), (2008).

3. Hughes-Hallett et al., '**Calculus - Single and Multivariable',** *John-Wiley and Sons,* (3rd Edition), (2003).

4. Maurice Weir, Joel Hass, '**Thomas' Calculus'**, *Pearson India*, (13th edition), (2016).

Reference Books:

1. J. E. Marsden, A. J. Tromba and A. Weinstein, '**Basic Multivariable Calculus'**, *Springer,* (3rd edition), (1993).

2. G. B. Thomas and R. L. Finney, '**Calculus and Analytic geometry'**, *Pearson, Reprint* (9th Edition), (2002).

3. Sudhir Ghorpade, Balmohan Limaye, '**A Course in Multivariable Calculus and Analysis'**, (Undergraduate Text in Mathematics), *Springer* (2009).

4. Dennis G. Zill, Warren S. Wright**, 'Multivariable Calculus**, **Early Transcendental'**, *Jones & Bartlett Publisher* (4th edition), (2009).

20BS04 Physics

Teaching Scheme	**Examination Scheme**
Lecture 3 Hrs per week	In – SEM Exam: 50 Marks
Number of Credits: 3	End – SEM Exam: 50 Marks

Course Objective:

To introduce undergraduate students of technology to the principles, notions, basic physical ideas, mathematical relations and applications of physical optics, thermodynamics, quantum physics, solid state physics and the properties of nano as well as bulk materials.

Course Outcomes:

By taking this course, the learner will be able to –

CO – 1: **Apply** the generalized Coulomb law and the law of Electromagnetic Radiation to determine the electric fields due to the stationary and the accelerated charges.

CO – 2: Apply the laws of Physical Optics to determine intensity distributions of interference – diffraction patterns, and to identify polarization-types.

CO – 3: Apply the principles of Statistical Physics to determine the thermal distribution of matter in different energy states and the thermal response of engineering materials.

CO – 4: Justify the selection of — quantum probability rules and single qubit logic gates.

CO – 5: Differentiate between the physical properties of 'nano' materials and of their 'bulk' counterparts.

Title of Module, Brief Description of Course Contents and No. of Lectures

Module – 1: Electromagnetic Radiation and Interference: 8 Lectures

Expression for the electric field beyond Coulomb's law; Two dipole radiators and Physics of interference; Mathematical treatment (propagating waves, rotating vectors, complex functions)

Module – 2: Diffraction and Polarization: **8 Lectures**

The resultant amplitude due to *n* equal oscillators; Diffraction Grating; The electric vector of light; Types of Polarized Light; Birefringence; Polarizers

Module – 3: Statistical Mechanics and Thermodynamics: **8 Lectures**

Principles of Statistical Mechanics (Distribution of particles in thermal equilibrium); Laws of Thermodynamics (Carnot Cycle, Entropy, Clausius-Clapeyron Equation); Information Entropy

Module – 4: Quantum Physics: **9 Lectures**

Laws of combining probability amplitudes; The Hamiltonian matrix & Schrödinger equation; Two-state systems: Pauli spin matrices & Photon polarization states; Single Qubit Logic Gates

Module – 5: Properties of Solids: **9 Lectures**

Band Theory; Electrical (conductivity, resistivity), Magnetic (dia-para-ferro), Optical (absorbance, reflectance, transmittance), Mechanical (hardness, elasticity) properties (of 'bulk' & 'nano' solids)

Text Book:

R. P. Feynman, R. B. Leighton and M. Sands, **'The Feynman Lectures on Physics'**, *Pearson Education* (2006)

Reference Books:

1. **J. Walker, D. Halliday, R, Resnick, 'Principles of Physics', Wiley** *Student Edition* **(10th Edition)**

2. **H. Young and Roger Freedman, 'University Physics', Pearson Addison Wesley (12th Edition)**

20ES04 Engineering Graphics

Teaching Scheme   **Examination Scheme:**

Theory: 2 Hrs/week   In semester: 50 Marks
Tutorial: 1 Hr/week   End semester: 50 Marks
Credits: 3

Course Objectives:

1   To develop the visualization and interpretation skills for the physical objects.
2   To provide the basic knowledge and develop the skills for creating 2 D drawings.
3   To provide the basic knowledge and develop the skills for creating Isometric views.
4   To familiarize about the development of solids.
5   To familiarize the construction and applications of Engineering Curves.

