1ST SEMESTER BSC. ITM			
	SUB CODE		SUB NAME
MAJOR	CORE-I	PAPER-1	Data Structure Using C
	CORE-I	PAPER-2	Operating System
MINOR	CORE-II		Calculus & Analytic Geometry
	MULTI DISCIPLINARY		Physics
	AEC		Odia
	VAC		Environmental Studies And Disaster Management

Semester-I

Core I (PAPER-1) Data structure Using C

Course Objectives:

The course is designed to provide complete knowledge of C language and its use in data structure. Students will be able to develop logics which will help them to write programs C. Also, by learning the basic programming constructs they can easily switch over to any other programming languages in future. It strengthens the ability of the students to identify and apply the suitable data structure for the given real-world problems. It enables them to gain knowledge in practical applications of data structures.

Course Outcome:
On completion of this course, the students will be able to

- Learn various elements of C language including data types, Operators, expressions, decision making implementation in programs.
- Write complex programs using arrays, structure, pointer & functions.
- Know the concept of stack, queue, linked list to represent data in various ways to solve real time applications.
- Search and sort the data using various searching and sorting methods.

Unit-I:

Introduction: Introduction to Programming Language, Character sets, Keywords & Identifiers, Constants, Variables, Input and Output statements (Formatted and Unformatted), Data types and modifiers, Types of Operators, Precedence and associativity of operators.
Control statements (Simple IF Statement, IF…ELSE, Nested IF…ELSE, IF...ELSE...IF Ladder), Switch Statement. Looping: Do…WHILE, WHILE and FOR Loop. Array Concept (1D and 2D Array).
Outcome: Students will able to understand the basics of C language to write programs and to store the data using array.

Unit-II:
Pointers and its types, Pointer arithmetic, Array of Pointers, Pointer to pointer. Storage classes. Functions: Types, Function Calls, Recursion, String, Structure, Self-Referential Structure, Array of Structures, Union.

Outcome: Students will be able to understand the use of Pointers in data structures, can learn the reusability of codes through functions, can be able to write complex programs in C.

Unit-III:

Dynamic Memory allocation (calloc, malloc, realloc &, free). **Stack:** Definition, Representation, Stack operations, Applications (Infix– Prefix– Postfix Conversion & Evaluation). **Queues:** Definition, Representation, queue operations & Applications. **Linked Lists:** Definition, Types (Single and Doubly Linked List), representation, and Linked list insertion and deletion operations.
Outcome: Students will be aware of data arrangements and accessing those data for various real-time applications.

Unit-IV:

Trees: Tree Terminologies, Binary Tree, Representation, Binary search Tree, Traversing BST, Operations on BST, Heap Tree (max-Heap & Min-Heap). Sorting: Bubble Sort, Insertion Sort, Selection Sort, Quick Sort. Searching: Linear Search, Binary Search.
Outcome: Students will be able to search and sort the data and will come to know about the arrangements of data in a hierarchical manner.

Text Books:

- *E. Balagurusamy, "Programming in ANSIC",4/e, (TMH)*
- *Classic Data Structure, P. Samanta, PHI,2/ed*

Reference Books:

- *B. Kernighan &Dennis Ritchie, "The C Programming Language",2/ePHI*
- *Paul Deitel, Harvey Deitel, "C: How to Program",8/prentice Hall.*
- *P.C. Sethi,P.K. Behera,"Programming using C",Kalyani Publisher,Ludhiana*
- *Ellis Horowitz, Sartaj Sahni, "Fundamentals of Data Structures", Galgotia Publications, 2000.*
- *Sastry C.V.,Nayak , R,Ch. Rajaramesh, Data Structure & Algorithms, I.K. International Publishing House Pvt .Ltd, New Delhi.*

Practical

Tutorial C & Data Structure Lab Write C'

- Basic programs in C language.
- Programs using conditional statements (if. else, else if ladder, nested if, switch case)
- Programs using various loops
- Programs using 1D, 2D and multidimensional array.
- Program based on pointers.
- Programs using functions, recursion and strings.
- Programs based on structure and union.
- Programs on command line arguments.
- To search an element and print the total time of occurrence in the array.
- To delete all occurrence of an element in an array.
- Array implementation of Stack.
- Array implementation of Linear Queue.
- To implement linear linked list and perform different operations such as node insert and delete, search of an item, reverse the list.
- To implement double linked list and perform different operations such as node insert and delete.
- Linked list implementation of Stack.
- Linked list implementation of Queue.
- To implement a Binary Search Tree.
- To perform binary search operation.
- Bubble sort, Insertion sort, Selection sort, Quicksort.

Core-I (PAPER-2)

Operating Systems

Course Objectives:

This course has two components: a theory component to teach you the concepts and principles that underlie modern operating systems, and a practice component to relate theoretical principles with operating system implementation. In the theory component, you will learn about processes and processor management, concurrency and synchronization, memory management schemes, file system and secondary storage management, security and protection, etc.

Course Outcome: On completion of this course, students will be able to

- Understand the different services provided by Operating System at different level.
- Learn real life applications of Operating System in every field.
- Understand the use of different process scheduling algorithm and synchronization techniques to avoid deadlock.
- Learn different memory management techniques like paging, segmentation and demand paging etc.

Unit-I:

Introduction to Operating System, System Structures: Operating system services, system calls, system programs, Operating system design and implementation, Operating system structure.
Outcome: Students will be able to know the basic components and services of operating system.

Unit-II:

Process Management: Process Concept, Operations on processes, Process scheduling and algorithms, Inter-process Communication, Concepts on Thread and Process, Deadlocks: Deadlock detection, deadlock prevention and deadlock avoidance fundamentals.
Outcome: Students will be able to discuss various scheduling algorithms and know the concept of deadlock.

Unit-III:
Memory Management Strategies: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory Management: Concepts, implementation (Demand Paging), Page Replacement, Thrashing.
Outcome: Students will be able to comprehend how an operating system virtualizes CPU and memory.

Unit-IV:

Storage Management: File System concept, Access Methods, File System Mounting, File Sharing and File Protection, Implementing File Systems, Kernel I/O Systems.
Outcome: Students will be able to understand the functionality of file systems.

Text Books:

- *Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, and Greg Gagne, Eighth Edition, WileyStudentEdition2009.*

Reference Books:

- *Modern Operating System, Tanenbaum, Pearson,4/Ed.2014.*
- *Richard F Ashley, Linux with Operating System Concepts, Chapman and Hall/CRC Published, August 26, 2014.*
- *Richard Blum, Linux Command Line and Shell Scripting Bible, O' Reilly.*

Core II- Operating Systems Lab

- Write a program (using *fork()* and/or *exec()* commands) where parent and child execute: same program, same code. same program, different code. Before terminating, the parent waits for the child to finish its task.
- Write a program to report behavior of Linux kernel including kernel version, CPU type and model. (CPU information)
- Write a program to report behavior of Linux kernel including information on configured memory, amount of free and used memory. (memory information)
- Write a program to print file details including owner access permissions, file access time, where file name is given as argument.
- Write a program to copy files using system calls.
- Write a program using C to implement FCFS scheduling algorithm.
- Write a program using C to implement Round Robin scheduling algorithm.
- Write a program using C to implement SJF scheduling algorithm.
- Write a program using C to implement non-preemptive priority-based scheduling algorithm.
- Write a program using C to implement preemptive priority-based scheduling algorithm.
- Write a program using C to implement SRTF scheduling algorithm.
- Write a program using C to implement first-fit, best-fit and worst-fit allocation strategies.

MINOR Core I

Calculus & Analytic Geometry

Course Objective:

The main emphasis of this course is to equip the student with necessary analytic and technical skills to handle problems of mathematical nature as well as practical problems. More precisely, main target of this course is to explore the different tools for higher order derivatives to plot the various curves and to solve the problems associated with differentiation and integration of vector functions.

Learning Outcomes:

After completing the course the student will be able to

- Trace a curve and find asymptotes.
- Talculate integrals of typical type using reduction formulae, etc.
- Calculate arc length, surface of revolution and know about conics
- Calculate triple products, gradient divergence, curl, etc.

Unit I

Hyperbolic functions, higher order derivatives, Leibnitz rule and its applications to problems of the type $e^{ax+b}sinx$, $e^{ax+b}cosx$, $(ax+b)^n sinx$, $(ax+b)^n cosx$, concavity and inflection points, asymptotes, curve tracing in Cartesian coordinates, tracing in polar coordinates of standard curves, L'Hospital rule, application in business, economics and life sciences.