Course Outcomes:

After completing the course students will be able to draw
CO1   Orthographic and sectional orthographic projections
of an objectCO2   Isometric views of the given object
CO3   Development of surfaces of the given object
CO4   Engineering curves by applying the given method

Unit – 1

Introduction   Layout and sizes of drawing sheets, drawing instruments, types of lines
used in drawing practice, dimensioning systems, representation of tolerances, standard
codes by B.I.S (SP-46). (Not for Examination**)**   **(01)**

Unit – 2

Orthographic Projection Theory of projections, methods of obtaining orthographic
views, sectionalorthographic projections, Missing views.   **(08)**

Unit – 3

Isometric Views Isometric axes, Isometric scale, isometric projections and views,
construction ofisometric view from given orthographic views**.**   **(08)**

Unit – 4

Development of Solids Parallel line development, radial line development, methods to transferpoints for development of prisms, pyramids, cylinder and cone.   **(05)**

Unit – 5

Engineering Curves   Construction of ellipse, parabola, hyperbola, involute, cycloid, Archimedeanspiral, helix on cone and cylinder.   **(06)**

Text Books:

1. N. D. Bhatt and V. M. Panchal,'Engineering drawing, plane and solid geometry',Charotor Publication House.
2. R. K. Dhawan,'A text book of Engineering Drawing', Pearson Education Inc.
3. P.S. Gill, 'Engineering Graphics', Kataria and sons Publications.
4. M. L. Dabhade, 'Engineering Graphics', Vision Publications.

Reference Books:

1.   Warren J. Luzzader, 'Fundamentals of Engineering Drawing', Prentice Hall of India,New Delhi.
2.   Fredderock E. Giesecke, Alva Mitchell, 'Principles of Engineering Graphics',Maxwell

   Dhananjay A. Jolhe, 'Engineering Drawing', Tata McGrawHill Publishing Co. Ltd.

20ES05 Fundamentals of Programming Language-2

Teaching Scheme: **Examination Scheme:**
Lecture: 3 Hr/week   **In-Sem: 50 Marks**
                                                         End-Sem: 50 Marks
                                                         Credits: 3

Course Objectives:

To facilitate the learners:
    1)To understand and apply object-oriented principles for application development.
    2)To develop programming applications using Java.
    3)To make use of class, object, constructor.
    4)Learn programming construct of Java.

Course Outcome:

By taking this course, the learner will be able to:
    1)   Develop basic object oriented program using class, object and constructor.

    2)   Differentiate between different types of polymorphism

    3)   Demonstrate object-oriented programming concepts of exceptions using inbuilt classes and   user-defined exceptions

    4)   Make use of principles of object-oriented programming language Java to solve given problem

Unit-I : Introduction to Object Oriented Programming Paradigm   **(5)**

Role and need of programming languages, characteristics of a good programming language, introduction to various programming paradigms. Need of object-oriented paradigm, basic concepts of object oriented programming (OOP), benefits of OOP. General characteristics for OOP, Object oriented concepts: Class, Object, abstraction, encapsulation, polymorphism, and inheritance.
Illustration through real life examples and use cases

Unit-II : Introduction to Java Programming Language   **(6)**

History of Java, Features of Java, Java and Internet, Java virtual machine, First java Program, Command line arguments, Java Programming elements: Data types, Control Structures, Encapsulation, Abstraction and Polymorphism, Class, object, constructor
Illustration through real life examples and use cases

Unit-III : Polymorphism (5)

This keyword, static method, function overloading, argument passing, constructor overloading.
String and Array's in Java, Java Collection Framework – Arraylist, HashSet
Illustration through real life examples and use cases

Unit-IV: Inheritance (6)

Types of inheritance, base class and derived class, access specifiers, method overriding.
Illustration through real life examples and use cases

Unit-V: Abstract Class, Interfaces and Packages (6)

Abstract class, interfaces, run time polymorphism. Creating and importing packages.
Illustration through real life examples and use cases

Unit-VI: Exception Handling in Java (5)

Errors and Exceptions, Types of exceptions, try, catch, throw, throws and finally keywords, Build-in exceptions, creating and using custom exceptions.
Illustration through real life examples and use cases

Text Books:
1) Herbert Schilt, "JAVA Complete Reference", Tata McGraw Hill, (9thEdition), (2014)
2) Eckel B., "Thinking in Java", Pearson Education, (3rd Edition)

Reference Books:
1. Kathy Sierra & Bert Bates, "Head First Java", Oreilly publication,(2nd Edition) (2009)
2. Barry Burd "Beginning Programming with Java for Dummies", Oreilly publication, (5th Edition) (2017)
3. Paul Deital and Harvey Deital,"Java How to program", Prentice Hall Publication,(9th Edition) (2011)