Unit II

Riemann integration as a limit of sum, integration by parts, reduction formulae, derivations and illustrations of reduction formulae of the type $\int sin^n x dx$,$\int cos^n x dx$,$\int tan^n x dx$,$\int sec^n x dx$, $\int (logx)^n dx$,$\int sin^n x cos^n x dx$, definite integral, integration by substitution.

Unit III

Volumes by slicing, disks and washers methods, volumes by cylindrical shells, parametric equations, parameterizing a curve, arc length, arc length of parametric curves, area of surface of revolution, techniques of sketching conics, reflection properties of conics, rotation of axes and second degree equations, classification into conics using the discriminant, polar equations of conics.

Unit IV

Triple product, introduction to vector functions, operations with vector-valued functions, limits and continuity of vector functions, differentiation, partial differentiation, div, curl and integration of vector functions, tangent and normal components of acceleration.

Books Recommended:

- ✓ *H. Anton, I. Bivens and S. Davis: Calculus,10th Ed., John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002.*
- ✓ *Shanti Narayan, P. K. Mittal: Differential Calculus, S. Chand, 2014.*
- ✓ *R. J. T Bell: An elementary Treatise on coordinate geometry, MacMillan and Company Limited, 2005.*

Books for Reference:

- ✓ *James Stewart: Single Variable Calculus, Early Transcendental, 8th edition, Cengage Learning, 2016.*
- ✓ *G.B. Thomas and R. L. Finney: Calculus, 9th Ed., Pearson Education, Delhi, 2005.*
- ✓ *M. J. Strauss, G. L. Bradley and K. J. Smith: Calculus, 3rd edition, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi, 2007.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

MULTI DISCIPLINARY

Physics

Course objective:

The course has objectives to provide Basic knowledge of Physics with a special reference to electronics part. Students will be able to know the fundamentals of electronics devices.

Course Outcome:

After completion of this course, the students will be able to

- Understand the basic of electric current as they have to deal with electronic devices.
- Get idea regarding semiconductor and components like diode.
- Know the fundamentals of transistor

UNIT-I

Electric Current, Electric Currents in Conductors, Ohm's law, Drift of Electrons and the Origin of Resistivity, Limitations of Ohm's Law, Resistivity of Various Materials, Temperature Dependence of Resistivity, Electrical Energy, Power, Cells, emf, Internal Resistance, Cells in Series and in Parallel, Kirchhoff's Rules, Wheatstone Bridge

UNIT-II

Semiconductor: Bonds in Semiconductors, Crystals, Commonly Used Semiconductors, Energy Band Description of Semi- conductors, Effect of Temperature on Semi-conductors, Hole Current, Intrinsic & Extrinsic Semiconductor, n-type & P-Type Semiconductor, Charge on n- type and p-type Semiconductors, Majority and Minority, Carriers.

UNIT-III

Properties of pn-Junction, Applying D.C. Voltage across pn- Junction or Biasing a pn-Junction, Current Flow in a Forward Biased pn-Junction, Volt-Ampere Characteristics of pn Junction, Important Terms, Limitations in the Operating Conditions of pn- Junction.

UNIT-IV

Transistor, Some Facts about the Transistor, Transistor Symbols, Transistor Connections, Characteristics of Common Base Connection, Measurement of Leakage Current, Common Collector Connection, Commonly Used Transistor Connection, Transistor Load Line Analysis, Practical Way of Drawing CE Circuit, Performance of Transistor, Amplifier, Power Rating of Transistor, Semiconductor Devices Numbering System

ପ୍ରଥମ ପର୍ଯ୍ୟାୟ(SEMESTER-I)

ସାମର୍ଥ୍ୟବର୍ଦ୍ଧକ ପାଠ୍ୟକ୍ରମ

Ability Enhancement Course (AEC)

ପରିଶୁଦ୍ଧ ଭାଷା ଓ ଲିଖନ ଧାରା

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ସାହିତ୍ୟର ଲିଖନ ଓ ଅଧ୍ୟୟନ କ୍ଷେତ୍ରରେ ଭାଷାର ପରିଶୁଦ୍ଧତା ନିତାନ୍ତ ଆବଶ୍ୟକ । ସାହିତ୍ୟକର୍ମ ବ୍ୟତିରେକ ବିଭିନ୍ନକ୍ଷେତ୍ରରେ ନିର୍ଭୁଲଭାଷା ବ୍ୟବହାର ହେବା ବାଞ୍ଛନୀୟ । ଭାରତର ସମ୍ବିଧାନସ୍ୱୀକୃତ ଭାଷାମାନଙ୍କ ମଧ୍ୟରେ ଓଡ଼ିଆଭାଷାର ସ୍ଥାନ ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ । ଶିକ୍ଷାର୍ଥୀମାନେ ନିର୍ଭୁଲ ଭାଷା ପ୍ରୟୋଗକ୍ଷେତ୍ରରେ ଭିପରି ସମର୍ଥ ହେବେ, ସେଥିନିମିତ୍ତ ଏହି ପାଠ୍ୟପତ୍ରଟି ପରିକଳ୍ପିତ । ବିଭିନ୍ନ ପ୍ରତିଯୋଗିତାମୂଳକ ତଥା ପ୍ରାଣାସଙ୍ଗିକ ସେବାମୂଳକ ନିଯୁକ୍ତ ହେବାପାଇଁ ସମ୍ମୁଖୀନ ହେଉଥିବା ପରୀକ୍ଷାନିମିତ୍ତ ମଧ୍ୟ ଏହା ଶିକ୍ଷାର୍ଥୀଙ୍କୁ ସାହାଯ୍ୟ କରିବ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ: କ) ଶବ୍ଦ ଗଠନରେ ଶୁଦ୍ଧତା
ଖ) ଚୂଡ଼ିର ଅର୍ଥ ଅବଗତି
ଗ) ଚୂଡ଼ିର ପ୍ରୟୋଗବିଧି ଶିକ୍ଷା

୨ୟ ଏକକ: କ) ବାକ୍ୟର ଗଠନରୀତି ଶିକ୍ଷା
ଖ) ବିବିଧ ପ୍ରକାର ବାକ୍ୟ ସମ୍ପର୍କରେ ଧାରଣା
ଗ) ନିର୍ଭୁଲ ବାକ୍ୟଲିଖନ ବିଦ୍ୟା

୩ୟ ଏକକ: କ) ବୃହତ୍ ଅନୁଚ୍ଛେଦକୁ ସଂକ୍ଷିପ୍ତ କରିବାର କୌଶଳ
ଖ) ବିଷୟଗତ ଶୀର୍ଷକ ନିର୍ଦ୍ଧାରଣ କଳା
ଗ) ଅନୁଚ୍ଛେଦରୁ ବିଭିନ୍ନ ପ୍ରଶ୍ନର ଉତ୍ତର ପ୍ରଦାନ

୪ର୍ଥ ଏକକ: କ) ପତ୍ରଲିଖନ ଜ୍ଞାନ
ଖ) ଫିଚର୍ ପ୍ରସ୍ତୁତି
ଗ) ନିର୍ଭୁଲ ପତ୍ରଲିଖନ ଓ ବିଜ୍ଞାପନ ପ୍ରସ୍ତୁତି କଳା

ପାଠ୍ୟ ବିଷୟ

ପ୍ରଥମ ଏକକ: (କ) ଶବ୍ଦର ସଂଜ୍ଞା, ଶୁଦ୍ଧ ଶବ୍ଦ ଓ ବର୍ତ୍ତାଶୁଦ୍ଧି
(ଖ) ଚୂଡ଼ିର ଅର୍ଥ ଓ ପ୍ରୟୋଗ ବିଧି

ଦ୍ୱିତୀୟ ଏକକ: ବାକ୍ୟ ଗଠନରୀତି ଓ ପ୍ରକାର ଭେଦ

ତୃତୀୟ ଏକକ: ଅନୁଚ୍ଛେଦ ସଂକ୍ଷେପଣ, ଶୀର୍ଷକ ନିର୍ଦ୍ଧାରଣ ଓ ପ୍ରଶ୍ନୋତ୍ତର

ଚତୁର୍ଥ ଏକକ: ନିର୍ଭୁଲ ଲିଖନ ପଦ୍ଧତି, ପତ୍ର ଲିଖନ, ଫିଚର୍, ପତ୍ର ଲିଖନ, ବିଜ୍ଞାପନ ପ୍ରସ୍ତୁତି

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference) :