20ES06 GEO-INFORMATICS

Teaching Scheme: **Examination Scheme:**

Lectures: 3 Hrs/Week   In-Semester   : 50Marks

Credits: 3   End-Semester : 50Marks

Course Objectives:

1. To introduce the science and technologies involved in Remote sensing
2. To understand the application of GIS in various fields
3. To explain the earth and mapping principles
4. To learn basics about the Geodata & GIS software

Course Outcomes:

After completion of course, students will be able to

CO1: **Analyse** the parameters affecting visual interpretation of physical features of

an image

CO2: **Justify** use of various types of maps applicable in different scenarios

CO3: **Identify** use of components of GIS for spatial and attribute data relationship

CO4: **Apply** GPS technologies to real world examples using an understanding of

GPS theory

CO5: **Relate** GIS and remote sensing technologies with maps, images and apps

Unit – I: Principles of remote sensing   **(05)**

Concept of Remote Sensing, Working Principle, Types of remote sensing , Platforms of remote sensing , Output of remote sensing – photography, satellite imaginary and visual interpretation data

Unit – II: Data interpretation method in remote sensing (05)

Types of data, Visual interpretation of images-Natural and false colour composites, Image resolution, Limitations, Applications

Unit – III: Photogrammetry & Cartography (06)

Fundamentals of aerial photography, satellite images, virtual images, Image processing, Digitalization of maps

Cartography: Conventional Maps, Definition, Map Basics Elements/components of map, Map Scale, Large & Small Scale maps, Thematic maps , Coordinate system , Polar & Cartesian (Latitude-Longitude & x, y coordinates)

Unit – IV: Geographical information system (GIS) & Database management for geoinformatics (08)

GIS : Concept & definition of GIS (based on components, based on functions), GIS vs. Conventional Mapping, Components of GIS, Working Principle of GIS, Strengths of GIS, Geoinformatics Vs. GIS

Database management for geoinformatics : GIS Data and Data Models, Concept of Query, Concept of Spatial Analysis

Unit – V: Global Positioning System (GPS) (05)

History of GPS, Types of GPS, Working principle, Applications of GPS, Case study

Unit – VI: Application of geoinformatics   (07)

Case studies to be used for demonstration-

Navigational services : available on phones (travel direction from A to B), Vehicle tracking system / Fleet management : Cabs, City buses, Trains, Aircrafts, City Planning (urban sprawl, master planning) , Solid waste management (identifying location for waste disposal site, route optimization of waste collection, online/offline monitoring of waste collection); Identifying suitable location for business outlet (Pizza hut, Teco bell, General Motors), GIS for location based services (courier & other home delivery services) – Fedex, DHL, Telecom sector uses GIS (planning of OFC network, identifying suitable location for mobile towers, marketing, operations), Disaster Management using GIS (modelling & simulation tools – through videos)

Text Books:

1. **Information Systems**, *Prentice-Hall of India, New Delhi, 2006.*
2. Ian Heywood, Sarah Cornelius and Steve Carver -**An Introduction to Geographical Information Systems-** *(4th Edition) by 2012*
3. A.M. Chandra, S.K. Ghosh,- "**Remote Sensing and Geographical Information System**", *1 st Edition, Narosa Publishing house, 2007.*

Reference Books:

1. 1. Peter A. Burrough and Rachael A. Mc. Donnell- **Principles of Geographical Information** System, *Oxford University Press Inc., New York, 2004.*
2. 2. Ian Heywood, Sarah Cornelivs and Steve Carver, **An Introduction to Geographical Information System**, *Pearson Education Pvt .Ltd., New Delhi, 2007.*
3. Arthur H. Robinson et al. **Elements of Cartography**, *V Edition, John Wiley & Sons, New Delhi, 2002.*
4. Misra, R.P.and Ramesh, A**, Fundamentals of Cartography concept-***Publishing Company, New Delhi, 2002.*
5. Lillesand M. Thomas and Ralph W.Kiefer **- Remote Sensing and Image Interpretation**

20BS04L Physics Laboratory

Teaching Scheme	**Examination Scheme**
2 hours per week	In-SEM Exam : Term work (25 M)
Number of Credits : 1	End-SEM Exam : NA

Course Objectives :

The objective of the Physics Lab course is two-fold :

To inculcate experimental skills, and

To demonstrate the interplay between theoretical & experimental physics.

Course outcomes (CO) for Physics Lab - 20BS04L

By taking this course, the students will be able to —

CO - 1 : Record the observations as per the least counts of measuring instruments and Perform necessary calculations.

CO - 2 : Compare the experimental findings with the corresponding theoretical physics models.

CO - 3 : Determine errors in experimental findings and Analyze their sources and causes.

CO - 4 : Reach the conclusions pertaining to the observed behaviour of physical systems.

List of Experiments :

Physical Optics Experiments :

I. Polarization of light, II. Diffraction Grating : Emission Spectra, III. Michelson Interferometer, and IV. Newton's Rings.

Electromagnetism & Heat Experiments :

I. Dia-Para-Ferromagnetism : Magnetic Permeability, II. Faraday's Law, and III. Hysteresis (B-H) Curve of Iron core, IV : Specific Heat of solid materials.

Modern Physics Experiments :

I. Planck's Constant, II. I - V Characteristic of LED, III. Hall Effect, and IV. Zeeman Effect.

20ES04L Engineering Graphics Lab

Teaching Scheme   Examination Scheme

Practical: 2 Hrs/week   In Semester: 25 marks

Credits: 1

Course Objectives:

To familiarize student about1

1. Advantages of using software for Engineering drawing

2. 2-D drafting using a software

3. 3-D modeling using a software

4. 3-D printing technology

Course Outcomes:

After completing the course using a software package students will be able to

CO1: Draw orthographic projections of a given component

CO2: Draw Isometric projections of a given component

CO3: Draw development of solids

CO4: Draw free hand sketches of the machine elements

Part I

Introduction to 2-D Drafting using a drafting software   **(20 Hrs.)**

- Orthographic Projections
- Isometric Projections
- Development of surfaces of solids
- Free hand sketching of standard machine elements

Part II

Demonstration of 3-D Modeling and 3-D Printing   **(08 Hrs.)**

Creating a 3-D model of a simple component using a solid modeling software and manufacture using arapid prototyping technique.

Text Books:

N. D. Bhatt and V. M. Panchal,**'***Engineering drawing, plane and solid geometry'***,Charotor Publication House.

M.L.Dabhade, **'Engineering Graphics'**, *Vision Publications.*

Bethune, J.D., "*Engineering Graphics with AutoCAD 2013*", PHI Learning Private Limited, Delhi, 2013

20ES05L Fundamentals of Programming Language Lab-2

Teaching Scheme: **Examination Scheme:**

Practical: 2 Hr/week   In-Sem: 25 Marks

Credits: 1

Course Objectives:

To facilitate the learners:

1) To explore the principles of object oriented programming
2) To apply object oriented programming concept for developing applications using Java
3) To make use of class, object and constructor for coding basic object oriented program
4) To handle built-in and user defined exceptions

Course Outcome:

By taking this course, the learner will be able to:

1) Develop basic object oriented program using class, object and constructor
2) Develop readable and reusable code using inheritance and polymorphism
3) Make use of exceptions using inbuilt classes and user defined exceptions
4) Develop application using object oriented programming language Java to solve given problem

A large part of ESFL205 lab would be for understanding the basic concepts of object-oriented programming and implementation of some real-world simple applications. Assignment statements are in brief and should be implemented in JAVA programming language. Faculty members are encouraged to expand problem statements with variations. Assignments can be framed and expanded in such a way that it explores concepts, language constructs, logic of solution and simple application. Students will be encouraged to solve open problems in different domains. Faculty will appropriately adopt assignments on similar lines as the examples shown here.

Example List of assignments:-

Group A: Assignment to write program in OO language to understand concept of data abstraction and encapsulation

1. Write a MyDate class which has attributes as day, month and year. Create five objects of MyDate and display them.
2. Design a user defined abstract data type 'Complex' in Java. Write a program to perform arithmetic operations of two complex numbers.
   A complex number has a real part and an imaginary part.

a) Given the values of real part and imaginary part of a complex number, the magnitude of the complex number can be calculated as square root of the sum of squares of real part and the imaginary part.

b) The argument of the complex number can be calculated as tan inverse of ratio of imaginary part(numerator) and real part(denominator)

c) The complex number can be added to another complex number and the answer of the addition is a complex number. When one adds two complex numbers, the real parts of each of the complex numbers is added which becomes a real part of the answer and imaginary part of each complex number is added together which becomes imaginary part of the answer. Both these results are real and imaginary parts for a complex number which is the answer of the addition complex conjugate of the complex number can be calculated by negating the imaginary part of the complex number

d) The complex number can be subtracted from another complex number and the answer of the subtraction is a complex number.

e) When one subtracts a complex number from the other, the real part one complex number is subtracted from the other and the result becomes a real part of the answer and imaginary part of one complex number is number is subtracted from the other and the result of subtraction becomes imaginary part of the answer. Both these results are real and imaginary parts for a complex number which is the answer of the subtraction.