୧. ସର୍ବସାର ବ୍ୟାକରଣ - ଶ୍ରୀଧର ଦାସ, ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ ।
୨. ସାରସ୍ୱତ ବ୍ୟାବହାରିକ ବ୍ୟାକରଣ - କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ସତ୍ୟ ନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର ।
୩. ବୃହତ୍ ଓଡ଼ିଆ ବ୍ୟାକରଣ- ତ୍ରିଲୋଚନ ଦେହେରା, ଗୋବିନ୍ଦ ଚନ୍ଦ୍ର ଲେଙ୍କା, ପ୍ରେଣସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।
୪. ଆଧୁନିକ ଓଡ଼ିଆ ବ୍ୟାକରଣ- ଧନେଶ୍ୱର ମହାପାତ୍ର, ଜିତାତ୍ ମହଲ, କଟକ ।
୫. ସାଧାରଣ ଓଡ଼ିଆ ବନାନ ଶୁଦ୍ଧି- ଓଡ଼ିଆ ଭାଷା ପ୍ରତିଷ୍ଠାନ, ଭୁବନେଶ୍ୱର ।
୬. ଗଣମାଧ୍ୟମ ଓ ଗଣଯୋଗାଯୋଗ – ଶିଶିର ଦେହେରା, ପ୍ରେଣସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।
୭. ଯୋଗାଯୋଗ ମୂଳକ ମାତୃଭାଷା – ବିରଞ୍ଚି ନାରାୟଣ ସାମଲ, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ ।
୮. ଯୋଗାଯୋଗର ଭାଷା – ସୁଧୀର ଚନ୍ଦ୍ର ମହାନ୍ତି, ପ୍ରାଚୀ ପ୍ରକାଶନ, କଟକ ।

୯. ନିର୍ଭୁଲ ଲେଖାର ମୂଳସୂତ୍ର, ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, କିତାବ ମହଲ, କଟକ ।
୧୦.ଓଡ଼ିଆ ଭାଷା ବ୍ୟାକରଣ ସୌରଭ, ଚନ୍ଦ୍ରଶେଖର ପତି, ଓଡ଼ିଶା ବୁକ୍ ଏମ୍ପୋରିୟମ୍, କଟକ ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. ଶବ୍ଦ କାହାକୁ କୁହାଯାଏ ? (୧ ମାର୍କ)

୨.ପର୍ବତର ଦୁଇଟି ପ୍ରତିଶବ୍ଦ ଲେଖ । (୨ ମାର୍କ)

୩.ବାକ୍ୟର ପ୍ରକାରଭେଦ ଦର୍ଶାଅ। (୫ ମାର୍କ)

୪.ତୁମ ମହାବିଦ୍ୟାଳୟରେ ଏକ ଶିକ୍ଷକ ନିଯୁକ୍ତିପାଇଁ କୌଣସି ସମ୍ବାଦପତ୍ରରେ ଓଡ଼ିଆ ଭାଷାରେ କିପରି ବିଜ୍ଞାପନ ଦିଆଯିବ, ତାହାର ଏକ ନମୁନା ଲେଖ । (୮ ମାର୍କ)

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SEMESTER-I

AEC

प्रयोजनमूलक हिंदी

UNIT - I

प्रयोजनमूलक हिंदी :

प्रयोजनमूलक हिंदी का स्वरूप और परिभाषा, प्रयोजनमूलक हिंदी के भेद, प्रयोजनमूलक हिंदी की विशेषताएँ, प्रयोजनमूलक हिंदी की समस्याएँ और संभावनाएँ

UNIT - II

राजभाषा हिंदी की संवैधानिक स्थिति:

राजभाषा समिति, 1957, राजभाषा के संबंध में राष्ट्रपति के आदेश, 952, 1955, 1960, राजभाषा अधिनियम 1963, राजभाषा अधिनियम 1967, राजभाषा अधिनियम 1976

UNIT - III

कार्यलयी हिंदी:

हिंदी के विविध रूप : राजभाषा, राष्ट्रभाषा, संपर्क भाषा, संचार भाषा, मातृभाषा, सर्जनात्मक भाषा राष्ट्रभाषा और राजभाषा में अंतर, मानक हिंदी

कार्यालयी हिंदी के प्रमुख प्रकार्य

आलेखन: परिभाषा, स्वरूप, विशेषता, प्रारूप

टिप्पण: परिभाषा, स्वरूप, विशेषता, प्रारूप

पत्रलेखन, पल्लवन, संक्षेपण

पारिभाषिक शब्दावली : पारिभाषिक शब्दावली का स्वरूप एवं महत्त्व पारिभाषिक शब्दावली निर्माण के सिद्धांत, पारिभाषिक शब्दावली के भेद, ज्ञान-विज्ञान के विभिन्न क्षेत्रों में प्रयुक्त कुछ निर्धारित पारिभाषिक शब्दाबली

UNIT – IV

हिंदी में कंप्यूटर का अनुप्रयोग:

कंप्यूटर का परिचय, कंप्यूटर की संरचना, कंप्यूटर के प्रकार, कंप्यूटर की उपयोगिता, हिंदी में शब्द संसाधन, हिंदी में डाटा संसाधन, वेब पब्लिशिंग, वेब पेज डिजाइनर

इंटरनेट :

इंटरनेट स्वरूप और विकास इंटरनेट : कार्यप्राणाली, इंटरनेट के संपर्क उपकरणों का परिचय, इंटरनेट एक्सप्लोटर, इंटरनेट की अनुप्रयुक्तता।

लिंक, ई-मेल, ब्राउजिंग, अपलोडिंग, डाउनलोडिंग, न्यू मीडिया, वेब पत्रकारिता, ब्लागिंग, इंटरनेट रिलै चैट, हिंदी के प्रमुख इंटरनेट पोर्टल।

पाठ्य पुस्तक:

1. प्रयोजनमूलक हिंदी- प्रो. राधाकांत मिश्र,
   डॉ. अमूल्य रत्न महांती,
   प्लैनेट वी, हिंदी बुक सेंटर, बादामबाड़ी, कटक

VAC
Environmental Studies
&
Disaster Management

SEMESTER-I
For Under Graduate Compulsory Courses for Arts, Science and Commerce

FULL MARK-100 (Credit-3)

Unit 1: Multidisciplinary nature of environmental studies (8Period)
Definition, scope and importance
Need for public awareness
Environmental Pollution
Definition
• Cause, effects and control measures of:-
a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Radiation pollution

Unit 2: Natural Resources: (8Period)

Renewable and non-renewable resources:
Natural resources and associated problems.
a. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
b. Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
c. Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
d. Food resources : World food problems, changes caused by agriculture and Overgrazing, effects of modern agriculture, fertilizer-pesticide problems, waterlogging, salinity, case studies.
e. Energy resources : Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

Biodiversity:-
Introduction-Definition; Biogeographically classification of India
India as a mega diversity nation. Hot sports of biodiversity, Threats to biodiversity. Endangered and endemic species of India. Conservation of biodiversity. In Situ and Ex-so conservation of biodiversity

Unit-3: Disaster Management (8 Period)

1. **Disaster Management:** Types of disasters (natural and Man-made) and their causes and effect)
2. **Vulnerability Assessment and Risk analysis:** Vulnerability to various disasters (Flood, Cyclone, Earthquake, Heat waves, Desertification and Lighting)
3. **Institutional Framework:** Institutional arrangements for disaster management (National Disaster Management Authority (NDMA), State Disaster Management Authority (SDMA), Disaster Management Act, 2005, District Disaster Management Authority (DDMA), National Disaster Response Force(NDRF) and Odisha Disaster Rapid Action Force(ODRAF)
4. **Preparedness measures:** Disaster Management cycle, Early Warning System, Pre-Disaster and Post-Disaster Preparedness, strengthening of SDMA and DDMA, Community Preparedness for flood cyclone, heat waves, fire safety, lightening and snake biting. Stakeholders participation, Corporate Social Responsibility (CSR)
5. **Survival Skills:** Survival skills adopted during and after disaster (Flood, Fire, Earthquake, Cyclone and Lightening), Disaster Management Act-2005, Compensation and Insurance

Unit 4: Social Issues and the Environment (6 Period)

A.

a. Environmental Ethics: Issues and possible solutions.
b. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies
c. Environment Protection Act
d. Air(Preservation Control of Pollution) Act
e. Water(Preservation Control of Pollution) Act
f. Wildlife Protection Act
g. Forest Conservation Act
h. Solid waste management Cause, effect and Control Measure of Urban and Industrial waste

(Role of each individual in conservation of Natural resources and prevention of pollution)

B. Human Population and the Environment

Population Ecology: Individuals, species, population, community
Human population growth, population control method
Urbanisation and its effect on society

Unit 5: Field work (15 Periods of 30 hrs)

- Visit to an area to document environmental assets: river/forest/flora/fauna, etc.
- Visit to a local polluted site- Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river, Delhi Ridge ,etc.