3. Create a student result database in Java. Calculate the grades of students. Decide criteria for best student and short-list students who satisfy the criteria.

a) A student has a roll No, name, marks in five courses and a grade. A student list has many students. If a student has grade equal or beyond 8, he is considered as a top band student.

b) Create at least ten students. From these, find all such students which satisfy the criteria of top band student. Create a list of such students and display the students in the list.

4. A circle has a radius. Its area can be calculated. The area is a double number. Its perimeter can be calculated as $2\pi r$. The perimeter is a double number. Given two circles one can find out which is large and which is small.
Create two circles c1 and c2 with radius as 10 and 7 respectively. Calculate the area and perimeter of each. Compare two circles with each other and display which is large and which is small.

5. Write a JAVA program to perform String operations using String/String Buffer class

a) Write a program that reads a word and then prints the first character, the last character, and the characters in the middle. For example, if the input is Cummins, the program prints Cummins.

b) Write a program that reads a name (such as Ranbeer Rishi Kapoor) and then prints a monogram consisting of the initial letters of the first, middle, and last name (such as RRK).

Group B: Assignment to write program in OO language to understand concept of class inheritance and polymorphism.

1. Implement Java program to calculate area and perimeter of various shapes-circle, triangle and rectangle.

2. Create an application like book shop and maintain the inventory of books that are being sold at the shop

3. Find appropriate class hierarchy, polymorphic behavior in applications like banking and implement it.

4. Model the HRD application using the concepts of inheritance, interface, polymorphism

5. A company has many employees. An employee has employee Id, basic salary, house rent allowance, dearness allowance, profession tax and total salary. An employee has an address. The address has apartment number, apartment name, road and PIN code.

   The total salary of an employee is the summation of basic salary, house rent allowance which is 20 percent of basic salary, dearness allowance which is 45 percent of basic salary. The take home salary is calculated after deducting profession tax from which is 7 percent of basic salary from the total salary.
   When an employee is appointed, he is assigned with an employee Id and basic salary. One can ask for total salary of the employee and take-home salary of the employee.
   Identify a class/classes from the above statement, identify the attributes, the data types, the behaviour. Test your program for ten employees
   Display all the details of the employees as per id and as per pin code.
   Display take home salary for all the employees, display the tax to be deducted across all employees.

6. Reading material has title and price. A book is a reading material. It has ISBN number. A magazine is a reading material, it has month of issue. A CD is a reading material, it has duration in minutes. Represent the above description as a generalization, specialization tree. Identify the parent class, its attributes, child class and their attributes. Write all of them clearly.

7. A vehicle has engine no and chassis number. It can be locked, unlocked. Every vehicle is movable (interface). It can be started, stopped, turned, accelerated, turned, and decelerated. A car is a vehicle. It has steering. An airplane is a vehicle. It has wings. A boat is a vehicle. It has propeller.

Group C: Assignment to write program in OO language to understand concept of exception handling

1) Write a program to catch various in-built exceptions (try, catch and finally block)

2) Create User defined exception to check the specific conditions for systems like recruitment etc and throw the exception if the criterion does not met in Java.

3) Consider student data consist of fields such as roll number, name, and marks of various subjects. Write a program using inbuilt and user defined exceptions to avoid invalid entry.

20ES06L GEO-INFORMATICS Lab

Teaching Scheme: **Examination Scheme:**

Practical : 2 Hr/Week   Term Work: 25 Marks

Credit1: 1

Course Objectives:

1. To introduce students basics of spatial data and its creation.

2. To learn basics about the Geodata & GIS software.

Course Outcomes:

After completion of course, students will be able to

CO1: **Interpret** satellite images and their characteristics with the use of software features

CO2: **Apply** basic data visualization concepts for identification of physical features

CO3: **Use software to interpret** aspatial attribute data and relate it with spatial data

CO4: **Use software to interpret** vector layer and relate it with attribute data

List of Experiments

1) Exploring Digital Map
2) Study and observations of paper map and digital map
3) Measurement of area using Digital planimeter.
4) Study of Layers, Display Controls, Locating a place

5) Adding place marks - Saving KMZ/ KML files

6) Study of ground profile between given two points

7) Visual Interpretation of multispectral image

8) Creating csv file (attribute data) and importing in GIS platform

9) Understanding QGIS interface

10) Working with vector data – Point, Line, Polygon